

# The biblatex Package

## Programmable Bibliographies and Citations

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# 1 Introduction

This document is a systematic reference manual for the `biblatex` package. Look at the sample documents which come with `biblatex` to get a first impression.<sup>1</sup> For a quick start guide, browse §§ 1.1, 2.1, 2.2, 2.3, 3.1, 3.3, 3.8, 3.9, 3.14.

## 1.1 About `biblatex`

This package provides advanced bibliographic facilities for use with LaTeX. The package is a complete reimplementation of the bibliographic facilities provided by LaTeX. The `biblatex` package works with the “backend” (program) `biber`, which is used to process BibTeX format data files and then performs all sorting, label generation (and a great deal more). Formatting of the bibliography is entirely controlled by TeX macros. Good working knowledge in LaTeX should be sufficient to design new bibliography and citation styles. This package also supports subdivided bibliographies, multiple bibliographies within one document, and separate lists of bibliographic information such as abbreviations of various fields. Bibliographies may be subdivided into parts and/or segmented by topics. Just like the bibliography styles, all citation commands may be freely defined. Features such as full Unicode support for bibliography data, customisable sorting, multiple bibliographies with different sorting, customisable labels and dynamic data modification are available. Please refer to § 1.5.6 for information on `biber`/`biblatex` version compatibility. The package is completely localised and can interface with the `babel` and `polyglossia` packages. Please refer to table 2 for a list of languages currently supported by this package.

## 1.2 License

Copyright © 2006–2012 Philipp Lehman, 2012–2017 Philip Kime, Audrey Boruvka, Joseph Wright, 2018– Philip Kime and Moritz Wemheuer. Permission is granted to copy, distribute and/or modify this software under the terms of the LaTeX Project Public License, version 1.3.<sup>2</sup>

## 1.3 Feedback

Please use the `biblatex` project page on GitHub to report bugs and submit feature requests.<sup>3</sup> Before making a feature request, please ensure that you have thoroughly studied this manual. If you do not want to report a bug or request a feature but are simply in need of assistance, you might want to consider posting your question on the `comp.text.tex` newsgroup or TeX-LaTeX Stack Exchange.<sup>4</sup>

## 1.4 Acknowledgements

The package was originally written by Philipp Lehman and much of his excellent original code remains in the core. Philip Kime took over the package in 2012 with Moritz Wemheuer making regular and valuable contributions from 2017. The main authors would like to acknowledge the valuable help of Audrey Boruvka and Joseph Wright who helped with the transition of ownership in 2012 and following years.

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<sup>1</sup><https://ctan.org/tex-archive/macros/latex/contrib/biblatex/doc/examples>

<sup>2</sup><https://www.latex-project.org/lppl.txt>

<sup>3</sup><https://github.com/plk/biblatex>

<sup>4</sup><https://tex.stackexchange.com/questions/tagged/biblatex>

The language modules of this package are made possible thanks to the following contributors:

Ander Zarketa-Astigarraga (Basque); Augusto Ritter Stoffel, Mateus Araújo, Gustavo Barros (Brazilian); Kaloyan Ganey (Bulgarian); Sebastià Vila-Marta (Catalan); Ivo Pletikosić (Croatian); Michal Hoftich (Czech); Christian Mondrup, Jonas Nyrup (Danish); Johannes Wilm (Danish/Norwegian); Alexander van Loon, Pieter Belmans, Hendrik Maryns (Dutch); Kristian Kankainen, Benson Muite (Estonian); Hannu Väisänen, Janne Kujanpää (Finnish); Denis Bitouzé (French); Apostolos Syropoulos, Prokopis (Greek); Márton Marczell, Bence Ferdinandy (Hungarian); Baldur Kristinsson (Icelandic); Enrico Gregorio, Andrea Marchitelli (Italian); Rihards Skuja (Latvian); Valdemaras Klumbys (Lithuanian); निरंजन (Marathi); Håkon Malmedal, Hans Fredrik Nordhaug (Norwegian); Anastasia Kandulina, Yuriy Chernyshov (Polish); José Carlos Santos (Portuguese); Patrick Danilevici (Romanian); Oleg Domanov (Russian); Andrej Radović (Serbian); Martin Vrábel, Dávid Lupták (Slovak); Tea Tušar, Bogdan Filipič (Slovene); Ignacio Fernández Galván (Spanish); Per Starbäck, Carl-Gustav Werner, Filip Åsblom (Swedish); Abdulkерim Gok (Turkish); Sergiy M. Ponomarenko (Ukrainian).

## 1.5 Prerequisites

This section gives an overview of all resources required by this package and discusses compatibility issues.

### 1.5.1 Requirements

The resources listed in this section are strictly required for `biblatex` to function. The package will not work if they are not available.

- `e-TeX` The `biblatex` package requires e-TeX. TeX distributions have been providing e-TeX binaries for quite some time, the popular distributions use them by default these days. The `biblatex` package checks if it is running under e-TeX. Simply try compiling your documents as you usually do, the chances are that it just works. If you get an error message, try compiling the document with `elatex` instead of `latex` or `pdfelatex` instead of `pdflatex`, respectively.
- `biber` `biber` is the backend of `biblatex` used to transfer data from source files to the LaTeX code. `biber` comes with TeX Live and is also available from SourceForge.<sup>5</sup> `biber` uses the `btparse` C library for BibTeX format file parsing which aimed to be compatible with BibTeX's parsing rules but also aimed at correcting some of the common problems. For details, see the manual page for the Perl `Text::BibTeX` module<sup>6</sup>.
- `etoolbox` This LaTeX package, which is loaded automatically, provides generic programming facilities required by `biblatex`. It is available from CTAN.<sup>7</sup>
- `kvoptions` This LaTeX package, which is also loaded automatically, is used for internal option handling. It is available from CTAN.<sup>8</sup>

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<sup>5</sup><https://biblatex-biber.sourceforge.net/>

<sup>6</sup><https://metacpan.org/release/Text-BibTeX>

<sup>7</sup><https://ctan.org/pkg/etoolbox>

<sup>8</sup><https://ctan.org/pkg/kvoptions>

`logreq` This LaTeX package, which is also loaded automatically, provides a frontend for writing machine-readable messages to an auxiliary log file. It is available from CTAN.<sup>9</sup>

`pdftexcmds` This LaTeX package, which is loaded automatically, implements pdfTeX primitives for LuaTeX, it also offers a unified interface for these primitives across engines. It is available from CTAN.<sup>10</sup>

`biblatex` uses `pdftexcmds` to access the MD5 hash primitives, so version 0.27 (2018/01/30) or above is strongly recommended.

Apart from the above resources, `biblatex` also requires the standard LaTeX packages `keyval` and `ifthen` as well as the `url` package. These package are included in all common TeX distributions and will be loaded automatically.

### 1.5.2 Recommended Packages

The packages listed in this section are not strictly required for `biblatex` to function, but they provide recommended additional functions or enhance existing features.

`babel/polyglossia` The `babel` and `polyglossia` packages provides the core architecture for multi-lingual typesetting. If you are writing in a language other than American English, using one of these packages is strongly recommended. You should load `babel` or `polyglossia` before `biblatex` and then `biblatex` will detect `babel` or `polyglossia` automatically. (While `babel` may be loaded after `biblatex` if so desired, `polyglossia` must always be loaded before `biblatex`.)

`biblatex` has only limited support for `polyglossia` versions prior to v1.45 (2019/10/27). Additional useful features for `biblatex` were added in version 1.49. If `polyglossia` is used, it should be updated to version 1.49 (2020/04/08) or above. The minimum supported `babel` version is v3.9r (2016/04/23).

`csquotes` If this package is available, `biblatex` will use its language sensitive quotation facilities to enclose certain titles in quotation marks. If not, `biblatex` uses quotes suitable for American English as a fallback. When writing in a language other than American English, loading `csquotes` is strongly recommended.<sup>11</sup>

### 1.5.3 Additional Useful Packages

The packages listed in this section are not required for `biblatex` to function, but provide additional specialist functions or enhance existing features. These packages generally only need to be loaded if their functionality is explicitly desired. The package loading order usually does not matter.

`xpatch` The `xpatch` package extends the patching commands of `etoolbox` to `biblatex` bibliography macros, drivers and formatting directives.<sup>12</sup> Its commands are useful to apply surgical-precision changes to bibliography macros, drivers or formatting directives without having to restate the whole definition to change it. The `biblatex` core does not need or use these patching commands and styles that make use of them should load the package themselves.

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<sup>9</sup><https://ctan.org/pkg/logreq/>

<sup>10</sup><https://ctan.org/pkg/pdftexcmds/>

<sup>11</sup><https://ctan.org/pkg/csquotes/>

<sup>12</sup><https://ctan.org/pkg/xpatch/>

### 1.5.4 Compatible Classes and Packages

The `biblatex` package provides dedicated compatibility code for the classes and packages listed in this section.

**hyperref** The `hyperref` package transforms citations into hyperlinks. See the `hyperref` and `backref` package options in § 3.1.2.1 for further details. When using the `hyperref` package, it is preferable to load it after `biblatex`.

**showkeys** The `showkeys` package prints the internal keys of, among other things, citations in the text and items in the bibliography. The package loading order does not matter.

**memoir** When using the `memoir` class, the default bibliography headings are adapted such that they blend well with the default layout of this class. See § 3.15.2 for further usage hints.

**KOMA-Script** When using any of the `scrartcl`, `scrbook`, or `scrreprt` classes, the default bibliography headings are adapted such that they blend with the default layout of these classes. See § 3.15.1 for further usage hints.

If available `biblatex` makes use of some of the more recent of KOMA-Script's *do-hooks*. The relevant hooks are present from version 3.27 (2019/10/12) onwards, which is therefore the minimum version recommendation.

### 1.5.5 Incompatible Packages

The packages listed in this section are not compatible with `biblatex`. Since it reimplements the bibliographic facilities of LaTeX from the ground up, `biblatex` naturally conflicts with all packages modifying the same facilities. This is not specific to `biblatex`. Some of the packages listed below are also incompatible with each other for the same reason.

**babelbib** The `babelbib` package provides support for multilingual bibliographies. This is a standard feature of `biblatex`. Use the `langid` field and the package option `autolang` for similar functionality. Note that `biblatex` automatically adjusts to the main document language if `babel` or `polyglossia` is loaded. You only need the above mentioned features if you want to switch languages on a per-entry basis within the bibliography. See §§ 2.2.3 and 3.1.2.1 for details. Also see § 3.10.

**backref** The `backref` package creates back references in the bibliography. See the package options `hyperref` and `backref` in § 3.1.2.1 for comparable functionality.

**bibtopic** The `bibtopic` package provides support for bibliographies subdivided by topic, type, or other criteria. For bibliographies subdivided by topic, see the category feature in § 3.8.6 and the corresponding filters in § 3.8.2. Alternatively, you may use the `keywords` field in conjunction with the `keyword` and `notkeyword` filters for comparable functionality, see §§ 2.2.3 and 3.8.2 for details. For bibliographies subdivided by type, use the `type` and `nottype` filters. Also see § 3.14.4 for examples.

**bibunits** The `bibunits` package provides support for multiple partial (e. g., per chapter) bibliographies. See `chapterbib`.

**chapterbib** The `chapterbib` package provides support for multiple partial bibliographies. Use the `refsection` environment and the `section` filter for comparable functionality. Alternatively, you might also want to use the `refsegment` environment and the `segment` filter. See §§ 3.8.4, 3.8.5, 3.8.2 for details. Also see § 3.14.3 for examples.

- cite** The `cite` package automatically sorts numeric citations and can compress a list of consecutive numbers to a range. It also makes the punctuation used in citations configurable. For sorted and compressed numeric citations, see the `sortcites` package option in § 3.1.2.1 and the `numeric-comp` citation style in § 3.3.1. For configurable punctuation, see § 3.12.
- citeref** Another package for creating back references in the bibliography. See `backref`.
- inlinebib** The `inlinebib` package is designed for traditional citations given in footnotes. For comparable functionality, see the verbose citation styles in § 3.3.1.
- jurabib** Originally designed for citations in law studies and (mostly German) judicial documents, the `jurabib` package also provides features aimed at users in the humanities. In terms of the features provided, there are some similarities between `jurabib` and `biblatex` but the approaches taken by both packages are quite different. Since both `jurabib` and `biblatex` are full-featured packages, the list of similarities and differences is too long to be discussed here.
- mcite** The `mcite` package provides support for grouped citations, i. e., multiple items can be cited as a single reference and listed as a single block in the bibliography. The citation groups are defined as the items are cited. This only works with unsorted bibliographies. The `biblatex` package also supports grouped citations, which are called ‘entry sets’ or ‘reference sets’ in this manual. See §§ 3.14.5, 3.8.11, 3.9.10 for details.
- mciteplus** A significantly enhanced reimplement of the `mcite` package which supports grouping in sorted bibliographies. See `mcite`.
- multibib** The `multibib` package provides support for bibliographies subdivided by topic or other criteria. See `bibtopic`.
- natbib** The `natbib` package supports numeric and author-year citation schemes, incorporating sorting and compression code found in the `cite` package. It also provides additional citation commands and several configuration options. See the `numeric` and `author-year` citation styles and their variants in § 3.3.1, the `sortcites` package option in § 3.1.2.1, the citation commands in § 3.9, and the facilities discussed in §§ 3.8.7, 3.8.8, 3.12 for comparable functionality. Also see § 3.9.9.
- splitbib** The `splitbib` package provides support for bibliographies subdivided by topic. See `bibtopic`.
- titlesec** The `titlesec` package redefines user-level document division commands such as `\chapter` or `\section`. This approach is not compatible with internal command changes applied by the `biblatex` `refsection`, `refsegment` and `citereset` option settings described in § 3.1.2.1.
- ucs** The `ucs` package provides support for UTF-8 encoded input, but it does so in a way incompatible with `biblatex`.  
  
If you get an error about `ucs` being loaded, but you don’t load it explicitly in your preamble, check that you don’t load `inputenc`’s `utf8x` module: `\usepackage[utf8x]{inputenc}` will also load `ucs`.  
  
Instead of `ucs/utf8x` use a Unicode engine such as XeTeX or LuaTeX if you want full Unicode support. If you use pdfTeX or TeX, the Unicode characters predefined by the LaTeX format are usually enough for many use cases (this is true for LaTeX



from April 2018 or later, in older versions load `inputenc` with the `utf8` module) and missing characters can be defined using `\DeclareUnicodeCharacter` or `newunicodechar`'s `\newunicodechar`.

**etextools** The `etextools` package provides enhancements to list macros defined by `etoolbox` and a few other tools for command definitions. The package redefines list handling macros in a way incompatible with `biblatex`.

If you must load the `etextools` package at all costs, define the control sequence `\blx@noerroretextools` before you load `biblatex`. If `\blx@noerroretextools` is defined, no error will be issued if `etextools` is loaded, the message is degraded to a warning instead. In that case you need to make sure that all redefined macros used by `biblatex` (currently only `\forlistloop`) have their original `etoolbox` definitions when `biblatex` is loaded.

### 1.5.6 Compatibility Matrix for `biber`

`biber` versions are closely coupled with `biblatex` versions. You need to have the right combination of the two. `biber` will throw a fatal error during processing if it encounters information which comes from a `biblatex` version which is incompatible. Table 1 shows a compatibility matrix for the recent versions.

## 2 Database Guide

This section describes the default data model defined in the `blx-dm.def` file which is part of `biblatex`. The data model is defined using the macros documented in § 4.5.4. It is possible to redefine the data model which both `biblatex` and `biber` use so that datasources can contain new entrytypes and fields (which of course will need style support). The data model specification also allows for constraints to be defined so that data sources can be validated against the data model (using `biber`'s `--validate-datamodel` option). Users who want to customise the data model need to look at the `blx-dm.def` file and to read § 4.5.4.

All entry types and field names are given in all-lowercase form here. This is how the entry types and field names are given in the data model. While the `biber`/`BibTeX` input side is case insensitive, the `LaTeX` side is case sensitive and uses the exact capitalisation from the data model. This means that the input in the `bib` file may use any capitalisation of entry types and field names, but when the fields are used in the `LaTeX` document—for example in `\citefield`—the capitalisation must match the capitalisation in the data model, for standard types and fields that would be all lowercase.

### 2.1 Entry Types

This section gives an overview of the entry types supported by the default `biblatex` data model along with the fields supported by each type.

#### 2.1.1 Regular Types

The lists below indicate the fields supported by each entry type. Note that the mapping of fields to an entry type is ultimately at the discretion of the bibliography style. The lists below therefore serve two purposes. They indicate the fields supported by the standard styles which come with this package and they also serve as a model for custom styles. Note that the 'required' fields are not strictly required in all cases,

**Table 1: `biber`/`biblatex` compatibility matrix**

<b>Biber version</b>	<b><code>biblatex</code> version</b>
2.15	3.15
2.14	3.14
2.13	3.13
2.12	3.12
2.11	3.11
2.10	3.10
2.9	3.9
2.8	3.8
2.7	3.7
2.6	3.5, 3.6
2.5	3.4
2.4	3.3
2.3	3.2
2.2	3.1
2.1	3.0
2.0	3.0
1.9	2.9
1.8	2.8
1.7	2.7
1.6	2.6
1.5	2.5
1.4	2.4
1.3	2.3
1.2	2.1, 2.2
1.1	2.1
1.0	2.0
0.9.9	1.7x
0.9.8	1.7x
0.9.7	1.7x
0.9.6	1.7x
0.9.5	1.6x
0.9.4	1.5x
0.9.3	1.5x
0.9.2	1.4x
0.9.1	1.4x
0.9	1.4x



see § 2.3.2 for details. The fields marked as ‘optional’ are optional in a technical sense. Bibliographical formatting rules usually require more than just the ‘required’ fields. The default data model defined a few constraints for the format of date fields, ISBNs and some special fields like `gender` but the constraints are only used if validating against the data model with `biber’s --validate-datamodel` option. Generic fields like `abstract` and `annotation` or `label` and `shorthand` are not included in the lists below because they are independent of the entry type. The special fields discussed in § 2.2.3, which are also independent of the entry type, are not included in the lists either. See the default data model specification in the file `blx-dm.def` which comes with `biblatex` for a complete specification.

The ‘alias’ relation referred to in this subsection is the ‘soft alias’ defined with `\DeclareBibliographyAlias`. That means that the alias will use the same bibliography driver as the type it is aliased to, but that its type-specific formatting is still handled independently of the aliased type.

**article** An article in a journal, magazine, newspaper, or other periodical which forms a self-contained unit with its own title. The title of the periodical is given in the `journaltitle` field. If the issue has its own title in addition to the main title of the periodical, it goes in the `issuetitle` field. Note that `editor` and related fields refer to the journal while `translator` and related fields refer to the article.

Required fields: `author`, `title`, `journaltitle`, `year/date`

Optional fields: `translator`, `annotator`, `commentator`, `subtitle`, `titleaddon`, `editor`, `editora`, `editorb`, `editorc`, `journalsubtitle`, `journaltitleaddon`, `issuetitle`, `issuesubtitle`, `issuetitleaddon`, `language`, `origlanguage`, `series`, `volume`, `number`, `eid`, `issue`, `month`, `pages`, `version`, `note`, `issn`, `addendum`, `pubstate`, `doi`, `eprint`, `eprintclass`, `eprinttype`, `url`, `urldate`

**book** A single-volume book with one or more authors where the authors share credit for the work as a whole. This entry type also covers the function of the `@inbook` type of traditional BibTeX, see § 2.3.1 for details.

Required fields: `author`, `title`, `year/date`

Optional fields: `editor`, `editora`, `editorb`, `editorc`, `translator`, `annotator`, `commentator`, `introduction`, `foreword`, `afterword`, `subtitle`, `titleaddon`, `maintitle`, `mainsubtitle`, `maintitleaddon`, `language`, `origlanguage`, `volume`, `part`, `edition`, `volumes`, `series`, `number`, `note`, `publisher`, `location`, `isbn`, `eid`, `chapter`, `pages`, `pagetotal`, `addendum`, `pubstate`, `doi`, `eprint`, `eprintclass`, `eprinttype`, `url`, `urldate`

**mvbook** A multi-volume `@book`. For backwards compatibility, multi-volume books are also supported by the entry type `@book`. However, it is advisable to make use of the dedicated entry type `@mvbook`.

Required fields: `author`, `title`, `year/date`

Optional fields: `editor`, `editora`, `editorb`, `editorc`, `translator`, `annotator`, `commentator`, `introduction`, `foreword`, `afterword`, `subtitle`, `titleaddon`, `language`, `origlanguage`, `edition`, `volumes`, `series`, `number`, `note`, `publisher`, `location`, `isbn`, `pagetotal`, `addendum`, `pubstate`, `doi`, `eprint`, `eprintclass`, `eprinttype`, `url`, `urldate`

**inbook** A part of a book which forms a self-contained unit with its own title. Note that the profile of this entry type is different from standard BibTeX, see § 2.3.1.

Required fields: author, title, booktitle, year/date

Optional fields: bookauthor, editor, editora, editorb, editorc, translator, annotator, commentator, introduction, foreword, afterword, subtitle, titleaddon, maintitle, mainsubtitle, maintitleaddon, booksubtitle, booktitleaddon, language, origlanguage, volume, part, edition, volumes, series, number, note, publisher, location, isbn, eid, chapter, pages, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**bookinbook** This type is similar to @inbook but intended for works originally published as a stand-alone book. A typical example are books reprinted in the collected works of an author.

**suppbook** Supplemental material in a @book. This type is closely related to the @inbook entry type. While @inbook is primarily intended for a part of a book with its own title (e. g., a single essay in a collection of essays by the same author), this type is provided for elements such as prefaces, introductions, forewords, afterwords, etc. which often have a generic title only. Style guides may require such items to be formatted differently from other @inbook items. The standard styles will treat this entry type as an alias for @inbook.

**booklet** A book-like work without a formal publisher or sponsoring institution. Use the field howpublished to supply publishing information in free format, if applicable. The field type may be useful as well.

Required fields: author/editor, title, year/date

Optional fields: subtitle, titleaddon, language, howpublished, type, note, location, eid, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**collection** A single-volume collection with multiple, self-contained contributions by distinct authors which have their own title. The work as a whole has no overall author but it will usually have an editor.

Required fields: editor, title, year/date

Optional fields: editora, editorb, editorc, translator, annotator, commentator, introduction, foreword, afterword, subtitle, titleaddon, maintitle, mainsubtitle, maintitleaddon, language, origlanguage, volume, part, edition, volumes, series, number, note, publisher, location, isbn, eid, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**mvcollection** A multi-volume @collection. For backwards compatibility, multi-volume collections are also supported by the entry type @collection. However, it is advisable to make use of the dedicated entry type @mvcollection.

Required fields: editor, title, year/date

Optional fields: editora, editorb, editorc, translator, annotator, commentator, introduction, foreword, afterword, subtitle, titleaddon, language, origlanguage, edition, volumes, series, number, note, publisher, location, isbn, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**incollection** A contribution to a collection which forms a self-contained unit with a distinct author and title. The author refers to the title, the editor to the booktitle, i.e., the title of the collection.

Required fields: author, title, editor, booktitle, year/date

Optional fields: editor, editora, editorb, editorc, translator, annotator, commentator, introduction, foreword, afterword, subtitle, titleaddon, maintitle, mainsubtitle, maintitleaddon, booksubtitle, booktitleaddon, language, origlanguage, volume, part, edition, volumes, series, number, note, publisher, location, isbn, eid, chapter, pages, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**suppcollection** Supplemental material in a @collection. This type is similar to @suppbook but related to the @collection entry type. The standard styles will treat this entry type as an alias for @incollection.

**dataset** A data set or a similar collection of (mostly) raw data.

Required fields: author/editor, title, year/date

Optional fields: subtitle, titleaddon, language, edition, type, series, number, version, note, organization, publisher, location, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**manual** Technical or other documentation, not necessarily in printed form. The author or editor is omissible in terms of § 2.3.2.

Required fields: author/editor, title, year/date

Optional fields: subtitle, titleaddon, language, edition, type, series, number, version, note, organization, publisher, location, isbn, eid, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**misc** A fallback type for entries which do not fit into any other category. Use the field howpublished to supply publishing information in free format, if applicable. The field type may be useful as well. author, editor, and year are omissible in terms of § 2.3.2.

Required fields: author/editor, title, year/date

Optional fields: subtitle, titleaddon, language, howpublished, type, version, note, organization, location, month, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**online** An online resource. author, editor, and year are omissible in terms of § 2.3.2. This entry type is intended for sources such as web sites which are intrinsically online resources. Note that all entry types support the url field. For example, when

adding an article from an online journal, it may be preferable to use the `@article` type and its `url` field.

Required fields: `author/editor`, `title`, `year/date`, `doi/eprint/url`

Optional fields: `subtitle`, `titleaddon`, `language`, `version`, `note`, `organization`, `month`, `addendum`, `pubstate`, `eprintclass`, `eprinttype`, `urldate`

**patent** A patent or patent request. The number or record token is given in the `number` field. Use the `type` field to specify the type and the `location` field to indicate the scope of the patent, if different from the scope implied by the `type`. Note that the `location` field is treated as a key list with this entry type, see § 2.2.1 for details.

Required fields: `author`, `title`, `number`, `year/date`

Optional fields: `holder`, `subtitle`, `titleaddon`, `type`, `version`, `location`, `note`, `month`, `addendum`, `pubstate`, `doi`, `eprint`, `eprintclass`, `eprinttype`, `url`, `urldate`

**periodical** An complete issue of a periodical, such as a special issue of a journal. The title of the periodical is given in the `title` field. If the issue has its own title in addition to the main title of the periodical, it goes in the `issuetitle` field. The editor is omissible in terms of § 2.3.2.

Required fields: `editor`, `title`, `year/date`

Optional fields: `editora`, `editorb`, `editorc`, `subtitle`, `titleaddon`, `issuetitle`, `issuesubtitle`, `issuetitleaddon`, `language`, `series`, `volume`, `number`, `issue`, `month`, `note`, `issn`, `addendum`, `pubstate`, `doi`, `eprint`, `eprintclass`, `eprinttype`, `url`, `urldate`

**supperiodical** Supplemental material in a `@periodical`. This type is similar to `@suppbook` but related to the `@periodical` entry type. The role of this entry type may be more obvious if you bear in mind that the `@article` type could also be called `@inperiodical`. This type may be useful when referring to items such as regular columns, obituaries, letters to the editor, etc. which only have a generic title. Style guides may require such items to be formatted differently from articles in the strict sense of the word. The standard styles will treat this entry type as an alias for `@article`.

**proceedings** A single-volume conference proceedings. This type is very similar to `@collection`. It supports an optional `organization` field which holds the sponsoring institution. The editor is omissible in terms of § 2.3.2.

Required fields: `title`, `year/date`

Optional fields: `editor`, `subtitle`, `titleaddon`, `maintitle`, `mainsubtitle`, `maintitleaddon`, `eventtitle`, `eventtitleaddon`, `eventdate`, `venue`, `language`, `volume`, `part`, `volumes`, `series`, `number`, `note`, `organization`, `publisher`, `location`, `month`, `isbn`, `eid`, `chapter`, `pages`, `pagetotal`, `addendum`, `pubstate`, `doi`, `eprint`, `eprintclass`, `eprinttype`, `url`, `urldate`

**mvproceedings** A multi-volume `@proceedings` entry. For backwards compatibility, multi-volume proceedings are also supported by the entry type `@proceedings`. However, it is advisable to make use of the dedicated entry type `@mvproceedings`

Required fields: title, year/date

Optional fields: editor, subtitle, titleaddon, eventtitle, eventtitleaddon, eventdate, venue, language, volumes, series, number, note, organization, publisher, location, month, isbn, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**inproceedings** An article in a conference proceedings. This type is similar to `@incollection`. It supports an optional organization field.

Required fields: author, title, booktitle, year/date

Optional fields: editor, subtitle, titleaddon, maintitle, mainsubtitle, maintitleaddon, booksubtitle, booktitleaddon, eventtitle, eventtitleaddon, eventdate, venue, language, volume, part, volumes, series, number, note, organization, publisher, location, month, isbn, eid, chapter, pages, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**reference** A single-volume work of reference such as an encyclopedia or a dictionary. This is a more specific variant of the generic `@collection` entry type. The standard styles will treat this entry type as an alias for `@collection`.

**mvreference** A multi-volume `@reference` entry. The standard styles will treat this entry type as an alias for `@mvcollection`. For backwards compatibility, multi-volume references are also supported by the entry type `@reference`. However, it is advisable to make use of the dedicated entry type `@mvreference`.

**inreference** An article in a work of reference. This is a more specific variant of the generic `@incollection` entry type. The standard styles will treat this entry type as an alias for `@incollection`.

**report** A technical report, research report, or white paper published by a university or some other institution. Use the `type` field to specify the type of report. The sponsoring institution goes in the `institution` field.

Required fields: author, title, type, institution, year/date

Optional fields: subtitle, titleaddon, language, number, version, note, location, month, isrn, eid, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**set** An entry set. This entry type is special, see § 3.14.5 for details.

**software** Computer software. The standard styles will treat this entry type as an alias for `@misc`.

**thesis** A thesis written for an educational institution to satisfy the requirements for a degree. Use the `type` field to specify the type of thesis.

Required fields: author, title, type, institution, year/date

Optional fields: subtitle, titleaddon, language, note, location, month, isbn, eid, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**unpublished** A work with an author and a title which has not been formally published, such as a manuscript or the script of a talk. Use the fields `howpublished` and `note` to supply additional information in free format, if applicable.

Required fields: `author`, `title`, `year/date`

Optional fields: `subtitle`, `titleaddon`, `type`, `eventtitle`, `eventtitleaddon`, `eventdate`, `venue`, `language`, `howpublished`, `note`, `location`, `isbn`, `month`, `addendum`, `pubstate`, `doi`, `eprint`, `eprintclass`, `eprinttype`, `url`, `urldate`

**xdata** This entry type is special. `@xdata` entries hold data which may be inherited by other entries using the `xdata` field. Entries of this type only serve as data containers; they may not be cited or added to the bibliography. See § 3.14.6 for details.

**custom[a–f]** Custom types for special bibliography styles. The standard styles defined no bibliography drivers for these types and will fall back to using the driver for `@misc`.

### 2.1.2 Type Aliases

The entry types listed in this section are provided for backwards compatibility with traditional BibTeX styles. These aliases are resolved by the backend as the data is processed. `biblatex` and the styles will see only the entry type the alias points to (the target), not the alias name (the source). In particular `biblatex`-side per-type operations like type-specific formatting and filtering only work for the target type, not the source type. This ‘hard alias’ is unlike the ‘soft alias’ relation in the previous subsection. The relevant mappings for the `bibtex` driver can be found in § A.1.

**conference** A legacy alias for `@inproceedings`.

**electronic** An alias for `@online`.

**mastersthesis** Similar to `@thesis` except that the `type` field is optional and defaults to the localised term ‘Master’s thesis’. You may still use the `type` field to override that.

**phdthesis** Similar to `@thesis` except that the `type` field is optional and defaults to the localised term ‘PhD thesis’. You may still use the `type` field to override that.

**techreport** Similar to `@report` except that the `type` field is optional and defaults to the localised term ‘technical report’. You may still use the `type` field to override that.

**www** An alias for `@online`, provided for `jurabib` compatibility.

### 2.1.3 Non-standard Types

The types in this section are similar to the custom types `@custom[a–f]`, i.e., the standard bibliography styles provide no bibliography drivers for these types. In the standard styles they will use the bibliography driver for `@misc` entries—exceptions to this rule are noted in the descriptions below. The types are known to the default data model and will be happily accepted by `biber`.

**artwork** Works of the visual arts such as paintings, sculpture, and installations.

**audio** Audio recordings, typically on audio CD, DVD, audio cassette, or similar media. See also `@music`.

<code>bibnote</code>	This special entry type is not meant to be used in the <code>bib</code> file like other types. It is provided for third-party packages like <code>notes2bib</code> which merge notes into the bibliography. The notes should go into the <code>note</code> field. Be advised that the <code>@bibnote</code> type is not related to the <code>\defbibnote</code> command in any way. <code>\defbibnote</code> is for adding comments at the beginning or the end of the bibliography, whereas the <code>@bibnote</code> type is meant for packages which render endnotes as bibliography entries.
<code>commentary</code>	Commentaries which have a status different from regular books, such as legal commentaries.
<code>image</code>	Images, pictures, photographs, and similar media.
<code>jurisdiction</code>	Court decisions, court recordings, and similar things.
<code>legislation</code>	Laws, bills, legislative proposals, and similar things.
<code>legal</code>	Legal documents such as treaties.
<code>letter</code>	Personal correspondence such as letters, emails, memoranda, etc.
<code>movie</code>	Motion pictures. See also <code>@video</code> .
<code>music</code>	Musical recordings. This is a more specific variant of <code>@audio</code> .
<code>performance</code>	Musical and theatrical performances as well as other works of the performing arts. This type refers to the event as opposed to a recording, a score, or a printed play.
<code>review</code>	Reviews of some other work. This is a more specific variant of the <code>@article</code> type. The standard styles will treat this entry type as an alias for <code>@article</code> .
<code>standard</code>	National and international standards issued by a standards body such as the International Organization for Standardization.
<code>video</code>	Audiovisual recordings, typically on DVD, VHS cassette, or similar media. See also <code>@movie</code> .

## 2.2 Entry Fields

This section gives an overview of the fields supported by the `biblatex` default data model. See § 2.2.1 for an introduction to the data types used by the data model specification and §§ 2.2.2 and 2.2.3 for the actual field listings.

### 2.2.1 Data Types

In datasources such as a `bib` file, all bibliographic data is specified in fields. Some of those fields, for example `author` and `editor`, may contain a list of items. This list structure is implemented by the BibTeX file format via the keyword ‘and’, which is used to separate the individual items in the list. The `biblatex` package implements three distinct data types to handle bibliographic data: name lists, literal lists, and fields. There are also several list and field subtypes and a content type which can be used to semantically distinguish fields which are otherwise not distinguishable on the basis of only their datatype (see § 4.5.4). This section gives an overview of the data types supported by this package. See §§ 2.2.2 and 2.2.3 for information about the mapping of the BibTeX file format fields to `biblatex`’s data types.



**Name lists** are parsed and split up into the individual items at the `and` delimiter. Each item in the list is then dissected into the name part components: by default the given name, the name prefix (von, van, of, da, de, della, ...), the family name, and the name suffix (junior, senior, ...). The valid name parts can be customised by changing the `datamodel` definition described in § 4.2.3. Name lists may be truncated in the `bib` file with the keyword `'and others'`. Typical examples of name lists are `author` and `editor`.

Name list fields automatically have an `\ifuse*` test created as per the name lists in the default data model (see § 4.6.2). They are also automatically have a `ifuse*` option created which controls labelling and sorting behaviour with the name (see § 3.1.3.1). `biber` supports a customisable set of name parts but currently this is defined to be the same set of parts as supported by traditional BibTeX:

- Family name (also known as ‘last’ part)
- Given name (also known as ‘first’ part)
- Name prefix (also known as ‘von’ part)
- Name suffix (also known as ‘Jr’ part)

The supported list of name parts is defined as a constant list in the default data model using the `\DeclareDatamodelConstant` command (see 4.5.4). However, it is not enough to simply add to this list in order to add support for another name part as name parts typically have to be hard coded into bibliography drivers and the backend processing. See the example file `93-nameparts.tex` for details on how to define and use custom name parts. Also see `\DeclareUniquenameTemplate` in § 4.11.4 for information on how to customise name disambiguation using custom name parts.

**Literal lists** are parsed and split up into the individual items at the `and` delimiter but not dissected further. Literal lists may be truncated in the `bib` file with the keyword `'and others'`. There are two subtypes:

**Literal lists** in the strict sense are handled as described above. The individual items are simply printed as is. Typical examples of such literal lists are `publisher` and `location`.

**Key lists** are a variant of literal lists which may hold printable data or localisation keys. For each item in the list, styles should perform a test to determine whether it is a known localisation key (the localisation keys defined by default are listed in § 4.9.2). If so, the localised string should be printed. If not, the item should be printed as is. The standard styles are set up to exhibit this behaviour for all key lists listed below. New key lists do not automatically perform this test, it has to be implemented explicitly via the list format. A typical example of a key list is `language`.

**Fields** are usually printed as a whole. There are several subtypes:

**Literal fields** are printed as is. Typical examples of literal fields are `title` and `note`.

**Range fields** consist of one or more ranges where all dashes are normalized and replaced by the command `\bibrangedash`. A range is something optionally followed by one or more dashes optionally followed by some non-dash (e.g. 5--7). Any number of consecutive dashes will only yield

a single range dash. A typical example of a range field is the `pages` field. See also the `\bibrangessep` command which can be used to customise the separator between multiple ranges. Range fields will be skipped and will generate a warning if they do not consist of one or more ranges. You can normalise messy range fields before they are parsed using `\DeclareSourcemap` (see § 4.5.3).

**Integer fields** hold integers which may be converted to ordinals or strings as they are printed. A typical example is the `extradate` or `volume` field. Such fields are sorted as integers. `biber` makes a (quite serious) effort to map non-arabic representations (roman numerals for example) to integers for sorting purposes. See the `noroman` option which can be used to suppress roman numeral parsing. This can help in cases where there is an ambiguity between parsing as roman numerals or alphanumeric (e.g. ‘C’), see § 3.1.2.3.

**Datepart fields** hold unformatted integers which may be converted to ordinals or strings as they are printed. A typical example is the `month` field. For every field of datatype `date` in the `datamodel`, `datepart` fields are automatically created with the following names: `<datatype>year`, `<datatype>endyear`, `<datatype>month`, `<datatype>endmonth`, `<datatype>day`, `<datatype>endday`, `<datatype>hour`, `<datatype>endhour`, `<datatype>minute`, `<datatype>endminute`, `<datatype>second`, `<datatype>endsecond`, `<datatype>timezone`, `<datatype>endtimezone`. `<datatype>` is the string preceding ‘date’ for any `datamodel` field of `datatype=date`. For example, in the default `datamodel`, ‘event’, ‘orig’, ‘url’ and the empty string ‘’ for the date field `date`.

**Date fields** hold a date specification in `yyyy-mm-ddThh:nn[+-][hh[:nn]Z]` format or a date range in `yyyy-mm-ddThh:nn[+-][hh[:nn]Z]/yyyy-mm-ddThh:nn[+-][hh[:nn]Z]` format and other formats permitted by ISO8601-2 Clause 4, level 1, see § 2.3.8. Date fields are special in that the date is parsed and split up into its `datepart` type components. The `datepart` components (see above) are automatically defined and recognised when a field of `datatype=date` is defined in the `datamodel`. A typical example is the `date` field.

**Verbatim fields** are processed in verbatim mode and may contain special characters. Typical examples of verbatim fields are `file` and `doi`.

**URI fields** are processed in verbatim mode and may contain special characters. They are also URL-escaped if they don’t look like they already are. The typical example of a `uri` field is `url`.

**Separated value fields** A separated list of literal values. Examples are the `keywords` and `options` fields. The separator can be configured to be any Perl regular expression via the `xsvsep` option which defaults to the usual BibTeX comma surrounded by optional whitespace.

**Pattern fields** A literal field which must match a particular pattern. An example is the `gender` field from § 2.2.3.

**Key fields** May hold printable data or localisation keys. Styles should perform a test to determine whether the value of the field is a known localisation

key (the localisation keys defined by default are listed in § 4.9.2). If so, the localised string should be printed. If not, the value should be printed as is. The standard styles are set up to handle all key fields listed below in that way. New key fields do not automatically perform the test, it has to be enabled explicitly in the field format. A typical example is the `type` field.

**Code fields** Holds TeX code.

### 2.2.2 Data Fields

The fields listed in this section are the regular ones holding printable data in the default data model. The name on the left is the default data model name of the field as used by `biblatex` and its backend. The `biblatex` data type is given to the right of the name. See § 2.2.1 for explanation of the various data types.

Some fields are marked as ‘label’ fields which means that they are often used as abbreviation labels when printing bibliography lists in the sense of section § 3.8.3. `biblatex` automatically creates supporting macros for such fields. See § 3.8.3.

**abstract** field (literal)

This field is intended for recording abstracts in a `bib` file, to be printed by a special bibliography style. It is not used by all standard bibliography styles.

**addendum** field (literal)

Miscellaneous bibliographic data to be printed at the end of the entry. This is similar to the `note` field except that it is printed at the end of the bibliography entry.

**afterword** list (name)

The author(s) of an afterword to the work. If the author of the afterword is identical to the `editor` and/or `translator`, the standard styles will automatically concatenate these fields in the bibliography. See also `introduction` and `foreword`.

**annotation** field (literal)

This field may be useful when implementing a style for annotated bibliographies. It is not used by all standard bibliography styles. Note that this field is completely unrelated to `annotator`. The `annotator` is the author of annotations which are part of the work cited.

**annotator** list (name)

The author(s) of annotations to the work. If the annotator is identical to the `editor` and/or `translator`, the standard styles will automatically concatenate these fields in the bibliography. See also `commentator`.

**author** list (name)

The author(s) of the `title`.

**authortype** field (key)

The type of author. This field will affect the string (if any) used to introduce the author. Not used by the standard bibliography styles.

<code>bookauthor</code>	list (name)	The author(s) of the <code>booktitle</code> .
<code>bookpagination</code>	field (key)	If the work is published as part of another one, this is the pagination scheme of the enclosing work, i. e., <code>bookpagination</code> relates to pagination like <code>booktitle</code> to <code>title</code> . The value of this field will affect the formatting of the <code>pages</code> and <code>pagetotal</code> fields. The key should be given in the singular form. Possible keys are <code>page</code> , <code>column</code> , <code>line</code> , <code>verse</code> , <code>section</code> , and <code>paragraph</code> . See also pagination as well as § 2.3.12.
<code>booksubtitle</code>	field (literal)	The subtitle related to the <code>booktitle</code> . If the <code>subtitle</code> field refers to a work which is part of a larger publication, a possible subtitle of the main work is given in this field. See also <code>subtitle</code> .
<code>booktitle</code>	field (literal)	If the <code>title</code> field indicates the title of a work which is part of a larger publication, the title of the main work is given in this field. See also <code>title</code> .
<code>booktitleaddon</code>	field (literal)	An annex to the <code>booktitle</code> , to be printed in a different font.
<code>chapter</code>	field (literal)	A chapter or section or any other unit of a work.
<code>commentator</code>	list (name)	The author(s) of a commentary to the work. Note that this field is intended for commented editions which have a commentator in addition to the author. If the work is a stand-alone commentary, the commentator should be given in the <code>author</code> field. If the commentator is identical to the <code>editor</code> and/or <code>translator</code> , the standard styles will automatically concatenate these fields in the bibliography. See also <code>annotator</code> .
<code>date</code>	field (date)	The publication date. See also <code>month</code> and <code>year</code> as well as §§ 2.3.8 and 2.3.9.
<code>doi</code>	field (verbatim)	The Digital Object Identifier of the work.
<code>edition</code>	field (integer or literal)	The edition of a printed publication. This must be an integer, not an ordinal. Don't say <code>edition={First}</code> or <code>edition={1st}</code> but <code>edition={1}</code> . The bibliography style converts this to a language dependent ordinal. It is also possible to give the edition as a literal string, for example "Third, revised and expanded edition".

**editor** list (name)

The editor(s) of the `title`, `booktitle`, or `maintitle`, depending on the entry type. Use the `editortype` field to specify the role if it is different from ‘editor’. See § 2.3.6 for further hints.

**editora** list (name)

A secondary editor performing a different editorial role, such as compiling, redacting, etc. Use the `editoratype` field to specify the role. See § 2.3.6 for further hints.

**editorb** list (name)

Another secondary editor performing a different role. Use the `editorbtype` field to specify the role. See § 2.3.6 for further hints.

**editorc** list (name)

Another secondary editor performing a different role. Use the `editorctype` field to specify the role. See § 2.3.6 for further hints.

**editortype** field (key)

The type of editorial role performed by the `editor`. Roles supported by default are `editor`, `compiler`, `founder`, `continuator`, `redactor`, `reviser`, `collaborator`, `organizer`. The role ‘editor’ is the default. In this case, the field is omissible. See § 2.3.6 for further hints.

**editoratype** field (key)

Similar to `editortype` but referring to the `editora` field. See § 2.3.6 for further hints.

**editorbtype** field (key)

Similar to `editortype` but referring to the `editorb` field. See § 2.3.6 for further hints.

**editorctype** field (key)

Similar to `editortype` but referring to the `editorc` field. See § 2.3.6 for further hints.

**eid** field (literal)

The electronic identifier of an `@article` or chapter-like section of a larger work often called ‘article number’, ‘paper number’ or the like. This field may replace the `pages` field for journals deviating from the classic pagination scheme of printed journals by only enumerating articles or papers and not pages.

Not to be confused with `number`, which for `@articles` subdivides the volume.

**entrysubtype** field (literal)

This field, which is not used by the standard styles, may be used to specify a subtype of an entry type. This may be useful for bibliography styles which support a finer-grained set of entry types.

**eprint** field (verbatim)

The electronic identifier of an online publication. This is roughly comparable to a DOI but specific to a certain archive, repository, service, or system. See § 3.14.7 for details. Also see `eprinttype` and `eprintclass`.

**eprintclass** field (literal)

Additional information related to the resource indicated by the `eprinttype` field. This could be a section of an archive, a path indicating a service, a classification of some sort, etc. See § 3.14.7 for details. Also see `eprint` and `eprinttype`.

**eprinttype** field (literal)

The type of `eprint` identifier, e. g., the name of the archive, repository, service, or system the `eprint` field refers to. See § 3.14.7 for details. Also see `eprint` and `eprintclass`.

**eventdate** field (date)

The date of a conference, a symposium, or some other event in `@proceedings` and `@inproceedings` entries. This field may also be useful for the custom types listed in § 2.1.3. See also `eventtitle` and `venue` as well as § 2.3.8.

**eventtitle** field (literal)

The title of a conference, a symposium, or some other event in `@proceedings` and `@inproceedings` entries. This field may also be useful for the custom types listed in § 2.1.3. Note that this field holds the plain title of the event. Things like “Proceedings of the Fifth XYZ Conference” go into the `titleaddon` or `booktitleaddon` field, respectively. See also `eventdate` and `venue`.

**eventtitleaddon** field (literal)

An annex to the `eventtitle` field. Can be used for known event acronyms, for example.

**file** field (verbatim)

A local link to a PDF or other version of the work. Not used by the standard bibliography styles.

**foreword** list (name)

The author(s) of a foreword to the work. If the author of the foreword is identical to the editor and/or translator, the standard styles will automatically concatenate these fields in the bibliography. See also `introduction` and `afterword`.

**holder** list (name)

The holder(s) of a `@patent`, if different from the `author`. Note that corporate holders need to be wrapped in an additional set of braces, see § 2.3.3 for details. This list may also be useful for the custom types listed in § 2.1.3.

**howpublished** field (literal)

A publication notice for unusual publications which do not fit into any of the common categories.

`indextitle` field (literal)

A title to use for indexing instead of the regular `title` field. This field may be useful if you have an entry with a title like “An Introduction to ...” and want that indexed as “Introduction to ..., An”. Style authors should note that `biblatex` automatically copies the value of the `title` field to `indextitle` if the latter field is undefined.

`institution` list (literal)

The name of a university or some other institution, depending on the entry type. Traditional BibTeX uses the field name `school` for theses, which is supported as an alias. See also §§ 2.2.5 and 2.3.4.

`introduction` list (name)

The author(s) of an introduction to the work. If the author of the introduction is identical to the `editor` and/or `translator`, the standard styles will automatically concatenate these fields in the bibliography. See also `foreword` and `afterword`.

`isan` field (literal)

The International Standard Audiovisual Number of an audiovisual work. Not used by the standard bibliography styles.

`isbn` field (literal)

The International Standard Book Number of a book.

`ismn` field (literal)

The International Standard Music Number for printed music such as musical scores. Not used by the standard bibliography styles.

`isrn` field (literal)

The International Standard Technical Report Number of a technical report.

`issn` field (literal)

The International Standard Serial Number of a periodical.

`issue` field (literal)

The issue of a journal. This field is intended for journals whose individual issues are identified by a designation such as ‘Spring’ or ‘Summer’ rather than the month or a number. The placement of `issue` is similar to `month` and `number`. Integer ranges and short designators are better written to the `number` field. See also `month`, `number` and §§ 2.3.10 and 2.3.11.

`issuesubtitle` field (literal)

The subtitle of a specific issue of a journal or other periodical.

`issuetitle` field (literal)

The title of a specific issue of a journal or other periodical.

`issuetitleaddon` field (literal)

An annex to the `issuetitle`, to be printed in a different font.



`iswc` field (literal)

The International Standard Work Code of a musical work. Not used by the standard bibliography styles.

`journalsubtitle` field (literal)

The subtitle of a journal, a newspaper, or some other periodical.

`journaltitle` field (literal)

The name of a journal, a newspaper, or some other periodical.

`journaltitleaddon` field (literal)

An annex to the `journaltitle`, to be printed in a different font.

`label` field (literal)

A designation to be used by the citation style as a substitute for the regular label if any data required to generate the regular label is missing. For example, when an author-year citation style is generating a citation for an entry which is missing the author or the year, it may fall back to `label`. See § 2.3.2 for details. Note that, in contrast to `shorthand`, `label` is only used as a fallback. See also `shorthand`.

`language` list (key)

The language(s) of the work. Languages may be specified literally or as localisation keys. If localisation keys are used, the prefix `lang` is omissible. See also `origlanguage` and compare `langid` in § 2.2.3.

`library` field (literal)

This field may be useful to record information such as a library name and a call number. This may be printed by a special bibliography style if desired. Not used by the standard bibliography styles.

`location` list (literal)

The place(s) of publication, i. e., the location of the publisher or institution, depending on the entry type. Traditional BibTeX uses the field name `address`, which is supported as an alias. See also §§ 2.2.5 and 2.3.4. With `@patent` entries, this list indicates the scope of a patent. This list may also be useful for the custom types listed in § 2.1.3.

`mainsubtitle` field (literal)

The subtitle related to the `maintitle`. See also `subtitle`.

`maintitle` field (literal)

The main title of a multi-volume book, such as *Collected Works*. If the `title` or `booktitle` field indicates the title of a single volume which is part of multi-volume book, the title of the complete work is given in this field.

`maintitleaddon` field (literal)

An annex to the `maintitle`, to be printed in a different font.

**month** field (literal)

The publication month. This must be an integer, not an ordinal or a string. Don't say `month={January}` but `month={1}`. The bibliography style converts this to a language dependent string or ordinal where required. This field is a literal field only when given explicitly in the data (for plain BibTeX compatibility for example). It is however better to use the `date` field as this supports many more features. See §§ 2.3.8 and 2.3.9.

**nameaddon** field (literal)

An addon to be printed immediately after the author name in the bibliography. Not used by the standard bibliography styles. This field may be useful to add an alias or pen name (or give the real name if the pseudonym is commonly used to refer to that author).

**note** field (literal)

Miscellaneous bibliographic data which does not fit into any other field. The `note` field may be used to record bibliographic data in a free format. Publication facts such as “Reprint of the edition London 1831” are typical candidates for the `note` field. See also `addendum`.

**number** field (literal)

The number of a journal or the volume/number of a book in a `series`. See also `issue` as well as §§ 2.3.7, 2.3.10, 2.3.11. With `@patent` entries, this is the number or record token of a patent or patent request. Normally this field will be an integer or an integer range, but it may also be a short designator that is not entirely numeric such as “S1”, “Suppl. 2”, “3es”. In these cases the output should be scrutinised carefully.

Since `number` is—maybe counterintuitively given its name—a literal field, sorting templates will not treat its contents as integers, but as literal strings, which means that “11” may sort between “1” and “2”. If integer sorting is desired, the field can be declared an integer field in a custom data model (see § 4.5.4). But then the sorting of non-integer values is not well defined.

The ‘article number’ or ‘paper number’, which can be used instead of—or along with—a page range to pinpoint a specific article within another work, goes into the `eid` field.

**organization** list (literal)

The organization(s) that published a `@manual` or an `@online` resource, or sponsored a conference. See also § 2.3.4.

**origdate** field (date)

If the work is a translation, a reprint, or something similar, the publication date of the original edition. Not used by the standard bibliography styles. See also `date`.

**origlanguage** list (key)

If the work is a translation, the language(s) of the original work. See also `language`.

**origlocation** list (literal)

If the work is a translation, a reprint, or something similar, the `location` of the original edition. Not used by the standard bibliography styles. See also `location` and § 2.3.4.

`origpublisher` list (literal)

If the work is a translation, a reprint, or something similar, the `publisher` of the original edition. Not used by the standard bibliography styles. See also `publisher` and § 2.3.4.

`origtitle` field (literal)

If the work is a translation, the `title` of the original work. Not used by the standard bibliography styles. See also `title`.

`pages` field (range)

One or more page numbers or page ranges. If the work is published as part of another one, such as an article in a journal or a collection, this field holds the relevant page range in that other work. It may also be used to limit the reference to a specific part of a work (a chapter in a book, for example). For papers in electronic journals with a non-classical pagination setup the `eid` field may be more suitable.

`pagetotal` field (literal)

The total number of pages of the work.

`pagination` field (key)

The pagination of the work. The value of this field will affect the formatting the `<postnote>` argument to a citation command. The key should be given in the singular form. Possible keys are `page`, `column`, `line`, `verse`, `section`, and `paragraph`. See also `bookpagination` as well as §§ 2.3.12 and 3.15.3.

`part` field (literal)

The number of a partial volume. This field applies to books only, not to journals. It may be used when a logical volume consists of two or more physical ones. In this case the number of the logical volume goes in the `volume` field and the number of the part of that volume in the `part` field. See also `volume`.

`publisher` list (literal)

The name(s) of the publisher(s). See also § 2.3.4.

`pubstate` field (key)

The publication state of the work, e. g., ‘in press’. See § 4.9.2.11 for known publication states.

`reprinttitle` field (literal)

The title of a reprint of the work. Not used by the standard styles.

`series` field (literal)

The name of a publication series, such as “Studies in ...”, or the number of a journal series. Books in a publication series are usually numbered. The number or volume of a book in a series is given in the `number` field. Note that the `@article` entry type makes use of the `series` field as well, but handles it in a special way. See § 2.3.7 for details.

<code>shortauthor</code>	list (name)	Label field
	The author(s) of the work, given in an abbreviated form. This field is mainly intended for abbreviated forms of corporate authors, see § 2.3.3 for details.	
<code>shorteditor</code>	list (name)	Label field
	The editor(s) of the work, given in an abbreviated form. This field is mainly intended for abbreviated forms of corporate editors, see § 2.3.3 for details.	
<code>shorthand</code>	field (literal)	Label field
	A special designation to be used by the citation style instead of the usual label. If defined, it overrides the default label. See also <code>label</code> .	
<code>shorthandintro</code>	field (literal)	
	The verbose citation styles which comes with this package use a phrase like “henceforth cited as [shorthand]” to introduce shorthands on the first citation. If the <code>shorthandintro</code> field is defined, it overrides the standard phrase. Note that the alternative phrase must include the shorthand.	
<code>shortjournal</code>	field (literal)	Label field
	A short version or an acronym of the <code>journaltitle</code> . Not used by the standard bibliography styles.	
<code>shortseries</code>	field (literal)	Label field
	A short version or an acronym of the <code>series</code> field. Not used by the standard bibliography styles.	
<code>shorttitle</code>	field (literal)	Label field
	The title in an abridged form. This field is usually not included in the bibliography. It is intended for citations in author-title format. If present, the author-title citation styles use this field instead of <code>title</code> .	
<code>subtitle</code>	field (literal)	
	The subtitle of the work.	
<code>title</code>	field (literal)	
	The title of the work.	
<code>titleaddon</code>	field (literal)	
	An annex to the <code>title</code> , to be printed in a different font.	
<code>translator</code>	list (name)	
	The translator(s) of the <code>title</code> or <code>booktitle</code> , depending on the entry type. If the translator is identical to the <code>editor</code> , the standard styles will automatically concatenate these fields in the bibliography.	
<code>type</code>	field (key)	
	The type of a manual, patent, report, or thesis. This field may also be useful for the custom types listed in § 2.1.3.	

`url` field (uri)

The URL of an online publication. If it is not URL-escaped (no ‘%’ chars) it will be URI-escaped according to RFC 3987, that is, even Unicode chars will be correctly escaped.

`urldate` field (date)

The access date of the address specified in the `url` field. See also § 2.3.8.

`venue` field (literal)

The location of a conference, a symposium, or some other event in `@proceedings` and `@inproceedings` entries. This field may also be useful for the custom types listed in § 2.1.3. Note that the `location` list holds the place of publication. It therefore corresponds to the `publisher` and `institution` lists. The location of the event is given in the `venue` field. See also `eventdate` and `eventtitle`.

`version` field (literal)

The revision number of a piece of software, a manual, etc.

`volume` field (integer)

The volume of a multi-volume book or a periodical. It is expected to be an integer, not necessarily in arabic numerals since `biber` will automatically convert from roman numerals or arabic letter to integers internally for sorting purposes. See also `part`. See the `noroman` option which can be used to suppress roman numeral parsing. This can help in cases where there is an ambiguity between parsing as roman numerals or alphanumeric (e.g. ‘C’), see § 3.1.2.3.

`volumes` field (integer)

The total number of volumes of a multi-volume work. Depending on the entry type, this field refers to `title` or `maintitle`. It is expected to be an integer, not necessarily in arabic numerals since `biber` will automatically convert from roman numerals or arabic letter to integers internally for sorting purposes. See the `noroman` option which can be used to suppress roman numeral parsing. This can help in cases where there is an ambiguity between parsing as roman numerals or alphanumeric (e.g. ‘C’), see § 3.1.2.3.

`year` field (literal)

The year of publication. This field is a literal field only when given explicitly in the data (for plain BibTeX compatibility for example). It is however better to use the `date` field as this is compatible with plain years too and supports many more features. See §§ 2.3.8 and 2.3.9.

### 2.2.3 Special Fields

The fields listed in this section do not hold printable data but serve a different purpose. They apply to all entry types in the default data model.

`crossref` field (entry key)

This field holds an entry key for the cross-referencing feature. Child entries with a `crossref` field inherit data from the parent entry specified in the `crossref`

field. If the number of child entries referencing a specific parent entry hits a certain threshold, the parent entry is automatically added to the bibliography even if it has not been cited explicitly. The threshold is settable with the `mincrossrefs` package option from § 3.1.2.1. Style authors should note that whether or not the `crossref` fields of the child entries are defined on the `biblatex` level depends on the availability of the parent entry. If the parent entry is available, the `crossref` fields of the child entries will be defined. If not, the child entries still inherit the data from the parent entry but their `crossref` fields will be undefined. Whether the parent entry is added to the bibliography implicitly because of the threshold or explicitly because it has been cited does not matter. See also the `xref` field in this section as well as § 2.4.1.

**entryset** field (separated values)

This field is specific to entry sets. See § 3.14.5 for details. This field is consumed by the backend processing and does not appear in the `.bbl`.

**execute** field (code)

A special field which holds arbitrary TeX code to be executed whenever the data of the respective entry is accessed. This may be useful to handle special cases. Conceptually, this field is comparable to the hooks `\AtEveryBibitem`, `\AtEveryLositem`, and `\AtEveryCitekey` from § 4.10.6, except that it is definable on a per-entry basis in the `bib` file. Any code in this field is executed automatically immediately after these hooks.

**gender** field (Pattern matching one of: `sf`, `sm`, `sn`, `pf`, `pm`, `pn`, `pp`)

The gender of the author or the gender of the editor, if there is no author. The following identifiers are supported: `sf` (feminine singular, a single female name), `sm` (masculine singular, a single male name), `sn` (neuter singular, a single neuter name), `pf` (feminine plural, a list of female names), `pm` (masculine plural, a list of male names), `pn` (neuter plural, a list of neuter names), `pp` (plural, a mixed gender list of names). This information is only required by special bibliography and citation styles and only in certain languages. For example, a citation style may replace recurrent author names with a term such as ‘*idem*’. If the Latin word is used, as is custom in English and French, there is no need to specify the gender. In German publications, however, such key terms are usually given in German and in this case they are gender-sensitive.

**langid** field (identifier)

The language id of the bibliography entry. The alias `hyphenation` is provided for backwards compatibility. The identifier must be a language name known to the `babel`/`polyglossia` packages. This information may be used to switch hyphenation patterns and localise strings in the bibliography. Note that the language names are case sensitive. The languages currently supported by this package are given in table 2. Note that `babel` treats the identifier `english` as an alias for `british` or `american`, depending on the `babel` version. The `biblatex` package always treats it as an alias for `american`. It is preferable to use the language identifiers `american` and `british` (`babel`) or a language specific option to specify a language variant (`polyglossia`, using the `langidopts` field) to avoid any possible confusion. Compare language in § 2.2.2.

**Table 2: Supported Languages**

Language	Region/Dialect	Identifiers
Basque	France, Spain	basque
Bulgarian	Bulgaria	bulgarian
Catalan	Spain, France, Andorra, Italy	catalan
Croatian	Croatia, Bosnia and Herzegovina, Serbia	croatian
Czech	Czech Republic	czech
Danish	Denmark	danish
Dutch	Netherlands	dutch
English	USA	american, USenglish, english
	United Kingdom	british, UKenglish
	Canada	canadian
	Australia	australian
	New Zealand	newzealand
Estonian	Estonia	estonian
Finnish	Finland	finnish
French	France, Canada	french
German	Germany	german
	Austria	austrian
	Switzerland	swissgerman
	Germany (new)	ngerman
German (new)	Austria	naustrian
	Switzerland	nswissgerman
Greek	Greece	greek
Hungarian	Hungary	magyar, hungarian
Icelandic	Iceland	icelandic
Italian	Italy	italian
Latvian	Latvia	latvian
Lithuanian	Lithuania	lithuanian
Marathi	India	marathi
Norwegian (Bokmål)	Norway	norsk
Norwegian (Nynorsk)	Norway	nynorsk
Polish	Poland	polish
Portuguese	Brazil	brazil
	Portugal	portuguese, portuges
Romanian	Romania	romanian
Russian	Russia	russian
Serbian (Latin)	Serbia	serbian
Serbian (Cyrillic)	Serbia	serbianc
Slovak	Slovakia	slovak
Slovene	Slovenia	slovene, slovenian
Spanish	Spain	spanish
Swedish	Sweden	swedish
Turkish	Turkey	turkish
Ukrainian	Ukraine	ukrainian



**langidopts** field (literal)

For `polyglossia` users, allows per-entry language specific options. The literal value of this field is passed to `polyglossia`'s language switching facility when using the package option `autolang=langname`. For example, the fields:

```
langid      = {english},  
langidopts  = {variant=british},
```

would wrap the bibliography entry in:

```
\english[variant=british]  
...  
\endenglish
```

**ids** field (separated list of entrykeys)

Citation key aliases for the main citation key. An entry may be cited by any of its aliases and `biblatex` will treat the citation as if it had used the primary citation key. This is to aid users who change their citation keys but have legacy documents which use older keys for the same entry. This field is consumed by the backend processing and does not appear in the `.bbl`.

**indexsorttitle** field (literal)

The title used when sorting the index. In contrast to `indextitle`, this field is used for sorting only. The printed title in the index is the `indextitle` or the `title` field. This field may be useful if the title contains special characters or commands which interfere with the sorting of the index. Consider this example:

```
title      = {The \LaTeX\ Companion},  
indextitle = {\LaTeX\ Companion, The},  
indexsorttitle = {LATEX Companion},
```

Style authors should note that `biblatex` automatically copies the value of either the `indextitle` or the `title` field to `indexsorttitle` if the latter field is undefined.

**keywords** field (separated values)

A separated list of keywords. These keywords are intended for the bibliography filters (see §§ 3.8.2 and 3.14.4), they are usually not printed. Note that with the default separator (comma), spaces around the separator are ignored.

**options** field (separated  $\langle key \rangle = \langle value \rangle$  options)

A separated list of entry options in  $\langle key \rangle = \langle value \rangle$  notation. This field is used to set options on a per-entry basis. See § 3.1.3 for details. Note that citation and bibliography styles may define additional entry options.

`presort` field (string)

A special field used to modify the sorting order of the bibliography. This field is the first item the sorting routine considers when sorting the bibliography, hence it may be used to arrange the entries in groups. This may be useful when creating subdivided bibliographies with the bibliography filters. Please refer to § 3.6 for further details. Also see § 4.5.6. This field is consumed by the backend processing and does not appear in the `.bbl`.

`related` field (separated values)

Citation keys of other entries which have a relationship to this entry. The relationship is specified by the `relatedtype` field. Please refer to § 3.5 for further details.

`relatedoptions` field (separated values)

Per-type options to set for a related entry. Note that this does not set the options on the related entry itself, only the `dataonly` clone which is used as a datasource for the parent entry.

`relatedtype` field (identifier)

An identifier which specified the type of relationship for the keys listed in the `related` field. The identifier is a localised bibliography string printed before the data from the related entry list. It is also used to identify type-specific formatting directives and bibliography macros for the related entries. Please refer to § 3.5 for further details.

`relatedstring` field (literal)

A field used to override the bibliography string specified by `relatedtype`. Please refer to § 3.5 for further details.

`sortkey` field (literal)

A field used to modify the sorting order of the bibliography. Think of this field as the master sort key. If present, `biblatex` uses this field during sorting and ignores everything else, except for the `presort` field. Please refer to § 3.6 for further details. This field is consumed by the backend processing and does not appear in the `.bbl`.

`sortname` list (name)

A name or a list of names used to modify the sorting order of the bibliography. If present, this list is used instead of `author` or `editor` when sorting the bibliography. Please refer to § 3.6 for further details. This field is consumed by the backend processing and does not appear in the `.bbl`.

`sortshorthand` field (literal)

Similar to `sortkey` but used in the list of shorthands. If present, `biblatex` uses this field instead of `shorthand` when sorting the list of shorthands. This is useful if the `shorthand` field holds shorthands with formatting commands such as `\emph` or `\textbf`. This field is consumed by the backend processing and does not appear in the `.bbl`.

`sorttitle` field (literal)

A field used to modify the sorting order of the bibliography. If present, this field is used instead of the `title` field when sorting the bibliography. The `sorttitle` field may come in handy if you have an entry with a title like “An Introduction to...” and want that alphabetized under ‘I’ rather than ‘A’. In this case, you could put “Introduction to...” in the `sorttitle` field. Please refer to § 3.6 for further details. This field is consumed by the backend processing and does not appear in the `.bbl`.

`sortyear` field (integer)

A field used to modify the sorting order of the bibliography. In the default sorting templates, if this field is present, it is used instead of the `year` field when sorting the bibliography. Please refer to § 3.6 for further details. This field is consumed by the backend processing and does not appear in the `.bbl`.

`xdata` field (separated list of entrykeys)

This field inherits data from one or more `@xdata` entries. Conceptually, the `xdata` field is related to `crossref` and `xref`: `crossref` establishes a logical parent/child relation and inherits data; `xref` establishes as logical parent/child relation without inheriting data; `xdata` inherits data without establishing a relation. The value of the `xdata` may be a single entry key or a separated list of keys. See § 3.14.6 for further details. This field is consumed by the backend processing and does not appear in the `.bbl`.

`xref` field (entry key)

This field is an alternative cross-referencing mechanism. It differs from `crossref` in that the child entry will not inherit any data from the parent entry specified in the `xref` field. If the number of child entries referencing a specific parent entry hits a certain threshold, the parent entry is automatically added to the bibliography even if it has not been cited explicitly. The threshold is settable with the `minxrefs` package option from § 3.1.2.1. Style authors should note that whether or not the `xref` fields of the child entries are defined on the `biblatex` level depends on the availability of the parent entry. If the parent entry is available, the `xref` fields of the child entries will be defined. If not, their `xref` fields will be undefined. Whether the parent entry is added to the bibliography implicitly because of the threshold or explicitly because it has been cited does not matter. See also the `crossref` field in this section as well as § 2.4.1.

## 2.2.4 Custom Fields

The fields listed in this section are intended for special bibliography styles. They are not used by the standard bibliography styles.

`name[a-c]` list (name)

Custom lists for special bibliography styles. Not used by the standard bibliography styles.

`name[a-c]type` field (key)

Similar to `authortype` and `editortype` but referring to the fields `name[a--c]`. Not used by the standard bibliography styles.

`list[a-f]` list (literal)

Custom lists for special bibliography styles. Not used by the standard bibliography styles.

`user[a-f]` field (literal)

Custom fields for special bibliography styles. Not used by the standard bibliography styles.

`verb[a-c]` field (literal)

Similar to the custom fields above except that these are verbatim fields. Not used by the standard bibliography styles.

### 2.2.5 Field Aliases

The aliases listed in this section are provided for backwards compatibility with traditional BibTeX and other applications based on traditional BibTeX styles. Note that these aliases are immediately resolved as the `bib` file is processed. All bibliography and citation styles must use the names of the fields they point to, not the alias. In `bib` files, you may use either the alias or the field name but not both at the same time.

`address` list (literal)

An alias for `location`, provided for BibTeX compatibility. Traditional BibTeX uses the slightly misleading field name `address` for the place of publication, i. e., the location of the publisher, while `biblatex` uses the generic field name `location`. See §§ 2.2.2 and 2.3.4.

`annotate` field (literal)

An alias for `annotation`, provided for `jurabib` compatibility. See § 2.2.2.

`archiveprefix` field (literal)

An alias for `eprinttype`, provided for arXiv compatibility. See §§ 2.2.2 and 3.14.7.

`journal` field (literal)

An alias for `journaltitle`, provided for BibTeX compatibility. See § 2.2.2.

`key` field (literal)

An alias for `sortkey`, provided for BibTeX compatibility. See § 2.2.3.

`pdf` field (verbatim)

An alias for `file`, provided for JabRef compatibility. See § 2.2.2.

`primaryclass` field (literal)

An alias for `eprintclass`, provided for arXiv compatibility. See §§ 2.2.2 and 3.14.7.

`school` list (literal)

An alias for `institution`, provided for BibTeX compatibility. The `institution` field is used by traditional BibTeX for technical reports whereas the `school` field holds the institution associated with theses. The `biblatex` package employs the generic field name `institution` in both cases. See §§ 2.2.2 and 2.3.4.

## 2.3 Usage Notes

The entry types and fields supported by this package should for the most part be intuitive to use for anyone familiar with BibTeX. However, apart from the additional types and fields provided by this package, some of the familiar ones are handled in a way which is in need of explanation. This package includes some compatibility code for `bib` files which were generated with a traditional BibTeX style in mind. Unfortunately, it is not possible to handle all legacy files automatically because `biblatex`'s data model is slightly different from traditional BibTeX. Therefore, such `bib` files will most likely require editing in order to work properly with this package. In sum, the following items are different from traditional BibTeX styles:

- The entry type `@inbook`. See §§ 2.1.1 and 2.3.1 for details.
- The fields `institution`, `organization`, and `publisher` as well as the aliases `address` and `school`. See §§ 2.2.2, 2.2.5, 2.3.4 for details.
- The handling of certain types of titles. See § 2.3.5 for details.
- The field `series`. See §§ 2.2.2 and 2.3.7 for details.
- The fields `year` and `month`. See §§ 2.2.2, 2.3.8, 2.3.9, 2.3.10 for details.
- The field `edition`. See § 2.2.2 for details.
- The field `key`. See § 2.3.2 for details.

Users of the `jurabib` package should note that the `shortauthor` field is treated as a name list by `biblatex`, see § 2.3.3 for details.

### 2.3.1 The Entry Type `@inbook`

Use the `@inbook` entry type for a self-contained part of a book with its own title only. It relates to `@book` just like `@incollection` relates to `@collection`. See § 2.3.5 for examples. If you want to refer to a chapter or section of a book, simply use the `book` type and add a `chapter` and/or `pages` field. Whether a bibliography should at all include references to chapters or sections is controversial because a chapter is not a bibliographic entity.

### 2.3.2 Missing and Omissible Data

The fields marked as ‘required’ in § 2.1.1 are not strictly required in all cases. The bibliography styles which come with this package can get by with as little as a `title` field for most entry types. A book published anonymously, a periodical without an explicit editor, or a software manual without an explicit author should pose no problem as far as the bibliography is concerned. Citation styles, however, may have different requirements. For example, an author-year citation scheme obviously requires an `author/editor` and a `year` field.

You may generally use the `label` field to provide a substitute for any missing data required for citations. How the `label` field is employed depends on the citation style. The author-year citation styles which come with this package use the `label` field as a fallback if either the `author/editor` or the `year` is missing. The numeric styles, on the other hand, do not use it at all since the numeric scheme is independent of the available data. The author-title styles ignore it as well, because the bare `title` is usually sufficient to form a unique citation and a title is expected to be available in any case. The `label` field may also be used to override the non-numeric portion of

the automatically generated `labelalpha` field used by alphabetic citation styles. See § 4.2.4 for details.

Note that traditional BibTeX styles support a `key` field which is used for alphabetizing if both `author` and `editor` are missing. The `biblatex` package treats `key` as an alias for `sortkey`. In addition to that, it offers very fine-grained sorting controls, see §§ 2.2.3 and 3.6 for details. The `natbib` package employs the `key` field as a fallback label for citations. Use the `label` field instead.

### 2.3.3 Corporate Authors and Editors

Corporate authors and editors are given in the `author` or `editor` field, respectively. Note that they must be wrapped in an extra pair of curly braces to prevent data parsing from treating them as personal names which are to be dissected into their components. Use the `shortauthor` field if you want to give an abbreviated form of the name or an acronym for use in citations.

```
author      = {{National Aeronautics and Space  
    ↪ Administration}},  
shortauthor = {NASA},
```

The default citation styles will use the short name in all citations while the full name is printed in the bibliography. For corporate editors, use the corresponding fields `editor` and `shorteditor`. Since all of these fields are treated as name lists, it is possible to mix personal names and corporate names, provided that the names of all corporations and institutions are wrapped in braces.

```
editor      = {{National Aeronautics and Space  
    ↪ Administration}  
    and Doe, John},  
shorteditor = {NASA and Doe, John},
```

Users switching from the `jurabib` package to `biblatex` should note that the `shortauthor` field is treated as a name list.

### 2.3.4 Literal Lists

The fields `institution`, `organization`, `publisher`, and `location` are literal lists in terms of § 2.2. This also applies to `origlocation`, `origpublisher` and to the field aliases `address` and `school`. All of these fields may contain a list of items separated by the keyword ‘and’. If they contain a literal ‘and’, it must be wrapped in braces.

```
publisher    = {William Reid {and} Company},  
institution  = {Office of Information Management {and}  
    ↪ Communications},  
organization = {American Society for Photogrammetry {and}  
    ↪ } Remote Sensing  
    and  
    American Congress on Surveying {and}  
    ↪ Mapping},
```

Note the difference between a literal ‘`{and}`’ and the list separator ‘and’ in the above examples. You may also wrap the entire name in braces:

```

publisher    = {{William Reid and Company}},
institution  = {{Office of Information Management and
    ↪ Communications}},
organization = {{American Society for Photogrammetry and
    ↪ Remote Sensing}
    and
    {American Congress on Surveying and
    ↪ Mapping}},

```

Legacy files which have not been updated for use with `biblatex` will still work if these fields do not contain a literal ‘and’. However, note that you will miss out on the additional features of literal lists in this case, such as configurable formatting and automatic truncation.

### 2.3.5 Titles

The following examples demonstrate how to handle different types of titles. Let’s start with a five-volume work which is referred to as a whole:

```

@MvBook{works,
  author    = {Shakespeare, William},
  title      = {Collected Works},
  volumes    = {5},
  ...

```

The individual volumes of a multi-volume work usually have a title of their own. Suppose the fourth volume of the *Collected Works* includes Shakespeare’s sonnets and we are referring to this volume only:

```

@Book{works:4,
  author    = {Shakespeare, William},
  maintitle  = {Collected Works},
  title      = {Sonnets},
  volume     = {4},
  ...

```

If the individual volumes do not have a title, we put the main title in the `title` field and include a volume number:

```

@Book{works:4,
  author    = {Shakespeare, William},
  title      = {Collected Works},
  volume     = {4},
  ...

```

In the next example, we are referring to a part of a volume, but this part is a self-contained work with its own title. The respective volume also has a title and there is still the main title of the entire edition:

```

@InBook{lear,
  author    = {Shakespeare, William},

```



```

bookauthor = {Shakespeare, William},
maintitle  = {Collected Works},
booktitle  = {Tragedies},
title      = {King Lear},
volume     = {1},
pages      = {53-159},
...

```

Suppose the first volume of the *Collected Works* includes a reprinted essay by a well-known scholar. This is not the usual introduction by the editor but a self-contained work. The *Collected Works* also have a separate editor:

```

@InBook{stage,
  author      = {Expert, Edward},
  title       = {Shakespeare and the Elizabethan Stage},
  bookauthor  = {Shakespeare, William},
  editor      = {Bookmaker, Bernard},
  maintitle   = {Collected Works},
  booktitle   = {Tragedies},
  volume      = {1},
  pages       = {7-49},
  ...

```

See § 2.3.7 for further examples.

### 2.3.6 Editorial Roles

The type of editorial role performed by an editor in one of the `editor` fields (i. e., `editor`, `editora`, `editorb`, `editorc`) may be specified in the corresponding `editor...type` field. The following roles are supported by default. The role ‘editor’ is the default. In this case, the `editortype` field is omissible.

- `editor`    The main editor. This is the most generic editorial role and the default value.
- `compiler`    Similar to `editor` but used if the task of the editor is mainly compiling.
- `founder`    The founding editor of a periodical or a comprehensive publication project such as a ‘Collected Works’ edition or a long-running legal commentary.
- `continuator`    An editor who continued the work of the founding editor (`founder`) but was subsequently replaced by the current editor (`editor`).
- `redactor`    A secondary editor whose task is redacting the work.
- `reviser`    A secondary editor whose task is revising the work.
- `collaborator`    A secondary editor or a consultant to the editor.
- `organizer`    Similar to `editor` but used if the task of the editor is mainly organizing.

For example, if the task of the editor is compiling, you may indicate that in the corresponding `editortype` field:

```

@Collection{...,
  editor      = {Editor, Edward},
  editortype  = {compiler},
  ...

```

There may also be secondary editors in addition to the main editor:

```
@Book{...,
  author      = {...},
  editor      = {Editor, Edward},
  editora     = {Redactor, Randolph},
  editoratype = {redactor},
  editorb     = {Consultant, Conrad},
  editorbtype = {collaborator},
  ...}
```

Periodicals or long-running publication projects may see several generations of editors. For example, there may be a founding editor in addition to the current editor:

```
@Book{...,
  author      = {...},
  editor      = {Editor, Edward},
  editora     = {Founder, Frederic},
  editoratype = {founder},
  ...}
```

Note that only the `editor` is considered in citations and when sorting the bibliography. If an entry is typically cited by the founding editor (and sorted accordingly in the bibliography), the founder goes into the `editor` field and the current editor moves to one of the `editor...` fields:

```
@Collection{...,
  editor      = {Founder, Frederic},
  editortype  = {founder},
  editora     = {Editor, Edward},
  ...}
```

You may add more roles by initializing and defining a new localisation key whose name corresponds to the identifier in the `editor...type` field. See §§ 3.10 and 4.9.1 for details.

### 2.3.7 Publication and Journal Series

The `series` field is used by traditional BibTeX styles both for the main title of a multi-volume work and for a publication series, i. e., a loosely related sequence of books by the same publisher which deal with the same general topic or belong to the same field of research. This may be ambiguous. This package introduces a `maintitle` field for multi-volume works and employs `series` for publication series only. The volume or number of a book in the series goes in the `number` field in this case:

```
@Book{...,
  author      = {Expert, Edward},
  title       = {Shakespeare and the Elizabethan Age},
  series      = {Studies in English Literature and
  ↪ Drama},
  number      = {57},
  ...}
```

**Table 3: Date Specifications**

Date Specification	Formatted Date (Examples)	
	Short/12-hour Format	Long/24-hour Format
1850	1850	1850
1997/	1997–	1997–
/1997	–1997	–1997
1997/..	1997–	1997–
../1997	–1997	–1997
1967-02	02/1967	February 1967
2009-01-31	31/01/2009	31st January 2009
1988/1992	1988–1992	1988–1992
2002-01/2002-02	01/2002–02/2002	January 2002–February 2002
1995-03-30/1995-04-05	30/03/1995–05/04/1995	30th March 1995–5th April 1995
2004-04-05T14:34:00	05/04/2004 2:34 PM	5th April 2004 14:34:00

The `@article` entry type makes use of the `series` field as well, but handles it in a special way. First, a test is performed to determine whether the value of the field is an integer. If so, it will be printed as an ordinal. If not, another test is performed to determine whether it is a localisation key. If so, the localised string is printed. If not, the value is printed as is. Consider the following example of a journal published in numbered series:

```
@Article{...,
  journal      = {Journal Name},
  series       = {3},
  volume       = {15},
  number       = {7},
  year         = {1995},
  ...
}
```

This entry will be printed as “*Journal Name*. 3rd ser. 15.7 (1995)”. Some journals use designations such as “old series” and “new series” instead of a number. Such designations may be given in the `series` field as well, either as a literal string or as a localisation key. Consider the following example which makes use of the localisation key `newseries`:

```
@Article{...,
  journal      = {Journal Name},
  series       = {newseries},
  volume       = {9},
  year         = {1998},
  ...
}
```

This entry will be printed as “*Journal Name*. New ser. 9 (1998)”. See § 4.9.2 for a list of localisation keys defined by default.

### 2.3.8 Date and Time Specifications

Date fields such as the default data model dates `date`, `origdate`, `eventdate`, and `urldate` adhere to iso8601-2 Extended Format specification level 1. In addition to the iso8601-2 empty date range markers, you may also specify an open ended/start date range by giving the range separator and omitting the end/start date (e. g., `YYYY/`,

**Table 4: ISO8601-2 4.3 Unspecified Date Parsing**

Date Specification	Expanded Range	Meta-information
199X	1990/1999	yearindecade
19XX	1900/1999	yearincentury
1999-XX	1999-01/1999-12	monthinyear
1999-01-XX	1999-01-01/1999-01-31	dayinmonth
1999-XX-XX	1999-01-01/1999-12-31	dayinyear

/YYYY). See table 3 for some examples of valid date specifications and the formatted dates automatically generated by `biblatex`. The formatted date is language specific and will be adapted automatically. If there is no date field in an entry, `biblatex` will also consider the fields `year` and `month` for backwards compatibility with traditional BibTeX but this is not encouraged as explicit year and month are not parsed for date meta-information markers or times and are used as-is. Style authors should note that date fields like `date` or `origdate` are only available in the `bib` file. All dates are parsed and dissected into their components as the `bib` file is processed. The date and time components are made available to styles by way of the special fields discussed in § 4.2.4.3. See this section and table 10 on page 174 for further information.

iso8601-2 Extended Format dates are astronomical dates in which year ‘0’ exists. When outputting dates in BCE or BC era (see the `dateera` option below), note that they will typically be one year earlier since BCE/BC era do not have a year 0 (year 0 is 1 BCE/BC). This conversion is automatic. See examples in table 5.

Date field names *must* end with the string ‘date’, as with the default date fields. Bear this in mind when adding new date fields to the `datamodel` (see § 4.5.4). `biblatex` will check all date fields after reading the data model and will exit with an error if it finds a date field which does not adhere to this naming convention.

iso8601-2 supports dates before common era (BCE/BC) by way of a negative date format and supports ‘approximate’ (circa) and uncertain dates. Such date formats set internal markers which can be tested for so that appropriate localised markers (such as `circa` or `beforecommonera`) can be inserted. Also supported are ‘unspecified’ dates (iso8601-2 4.3) which are automatically expanded into appropriate data ranges accompanied by a field `<datatype>dateunspecified` which details the granularity of the unspecified data. Styles may use this information to format such dates appropriately but the standard styles do not do this. See table 4 on page 40 for the allowed iso8601-2 ‘unspecified’ formats, their range expansions and `<datatype>dateunspecified` values (see § 4.2.4.1).

Table 5 shows formats which use appropriate tests and formatting. See the date meta-information tests in § 4.6.2 and the localisation strings in § 4.9.2.21. See also the `96-dates.tex` example file for complete examples of the tests and localisation strings use.

The output of ‘circa’, uncertainty and era information in standard styles (or custom styles not customising the internal `\mkdaterange*` macros) is controlled by the package options `datecirca`, `dateuncertain`, `dateera` and `dateeraauto` (see § 3.1.2.1). See table 5 on page 41 for examples which assumes these options are all used.

### 2.3.9 Year, Month and Date

The fields `year` and `month` are still supported by `biblatex`, but the full set of date features (day and time precision, ranges, ...) can only be used with `date`. It is

**Table 5: Enhanced Date Specifications**

Date Specification	Formatted Date (Examples)	
	Output Format	Output Format Notes
0000	1 BC	dateera=christian prints beforechrist localisation
-0876	877 BCE	dateera=secular prints beforecommonera localisation string
-0877/-0866	878 BC-867 BC	using \ifdateera test and beforechrist localisation string
0768	0768 CE	using dateeraauto set to '1000' and commonera localisation string
-0343-02	344-02 BCE	
0343-02-03	343-02-03 CE	with dateeraauto=400
0343-02-03	343-02-02 CE	with dateeraauto=400 and julian
1723~	circa 1723	using \ifdatecirca test
1723?	1723?	using \ifdateuncertain test
1723%	circa 1723?	using \ifdateuncertain and \ifdatecirca tests
2004-22	2004	also, yeardivision is set to the localisation string 'summer'
2004-24	2004	also, yeardivision is set to the localisation string 'winter'

therefore recommended to prefer date over year and month unless backwards compatibility of the bib file with classical BibTeX is required.

### 2.3.10 Months and Journal Issues

The month field is an integer field. The bibliography style converts the month to a language-dependent string as required. For backwards compatibility, you may also use the following three-letter abbreviations in the month field: jan, feb, mar, apr, may, jun, jul, aug, sep, oct, nov, dec. Note that these abbreviations are BibTeX strings which must be given without any braces or quotes. When using them, don't say month={jan} or month="jan" but month=jan. It is not possible to specify a month such as month={8/9}. Use the date field for date ranges instead. Quarterly journals are typically identified by a designation such as 'Spring' or 'Summer' which should be given in the issue field. The placement of the issue field in @article entries is similar to and overrides the month field.

### 2.3.11 Journal Numbers and Issues

The terms 'number', 'issue' and even 'issue number' are often used synonymously by journals to refer to the subdivision of a volume. The fact that biblatex's data model has fields of both names can sometimes lead to confusion about which field should be used. First and foremost the word that the journal uses for the subdivision of a volume should be of minor importance, what matters is the role in the data model. As a rule of thumb number is the right field in most circumstances. In the standard styles number modifies volume, whereas issue modifies the date (year) of the entry. Numeric identifiers and short designators that are not necessarily (entirely) numeric such as 'A', 'S1', 'C2', 'Suppl. 3', '4es' would go into the number field, because they usually modify the volume. The output of—especially longer—non-numeric input for number should be checked since it could potentially look odd with some styles. The field issue can be used for designations such as 'Spring', 'Winter' or 'Michaelmas term' if that is commonly used to refer to the journal.

The ‘article number’ or ‘paper number’, which can be used instead of—or along with—a page range to pinpoint a specific article within another work, goes into the `eid` field, whose placement in the standard styles is similar to the analogous `pages` field.

### 2.3.12 Pagination

When specifying a page or page range, either in the `pages` field of an entry or in the `<postnote>` argument to a citation command, it is convenient to have `biblatex` add prefixes like ‘p.’ or ‘pp.’ automatically and this is indeed what this package does by default. However, some works may use a different pagination scheme or may not be cited by page but rather by verse or line number. This is when the `pagination` and `bookpagination` fields come into play. As an example, consider the following entry:

```
@InBook{key,
  title           = {...},
  pagination      = {verse},
  booktitle       = {...},
  bookpagination  = {page},
  pages           = {53--65},
  ...
```

The `bookpagination` field affects the formatting of the `pages` and `pagetotal` fields in the list of references. Since `page` is the default, this field is omissible in the above example. In this case, the page range will be formatted as ‘pp. 53–65’. Suppose that, when quoting from this work, it is customary to use verse numbers rather than page numbers in citations. This is reflected by the `pagination` field, which affects the formatting of the `<postnote>` argument to any citation command. With a citation like `\cite[17]{key}`, the postnote will be formatted as ‘v. 17’. Setting the `pagination` field to `section` would yield ‘§ 17’. See § 3.15.3 for further usage instructions.

The `pagination` and `bookpagination` fields are key fields. This package will try to use their value as a localisation key, provided that the key is defined. Always use the singular form of the key name in `bib` files, the plural is formed automatically. The keys `page`, `column`, `line`, `verse`, `section`, and `paragraph` are predefined, with `page` being the default. The string ‘none’ has a special meaning when used in a `pagination` or `bookpagination` field. It suppresses the prefix for the respective entry. If there are no predefined localisation keys for the pagination scheme required by a certain entry, you can simply add them. See the commands `\NewBibliographyString` and `\DefineBibliographyStrings` in § 3.10. You need to define two localisation strings for each additional pagination scheme: the singular form (whose localisation key corresponds to the value of the `pagination` field) and the plural form (whose localisation key must be the singular plus the letter ‘s’). See the predefined keys in § 4.9.2 for examples.

## 2.4 Hints and Caveats

This section provides some additional hints concerning the data interface of this package. It also addresses some common problems.

### 2.4.1 Cross-referencing

biber features a highly customizable cross-referencing mechanism with flexible data inheritance rules. Duplicating certain fields in the parent entry or adding empty fields to the child entry is no longer required. Entries are specified in a natural way:

```
@Book{book,  
  author      = {Author},  
  title       = {Booktitle},  
  subtitle    = {Booksubtitle},  
  publisher   = {Publisher},  
  location    = {Location},  
  date        = {1995},  
}  
@InBook{inbook,  
  crossref    = {book},  
  title       = {Title},  
  pages       = {5--25},  
}
```

The title field of the parent will be copied to the booktitle field of the child, the subtitle becomes the booksubtitle. The author of the parent becomes the bookauthor of the child and, since the child does not provide an author field, it is also duplicated as the author of the child. After data inheritance, the child entry is similar to this:

```
author      = {Author},  
bookauthor  = {Author},  
title       = {Title},  
booktitle   = {Booktitle},  
booksubtitle = {Booksubtitle},  
publisher   = {Publisher},  
location    = {Location},  
date        = {1995},  
pages       = {5--25},
```

See appendix B for a list of mapping rules set up by default. Note that all of this is customizable. See § 4.5.12 on how to configure biber's cross-referencing mechanism. See also § 2.2.3.

#### 2.4.1.1 The xref field

In addition to the crossref field, biblatex supports a simplified cross-referencing mechanism based on the xref field. This is useful if you want to establish a parent/child relation between two associated entries but prefer to keep them independent as far as the data is concerned. The xref field differs from crossref in that the child entry will not inherit any data from the parent. If the parent is referenced by a certain number of child entries, biblatex will automatically add it to the bibliography. The threshold is controlled by the minxrefs package option from § 3.1.2.1.u See also § 2.2.3.



### 2.4.2 Sorting and Encoding Issues

`biber` handles US-ASCII, 8-bit encodings such as Latin 1, and UTF-8. It features true Unicode support and is capable of reencoding the `bib` data on the fly in a robust way. For sorting, `biber` uses a Perl implementation of the Unicode Collation Algorithm (UCA), as outlined in Unicode Technical Standard #10.<sup>13</sup> Collation tailoring based on the Unicode Common Locale Data Repository (CLDR) is also supported.<sup>14</sup>

Supporting Unicode implies much more than handling UTF-8 input. Unicode is a complex standard covering more than its most well-known parts, the Unicode character encoding and transport encodings such as UTF-8. It also standardizes aspects such as string collation, which is required for language-sensitive sorting. For example, by using the Unicode Collation Algorithm, `biber` can handle the character ‘ß’ without any manual intervention. All you need to do to get localised sorting is specify the locale:

```
\usepackage[sortlocale=de]{biblatex}
```

or if you are using German as the main document language via `babel` or `polyglossia`:

```
\usepackage[sortlocale=auto]{biblatex}
```

This will make `biblatex` pass the `babel/polyglossia` main document language as the locale which `biber` will map into a suitable default locale. `biber` will not try to get locale information from its environment as this makes document processing dependent on something not in the document which is against TeX’s spirit of reproducibility. This also makes sense since `babel/polyglossia` are in fact the relevant environment for a document. Note that this will also work with 8-bit encodings such as Latin 9, i. e., you can take advantage of Unicode-based sorting even though you are not using UTF-8 input. See § 2.4.2.1 on how to specify input and data encodings properly.

#### 2.4.2.1 Specifying Encodings

When using a non-US-ASCII encoding in the `bib` file, it is important to understand what `biblatex` can do for you and what may require manual intervention. The package takes care of the LaTeX side, i. e., it ensures that the data imported from the `bbl` file is interpreted correctly, provided that the `bibencoding` package option (or the `datasource` specific override for this, see § 3.8.1) is set properly. All of this is handled automatically and no further steps, apart from setting the `bibencoding` option in certain cases (namely when the encoding of the `bib` file differs from the encoding of the `tex` file), are required provided that you set up your document encoding (i. e., load `inputenc` or related packages if required) *before* `biblatex` is loaded. Here are a few typical usage scenarios along with the relevant lines from the document preamble:

- US-ASCII notation in both the `tex` and the `bib` file with pdfTeX or traditional TeX:

---

<sup>13</sup><https://unicode.org/reports/tr10/>

<sup>14</sup><http://cldr.unicode.org/>

```
\usepackage{biblatex}
```

- Latin 1 encoding (iso-8859-1) in the `tex` file, `us-ASCII` notation in the `bib` file with pdfTeX or traditional TeX:

```
\usepackage[latin1]{inputenc}  
\usepackage[bibencoding=ascii]{biblatex}
```

- Latin 9 encoding (iso-8859-15) in both the `tex` and the `bib` file with pdfTeX or traditional:

```
\usepackage[latin9]{inputenc}  
\usepackage[bibencoding=auto]{biblatex}
```

Since `bibencoding=auto` is the default setting, the option is omissible. The following setup will have the same effect:

```
\usepackage[latin9]{inputenc}  
\usepackage{biblatex}
```

- UTF-8 encoding in the `tex` file, Latin 1 (iso-8859-1) in the `bib` file with pdfTeX or traditional TeX:

```
\usepackage[utf8]{inputenc}  
\usepackage[bibencoding=latin1]{biblatex}
```

The same scenario with LaTeX release 2018-04-01 or above, XeTeX or LuaTeX in native UTF-8 mode:

```
\usepackage[bibencoding=latin1]{biblatex}
```

`biber` can handle `us-ASCII` notation, 8-bit encodings such as Latin 1, and UTF-8. It is also capable of reencoding the `bib` data on the fly (replacing the limited macro-level reencoding feature of `biblatex`). This will happen automatically if required, provided that you specify the encoding of the `bib` files properly. In addition to the scenarios discussed above, `biber` can also handle the following cases:

- Transparent UTF-8 workflow, i.e., UTF-8 encoding in both the `tex` and the `bib` file with pdfTeX or traditional TeX:

```
\usepackage[utf8]{inputenc}  
\usepackage[bibencoding=auto]{biblatex}
```

Since `bibencoding=auto` is the default setting, the option is omissible:

```
\usepackage[utf8]{inputenc}
\usepackage{biblatex}
```

The same scenario with XeTeX or LuaTeX in native UTF-8 mode:

```
\usepackage{biblatex}
```

- It is even possible to combine an 8-bit encoded `tex` file with UTF-8 encoding in the `bib` file, provided that all characters in the `bib` file are also covered by the selected 8-bit encoding:

```
\usepackage[latin1]{inputenc}
\usepackage[bibencoding=utf8]{biblatex}
```

Some workarounds may be required when using traditional TeX or pdfTeX with UTF-8 encoding because `inputenc`'s `utf8` module does not cover all of Unicode. Roughly speaking, it only covers the Western European Unicode range. When loading `inputenc` with the `utf8` option, `biblatex` will normally instruct `biber` to reencode the `bib` data to UTF-8. This may lead to `inputenc` errors if some of the characters in the `bib` file are outside the limited Unicode range supported by `inputenc`.

- If you are affected by this problem, try setting the `safeinputenc` option:

```
\usepackage[utf8]{inputenc}
\usepackage[safeinputenc]{biblatex}
```

If this option is enabled, `biblatex` will ignore `inputenc`'s `utf8` option and use `US-ASCII`. `biber` will then try to convert the `bib` data to `US-ASCII` notation. For example, it will convert `§` to `\k{S}`. This option is similar to setting `texencoding=ascii` but will only take effect in this specific scenario (`inputenc/inputenx` with UTF-8). This workaround takes advantage of the fact that both Unicode and the UTF-8 transport encoding are backwards compatible with `US-ASCII`.

This solution may be acceptable as a workaround if the data in the `bib` file is mostly `US-ASCII` anyway, with only a few strings, such as some authors' names, causing problems. However, keep in mind that it will not magically make traditional TeX or pdfTeX support Unicode. It may help if the occasional odd character is not supported by `inputenc`, but may still be processed by TeX when using an accent command (e.g., `\d{S}` instead of `§`). If you need full Unicode support, however, switch to XeTeX or LuaTeX.

Typical errors when `inputenc` cannot handle a certain UTF-8 character are:

```
! Package inputenc Error: Unicode char <char> (U+<codepoint>)
(inputenc)                not set up for use with LaTeX.
```

but also less obvious things like:

```
! Argument of \UTFviii@three@octets has an extra }.
```

## 3 User Guide

This part of the manual documents the user interface of the `biblatex` package. The user guide covers everything you need to know in order to use `biblatex` with the default styles that come with this package. You should read the user guide first in any case. If you want to write your own citation and/or bibliography styles, continue with the author guide afterwards.

### 3.1 Package Options

All package options are given in  $\langle key \rangle = \langle value \rangle$  notation. The value `true` is omissible with all boolean keys. For example, giving `sortcites` without a value is equivalent to `sortcites=true`.

#### 3.1.1 Load-time Options

The following options must be used as `biblatex` is loaded, i. e., in the optional argument to `\usepackage`.

`backend=bibtex, bibtex8, biber` default: `biber`

Specifies the database backend. The following backends are supported:

- |                      |  |
|----------------------|--|
| <code>biber</code>   | <code>biber</code> , the default backend of <code>biblatex</code> , supports US-ASCII, 8-bit encodings, UTF-8, on-the-fly reencoding, locale-specific sorting, and many other features. Locale-specific sorting, case-sensitive sorting, and upper/lowercase precedence are controlled by the options <code>sortlocale</code> , <code>sortcase</code> , and <code>sortupper</code> , respectively. |
| <code>bibtex</code>  | Legacy BibTeX. Traditional BibTeX supports US-ASCII encoding only. Sorting is always case-insensitive.   |
| <code>bibtex8</code> | <code>bibtex8</code> , the 8-bit implementation of BibTeX, supports US-ASCII and 8-bit encodings such as Latin 1.  |

See § 3.16 for details of using BibTeX as a backend.

`style=\langle file \rangle` default: `numeric`

Loads the bibliography style  $\langle file \rangle .bbx$  and the citation style  $\langle file \rangle .cbx$ . See § 3.3 for an overview of the standard styles.

`bibstyle=\langle file \rangle` default: `numeric`

Loads the bibliography style  $\langle file \rangle .bbx$ . See § 3.3.2 for an overview of the standard bibliography styles.

`citestyle=\langle file \rangle` default: `numeric`

Loads the citation style  $\langle file \rangle .cbx$ . See § 3.3.1 for an overview of the standard citation styles.

`natbib=true, false` default: `false`

Loads compatibility module which provides aliases for the citation commands of the `natbib` package. See § 3.9.9 for details.

`mcite=true, false` default: false

Loads a citation module which provides `mcite/mciteplus`-like citation commands. See § 3.9.10 for details.

`casechanger=auto, latex2e, expl3` default: auto

This option selects the implementation of `biblatex`'s case changing functions, most prominently `\MakeSentenceCase*`. `expl3` selects the new implementation based on the LaTeX 3 module `l3text`. Note that the `l3text` module assumes UTF-8 input and that your `expl3` version should be new enough (at least version 2020-04-06). `latex2e` selects the original implementation, which has tricky brace protection behaviour and some shortcomings when dealing with non-US-ASCII characters. The default `auto` selects the case changing code based on the available `expl3` version and detected document encoding (`expl3` is selected if `expl3` is at least version 2020-04-06 and the document encoding is detected as UTF-8).

## 3.1.2 Preamble Options

### 3.1.2.1 General

The following options may be used in the optional argument to `\usepackage` as well as in the configuration file and the document preamble. The default value listed to the right is the package default. Note that bibliography and citation styles may modify the default setting at load time, see § 3.3 for details.

`sorting=nty, nyt, nyvt, anyt, anyvt, ynt, ydnt, none, count,` default: nty  
`debug, <name>`

The sorting order of the bibliography. Unless stated otherwise, the entries are sorted in ascending order. The following choices are available by default:

<code>nty</code>	Sort by name, title, year.
<code>nyt</code>	Sort by name, year, title.
<code>nyvt</code>	Sort by name, year, volume, title.
<code>anyt</code>	Sort by alphabetic label, name, year, title.
<code>anyvt</code>	Sort by alphabetic label, name, year, volume, title.
<code>ynt</code>	Sort by year, name, title.
<code>ydnt</code>	Sort by year (descending), name, title.
<code>none</code>	Do not sort at all. All entries are processed in citation order.
<code>count</code>	Sort in descending order of number of times cited
<code>debug</code>	Sort by entry key. This is intended for debugging only.
<code>&lt;name&gt;</code>	Use <code>&lt;name&gt;</code> , as defined with <code>\DeclareSortingTemplate</code> (§ 4.5.6)

Using any of the 'alphabetic' sorting templates only makes sense in conjunction with a bibliography style which prints the corresponding labels. Note that some bibliography styles initialize this package option to a value different from the package default (`nty`). See § 3.3.2 for details. Please refer to § 3.6 for an in-depth explanation of the above sorting options as well as the fields considered in the sorting process. See also § 4.5.6 on how to adapt the predefined templates or define new ones.

`sortcase=true, false` default: true

Whether or not to sort the bibliography and the list of shorthands case-sensitively.

`sortupper=true, false` default: true

This option corresponds to `biber's --sortupper` command-line option. If enabled, the bibliography is sorted in ‘uppercase before lowercase’ order. Disabling this option means ‘lowercase before uppercase’ order.

`sortlocale=auto,  $\langle locale \rangle$`  default: auto

This option sets the global sorting locale. Every sorting template inherits this locale if none is specified using the  $\langle locale \rangle$  option to `\printbibliography`. Setting this to `auto` requests that it be set to the `babel/polyglossia` main document language identifier, if these packages are used and `en_US` otherwise. `biber` will map `babel/polyglossia` language identifiers into sensible locale identifiers (see the `biber` documentation). You can therefore specify either a normal locale identifier like `de_DE_phonebook`, `es_ES` or one of the supported `babel/polyglossia` language identifiers if the mapping `biber` makes of this is fine for you.

`sortcites=true, false` default: false

Whether or not to sort citations if multiple entry keys are passed to a citation command. If this option is enabled, citations are sorted according to the current bibliography context sorting template (see § 3.8.10). This feature works with all citation styles.

`sortsets=true, false` default: false

Whether or not to sort set members according to the active reference context sorting scheme. By default this is false and set members appear in the order given in the data source.

`pluralothers=true, false` default: false

Controls whether the localised ‘and others’ string (e.g. ‘et al’) is forced to be plural. If true, it will only be printed in place of two or more names and if there is only one name it would replace, the name itself is printed instead. Defaults to false.

`maxnames= $\langle integer \rangle$`  default: 3

A threshold affecting all lists of names (author, editor, etc.). If a list exceeds this threshold, i. e., if it holds more than  $\langle integer \rangle$  names, it is automatically truncated according to the setting of the `minnames` option. `maxnames` is the master option which sets `maxbibnames`, `maxcitenames` and `maxsortnames`. Note that the `uniquelist` feature can locally override `maxnames`, see the documentation of the `uniquelist` option in § 3.1.2.3 and § 4.11.4.

`minnames= $\langle integer \rangle$`  default: 1

A limit affecting all lists of names (author, editor, etc.). If a list holds more than  $\langle maxnames \rangle$  names, it is automatically truncated to  $\langle minnames \rangle$  names. The  $\langle minnames \rangle$  value must be smaller than or equal to  $\langle maxnames \rangle$ . `minnames` is the master option which sets both `minbibnames` and `mincitenames`. Like `maxnames` the value of `minnames` can be overridden by `uniquelist`.

`maxbibnames`= $\langle integer \rangle$  default:  $\langle maxnames \rangle$

Similar to `maxnames` but affects only the bibliography.

`minbibnames`= $\langle integer \rangle$  default:  $\langle minnames \rangle$

Similar to `minnames` but affects only the bibliography.

`maxcitenames`= $\langle integer \rangle$  default:  $\langle maxnames \rangle$

Similar to `maxnames` but affects only the citations in the document body.

`mincitenames`= $\langle integer \rangle$  default:  $\langle minnames \rangle$

Similar to `minnames` but affects only the citations in the document body.

`maxsortnames`= $\langle integer \rangle$  default:  $\langle maxbibnames \rangle$

Similar to `maxnames` but affects only the names visible to sorting. Since this defaults to  $\langle maxbibnames \rangle$ , you should set this after `maxbibnames` if `maxbibnames` is explicitly set.

`minsortnames`= $\langle integer \rangle$  default:  $\langle minbibnames \rangle$

Similar to `minnames` but affects only the names visible to sorting. Since this defaults to  $\langle minbibnames \rangle$ , you should set this after `minbibnames` if `minbibnames` is explicitly set.

`maxitems`= $\langle integer \rangle$  default: 3

Similar to `maxnames`, but affecting all literal lists (publisher, location, etc.).

`minitems`= $\langle integer \rangle$  default: 1

Similar to `minnames`, but affecting all literal lists (publisher, location, etc.).

`autocite`=plain, inline, footnote, superscript, ...

This option controls the behavior of the `\autocite` command discussed in § 3.9.4. The plain option makes `\autocite` behave like `\cite`, inline makes it behave like `\parencite`, footnote makes it behave like `\footcite`, and superscript makes it behave like `\supercite`. The options plain, inline, and footnote are always available, the superscript option is only provided by the numeric citation styles which come with this package. The citation style may also define additional options. The default setting of this option depends on the selected citation style, see § 3.3.1.

`autopunct`=true, false default: true

This option controls whether the citation commands scan ahead for punctuation marks. See § 3.9 and `\DeclareAutoPunctuation` in § 4.7.5 for details.

`language`=autobib, autocite, auto,  $\langle language \rangle$  default: autobib

This option controls multilingual support. By default `biblatex` automatically picks up the active surrounding language from the `babel`/`polyglossia` package<sup>15</sup> (and

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<sup>15</sup>Note that `biblatex` has only limited support for `polyglossia` versions prior to v1.45. If `polyglossia` is used, it should be updated to version 1.45 (2019/10/27) or above.



fall back to English if `babel/polyglossia` is not available). `autobib` switches the language for each entry in the bibliography using the `langid` field and the language environment specified by the `autolang` option. `autocite` switches the language for each citation using the `langid` field and the language environment specified by the `autolang` option. `auto` is a shorthand to set both `autobib` and `autocite`. It is also possible to select the package language manually. In this case, the language chosen will override the `langid` of entries and you should still choose a language switching environment with the `autolang` option to select how the switch to the manually chosen language is handled. Please refer to table 2 for a list of supported languages and the corresponding identifiers.

`clearlang=true, false` default: true

If this option is enabled, `biblatex` will automatically clear the language field of all entries whose language matches the `babel/polyglossia` language of the document (or the language specified explicitly with the `language` option) in order to omit redundant language specifications. The language mappings required by this feature are provided by the `\DeclareRedundantLanguages` command from § 4.9.1. This option is also settable on a per-type and per-entry basis.

`autolang=none, hyphen, other, other*, langname` default: none

This option controls which `babel` language environment<sup>16</sup> is used if the `babel/polyglossia` package is loaded and a bibliography entry includes a `langid` field (see § 2.2.3). Note that regardless of the selected value `biblatex` automatically adjusts to the main document language if `babel/polyglossia` is loaded. In multilingual documents, it will also continually adjust to the current language as far as citations and the default language of the bibliography is concerned. The effect of additional language adjustment, which can negate the effect of picking up the surrounding language, depends on the language environment selected by this option. The possible choices are:

- `none`            Do not use any additional enclosing language environment at all. This means that citations and the bibliography are set in the currently active language—this need not be the main language.
- `hyphen`        Enclose the entry in a `hyphenrules` environment. This will load hyphenation patterns for the language specified in the `langid` field of the entry, if available. Localisation strings and extra language definitions are not changed and taken from the surrounding language environment.
- `other`          Enclose the entry in an `otherlanguage` environment. This will load hyphenation patterns for the specified language, enable all extra definitions which `babel/polyglossia` and `biblatex` provide for the respective language, and translate key terms such as ‘editor’ and ‘volume’. The extra definitions include localisations of the date format, of ordinals, and similar things.
- `other*`        Enclose the entry in an `otherlanguage*` environment. Please note that `biblatex` treats `otherlanguage*` like `otherlanguage` if `langhook` is set to `extras`.

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<sup>16</sup>`polyglossia` understands the `babel` language environments too and so this option controls both the `babel` and `polyglossia` language environments.

`langname` polyglossia only. Enclose the entry in a `<language>` environment. The benefit of this option value for polyglossia users is that it takes note of the `langidopts` field so that you can add per-language options to an entry (like selecting a language variant). When using babel, this option does the same as the other option value.

`langhook=captions, extras` default: captions

This option controls whether bibliography strings and extras are written to `\captions<language>` or `\extras<language>`. The exact effect of this option depend on the language package (babel/polyglossia). Broadly speaking, the language switching environments provided by those packages (except hyphenrules) either switch language captions and extras or only language extras. Hence, if this option is set to `extras`, all language switches will affect biblatex, whereas with `captions` only language switches that also switch other parts of the document language affect biblatex.

`block=none, space, par, nbpar, ragged` default: none

This option controls the extra spacing between blocks, i. e., larger segments of a bibliography entry. The possible choices are:

<code>none</code>	Do not add anything at all.
<code>space</code>	Insert additional horizontal space between blocks. This is similar to the default behavior of the standard LaTeX document classes.
<code>par</code>	Start a new paragraph for every block. This is similar to the <code>openbib</code> option of the standard LaTeX document classes.
<code>nbpar</code>	Similar to the <code>par</code> option, but disallows page breaks at block boundaries and within an entry.
<code>ragged</code>	Inserts a small negative penalty to encourage line breaks at block boundaries and sets the bibliography ragged right.

The `\newblockpunct` command may also be redefined directly to achieve different results, see § 3.12.1. Also see § 4.7.1 for additional information.

`locallabelwidth=true, false` default: false

This option controls whether `\printbibliography` uses a locally calculated value for `\labelnumberwidth` and `\labelalphawidth` or the global value calculated from all entries. The local value is calculated separately for each bibliography and takes into account only the entries displayed in that bibliography. This option is useful if there are several bibliographies with wildly varying label lengths in the same document.

`notetype=foot+end, footonly, endonly` default: foot+end

This option controls the behavior of `\mkbibfootnote`, `\mkbibendnote`, and similar wrappers from § 4.10.4. The possible choices are:

<code>foot+end</code>	Support both footnotes and endnotes, i. e., <code>\mkbibfootnote</code> will generate footnotes and <code>\mkbibendnote</code> will generate endnotes.
<code>footonly</code>	Force footnotes, i. e., make <code>\mkbibendnote</code> generate footnotes.
<code>endonly</code>	Force endnotes, i. e., make <code>\mkbibfootnote</code> generate endnotes.

`hyperref=true, false, auto, manual`

default: `auto`

Whether or not to transform citations and back references into clickable hyperlinks. This feature requires the `hyperref` package. It also requires support by the selected citation style. All standard styles which ship with this package support hyperlinks. `hyperref=auto` automatically detects if the `hyperref` package has been loaded. This is the default setting. `hyperref=false` explicitly disables links even if `hyperref` is loaded. `hyperref=true` enables links when `hyperref` is loaded, it cannot explicitly enable links if `hyperref` is not loaded, as such it works exactly like `hyperref=auto` except that it will issue a warning if `hyperref` is not loaded. `hyperref=manual` gives full manual control over `hyperref` interaction, it should only be needed by package authors in very special circumstances. With the `hyperref=manual` setting you are responsible to enable or disable `hyperref` support manually with `\BiblatexManualHyperrefOn` or `\BiblatexManualHyperrefOff` yourself. One of the two commands must be called exactly once; `\BiblatexManualHyperrefOn` can only be called after `hyperref` is loaded.

`backref=true, false`

default: `false`

Whether or not to print back references in the bibliography. The back references are a list of page numbers indicating the pages on which the respective bibliography entry is cited. If there are `refsection` environments in the document, the back references are local to the reference sections. Strictly speaking, this option only controls whether the `biblatex` package collects the data required to print such references. This feature still has to be supported by the selected bibliography style. All standard styles which come with this package do so.

`backrefstyle=none, three, two, two+, three+, all+`

default: `three`

This option controls how sequences of consecutive pages in the list of back references are formatted. The following styles are available:

<code>none</code>	Disable this feature, i. e., do not compress the page list.
<code>three</code>	Compress any sequence of three or more consecutive pages to a range, e. g., the list ‘1, 2, 11, 12, 13, 21, 22, 23, 24’ is compressed to ‘1, 2, 11–13, 21–24’.
<code>two</code>	Compress any sequence of two or more consecutive pages to a range, e. g., the above list is compressed to ‘1–2, 11–13, 21–24’.
<code>two+</code>	Similar in concept to <code>two</code> but a sequence of exactly two consecutive pages is printed using the starting page and the localisation string <code>sequens</code> , e. g., the above list is compressed to ‘1 sq., 11–13, 21–24’.
<code>three+</code>	Similar in concept to <code>two+</code> but a sequence of exactly three consecutive pages is printed using the starting page and the localisation string <code>sequentes</code> , e. g., the above list is compressed to ‘1 sq., 11 sqq., 21–24’.
<code>all+</code>	Similar in concept to <code>three+</code> but any sequence of consecutive pages is printed as an open-ended range, e. g., the above list is compressed to ‘1 sq., 11 sqq., 21 sqq.’.

All styles support both Arabic and Roman numerals. In order to avoid potentially ambiguous lists, different sets of numerals will not be mixed when generating ranges, e. g., the list ‘iii, iv, v, 6, 7, 8’ is compressed to ‘iii–v, 6–8’.

`backrefsetstyle`=setonly, memonly, setormem, setandmem, memandset, setplusmem default: setonly

This option controls how back references to @set entries and their members are handled. The following options are available:

- `setonly` All back references are added to the @set entry. The pageref lists of set members remain blank.
- `memonly` References to set members are added to the respective member. References to the @set entry are added to all members. The pageref list of the @set entry remains blank.
- `setormem` References to the @set entry are added to the @set entry. References to set members are added to the respective member.
- `setandmem` References to the @set entry are added to the @set entry. References to set members are added to the respective member and to the @set entry.
- `memandset` References to the @set entry are added to the @set entry and to all members. References to set members are added to the respective member.
- `setplusmem` References to the @set entry are added to the @set entry and to all members. References to set members are added to the respective member and to the @set entry.

`backreffloats`=true, false default: true

Whether to enable back references to citations in floats.

`indexing`=true, false, cite, bib default: false

This option controls indexing in citations and in the bibliography. More precisely, it affects the `\ifciteindex` and `\ifbibindex` commands from § 4.6.2. The option is settable on a global, a per-type, or on a per-entry basis. The possible choices are:

- `true` Enable indexing globally.
- `false` Disable indexing globally.
- `cite` Enable indexing in citations only.
- `bib` Enable indexing in the bibliography only.

This feature requires support by the selected citation style. All standard styles which come with this package support indexing of both citations and entries in the bibliography. Note that you still need to enable indexing globally with `\makeindex` to get an index.

`loadfiles`=true, false default: false

This option controls whether external files requested by way of the `\printfile` command are loaded. See also § 3.14.8 and `\printfile` in § 4.4.1. Note that this feature is disabled by default for performance reasons.

`refsection`=none, part, chapter, chapter+, section, section+, subsection, subsection+ default: none

This option automatically starts a new reference section at a document division such as a chapter or a section. This is equivalent to the `\newrefsection` command, see § 3.8.4 for details. The following choice of document divisions is available:

<code>none</code>	Disable this feature.
<code>part</code>	Start a reference section at every <code>\part</code> command.
<code>chapter</code>	Start a reference section at every <code>\chapter</code> command.
<code>chapter+</code>	Start a reference section at every <code>\chapter</code> and every higher level of sectioning, i.e. <code>\part</code> .
<code>section</code>	Start a reference section at every <code>\section</code> command.
<code>section+</code>	Start a reference section at every <code>\section</code> and every higher level of sectioning, i.e. <code>\part</code> and <code>\chapter</code> (if available).
<code>subsection</code>	Start a reference section at every <code>\subsection</code> command.
<code>subsection+</code>	Start a reference section at every <code>\subsection</code> and every higher level of sectioning, i.e. <code>\part</code> , <code>\chapter</code> (if available) and <code>\section</code> .

The starred versions of these commands will not start a new reference section.

`refsegment=none, part, chapter, chapter+, section, section+, subsection, subsection+`      default: none

Similar to the `refsection` option but starts a new reference segment. This is equivalent to the `\newrefsegment` command, see § 3.8.5 for details. When using both options, note that you can only apply this option to a lower-level document division than the one `refsection` is applied to and that nested reference segments will be local to the enclosing reference section.

`citereset=none, part, chapter, chapter+, section, section+, subsection, subsection+`      default: none

This option automatically executes the `\citereset` command from § 3.9.8 at a document division such as a chapter or a section. The following choice of document divisions is available:

<code>none</code>	Disable this feature.
<code>part</code>	Perform a reset at every <code>\part</code> command.
<code>chapter</code>	Perform a reset at every <code>\chapter</code> command.
<code>chapter+</code>	Perform a reset at every <code>\chapter</code> and <code>\part</code> command.
<code>section</code>	Perform a reset at every <code>\section</code> command.
<code>section+</code>	Perform a reset at every <code>\section</code> , <code>\chapter</code> (if supported by the class) and <code>\part</code> command.
<code>subsection</code>	Perform a reset at every <code>\subsection</code> command.
<code>subsection+</code>	Perform a reset at every <code>\subsection</code> , <code>\section</code> , <code>\chapter</code> (if supported by the class) and <code>\part</code> command.

`abbreviate=true, false`      default: true

Whether or not to use long or abbreviated strings in citations and in the bibliography. This option affects the localisation modules. If this option is enabled, key terms such as ‘editor’ are abbreviated. If not, they are written out. This option is also settable on a per-type or per-entry basis.

`date=year, short, long, terse, comp, ymd, iso`

default: `comp`

This option controls the basic format of printed date specifications. The following choices are available:

<code>year</code>	Use only years, for example: 2010 2010–2012
<code>short</code>	Use the short format with verbose ranges, for example: 01/01/2010 21/01/2010–30/01/2010 01/21/2010–01/30/2010
<code>long</code>	Use the long format with verbose ranges, for example: 1st January 2010 21st January 2010–30th January 2010 January 21, 2010–January 30, 2010
<code>terse</code>	Use the short format with compact ranges, for example: 21–30/01/2010 01/21–01/30/2010
<code>comp</code>	Use the long format with compact ranges, for example: 21st–30th January 2010 January 21–30, 2010
<code>iso</code>	Use ISO8601 Extended Format ( <code>yyyy-mm-dd</code> ), for example: 2010-01-01 2010-01-21/2010-01-30
<code>ymd</code>	A year-month-day format which can be modified by other options unlike strict <code>iso8601-2</code> , for example: 2010-1-1 2010-1-21/2010-1-30

Note that `iso` format will enforce `dateera=astronomical`, `datezeros=true`, `timezeros=true`, `seconds=true`, `<datatype>time=24h` and `julian=false`. `ymd` is an EDTF-like format but which can change the various options which the strict `iso` option does not allow for.

As seen in the above examples, the actual date format is language specific. Note that the month name in all long formats is responsive to the `abbreviate` package option. The leading zeros for months and days in all short formats may be controlled separately with the `datezeros` package option. The leading zeros for hours, minutes and seconds in all short formats may be controlled separately with the `timezeros` package option. If outputting times, the printing of seconds and `timezones` is controlled by the `seconds` and `timezones` options respectively.

The options `julian` and `gregorianstart` may be used to control when to output Julian Calendar dates.

`labeldate=year, short, long, terse, comp, ymd, iso` default: year

Similar to the `date` option but controls the format of the date field selected with `\DeclareLabeldate`.

`<datatype>date=year, short, long, terse, comp, ymd, iso` default: comp

Similar to the `date` option but controls the format of the `<datatype>date` field in the datamodel.

`alldates=year, short, long, terse, comp, ymd, iso`

Sets the option for all dates in the datamodel to the same value. The date fields in the default data model are `date`, `origdate`, `eventdate` and `urldate`.

`julian=true, false` default: false

This option controls whether dates before the date specified in the `gregorianstart` option will be converted automatically to the Julian Calendar. Dates so changed will return ‘true’ for the `\ifdatejulian` and `\if<datatype>datejulian` tests (see § 4.6.2). Please bear in mind that dates consisting of just a year like ‘1565’ will never be converted to a Julian Calendar date because a date without a month and day has an ambiguous Julian Calendar representation<sup>17</sup>. For example, in the case of ‘1565’, this is Julian year ‘1564’ until after the Gregorian date ‘10th January 1565’ when the Julian year becomes ‘1565’.

`gregorianstart=<YYYY-MM-DD>`

This option controls the date before which dates are converted to the Julian Calendar. It is a strict format string, 4-digit year, 2-digit month and day, separated by a single dash character (any valid Unicode character with the ‘Dash’ property). The default is ‘1582-10-15’, the date of the instigation of the standard Gregorian Calendar. This option does not nothing unless `julian` is set to ‘true’.

`datezeros=true, false` default: true

This option controls whether `short` and `terse` date components are printed with leading zeros unless overridden by specific formatting.

`timezeros=true, false` default: true

This option controls whether time components are printed with leading zeros unless overridden by specific formatting.

`timezones=true, false` default: false

This option controls whether `timezones` are printed when printing times.

`seconds=true, false` default: false

This option controls whether `seconds` are printed when printing times.

`dateabbrev=true, false` default: true

This option controls whether `long` and `comp` dates are printed with long or abbreviated month/year/division names. The option is similar to the generic `abbreviate` option but specific to the date formatting. This option is also settable on a per-type and per-entry basis.

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<sup>17</sup>This is potentially true for dates missing times too but this is not relevant for bibliographic work.



`datecirca=true, false` default: false

This option controls whether to output ‘circa’ information about dates. If set to `true`, dates will be preceded by the expansion of the `\datecircaprint` macro (§ 3.12.1).

`dateuncertain=true, false` default: false

This option controls whether to output uncertainty information about dates. If set to `true`, dates will be followed by the expansion of the `\dateuncertainprint` macro and end dates will be followed by the `\enddateuncertainprint` macro (§ 3.12.1).

`dateera=astronomical, secular, christian` default: astronomical

This option controls how date era information is printed. ‘astronomical’ uses `\dateeraprintpre` to print era information *before* start/end dates. ‘secular’ and ‘christian’ uses `\dateeraprint` to print era information *after* the start/end-dates. By default ‘astronomical’ results in a minus sign before BCE/BC dates and ‘secular’/‘christian’ results in the relevant localisation strings like ‘BCE’ or ‘BC’ after BCE/BC dates. See the relevant comments in § 3.12.1 and the localisation strings in § 4.9.2.21.

`dateeraauto=<integer>` default: 0

This option sets the astronomical year, below which era localisation strings are automatically added. This option does nothing without `dateera` being set to ‘secular’ or ‘christian’.

`time=12h, 24h, 24hcomp` default: 24h

This option controls the basic format of printed time specifications. The following choices are available:

- |                      |  |
|----------------------|--|
| <code>24h</code>     | 24-hour format, for example:<br>14:03:23<br>14:3:23<br>14:03:23+05:00<br>14:03:23Z<br>14:21:23–14:23:45<br>14:23:23–14:23:45       |
| <code>24hcomp</code> | 24-hour format with compressed ranges, for example:<br>14:21–23 (hours are the same)<br>14:23:23–45 (hour and minute are the same) |
| <code>12h</code>     | 12-hour format with (localised) AM/PM markers, for example:<br>2:34 PM<br>2:34 PM–3:50 PM  |

As seen in the above examples, the actual time format is language specific. Note that the AM/PM string is responsive to the `abbreviate` package option, if this makes a difference in the specific locale. The leading zeros in the 24-hour formats may be controlled separately with the `timezeros` package option. The separator between

time components (`\bibtimesep` and `\bibtzminsep`) and between the time and any timezone (`\bibtimezonesep`) are also language specific and customisable, see § 3.12.3. There are global package options which determine whether seconds and timezones are printed (`seconds` and `timezones`, respectively, see § 3.1.2.1). Timezones, if present, are either ‘Z’ or a numeric positive or negative offset. No default styles print time information. Custom styles may print times by using the `\print<datatype>time` commands, see § 4.4.1.

`labeltime=12h, 24h, 24hcomp` default: 24h

Similar to the `time` option but controls the format of the time part fields obtained from the field selected with `\DeclareLabeldate`.

`<datatype>time=12h, 24h, 24hcomp` default: 24h

Similar to the `time` option but controls the format of the time part fields obtained from the `<datatype>date` field in the datamodel.

`alltimes=12h, 24h, 24hcomp`

Sets `labeltime` and the `<datatype>time` option for all times in the datamodel to the same value. The date fields supporting time parts in the default data model are `date`, `origdate`, `eventdate` and `urldate`.

`dateusetime=true, false` default: false

Specifies whether to print any time component of a date field after the date component. The separator between the date and time components is `\bibdatetimesep` from § 3.12.3.

`labeldateusetime=true, false` default: false

Similar to the `dateusetime` option but controls the whether to print time components for the field selected with `\DeclareLabeldate`.

`<datatype>dateusetime=true, false`  
default: false

Similar to the `dateusetime` option but controls the whether to print time components for the `<datatype>date` field in the datamodel.

`alldatesusetime=true, false` default: false

Sets `labeldateusetime` and the `<datatype>dateusetime` option for all `<datatype>date` fields in the datamodel.

`defernumbers=true, false` default: false

In contrast to standard LaTeX, the numeric labels generated by this package are normally assigned to the full list of references at the beginning of the document body. If this option is enabled, numeric labels (i.e., the `labelnumber` field discussed in § 4.2.4) are assigned the first time an entry is printed in any bibliography. See § 3.15.5 for further explanation. This option requires two LaTeX runs after the data has been exported to the `bb1` file by the backend (in addition to any other runs required by page breaks changing etc.). An important thing to note is that if you are using this option, then changes to options, the `bib` file or certain commands like `\printbibliography` will usually require that you delete your current `aux` file and re-run LaTeX to obtain the correct numbering. See § 4.1.

`punctfont=true, false` default: false

This option enables an alternative mechanism for dealing with unit punctuation after a field printed in a different font (for example, a title printed in italics). See `\setpunctfont` in § 4.7.1 for details.

`arxiv=abs, ps, pdf, format` default: abs

Path selector for arXiv links. If hyperlink support is enabled, this option controls which version of the document the arXiv eprint links will point to. The following choices are available:

<code>abs</code>	Link to the abstract page.
<code>ps</code>	Link to the PostScript version.
<code>pdf</code>	Link to the PDF version.
<code>format</code>	Link to the format selector page.

See § 3.14.7 for details on support for arXiv and electronic publishing information.

`texencoding=auto,  $\langle encoding \rangle$`  default: auto

Specifies the encoding of the `tex` file. This option affects the data transferred from the backend to `biblatex`. This corresponds to `biber`'s `--output-encoding` option. The following choices are available:

<code>auto</code>	Try to auto-detect the input encoding. If the <code>inputenc/inputenx/luainputenc</code> package is available, <code>biblatex</code> will get the main encoding from that package. If not, it assumes UTF-8 encoding if a LaTeX format using at least the April 2018 version of the kernel, XeTeX or LuaTeX has been detected, and US-ASCII otherwise.
$\langle encoding \rangle$	Specifies the $\langle encoding \rangle$ explicitly. This is for odd cases in which auto-detection fails or you want to force a certain encoding for some reason.

Note that setting `texencoding= $\langle encoding \rangle$`  will also affect the `bibencoding` option if `bibencoding=auto`.

`bibencoding=auto,  $\langle encoding \rangle$`  default: auto

Specifies the default encoding of the `bib` files. This can be overridden on a per-datasource basis using the `bibencoding` option to `\addbibresource`, see § 3.8.1. This option corresponds to `biber`'s `--input-encoding` option. The following choices are available:

<code>auto</code>	Use this option if the workflow is transparent, i. e., if the encoding of the <code>bib</code> file is identical to the encoding of the <code>tex</code> file.
$\langle encoding \rangle$	If the encoding of the <code>bib</code> file is different from the one of the <code>tex</code> file, you need to specify it explicitly.

By default, `biblatex` assumes that the `tex` file and the `bib` file use the same encoding (`bibencoding=auto`).

`safeinputenc=true, false` default: false

If this option is enabled, `biblatex` will automatically force `texencoding=ascii` if the `inputenc/inputenx` package has been loaded and the input encoding is UTF-8, i. e., it will ignore any macro-based UTF-8 support and use US-ASCII only.

biber will then try to convert any non-US-ASCII data in the bib file to US-ASCII. For example, it will convert § to \d{S}. See § 2.4.2.1 for an explanation of why you may want to enable this option.

`bibwarn=true, false` default: true

By default, biblatex will report warnings issued by the backend concerning the data in the bib file as LaTeX warnings. Use this option to suppress such warnings.

`mincrossrefs=<integer>` default: 2

Sets the minimum number of cross references to *<integer>* when requesting a backend run.<sup>18</sup> This option also affects the handling of the `xref` field. See the field description in § 2.2.3 as well as § 2.4.1 for details.

`minxrefs=<integer>` default: 2

As `mincrossrefs` but for `xref` fields.

`bibtexcaseprotection=true, false`  
default: true

This option only has an effect when the `expl3` implementation of the case changing functions is selected. If the option is set to `true`, `\MakeSentenceCase*` supports brace protection of words from case change as in classical BibTeX. If the option is set to `false`, pairs of braces no longer imply case protection, which can now be enforced by wrapping the relevant word in `\NoCaseChange`—this makes for a less confusing, if more verbose, markup of case protection.

### 3.1.2.2 Style-specific

The following options are provided by all standard bibliography styles (as opposed to the core package). The options are available as preamble options like those in § 3.1.2.1 and at a per-type and per-entry scope.

`isbn=true, false` default: true

This option controls whether the fields `isbn/issn/isrn` are printed.

`url=true, false` default: true

This option controls whether the `url` field and the access date is printed. The option only affects entry types whose `url` information is optional. The `url` field of `@online` entries is always printed.

`doi=true, false` default: true

This option controls whether the field `doi` is printed.

`eprint=true, false` default: true

This option controls whether `eprint` information is printed.

`related=true, false` default: true

Whether to use information from related entries or not. See § 3.5.

---

<sup>18</sup>If an entry which is cross-referenced by other entries in the bib file hits this threshold, it is included in the bibliography even if it has not been cited explicitly. This is a standard feature of the BibTeX format and not specific to biblatex. See the description of the `crossref` field in § 2.2.3 for further information.

**alphabetic/numeric** Additionally, styles of the `alphabetic` and `numeric` family support the `subentry` option in global, per-type and per-entry scope.

`subentry=true, false`

default: `false`

This option affects the handling of citations to set members and the display of sets in the bibliography. If the option is enabled, citations to individual set members feature an additional letter that identifies the member, that letter is also printed in the bibliography. If the option is disabled, a citation to the member of a set will display just as a citation to the entire set and there will be no additional letters in the bibliography entries enumerating the members.

Suppose `key1` and `key2` are members of the set `set1`. With `subentry` set to `true` in a numeric style a citation to `key1` will show as `[1a]` and a citation to `key2` as `[1b]`, while the entire set `set1` will be cited as `[1]`. Furthermore `(a)` and `(b)` will be added in front of the entry data for the set members in the bibliography entry for the set. With `subentry` set to `false` citations to all three keys will show as `[1]`, no additional letter will be printed in the bibliography.

**numeric-comp** The citation style `numeric-comp` supports the `subentrycomp` option in global, per-type and per-entry scope.

`subentrycomp=true, false`

default: `true`

This option determines whether or not citations to set members are compressed similar to non-set citations. The option only has an effect if `subentry` is set to `true`.

Suppose `key1`, `key2` and `key3` are members of the set `set1`. With `subentrycomp` set to `true` the three entries will be compressed to `[1a–c]` in citations. With `subentry` set to `false` the citation will show in the more verbose form `[1a, 1b, 1c]`.

The option is intended mainly for backwards compatibility, because earlier versions of `biblatex` did not compress set member citations.

**authortitle/authoryear** All bibliography styles of the `authoryear` and `authortitle` family as well as all bibliography styles of the `verbose` family—whose bibliography styles are based on `authortitle`—support the option `dashed` in global scope.

`dashed=true, false`

default: `true`

This option controls whether recurrent the same author/editor list in the bibliography are replaced by a dash (`\bibnamdeash`, see § 3.12.1). If the option is enabled, subsequent mentions of the same name list at the beginning of an entry are replaced by a dash provided the entry is not the first on the current page. If the option is disabled, name lists are never replaced by a dash.

**authoryear** Bibliography styles of the `authoryear` family provide the option `mergedate` in global, per-type and per-entry scope.

`mergedate=false, minimum, basic, compact, maximum, true`

default: `true`

This option controls whether and how the date specification in the entry is merged with the date label shown directly after the author/editor list.

<code>false</code>	Strictly separate the date specification shown in the entry (styled with <code>date</code> ) from the date label (styled with <code>labeldate</code> ). The date will always be shown twice.
<code>minimum</code>	Omit the date specification whenever it coincides <i>exactly</i> —including <code>extradate</code> information—with the output of the date label.
<code>basic</code>	Similar to <code>minimum</code> , but the date specification will also be omitted if it differs from the date label only by the absence of the <code>extradate</code> letter.
<code>compact</code>	Merges all date specifications with the date label. The date format of that merged date label is controlled by <code>date</code> , not <code>labeldate</code> , even if it is printed in the position of the date label. The <code>issue</code> field is not merged.
<code>maximum</code>	Like <code>compact</code> , but if present the <code>issue</code> field will also be moved into the date label at the beginning of the entry.
<code>true</code>	An alias for <code>compact</code> .

More in-depth examples of this option can be found in the style examples.

**‘ibid’ styles** Citation styles with ‘ibid.’ function, namely `authortitle-ibid`, `authortitle-icomp`, `authoryear-ibid`, `authoryear-icomp`, `verbose-ibid`, `verbose-inote`, `verbose-trad1`, `verbose-trad2` and `verbose-trad3` provide the global `ibidpage` option.

`ibidpage=true, false` default: false

Whether *ibidem* without page reference means ‘same work’ or ‘same work + same page’. If set to `true` a page range postnote will be suppressed in an *ibidem* citation if the last citation was to the same page range. With `ibidpage=false` the postnote is not omitted. Citations to different page ranges than the previous always produce the page ranges with either setting.

**verbose** All citation styles of the `verbose` family provide the global option `citepages`.

`citepages=permit, suppress, omit, separate` default: permit

This option controls the output of the `page/pagetotal` field in the full citation in combination with a postnote containing a page range. The option can be used to suppress references to two page ranges in full citations like the following

Author. “Title.” In: *Book*, pp. 100–150, p. 125.

Here ‘p. 125’ is the `postnote` argument and ‘pp. 100–150’ is the value of the `pages` field.

<code>permit</code>	Allow duplication of page specifications, i.e. print both <code>page/pagetotal</code> and <code>postnote</code> .
<code>suppress</code>	Unconditionally suppress the <code>pages/pagetotal</code> fields in citations, regardless of the <code>postnote</code> .
<code>omit</code>	Suppress the <code>pages/pagetotal</code> if the <code>postnote</code> contains a page range. They are still printed if there is no <code>postnote</code> or if the <code>postnote</code> is not a number or range.

**separate** Separate the pages/pagetotal from the postnote if the latter contains a page range. The string `thiscite` is added to separate the two page ranges.

**verbose-trad** The citation styles of the `verbose-trad` family support the global option `strict`.

`strict=true, false` default: false

This option allows to restrict the use of the scholarly abbreviations ‘ibid.’ and ‘op. cit.’ to avoid ambiguities. If the option is set to `true` these terms will only be used if the relevant work was cited in the same or previous footnote.

**reading** The `reading` style supports a number of additional options, but these are not of general interest and can be found in the style example.

### 3.1.2.3 Internal

The default settings of the following preamble options are controlled by bibliography and citation styles. Apart from the `pagetracker` and `<name>inits` options, which you may want to adapt, there is normally no need to set them explicitly.

`pagetracker=true, false, page, spread` default: false

This option controls the page tracker which is required by the `\ifsamepage` and `\iffirstonpage` tests from § 4.6.2. The possible choices are:

- `true` Enable the tracker in automatic mode. This is like `spread` if LaTeX is in `twoside` mode, and like `page` otherwise.
- `false` Disable the tracker.
- `page` Enable the tracker in page mode. In this mode, tracking works on a per-page basis.
- `spread` Enable the tracker in spread mode. In this mode, tracking works on a per-spread (double page) basis.

Note that this tracker is disabled in all floats unless explicitly requested with `trackfloats`, see § 4.11.5.

`citecounter=true, false, context` default: false

This option controls the citation counter which is required by `citecounter` from § 4.6.2. The possible choices are:

- `true` Enable the citation counter in global mode.
- `false` Disable the citation counter.
- `context` Enable the citation counter in context-sensitive mode. In this mode, citations in footnotes and in the body text are counted independently.

`citetracker=true, false, context, strict, constrict` default: false

This option controls the citation tracker which is required by the `\ifciteseen` and `\ifentryseen` tests from § 4.6.2. The possible choices are:

- `true` Enable the tracker in global mode.



<code>false</code>	Disable the tracker.
<code>context</code>	Enable the tracker in context-sensitive mode. In this mode, citations in footnotes and in the body text are tracked independently.
<code>strict</code>	Enable the tracker in strict mode. In this mode, an item is only considered by the tracker if it appeared in a stand-alone citation, i. e., if a single entry key was passed to the citation command.
<code>constrict</code>	This mode combines the features of <code>context</code> and <code>strict</code> .

Note that this tracker is disabled in all floats unless explicitly requested with `trackfloats`, see § 4.11.5. This option is also settable on a per-type or per-entry basis.

`ibidtracker=true, false, context, strict, constrict` default: false

This option controls the ‘ibidem’ tracker which is required by the `\ifciteibid` test from § 4.6.2. The possible choices are:

<code>true</code>	Enable the tracker in global mode.
<code>false</code>	Disable the tracker.
<code>context</code>	Enable the tracker in context-sensitive mode. In this mode, citations in footnotes and in the body text are tracked separately.
<code>strict</code>	Enable the tracker in strict mode. In this mode, potentially ambiguous references are suppressed. A reference is considered ambiguous if either the current citation (the one including the ‘ibidem’) or the previous citation (the one the ‘ibidem’ refers to) consists of a list of references. <sup>19</sup>
<code>constrict</code>	This mode combines the features of <code>context</code> and <code>strict</code> . It also keeps track of footnote numbers and detects potentially ambiguous references in footnotes in a stricter way than the <code>strict</code> option. In addition to the conditions imposed by the <code>strict</code> option, a reference in a footnote will only be considered as unambiguous if the current citation and the previous citation are given in the same footnote or in immediately consecutive footnotes.

Note that this tracker is disabled in all floats unless explicitly requested with `trackfloats`, see § 4.11.5. This option is also settable on a per-type or per-entry basis.

`opcittracker=true, false, context, strict, constrict` default: false

This option controls the ‘opcit’ tracker which is required by the `\ifopcit` test from § 4.6.2. This feature is similar to the ‘ibidem’ tracker, except that it tracks citations on a per-author/editor basis, i. e., `\ifopcit` will yield `true` if the cited item is the same as the last one by this author/editor. The possible choices are:

<code>true</code>	Enable the tracker in global mode.
<code>false</code>	Disable the tracker.

<sup>19</sup>For example, suppose the initial citation is “Jones, *Title*; Williams, *Title*” and the following one “ibidem”. From a technical point of view, it is fairly clear that the ‘ibidem’ refers to ‘Williams’ because this is the last reference processed by the previous citation command. To a human reader, however, this may not be obvious because the ‘ibidem’ may also refer to both titles. The strict mode avoids such ambiguous references.

- `context` Enable the tracker in context-sensitive mode. In this mode, citations in footnotes and in the body text are tracked separately.
- `strict` Enable the tracker in strict mode. In this mode, potentially ambiguous references are suppressed. See `ibidtracker=strict` for details.
- `constrict` This mode combines the features of `context` and `strict`. See the explanation of `ibidtracker=constrict` for details.

Note that this tracker is disabled in all floats unless explicitly requested with `trackfloats`, see § 4.11.5. This option is also settable on a per-type or per-entry basis.

`loccittracker=true, false, context, strict, constrict` default: false

This option controls the ‘loccit’ tracker which is required by the `\ifloccit` test from § 4.6.2. This feature is similar to the ‘opcit’ tracker except that it also checks whether the *⟨postnote⟩* arguments match, i.e., `\ifloccit` will yield `true` if the citation refers to the same page cited before. The possible choices are:

- `true` Enable the tracker in global mode.
- `false` Disable the tracker.
- `context` Enable the tracker in context-sensitive mode. In this mode, citations in footnotes and in the body text are tracked separately.
- `strict` Enable the tracker in strict mode. In this mode, potentially ambiguous references are suppressed. See `ibidtracker=strict` for details. In addition to that, this mode also checks if the *⟨postnote⟩* argument is numerical (based on `\ifnumerals` from § 4.6.2).
- `constrict` This mode combines the features of `context` and `strict`. See the explanation of `ibidtracker=constrict` for details. In addition to that, this mode also checks if the *⟨postnote⟩* argument is numerical (based on `\ifnumerals` from § 4.6.2).

Note that this tracker is disabled in all floats unless explicitly requested with `trackfloats`, see § 4.11.5. This option is also settable on a per-type or per-entry basis.

`idemtracker=true, false, context, strict, constrict` default: false

This option controls the ‘idem’ tracker which is required by the `\ifciteidem` test from § 4.6.2. The possible choices are:

- `true` Enable the tracker in global mode.
- `false` Disable the tracker.
- `context` Enable the tracker in context-sensitive mode. In this mode, citations in footnotes and in the body text are tracked separately.
- `strict` This is an alias for `true`, provided only for consistency with the other trackers. Since ‘idem’ replacements do not get ambiguous in the same way as ‘ibidem’ or ‘op. cit.’, the `strict` tracking mode does not apply to them.
- `constrict` This mode is similar to `context` with one additional condition: a reference in a footnote will only be considered as unambiguous if the current citation and the previous citation are given in the same footnote or in immediately consecutive footnotes.

Note that this tracker is disabled in all floats unless explicitly requested with `trackfloats`, see § 4.11.5. This option is also settable on a per-type or per-entry basis.

`trackfloats=true, false` default: false

Whether to enable citation tracking in floats. Citation tracking in floats can be tricky, so this option should only be enabled if absolutely necessary and the output should be scrutinised carefully, see also § 4.11.5.

`parentracker=true, false` default: true

This option controls the parenthesis tracker which keeps track of nested parentheses and brackets. This information is used by `\parentext` and `\brackettext` from § 3.9.5, `\mkbibparens` and `\mkbibbrackets` from § 4.10.4 and `\bibopenparen`, `\bibcloseparen`, `\bibopenbracket`, `\bibclosebracket` (also § 4.10.4).

`maxparens=<integer>` default: 3

The maximum permitted nesting level of parentheses and brackets. If parentheses and brackets are nested deeper than this value, `biblatex` will issue errors.

`<namepart>inits=true, false` default: false

The option sets the `\if<namepart>inits` test from § 4.6.2. `<namepart>` is any valid name part as defined in the data model by the `\DeclareDatamodelConstant` command (§ 4.2.3). For the given name, for example, the option becomes `giveninits`. This option is also settable on a per-type, per-entry, per-namelist and per-name basis.

If `giveninits` is set to `true`, the default name formats will only render the given name initials and not the full given name. The standard styles only use the test `\ifgiveninits` and hence only respond to the option `giveninits`. Setting the option for a name part different from `given` has no effect on the default name formats.

Note that sorting and name uniqueness are not automatically affected by this option, that have to be requested explicitly via `\DeclareSortingNamekeyTemplate` and the `uniquename` option (or `\DeclareUniquenameTemplate`), respectively. A warning will be issued if `giveninits` is used together with `uniquename` set to one of the full values and `uniquename` is automatically set to the corresponding `init` value.

`terseinits=true, false` default: false

This option controls the format of all initials generated by `biblatex`. If enabled, initials are rendered using a terse format without dots and spaces. For example, the initials of Donald Ervin Knuth would be rendered as ‘D. E.’ by default, and as ‘DE’ if this option is enabled. The option will affect the `\ifterseinits` test from § 4.6.2. The option works by redefining some macros which control the format of initials. See § 3.15.4 for details. This option is also settable on a per-type, per-entry, per-name and per-namelist basis.

`labelalpha=true, false` default: false

Whether or not to provide the special fields `labelalpha` and `extraalpha`, see § 4.2.4 for details. This option is also settable on a per-type and per-entry basis. See

also `maxalphanames` and `minalphanames`. Table 7 summarises the various `extra*` disambiguation counters and what they track.

`maxalphanames`= $\langle integer \rangle$  default: 3

Similar to the `maxnames` option but customizes the format of the `labelalpha` field.

`minalphanames`= $\langle integer \rangle$  default: 1

Similar to the `minnames` option but customizes the format of the `labelalpha` field.

`labelnumber`=true, false default: false

Whether or not to provide the special field `labelnumber`, see § 4.2.4 for details. This option is also settable on a per-type and per-entry basis.

`noroman`=true, false default: false

Whether or not to try to parse roman numerals encountered in integer fields for sorting purposes. Since `biber` also tries to parse alphanumeric values when sorting integer fields, this roman numeral parsing can be a problem when, for example, ‘C’ is encountered as this could be a roman numeral or a simple alphanumeric string which would have a different integer value depending on how it was parsed. It is likely that this is most useful on a per-entry basis for entries that have, for example, a `volume` field with values such as ‘A’, ‘B’, ‘C’, ‘D’ which should not be parsed as roman numerals since this would give incorrect integer values for ‘C’ and ‘D’.

This option is also settable on a per-type and per-entry basis.

`labeltitle`=true, false default: false

Whether or not to provide the special field `extratitle`, see § 4.2.4 for details. Note that the special field `labeltitle` is always provided and this option controls rather whether `labeltitle` is used to generate `extratitle` information. This option is also settable on a per-type and per-entry basis. Table 7 summarises the various `extra*` disambiguation counters and what they track.

`labeltitleyear`=true, false default: false

Whether or not to provide the special field `extratitleyear`, see § 4.2.4 for details. Note that the special field `labeltitle` is always provided and this option controls rather whether `labeltitle` is used to generate `extratitleyear` information. This option is also settable on a per-type and per-entry basis. Table 7 summarises the various `extra*` disambiguation counters and what they track.

`labeldateparts`=true, false default: false

Whether or not to provide the special fields `labelyear`, `labelmonth`, `labelday`, `labelendyear`, `labelendmonth`, `labelendday`, `labelhour`, `labelendhour`, `labelminute`, `labelendminute`, `labelsecond`, `labelendsecond`, `labelyeardivision`, `labelendyeardivision`, `labeltimezone`, `labelendtimeone` and `extradate`, see § 4.2.4 for details. This option is also settable on a per-type and per-entry basis. Table 7 summarises the various `extra*` disambiguation counters and what they track.

**Table 6: Work Uniqueness options**

Option	Test	Tracks
<code>singletitle</code>	<code>\ifsingletitle</code>	<code>labelname</code>
<code>uniquetitle</code>	<code>\ifuniquetitle</code>	<code>labeltitle</code>
<code>uniquebaretitle</code>	<code>\ifuniquebaretitle</code>	<code>labeltitle when labelname is null</code>
<code>uniquework</code>	<code>\ifuniquework</code>	<code>labelname+labeltitle</code>

`singletitle`=true, false default: false

Whether or not to provide the data required by the `\ifsingletitle` test, see § 4.6.2 for details. See table 6 for details on what determines the data for this test. This option is also settable on a per-type and per-entry basis.

`uniquetitle`=true, false default: false

Whether or not to provide the data required by the `\ifuniquetitle` test, see § 4.6.2 for details. See table 6 for details on what determines the data for this test. This option is also settable on a per-type and per-entry basis.

`uniquebaretitle`=true, false default: false

Whether or not to provide the data required by the `\ifuniquebaretitle` test, see § 4.6.2 for details. See table 6 for details on what determines the data for this test. This option is also settable on a per-type and per-entry basis.

`uniquework`=true, false default: false

Whether or not to provide the data required by the `\ifuniquework` test, see § 4.6.2 for details. See table 6 for details on what determines the data for this test. This option is also settable on a per-type and per-entry basis.

`uniqueprimaryauthor`=true, false  
default: false

Whether or not to provide the data required by the `\ifuniqueprimaryauthor` test, see § 4.6.2 for details. This option is also settable on a per-type and per-entry basis.

`uniquename`=true, false, init, full, allinit, allfull,  
mininit,minfull default: false

Whether or not to update the `uniquename` counter, see § 4.6.2 for details. This feature will disambiguate individual names in the `labelname` list. This option is also settable on a per-type, per-entry, per-namelist and per-name basis. The possible choices are:

<code>true</code>	An alias for <code>full</code> .
<code>false</code>	Disable this feature.
<code>init</code>	Disambiguate using initials only.
<code>full</code>	Disambiguate using initials or full names, as required.
<code>allinit</code>	Similar to <code>init</code> but disambiguates all names in the <code>labelname</code> list, beyond <code>maxnames/minnames/uniquelist</code> .

- `allfull`      Similar to `full` but disambiguates all names in the `labelname` list, beyond `maxnames/minnames/unique`list.
- `mininit`      A variant of `init` which only disambiguates names in identical lists of base nameparts (by default, lists of family names).
- `minfull`      A variant of `full` which only disambiguates names in identical lists of base nameparts (by default, lists of family names).

Note that the `unique`name option will also affect `unique`list, the `\ifsingle`title test, and the `extradate` and `extraname` fields. See § 4.11.4 for further details and practical examples.

`unique`list=`true`, `false`, `minyear` default: `false`

Whether or not to update the `unique`list counter, see § 4.6.2 for details. This feature will disambiguate the `labelname` list if it has become ambiguous after `maxnames/minnames` truncation. Essentially, it overrides `maxnames/minnames` on a per-field basis. This option is also settable on a per-type, per-entry and per-namelist basis. The possible choices are:

- `true`            Disambiguate the `labelname` list.
- `false`          Disable this feature.
- `minyear`        Disambiguate the `labelname` list only if the truncated list is identical to another one with the same `labelyear`. This mode of operation is useful for author-year styles and requires `labeldateparts=true`.

Note that the `unique`list option will also affect the `\ifsingle`title test and the `extradate` and `extraname` fields. See § 4.11.4 for further details and practical examples.

`nohashothers`=`true`, `false` default: `false`

By default, name lists which are truncated with ‘et al’—either explicitly by ‘and others’ in the data source or the `unique`list and `min/maxnames` options—result in different name list hashes (and therefore different `extraname` and `extradate` values) and different sorting. This option allows this behaviour to be tuned. When set to `<true>`, `biber` ignores ‘et al’ truncations for the purposes of generating name list hashes. Consider:

```
Jones 1972
Jones/and others 1972
Smith 2000
Smith/Vogel/Beast/Tremble 2000
```

With `maxnames=3`, `minnames=1`, `nohashothers=false`, the result would be:

```
Jones 1972
Jones et al. 1972
Smith 2000
Smith et al. 2000
```

Whereas with `maxnames=3, minnames=1, nohashothers=true`, the result would be:

```
Jones 1972a
Jones et al. 1972b
Smith 2000a
Smith et al. 2000b
```

If desired, this could be further simplified by removing the ‘et al.’ to obtain:

```
Jones 1972a
Jones 1972b
Smith 2000a
Smith 2000b
```

Note that the `nohashothers` option will affect the `extradate` and `extraname` fields.

This option is also settable on a per-type, per-entry and per-namelist basis.

`nosortothers=true, false`

default: false

The option has a related to effect to `nohashothers` but applies to sorting—the visible list of names (which is the `minsortnames` value) used to determine sorting will ignore any truncation. This means that with `nosortothers=true`, the name lists:

```
Jones, Smith
Jones, Smith et al
```

will sort exactly the same. The default setting of `nosortothers` always sorts in the order shown in the example, that is, by default, truncated names lists always sort after any name lists identical to the point of truncation.

This option is also settable on a per-type, per-entry and per-namelist basis.

### 3.1.3 Entry Options

Entry options are package options which determine how bibliography data entries are handled. They may be set at various scopes defined below.

#### 3.1.3.1 Preamble/Type/Entry Options

The following options are settable on a per-type basis or on a per-entry in the `options` field. In addition to that, they may also be used in the optional argument to `\usepackage` as well as in the configuration file and the document preamble. This is useful if you want to change the default behaviour globally.

`useauthor=true, false`

default: true

Whether the `author` is used in labels and considered during sorting. This may be useful if an entry includes an `author` field but is usually not cited by author for some reason. Setting `useauthor=false` does not mean that the `author` is



**Table 7: Disambiguation counters**

Option	Enabled field(s)	Enabled counter	Counter tracks
labelalpha	labelalpha	extraalpha	label
labeldateparts	labelyear labelmonth labelday labelendyear labelendmonth labelendday labelhour labelminute labelsecond labelendhour labelendminute labelendsecond labelyeardivision labelendyeardivision labeltimezone labelendtimezone	extradate	labelname+ labelyear
labeltitle	—	extratitle	labelname+labeltitle
labeltitleyear	—	extratitleyear	labeltitle+labelyear
—	—	extraname	labelname

ignored completely. It means that the `author` is not used in labels and ignored during sorting. The entry will then be alphabetized by `editor` or `title`. With the standard styles, the `author` is printed after the title in this case. See also § 3.6. This option is also settable on a per-type and per-entry basis.

`useeditor=true, false`

default: `true`

Whether the `editor` replaces a missing `author` in labels and during sorting. This may be useful if an entry includes an `editor` field but is usually not cited by `editor`. Setting `useeditor=false` does not mean that the `editor` is ignored completely. It means that the `editor` does not replace a missing `author` in labels and during sorting. The entry will then be alphabetized by `title`. With the standard styles, the `editor` is printed after the title in this case. See also § 3.6. This option is also settable on a per-type and per-entry basis.

`usetranslator=true, false`

default: `false`

Whether the `translator` replaces a missing `author/editor` in labels and during sorting. Setting `usetranslator=true` does not mean that the `translator` overrides the `author/editor`. It means that the `translator` is considered as a fallback if the `author/editor` is missing or if `useauthor` and `useeditor` are set to `false`. In other words, in order to cite a book by `translator` rather than by `author`, you need to set the following options: This option is also settable on a per-type and per-entry basis.

```
@Book{...,
  options      = {useauthor=false,usetranslator=true},
  author       = {...},
  translator   = {...},
  ...
}
```

With the standard styles, the `translator` is printed after the title by default. See also § 3.6.

`use<name>=true, false` default: true

As per `useauthor`, `useeditor` and `usetranslator`, all name lists defined in the data model have an option controlling their behaviour in sorting and labelling automatically defined. Global, per-type and per-entry options called ‘`use<name>`’ are automatically created.

`useprefix=true, false` default: false

Whether the default data model name part ‘prefix’ (von, van, of, da, de, della, etc.) is considered when:

- Printing the family name in citations
- Sorting
- Generation of certain types of labels
- Generating name uniqueness information
- Formatting aspects of the bibliography

For example, if this option is enabled, `biblatex` precedes the family name with the prefix—Ludwig van Beethoven would be cited as “van Beethoven” and alphabetized as “Van Beethoven, Ludwig”. If this option is disabled (the default), he is cited as “Beethoven” and alphabetized as “Beethoven, Ludwig van” instead. This option is also settable on a per-type scope. With `biblatexml` datasources and the BibTeX extended name format supported by `biber` (see § 3.4), this is also settable on per-namelist and per-name scopes.

`indexing=true, false, cite, bib`

The `indexing` option is also settable per-type or per-entry basis. See § 3.1.2.1 for details.

`skipbib=true, false` default: false

If this option is enabled, the entry is excluded from the bibliography but it may still be cited. This option is also settable on a per-type basis.

`skipbiblist=true, false` default: false

If this option is enabled, the entry is excluded from bibliography lists. It is still included in the bibliography and it may also be cited by shorthand etc. This option is also settable on a per-type basis.

`skiplab=true, false` default: false

If this option is enabled, `biblatex` will not assign any labels to the entry. It is not required for normal operation. Use it with care. If enabled, `biblatex` can not guarantee unique citations for the respective entry and citations styles which require labels may fail to create valid citations for the entry. This option is also settable on a per-type basis.

`dataonly=true, false` default: false

Setting this option is equivalent to `uniquename=false`, `uniquelist=false`, `skipbib`, `skipbiblist`, and `skiplab`. It is not required for normal operation. Use it with care. This option is also settable on a per-type basis.

### 3.1.3.2 Entry Only Options

The following options are settable only on a per-entry in the `options` field. They are not available globally or per-type.

`labelnamefield=<fieldname>`

Specifies the field to consider first when looking for a `labelname` candidate. It is essentially prepended to the search list created by `\DeclareLabelname` for just this entry.

`labeltitlefield`  
`=<fieldname>`

Specifies the field to consider first when looking for a `labeltitle` candidate. It is essentially prepended to the search list created by `\DeclareLabeltitle` for just this entry.

### 3.1.4 Legacy Options

The following legacy option may be used globally in the optional argument to `\documentclass` or locally in the optional argument to `\usepackage`:

`openbib` This option is provided for backwards compatibility with the standard LaTeX document classes. `openbib` is similar to `block=par`. Deprecated

## 3.2 Global Customization

Apart from writing new citation and bibliography styles, there are numerous ways to customize the styles which come with this package. Customization will usually take place in the preamble, but there is also a configuration file for permanent adaptations. The configuration file may also be used to initialize the package options to a value different from the package default.

### 3.2.1 Configuration File

If available, this package will load the configuration file `biblatex.cfg`. This file is read at the end of the package, immediately after the citation and bibliography styles have been loaded.

### 3.2.2 Setting Package Options

The load-time package options in § 3.1.1 must be given in the optional argument to `\usepackage`. The package options in § 3.1.2 may also be given in the preamble. The options are executed with the following command:

`\ExecuteBibliographyOptions[<entrytype, ...>]{<key=value, ...>}`

This command may also be used in the configuration file to modify the default setting of a package option. Certain options are also settable on a per-type basis. In this case, the optional `<entrytype>` argument specifies the entry type. The `<entrytype>` argument may be a comma-separated list of values.

### 3.3 Standard Styles

This section provides a short description of all bibliography and citation styles which come with the `biblatex` package. Each style is further illustrated in a style example which is linked in the right margin. The local link may not be available if this document does not reside in the expected folder structure. If you want to write your own styles, see § 4.

#### 3.3.1 Citation Styles

The citation styles which come with this package implement several common citation schemes. All standard styles cater for the `shorthand` field and support hyperlinks as well as indexing.

- |                        |  |  |
|------------------------|--|--|
| <b>numeric</b>         | This style implements a numeric citation scheme similar to the standard bibliographic facilities of LaTeX. It should be employed in conjunction with a numeric bibliography style which prints the corresponding labels in the bibliography. It is intended for in-text citations. The style will set the following package options at load time: <code>autocite=inline</code> , <code>labelnumber=true</code> . This style also provides an additional preamble option called <code>subentry</code> which affects the handling of entry sets. If this option is disabled, citations referring to a member of a set will point to the entire set. If it is enabled, the style supports citations like “[5c]” which point to a subentry in a set (the third one in this example). See the style example for details.  | Style example:<br><a href="#">local</a> , <a href="#">online</a> . |
| <b>numeric-comp</b>    | A compact variant of the <code>numeric</code> style which prints a list of more than two consecutive numbers as a range. This style is similar to the <code>cite</code> package and the <code>sort&amp;compress</code> option of the <code>natbib</code> package in numerical mode. For example, instead of “[8, 3, 1, 7, 2]” this style would print “[1–3, 7, 8]”. It is intended for in-text citations. The style will set the following package options at load time: <code>autocite=inline</code> , <code>sortcites=true</code> , <code>labelnumber=true</code> . It also provides the <code>subentry</code> and <code>subentrycomp</code> options.  | Style example:<br><a href="#">local</a> , <a href="#">online</a> . |
| <b>numeric-verb</b>    | A verbose variant of the <code>numeric</code> style. The difference affects the handling of a list of citations and is only apparent when multiple entry keys are passed to a single citation command. For example, instead of “[2, 5, 6]” this style would print “[2]; [5]; [6]”. It is intended for in-text citations. The style will set the following package options at load time: <code>autocite=inline</code> , <code>labelnumber=true</code> . It also provides the <code>subentry</code> option.  | Style example:<br><a href="#">local</a> , <a href="#">online</a> . |
| <b>alphabetic</b>      | This style implements an alphabetic citation scheme similar to the <code>alpha.bst</code> style of traditional BibTeX. The alphabetic labels resemble a compact author-year style to some extent, but the way they are employed is similar to a numeric citation scheme. For example, instead of “Jones 1995” this style would use the label “[Jon95]”. “Jones and Williams 1986” would be rendered as “[JW86]”. This style should be employed in conjunction with an alphabetic bibliography style which prints the corresponding labels in the bibliography. It is intended for in-text citations. The style will set the following package options at load time: <code>autocite=inline</code> , <code>labelalpha=true</code> . This style also provides an additional preamble option called <code>subentry</code> which affects the handling of entry sets. If this option is disabled, citations referring to a member of a set will point to the entire set. If it is enabled, the style supports citations like “[SGW(c)]” which point to a subentry in a set (the third one in this example). See the style example for details. | Style example:<br><a href="#">local</a> , <a href="#">online</a> . |
| <b>alphabetic-verb</b> | A verbose variant of the <code>alphabetic</code> style. The difference affects the handling  | Style example:<br><a href="#">local</a> , <a href="#">online</a> . |

of a list of citations and is only apparent when multiple entry keys are passed to a single citation command. For example, instead of “[Doe92; Doe95; Jon98]” this style would print “[Doe92]; [Doe95]; [Jon98]”. It is intended for in-text citations. The style will set the following package options at load time: `autocite=inline`, `labelalpha=true`. It also provides the subentry option.

<code>authoryear</code>	This style implements an author-year citation scheme. If the bibliography contains two or more works by the same author which were all published in the same year, a letter is appended to the year. For example, this style would print citations such as “Doe 1995a; Doe 1995b; Jones 1998”. This style should be employed in conjunction with an author-year bibliography style which prints the corresponding labels in the bibliography. It is primarily intended for in-text citations, but it could also be used with citations given in footnotes. The style will set the following package options at load time: <code>autocite=inline</code> , <code>labeldateparts=true</code> , <code>uniquename=full</code> , <code>uniquelist=true</code> .	Style example: <a href="#">local</a> , <a href="#">online</a> .
<code>authoryear-comp</code>	A compact variant of the <code>authoryear</code> style which prints the author only once if subsequent references passed to a single citation command share the same author. If they share the same year as well, the year is also printed only once. For example, instead of “Doe 1995b; Doe 1992; Jones 1998; Doe 1995a” this style would print “Doe 1992, 1995a,b; Jones 1998”. It is primarily intended for in-text citations, but it could also be used with citations given in footnotes. The style will set the following package options at load time: <code>autocite=inline</code> , <code>sortcites=true</code> , <code>labeldateparts=true</code> , <code>uniquename=full</code> , <code>uniquelist=true</code> .	Style example: <a href="#">local</a> , <a href="#">online</a> .
<code>authoryear-ibid</code>	A variant of the <code>authoryear</code> style which replaces repeated citations by the abbreviation <i>ibidem</i> unless the citation is the first one on the current page or double-page spread, or the <i>ibidem</i> would be ambiguous in the sense of the package option <code>ibidtracker=constrict</code> . The style will set the following package options at load time: <code>autocite=inline</code> , <code>labeldateparts=true</code> , <code>uniquename=full</code> , <code>uniquelist=true</code> , <code>ibidtracker=constrict</code> , <code>pagetracker=true</code> . This style also provides an additional preamble option called <code>ibidpage</code> . See the style example for details.	Style example: <a href="#">local</a> , <a href="#">online</a> .
<code>authoryear-icomp</code>	A style combining <code>authoryear-comp</code> and <code>authoryear-ibid</code> . The style will set the following package options at load time: <code>autocite=inline</code> , <code>labeldateparts=true</code> , <code>uniquename=full</code> , <code>uniquelist=true</code> , <code>ibidtracker=constrict</code> , <code>pagetracker=true</code> , <code>sortcites=true</code> . This style also provides an additional preamble option called <code>ibidpage</code> . See the style example for details.	Style example: <a href="#">local</a> , <a href="#">online</a> .
<code>authortitle</code>	This style implements a simple author-title citation scheme. It will make use of the <code>shorttitle</code> field, if available. It is intended for citations given in footnotes. The style will set the following package options at load time: <code>autocite=footnote</code> , <code>uniquename=full</code> , <code>uniquelist=true</code> .	Style example: <a href="#">local</a> , <a href="#">online</a> .
<code>authortitle-comp</code>	A compact variant of the <code>authortitle</code> style which prints the author only once if subsequent references passed to a single citation command share the same author. For example, instead of “Doe, <i>First title</i> ; Doe, <i>Second title</i> ” this style would print “Doe, <i>First title, Second title</i> ”. It is intended for citations given in footnotes. The style will set the following package options at load time: <code>autocite=footnote</code> , <code>sortcites=true</code> , <code>uniquename=full</code> , <code>uniquelist=true</code> .	Style example: <a href="#">local</a> , <a href="#">online</a> .
<code>authortitle-ibid</code>	A variant of the <code>authortitle</code> style which replaces repeated citations by the	Style example: <a href="#">local</a> , <a href="#">online</a> .

abbreviation *ibidem* unless the citation is the first one on the current page or double-page spread, or the *ibidem* would be ambiguous in the sense of the package option `ibidtracker=constrict`. It is intended for citations given in footnotes. The style will set the following package options at load time: `autocite=footnote`, `uniquename=full`, `uniquelist=true`, `ibidtracker=constrict`, `pagetracker=true`. This style also provides an additional preamble option called `ibidpage`. See the style example for details.

<a href="#">authortitle-icomp</a>	A style combining the features of <code>authortitle-comp</code> and <code>authortitle-ibid</code> . The style will set the following package options at load time: <code>autocite=footnote</code> , <code>uniquename=full</code> , <code>uniquelist=true</code> , <code>ibidtracker=constrict</code> , <code>pagetracker=true</code> , <code>sortcites=true</code> . This style also provides an additional preamble option called <code>ibidpage</code> . See the style example for details.	Style example: <a href="#">local</a> , <a href="#">online</a> .
<a href="#">authortitle-terse</a>	A terse variant of the <code>authortitle</code> style which only prints the title if the bibliography contains more than one work by the respective author/editor. This style will make use of the <code>shorttitle</code> field, if available. It is suitable for in-text citations as well as citations given in footnotes. The style will set the following package options at load time: <code>autocite=inline</code> , <code>singletitle=true</code> , <code>uniquename=full</code> , <code>uniquelist=true</code> .	Style example: <a href="#">local</a> , <a href="#">online</a> .
<a href="#">authortitle-tcomp</a>	A style combining the features of <code>authortitle-comp</code> and <code>authortitle-terse</code> . This style will make use of the <code>shorttitle</code> field, if available. It is suitable for in-text citations as well as citations given in footnotes. The style will set the following package options at load time: <code>autocite=inline</code> , <code>sortcites=true</code> , <code>singletitle=true</code> , <code>uniquename=full</code> , <code>uniquelist=true</code> .	Style example: <a href="#">local</a> , <a href="#">online</a> .
<a href="#">authortitle-ticomp</a>	A style combining the features of <code>authortitle-icomp</code> and <code>authortitle-terse</code> . In other words: a variant of the <code>authortitle-tcomp</code> style with an <i>ibidem</i> feature. This style is suitable for in-text citations as well as citations given in footnotes. It will set the following package options at load time: <code>autocite=inline</code> , <code>ibidtracker=constrict</code> , <code>pagetracker=true</code> , <code>sortcites=true</code> , <code>singletitle=true</code> , <code>uniquename=full</code> , <code>uniquelist=true</code> . This style also provides an additional preamble option called <code>ibidpage</code> . See the style example for details.	Style example: <a href="#">local</a> , <a href="#">online</a> .
<a href="#">verbose</a>	A verbose citation style which prints a full citation similar to a bibliography entry when an entry is cited for the first time, and a short citation afterwards. If available, the <code>shorttitle</code> field is used in all short citations. If the <code>shorthand</code> field is defined, the shorthand is introduced on the first citation and used as the short citation thereafter. This style may be used without a list of references and shorthands since all bibliographic data is provided on the first citation. It is intended for citations given in footnotes. The style will set the following package options at load time: <code>autocite=footnote</code> , <code>citracker=context</code> . This style also provides an additional preamble option called <code>citepages</code> . See the style example for details.	Style example: <a href="#">local</a> , <a href="#">online</a> .
<a href="#">verbose-ibid</a>	A variant of the <code>verbose</code> style which replaces repeated citations by the abbreviation <i>ibidem</i> unless the citation is the first one on the current page or double-page spread, or the <i>ibidem</i> would be ambiguous in the sense of <code>ibidtracker=strict</code> . This style is intended for citations given in footnotes. The style will set the following package options at load time: <code>autocite=footnote</code> , <code>citracker=context</code> , <code>ibidtracker=constrict</code> , <code>pagetracker=true</code> . This style also provides	Style example: <a href="#">local</a> , <a href="#">online</a> .



additional preamble options called `ibidpage` and `citepages`. See the style example for details.

- verbose-note** This style is similar to the `verbose` style in that it prints a full citation similar to a bibliography entry when an entry is cited for the first time, and a short citation afterwards. In contrast to the `verbose` style, the short citation is a pointer to the footnote with the full citation. If the bibliography contains more than one work by the respective author/editor, the pointer also includes the title. If available, the `shorttitle` field is used in all short citations. If the `shorthand` field is defined, it is handled as with the `verbose` style. This style may be used without a list of references and shorthands since all bibliographic data is provided on the first citation. It is exclusively intended for citations given in footnotes. The style will set the following package options at load time: `autocite=footnote`, `citetracker=context`, `singletitle=true`. This style also provides additional preamble options called `pageref` and `citepages`. See the style example for details. Style example: [local](#), [online](#).
- verbose-inote** A variant of the `verbose-note` style which replaces repeated citations by the abbreviation *ibidem* unless the citation is the first one on the current page or double-page spread, or the *ibidem* would be ambiguous in the sense of `ibidtracker=strict`. This style is exclusively intended for citations given in footnotes. It will set the following package options at load time: `autocite=footnote`, `citetracker=context`, `ibidtracker=constrict`, `singletitle=true`, `pagetracker=true`. This style also provides additional preamble options called `ibidpage`, `pageref`, and `citepages`. See the style example for details. Style example: [local](#), [online](#).
- verbose-trad1** This style implements a traditional citation scheme. It is similar to the `verbose` style in that it prints a full citation similar to a bibliography entry when an item is cited for the first time, and a short citation afterwards. Apart from that, it uses the scholarly abbreviations *ibidem*, *idem*, *op. cit.*, and *loc. cit.* to replace recurrent authors, titles, and page numbers in repeated citations in a special way. If the `shorthand` field is defined, the shorthand is introduced on the first citation and used as the short citation thereafter. This style may be used without a list of references and shorthands since all bibliographic data is provided on the first citation. It is intended for citations given in footnotes. The style will set the following package options at load time: `autocite=footnote`, `citetracker=context`, `ibidtracker=constrict`, `idemtracker=constrict`, `opcitracker=context`, `loccitracker=context`. This style also provides additional preamble options called `ibidpage`, `strict`, and `citepages`. See the style example for details. Style example: [local](#), [online](#).
- verbose-trad2** Another traditional citation scheme. It is also similar to the `verbose` style but uses scholarly abbreviations like *ibidem* and *idem* in repeated citations. In contrast to the `verbose-trad1` style, the logic of the *op. cit.* abbreviations is different in this style and *loc. cit.* is not used at all. It is in fact more similar to `verbose-ibid` and `verbose-inote` than to `verbose-trad1`. The style will set the following package options at load time: `autocite=footnote`, `citetracker=context`, `ibidtracker=constrict`, `idemtracker=constrict`. This style also provides additional preamble options called `ibidpage`, `strict`, and `citepages`. See the style example for details. Style example: [local](#), [online](#).
- verbose-trad3** Yet another traditional citation scheme. It is similar to the `verbose-trad2` style but uses the scholarly abbreviations *ibidem* and *op. cit.* in a slightly different way. The Style example: [local](#), [online](#).



style will set the following package options at load time: `autocite=footnote`, `citetracker=context`, `ibidtracker=constrict`, `loccittracker=constrict`. This style also provides additional preamble options called `strict` and `citepages`. See the style example for details.

**reading** A citation style which goes with the bibliography style by the same name. It simply loads the `authortitle` style. Style example: [local](#), [online](#).

The following citation styles are special purpose styles. They are not intended for the final version of a document:

**draft** A draft style which uses the entry keys in citations. The style will set the following package options at load time: `autocite=plain`. Style example: [local](#), [online](#).

**debug** This style prints the entry key rather than some kind of label. It is intended for debugging only and will set the following package options at load time: `autocite=plain`. Style example: [local](#), [online](#).

### 3.3.2 Bibliography Styles

All bibliography styles which come with this package use the same basic format for the individual bibliography entries. They only differ in the kind of label printed in the bibliography and the overall formatting of the list of references. There is a matching bibliography style for every citation style. Note that some bibliography styles are not mentioned below because they simply load a more generic style. For example, the bibliography style `authortitle-comp` will load the `authortitle` style.

**numeric** This style prints a numeric label similar to the standard bibliographic facilities of LaTeX. It is intended for use in conjunction with a numeric citation style. Note that the `shorthand` field overrides the default label. The style will set the following package options at load time: `labelnumber=true`. This style also provides an additional preamble option called `subentry` which affects the formatting of entry sets. If this option is enabled, all members of a set are marked with a letter which may be used in citations referring to a set member rather than the entire set. See the style example for details. Style example: [local](#), [online](#).

**alphabetic** This style prints an alphabetic label similar to the `alpha.bst` style of traditional BibTeX. It is intended for use in conjunction with an alphabetic citation style. Note that the `shorthand` field overrides the default label. The style will set the following package options at load time: `labelalpha=true`, `sorting=anyt`. Style example: [local](#), [online](#).

**authoryear** This style differs from the other styles in that the publication date is not printed towards the end of the entry but rather after the author/editor. It is intended for use in conjunction with an author-year citation style. Recurring author and editor names are replaced by a dash unless the entry is the first one on the current page or double-page spread. This style provides an additional preamble option called `dashed` which controls this feature. It also provided a preamble option called `mergedate`. See the style example for details. The style will set the following package options at load time: `labeldateparts=true`, `sorting=nyt`, `pagetracker=true`, `mergedate=true`. Style example: [local](#), [online](#).

**authortitle** This style does not print any label at all. It is intended for use in conjunction with an author-title citation style. Recurring author and editor names are replaced by a dash unless the entry is the first one on the current page or double-page spread. This Style example: [local](#), [online](#).

style also provides an additional preamble option called `dashed` which controls this feature. See the style example for details. The style will set the following package options at load time: `pagetracker=true`.

**verbose** This style is similar to the `authortitle` style. It also provides an additional preamble option called `dashed`. See the style example for details. The style will set the following package options at load time: `pagetracker=true`. Style example: [local](#), [online](#).

**reading** This special bibliography style is designed for personal reading lists, annotated bibliographies, and similar applications. It optionally includes the fields `annotation`, `abstract`, `library`, and `file` in the bibliography. If desired, it also adds various kinds of short headers to the bibliography. This style also provides the additional preamble options `entryhead`, `entrykey`, `annotation`, `abstract`, `library`, and `file` which control whether or not the corresponding items are printed in the bibliography. See the style example for details. See also § 3.14.8. The style will set the following package options at load time: `loadfiles=true`, `entryhead=true`, `entrykey=true`, `annotation=true`, `abstract=true`, `library=true`, `file=true`. Style example: [local](#), [online](#).

The following bibliography styles are special purpose styles. They are not intended for the final version of a document:

**draft** This draft style includes the entry keys in the bibliography. The bibliography will be sorted by entry key. The style will set the following package options at load time: `sorting=debug`. Style example: [local](#), [online](#).

**debug** This style prints all bibliographic data in tabular format. It is intended for debugging only and will set the following package options at load time: `sorting=debug`. Style example: [local](#), [online](#).

### 3.4 Extended Name Format

The parsing rules for BibTeX names are rather archaic and not suited to many international name formats. `biber` supports an extended name format which allows explicit specification of the parts of names. This allows the use of custom name parts apart from the four standard BibTeX parts. Extended name formats are supported in all name fields and can be used along with the usual BibTeX name format. Recognition of extended name format can be disabled with the `biber` option `--noxname` in case you do not need the extended format and the auto-detection causes problems with normal name parsing. The separator `=` which comes between the namepart names and values is customisable with the `biber` option `--xnamesep`. Here is an example:

```
AUTHOR = {Hans Harman and Simon de Beumont}
AUTHOR = {given=Hans, family=Harman and given=Simon,
  ↪ prefix=de, family=Beumont}
```

These two name specifications are equivalent but the extended format explicitly names the parts. The supported parts are those specified by the `biblatex` data mode constant `nameparts`, see § 4.2.3. As with traditional BibTeX name parsing, initials are automatically generated but it is also possible to specify these explicitly:

```
AUTHOR = {given=Jean, prefix=de la, prefix-i=d, family=
  ↪ Rousse}
AUTHOR = {given={Jean Pierre Simon}, given-i=JPS}
```

Initials are specified by adding the suffix `-i` to the namepart name. Compound parts may be protected with braces:

```
AUTHOR = {given={Jean Pierre}}
```

If a namepart contains a comma, the whole namepart should be protected with quotes:

```
AUTHOR = {"family={Robert and Sons, Inc.}"}
```

Traditional BibTeX name formats and the extended form may be used together:

```
AUTHOR = {Hans Harman and given=Simon, prefix=de, family  
→ =Beumont}
```

Per-namelist and per-name options may be specified in the extended name format, see § 3.1.3.1:

```
AUTHOR = {nosortothers=true and Hans Harman and  
given=Simon, family=Beumont, prefix=de,  
→ useprefix=true}
```

### 3.5 Related Entries

Almost all bibliography styles require authors to specify certain types of relationship between entries such as “Reprint of”, “Reprinted in” etc. It is impossible to provide data fields to cover all of these relationships and so `biblatex` provides a general mechanism for this using the entry fields `related`, `relatedtype` and `relatedstring`. A related entry does not need to be cited and does not appear in the bibliography itself (unless of course it is also cited itself independently) as a clone is taken of the related entry to be used as a data source. The `relatedtype` field should specify a localisation string which will be printed before the information from the related entries is printed, for example “Orig. Pub. as”. The `relatedstring` field can be used to override the string determined via `relatedtype`. Some examples:

```
@Book{key1,  
  ...  
  related      = {key2},  
  relatedtype  = {reprintof},  
  ...  
}  
  
@Book{key2,  
  ...  
}
```

Here we specify that entry `key1` is a reprint of entry `key2`. In the bibliography driver for Book entries, when `\usebibmacro{related}` is called for entry `key1`:

- If the localisation string “reprintof” is defined, it is printed in the `relatedstring:reprintof` format. If this formatting directive is undefined, the string is printed in the `relatedstring:default` format.
- If the `related:reprintof` macro is defined, it is used to format the information contained in entry `key2`, otherwise the `related:default` macro is used
- If the `related:reprintof` format is defined, it is used to format both the localisation string and data. If this format is not defined, then the `related` format is used instead.

It is also supported to have cascading and/or circular relations:

```
@Book{key1,
  ...
  related      = {key2},
  relatedtype  = {reprintof},
  ...
}

@Book{key2,
  ...
  related      = {key3},
  relatedtype  = {translationof},
  ...
}

@Book{key3,
  ...
  related      = {key2},
  relatedtype  = {translatedas},
  ...
}
```

Multiple relations to the same entry are also possible:

```
@MVBook{key1,
  ...
  related      = {key2,key3},
  relatedtype  = {multivolume},
  ...
}

@Book{key2,
  ...
}

@Book{key3,
  ...
}
```

Note the order of the keys in lists of multiple related entries is important. The data from multiple related entries is printed in the order of the keys listed in this field. See § 4.5.1 for a more details on the mechanisms behind this feature. You can turn this feature off using the package option `related` from § 3.1.2.1.

You can use the `relatedoptions` to set options on the related entry data clone. This is useful if you need to override the `dataonly` option which is set by default on all related entry clones. For example, if you will expose some of the names in the related clone in your document, you may want to have them disambiguated from names in other entries but normally this won't happen as related clones have the per-entry `dataonly` option set and this in turn sets `uniquename=false` and `uniquelist=false`. In such a case, you can set `relatedoptions` to just `skiplab`, `skipbib`, `skipbiblist`.

### 3.6 Sorting Options

This package supports fully customisable sorting templates for the bibliography. The default global sorting template is selected with the `sorting` package option from § 3.1.2.1. Apart from the regular data fields there are also some special fields which may be used to optimize the sorting of the bibliography. Appendices C.1 and C.2 give an outline of the default alphabetic sorting templates supported by `biblatex`. Chronological sorting templates are listed in appendix C.3. A few explanations concerning the default templates are in order.

The first item considered in the sorting process is always the `presort` field of the entry. If this field is undefined, `biblatex` will use the default value 'mm' as a presort string. The next item considered is the `sortkey` field. If this field is defined, it serves as the master sort key. Apart from the `presort` field, no further data is considered in this case. If the `sortkey` field is undefined, sorting continues with the name. The package will try using the `sortname`, `author`, `editor`, and `translator` fields, in this order. Which fields are considered also depends on the setting of the `use<name>` options. If all such options are disabled, the `sortname` field is ignored as well. Note that all name fields are responsive to `maxnames` and `minnames`. If no name field is available, either because all of them are undefined or because all `use<name>` options are disabled, `biblatex` will fall back to the `sorttitle` and `title` fields as a last resort. The remaining items are, in various order: the `sortyear` field, if defined, or the first four digits of the `year` field otherwise; the `sorttitle` field, if defined, or the `title` field otherwise; the `volume` field. Note that the sorting templates shown in appendix C.2 include an additional item: `labelalpha` is the label used by 'alphabetic' bibliography styles. Strictly speaking, the string used for sorting is `labelalpha + extraalpha`. The sorting templates in appendix C.2 are intended to be used in conjunction with alphabetic styles only.

The chronological sorting templates presented in appendix C.3 also make use of the `presort` and `sortkey` fields, if defined. The next item considered is the `sortyear` or the `year` field, depending on availability. The `ynt` template extracts the first four Arabic figures from the field. If both fields are undefined, the string 9999 is used as a fallback value. This means that all entries without a year will be moved to the end of the list. The `ydnt` template is similar in concept but sorts the year in descending order. As with the `ynt` template, the string 9999 is used as a fallback value. The remaining items are similar to the alphabetic sorting templates discussed above. Note that the `ydnt` sorting template will only sort the date in descending order. All other items are sorted in ascending order as usual.

Using special fields such as `sortkey`, `sortname`, or `sorttitle` is usually not required. The `biblatex` package is quite capable of working out the desired sorting order by using the data found in the regular fields of an entry. You will only need them if you want to manually modify the sorting order of the bibliography or if any data required for sorting is missing. Please refer to the field descriptions in § 2.2.3 for details on possible uses of the special fields.

### 3.7 Data Annotations

Ideally, there should be no formatting information in a bibliography data file, however, sometimes such questionable practice seems to be the only way in which the desired results can be achieved. Data annotations are a way of addressing this by allowing users to attach semantic information (rather than typographical markup) to information in a bibliography data source so that the information can be used at markup time by a style. For example, if you wanted to highlight certain names in a work depending on whether they were a student author (indicated by a superscript asterisk in the references) or a corresponding author (indicated by bold face), then you might be tempted to try:

```
@MISC{Article1,
  AUTHOR = {Last1\textsuperscript{*}, First1 and \textbf{
    ↳ {Last2}, \textbf{First2} and Last3, First3}
}
```

There are several problems with this. Firstly, it will break BibTeX’s fragile name parsing routines and probably won’t compile at all. Secondly, it is not only mixing up data with markup, it does so in a hard-coded way: this data can’t easily be shared and used with other styles. While it is possible to achieve this formatting using `biblatex` internals in a style or document, this is a complex and unreliable method which many users will not wish to use.

In order to address these issues, `biblatex` has a general data annotation facility which allows you to attach any number of a comma-separated list of annotations to data fields, items within data field lists (like names) and even parts of specific items such as parts of names (given name, family name etc.). There are macros provided to check for annotations which can be used in formatting directives.

There are three “scopes” for data annotations, in order of increasing specificity:

- `field`—applied to top-level fields in a data source entry
- `item`—applied to items within a list field in a data source entry
- `part`—applied to parts within items within a list field in a data source entry

Data annotations are supported for BibTeX and `biblatexml` data sources.

```
@MISC{ann1,
  AUTHOR          = {Last1, First1 and Last2, First2
    ↳ and Last3, First3},
  AUTHOR+an       = {1:family=student;2=corresponding},
  TITLE           = {The Title},
  TITLE+an:default = {=titleannotation},
  TITLE+an:french  = {="Le titre"},
  TITLE+an:german  = {="Der Titel"},
}
```

Here the field name suffix `+an` is a user-definable<sup>20</sup> suffix which marks a data field as an annotation of the unsuffixed field. Multiple annotations can be provided for the same field since all annotations are named. After the annotation marker is the optional named annotation marker<sup>21</sup> and an optional annotation name. The annotation name is 'default' if not specified and so in the above example the following two are equivalent:

```
TITLE+an          = {=titleannotation},
TITLE+an:default = {=titleannotation},
```

The format of annotation fields in BibTeX data sources is as follows:

```
<annotationspecs> ::= <annotationspec> [ ";" <
  ↳ annotationspec> ]
<annotationspec> ::= [ <itemcount> [ ":" <part> ] ] "="
  ↳ <annotations>
<annotations>      ::= <annotation> [ "," <annotation> ]
<annotation>       ::= ["] (string) ["]
```

That is, one or more specifications separated by semicolons. Each specification is an equals sign followed by a comma-separated list of annotation keywords or a string enclosed in double-quotes (a 'literal' annotation, see below). To annotate a specific item in a list, put the number of the list item before the equals sign (lists start at 1). If you need to annotate a specific part of the list item, give its name after the list item number, preceded by a colon. Name part names are defined in the data model, see § 4.2.3. Some further examples:

```
AUTHOR          = {Last1, First1 and Last2, First2 and Last3
  ↳ , First3},
AUTHOR+an       = {3:given=annotation1, annotation2},
TITLE           = {A title},
TITLE+an        = {=a title annotation, another title
  ↳ annotation},
LANGUAGE        = {english and french},
LANGUAGE+an     = {1=annotation3; 2=annotation4}
}
```

Attaching annotations to data is similar in biblalexml data sources. Using the example above, we would have:

```
<bltx:entries xmlns:bltx="http://biblalex-biber.
  ↳ sourceforge.net/biblalexml">
  <bltx:entry id="test" entrytype="misc">
    <bltx:names type="author">
      <bltx:name>
        <bltx:namepart type="given" initial="F">First1</
  ↳ bltx:namepart>
        <bltx:namepart type="family" initial="L">Last1</
  ↳ bltx:namepart>
```

<sup>20</sup>See biber's `--annotation-marker` option.

<sup>21</sup>See biber's `--named-annotation-marker` option.



```

    </bltx:name>
    <bltx:name>
      <bltx:namepart type="given" initial="F">First2</
    ↪ bltx:namepart>
      <bltx:namepart type="family" initial="L">Last2</
    ↪ bltx:namepart>
    </bltx:name>
    <bltx:name>
      <bltx:namepart type="given" initial="F">First3</
    ↪ bltx:namepart>
      <bltx:namepart type="family" initial="L">Last3</
    ↪ bltx:namepart>
    </bltx:name>
  </bltx:names>
</bltx:annotation field="author" item="1" part="
    ↪ family">student</bltx:annotation>
  </bltx:annotation field="author" item="2">
    ↪ corresponding</bltx:annotation>
</bltx:entry>
</bltx:entries>

```

To access the annotation information when formatting bibliography data, macros are provided, corresponding to the three annotation scopes:

`\iffieldannotation`[*<field>*][*<annotationname>*]{*<annotation>*}{*<true>*}{*<false>*}

Executes *<true>* if the data field *<field>* has an annotation *<annotation>* for the annotation called *<annotationname>* and false otherwise. If *<annotationname>* is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). If *<field>* is not given, the current data field as indicated by `\currentfield`, `\currentlist` or `\currentname` (see § 4.4.2) is assumed. Of course, this is only possible if these commands are defined, that is, inside formatting directives.

`\ifitemannotation`[*<field>*][*<annotationname>*][*<item>*]{*<annotation>*}{*<true>*}{*<false>*}

Executes *<true>* if the item *<item>* in the data field *<field>* has an annotation *<annotation>* and false otherwise. If *<annotationname>* is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). The optional argument *<field>* can be inferred if not provided as with `\iffieldannotation`. If *<item>* is not given, the number of the item currently being processed as given by `listcount` is used.

`\ifpartannotation`[*<field>*][*<annotationname>*][*<item>*]{*<part>*}{*<annotation>*}{*<true>*}{*<false>*}

Executes *<true>* if the part named *<part>* in item *<item>* in the data field *<field>* has an annotation *<annotation>* and false otherwise. If *<annotationname>* is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). The two optional arguments *<field>* and *<item>* can be inferred as in `\ifitemannotation`. The parameter *<part>* can never be inferred and is therefore a mandatory argument.

Date fields are special and handled in a context where `\currentfield` is not accessible. Thus there is a fourth command to test annotations for dates.

`\ifdateannotation[⟨annotationname⟩]{⟨datatype⟩}{⟨annotation⟩}{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the date field `⟨datatype⟩` has an annotation `⟨annotation⟩` and false otherwise. If `⟨annotationname⟩` is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). The `⟨datatype⟩` argument is mandatory, because it cannot be inferred in most contexts where `\ifdateannotation` will be used.

`\hasfieldannotation[⟨field⟩][⟨annotationname⟩]{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the data field `⟨field⟩` has a literal annotation `⟨annotationname⟩` defined and false otherwise. If `⟨annotationname⟩` is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). If `⟨field⟩` is not given, the current data field as indicated by `\currentfield`, `\currentlist` or `\currentname` (see § 4.4.2) is assumed. Of course, this is only possible if these commands are defined, that is, inside formatting directives.

`\hasitemannotation[⟨field⟩][⟨annotationname⟩][⟨item⟩]{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the item `⟨item⟩` in the data field `⟨field⟩` has a literal annotation `⟨annotationname⟩` defined and false otherwise. If `⟨annotationname⟩` is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). The optional argument `⟨field⟩` can be inferred if not provided as with `\iffieldannotation`. If `⟨item⟩` is not given, the number of the item currently being processed as given by `listcount` is used.

`\haspartannotation[⟨field⟩][⟨annotationname⟩][⟨item⟩]{⟨part⟩}{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the part named `⟨part⟩` in the item `⟨item⟩` in the data field `⟨field⟩` has a literal annotation `⟨annotationname⟩` defined and false otherwise. If `⟨annotationname⟩` is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). The two optional arguments `⟨field⟩` and `⟨item⟩` can be inferred as in `\ifitemannotation`. The parameter `⟨part⟩` can never be inferred and is therefore a mandatory argument.

Date fields are special and handled in a context where `\currentfield` is not accessible. Thus there is a fourth command to test the existence of annotations for dates.

`\hasdateannotation[⟨annotationname⟩]{⟨datatype⟩}{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the date field `⟨datatype⟩` has any annotation `⟨annotationname⟩` defined and false otherwise. If `⟨annotationname⟩` is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). The `⟨datatype⟩` argument is mandatory, because it cannot be inferred in most contexts where `\ifdateannotation` will be used.

As an example of how to use the annotation information to solve the problem originally presented in this section, this could be used in the name formatting directives to put an asterisk after all family names annotated as “student”:

```
\ifpartannotation{family}{student}
{\textsuperscript{*}}
}%
```

To put the given and family names of name list items annotated as “corresponding” in boldface:

```
\renewcommand*{\mkbibnamegiven}[1]{%
  \ifitemannotation{corresponding}
    {\textbf{#1}}
  {#1}}

\renewcommand*{\mkbibnamefamily}[1]{%
  \ifitemannotation{corresponding}
    {\textbf{#1}}
  {#1}}
```

### 3.7.1 Literal Annotations

If the annotation is a string enclosed in double-quotes, the annotation is a ‘literal’ annotation. In this case the annotation can be retrieved and used as a string rather than as meta-information used to determine formatting. This is useful in order to be able to attached specific annotations to data which are to be printed as-is. For example:

```
AUTHOR = {{American Educational Research Association}
  ↪ and {American Psychological Association}
        and {National Council on Measurement in
  ↪ Education}},
AUTHOR+an = {1:family="AERA"; 2:family="APA"; 3:family="
  ↪ NCME" }
}
```

Such annotations are not keys whose presence can be tested for but are rather literal information attached to the data. The values are retrieved by the following macros

`\getfieldannotation[⟨field⟩][⟨annotationname⟩]`

Retrieves any literal annotation for the field *⟨field⟩*. If *⟨annotationname⟩* is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). If *⟨field⟩* is not given, the current data field as indicated by `\currentfield`, `\currentlist` or `\currentname` (see § 4.4.2) is assumed. Of course, this is only possible if these commands are defined, that is, inside formatting directives.

`\getitemannotation[⟨field⟩][⟨annotationname⟩][⟨item⟩]`

Retrieves any literal annotation for the item *⟨item⟩* in the field *⟨field⟩*. If *⟨annotationname⟩* is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). The optional argument *⟨field⟩* can be inferred if not provided as with `\getfieldannotation`. If *⟨item⟩* is not given, the number of the item currently being processed as given by `listcount` is used.

`\getpartannotation`[ $\langle field \rangle$ ][ $\langle annotationname \rangle$ ][ $\langle item \rangle$ ]{ $\langle part \rangle$ }

Retrieves any literal annotation for the part  $\langle part \rangle$ . If  $\langle annotationname \rangle$  is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). The two optional arguments  $\langle field \rangle$  and  $\langle item \rangle$  can be inferred as in `\getitemannotation`. The parameter  $\langle part \rangle$  can never be inferred and is therefore a mandatory argument.

Date fields are special and handled in a context where `\currentfield` is not accessible. Thus there is a fourth command to access literal annotations for dates.

`\getdateannotation`[ $\langle annotationname \rangle$ ]{ $\langle datatype \rangle$ }

Retrieve a literal annotation for the datefield  $\langle datatype \rangle$ . If  $\langle annotationname \rangle$  is not given, then the annotation named ‘default’ is assumed (this is the name given to annotations defined without an explicit name). The  $\langle datatype \rangle$  argument is mandatory, because it cannot be inferred in most contexts where `\getdateannotation` will be used.

So, for example, given the bibliography entry above, we could put the following in the preamble:

```
\renewcommand*{\mkbibnamefamily}[1]{%
  #1\space\mkbibparens{\getpartannotation{family}}}
```

In order to get something like this in the bibliography when formatting names:

```
American Educational Research Association (AERA) and
American Psychological Association (APA), and
National Council on Measurement in Education (NCME)
}
```

Naturally there are semantically more elegant ways of dealing with corporate authors without using the ‘family’ namepart (see § 4.2.3) but this example demonstrates clearly a use for literal annotations.

## 3.8 Bibliography Commands

### 3.8.1 Resources

`\addbibresource`[ $\langle options \rangle$ ]{ $\langle resource \rangle$ }

Adds a  $\langle resource \rangle$ , such as a `.bib` file, to the default resource list. This command is only available in the preamble. It replaces the `\bibliography` legacy command. Note that files must be specified with their full name, including the extension. With `biber`, the resource name can be a BSD-style glob pattern. This only makes sense when resources refer to files with an absolute or relative path and does not work when looking for data resources in `biber s` input/output directories or with resources located by  $\langle kpsewhich \rangle$  etc. When running on Windows, `biber` will switch to a Windows compatible globbing mode where backslashes are also useable as path separators and case does not matter. If the resources contain duplicate entries (that is, duplicate `entrykeys`), it is backend dependent what then happens. For example, by default `biber` will ignore further occurrence of `entrykeys` unless its `--noskipduplicates` options is used. Invoke `\addbibresource` multiple times to add more resources, for example:

```

\addbibresource{bibfile1.bib}
\addbibresource{bibfile2.bib}
\addbibresource[glob]{bibfiles/bibfile*.bib}
\addbibresource[glob]{bibfile-num?.bib}
\addbibresource[glob]{bibfile{1,2,3}.bib}
\addbibresource[location=remote]{https://raw.
    ↪ githubusercontent.com/plk/biblatex/master/bibtex/
    ↪ bib/biblatex/biblatex-examples.bib}
\addbibresource[location=remote,label=lan]{ftp
    ↪ ://192.168.1.57/~user/file.bib}

```

Since the  $\langle resource \rangle$  string is read in a verbatim-like mode, it may contain arbitrary characters. The only restriction is that any curly braces must be balanced. The following  $\langle options \rangle$  are available:

$\text{bibencoding}=\langle bibencoding \rangle$

This option can be used to override the global `bibencoding` option for a particular  $\langle resource \rangle$ .

$\text{label}=\langle identifier \rangle$

Assigns a label to a resource. The  $\langle identifier \rangle$  may be used in place of the full resource name in the optional argument of `refsection` (see § 3.8.4). The label is a *unique* identifier for the  $\langle resource \rangle$ , so each label should only be used once.

$\text{location}=\langle location \rangle$  default: `local`

The location of the resource. The  $\langle location \rangle$  may be either `local` for local resources or `remote` for URLs. Remote resources require `biber`. The protocols HTTP/HTTPS and FTP are supported. The remote URL must be a fully qualified path to a `bib` file or a URL which returns a `bib` file.

$\text{type}=\langle type \rangle$  default: `file`

The type of resource. Currently, the only supported type is `file`.

$\text{datatype}=\langle datatype \rangle$  default: `bibtex`

The data type (format) of the resource. The following formats are currently supported:

`bibtex`      BibTeX format.

`biblatexml`   Experimental XML format for `biblatex`. See § D.

$\text{glob}=\text{true}, \text{false}$

Whether `biber` should `glob` (expand according to pattern) the `datasource` name. There is a global setting for this in `biber` (false by default and settable to true using the `--glob-datasources` option). This option allows overriding the `biber` default on a per-resource basis.

$\text{\addglobalbib}[\langle options \rangle]{\langle resource \rangle}$

This command differs from `\addbibresource` in that the  $\langle resource \rangle$  is added to the global resource list. The difference between default resources and global resources is only relevant if there are reference sections in the document and the optional argument of `refsection` (§ 3.8.4) is used to specify alternative resources which replace the default resource list. Any global resources are added to all reference sections.

`\addsectionbib[⟨options⟩]{⟨resource⟩}`

This command differs from `\addbibresource` in that the resource `⟨options⟩` are registered but the `⟨resource⟩` not added to any resource list. This is only required for resources which 1) are given exclusively in the optional argument of `refsection` (§ 3.8.4) and 2) require options different from the default settings. In this case, `\addsectionbib` is employed to qualify the `⟨resource⟩` prior to using it by setting the appropriate `⟨options⟩` in the preamble. The `label` option may be useful to assign a short name to the resource.

`\bibliography{⟨bibfile, ...⟩}`

Deprecated

The legacy command for adding bibliographic resources, supported for backwards compatibility. Like `\addbibresource`, this command is only available in the preamble and adds resources to the default resource list. Its argument is a comma-separated list of `bib` files. The `.bib` extension may be omitted from the filename. Invoking this command multiple times to add more files is permissible. This command is deprecated. Please consider using `\addbibresource` instead.

### 3.8.2 The Bibliography

`\printbibliography[⟨key=value, ...⟩]`

This command prints the bibliography. It takes one optional argument, which is a list of options given in `⟨key⟩=⟨value⟩` notation. The following options are available:

`env=⟨name⟩` default: `bibliography/shorthands`

The ‘high-level’ layout of the bibliography and the list of shorthands is controlled by environments defined with `\defbibenvironment`. This option selects an environment. The `⟨name⟩` corresponds to the identifier used when defining the environment with `\defbibenvironment`. By default, the `\printbibliography` command uses the identifier `bibliography`; `\printbiblist` uses `shorthands`. See also §§ 3.8.3 and 3.8.7.

`heading=⟨name⟩` default: `bibliography/shorthands`

The bibliography and the list of shorthands typically have a chapter or section heading. This option selects the heading `⟨name⟩`, as defined with `\defbibheading`. By default, the `\printbibliography` command uses the heading `bibliography`; `\printbiblist` uses `shorthands`. See also §§ 3.8.3 and 3.8.7.

`title=⟨text⟩`

This option overrides the default title provided by the heading selected with the heading option, if supported by the heading definition. See § 3.8.7 for details.

`label=⟨label⟩`

If `⟨label⟩` is nonempty, issue `\label{⟨label⟩}` after typesetting the heading. No sanity checking is done whether or not it is useful to set a label after the heading (e. g., if the heading is not numbered a `\ref` to the label might not result in useful output).

`block`=none, space, par, nbpar, ragged      default: *global setting* (none)

This option overrides the global `block` option (see § 3.1.2.1, the meaning of the settings is explained there as well).

`prenote`=*<name>*

The prenote is an arbitrary piece of text to be printed after the heading but before the list of references. This option selects the prenote *<name>*, as defined with `\defbibnote`. By default, no prenote is printed. The note is printed in the standard text font. It is not affected by `\bibsetup` and `\bibfont` but it may contain its own font declarations. See § 3.8.8 for details.

`postnote`=*<name>*

The postnote is an arbitrary piece of text to be printed after the list of references. This option selects the postnote *<name>*, as defined with `\defbibnote`. By default, no postnote is printed. The note is printed in the standard text font. It is not affected by `\bibsetup` and `\bibfont` but it may contain its own font declarations. See § 3.8.8 for details.

`section`=*<integer>*      default: *current section*

Print only entries cited in reference section *<integer>*. The reference sections are numbered starting at 1. All citations given outside a `refsection` environment are assigned to section 0. See § 3.8.4 for details and § 3.14.3 for usage examples.

`segment`=*<integer>*

Print only entries cited in reference segment *<integer>*. The reference segments are numbered starting at 1. All citations given outside a `refsegment` environment are assigned to segment 0. See § 3.8.5 for details and § 3.14.3 for usage examples. Remember that segments within a section are numbered local to the section so the segment you request will be the *n*th segment in the requested (or currently active enclosing) section.

`type`=*<entrytype>*

Print only entries whose entry type is *<entrytype>*.

`nottype`=*<entrytype>*

Print only entries whose entry type is not *<entrytype>*. This option may be used multiple times.

`subtype`=*<subtype>*

Print only entries whose `entrysubtype` is defined and *<subtype>*.

`notsubtype`=*<subtype>*

Print only entries whose `entrysubtype` is undefined or not *<subtype>*. This option may be used multiple times.

`keyword`=*<keyword>*

Print only entries whose `keywords` field includes *<keyword>*. This option may be used multiple times.



`notkeyword=<keyword>`

Print only entries whose `keywords` field does not include `<keyword>`. This option may be used multiple times.

`category=<category>`

Print only entries assigned to category `<category>`. This option may be used multiple times.

`notcategory=<category>`

Print only entries not assigned to category `<category>`. This option may be used multiple times.

`filter=<name>`

Filter the entries with filter `<name>`, as defined with `\defbibfilter`. See § 3.8.9 for details.

`check=<name>`

Filter the entries with check `<name>`, as defined with `\defbibcheck`. See § 3.8.9 for details.

`resetnumbers=<true,false,number>`

This option applies to numerical citation/bibliography styles only and requires that the `defernumbers` option from § 3.1.2.1 be enabled globally. If enabled, it will reset the numerical labels assigned to the entries in the respective bibliography, i. e., the numbering will restart at 1. You can also pass a number to this option, for example: `resetnumbers=10` to reset numbering to the specified number to aid numbering continuity across documents. Use this option with care as `biblatex` can not guarantee unique labels globally if they are reset manually.

`omitnumbers=true, false`

This option applies to numerical citation/bibliography styles only and requires that the `defernumbers` option from § 3.1.2.1 be enabled globally. If enabled, `biblatex` will not assign a numerical label to the entries in the respective bibliography. This is useful when mixing a numerical subbibliography with one or more subbibliographies using a different scheme (e. g., author-title or author-year).

`locallabelwidth=true, false` default: false

Calculate `\labelnumberwidth`, `\labelalphawidth` and similar lengths locally for the present bibliography and not globally for all entries. See also `labelnumberwidth` in § 3.1.2.1.

`\bibbysection[<key=value, ...>]`

This command automatically loops over all reference sections. This is equivalent to giving one `\printbibliography` command for every section but has the additional benefit of automatically skipping sections without references. Note that `\bibbysection` starts looking for references in section 1. It will ignore references given outside of `refsection` environments since they are assigned to

section 0. See § 3.14.3 for usage examples. The options are a subset of those supported by `\printbibliography`. Valid options are `env`, `heading`, `prenote`, `postnote`. The current bibliography context sorting template is used for all sections (see § 3.8.10).

`\bibbysegment` [`<key=value, ...>`]

This command automatically loops over all reference segments. This is equivalent to giving one `\printbibliography` command for every segment in the current `refsection` but has the additional benefit of automatically skipping segments without references. Note that `\bibbysegment` starts looking for references in segment 1. It will ignore references given outside of `refsegment` environments since they are assigned to segment 0. See § 3.14.3 for usage examples. The options are a subset of those supported by `\printbibliography`. Valid options are `env`, `heading`, `prenote`, `postnote`. The current bibliography context sorting template is used for all segments (see § 3.8.10).

`\bibbycategory` [`<key=value, ...>`]

This command loops over all bibliography categories. This is equivalent to giving one `\printbibliography` command for every category but has the additional benefit of automatically skipping empty categories. The categories are processed in the order in which they were declared. See § 3.14.3 for usage examples. The options are a subset of those supported by `\printbibliography`. Valid options are `env`, `prenote`, `postnote`, `section`. Note that `heading` is not available with this command. The name of the current category is automatically used as the heading name. This is equivalent to passing `heading=<category>` to `\printbibliography` and implies that there must be a matching heading definition for every category. The current bibliography context sorting template is used for all categories (see § 3.8.10).

`\printbibheading` [`<key=value, ...>`]

This command prints a bibliography heading defined with `\defbibheading`. It takes one optional argument, which is a list of options given in `<key>=<value>` notation. The options are a small subset of those supported by `\printbibliography`. Valid options are `heading`, `title` and `label`. By default, this command uses the heading `bibliography`. See § 3.8.7 for details. Also see §§ 3.14.3 and 3.14.4 for usage examples.

`\DeclarePrintBibliographyDefaults` {`<key=value, ...>`}

This command can be used to globally set defaults for some options to `\printbibliography`, the `\bibby...` bibliography commands and `\printbibheading`. The supported keys are

- `env`
- `heading`
- `title`
- `prenote`
- `postnote`
- `filter`

To print a bibliography with a different sorting template than the global sorting template, use the bibliography context switching commands from § 3.8.10.

### 3.8.3 Bibliography Lists

`biblatex` can, in addition to printing normal bibliographies, also print arbitrary lists of information derived from the bibliography data such as a list of shorthand abbreviations for particular entries or a list of abbreviations of journal titles.

A bibliography list differs from a normal bibliography in that the same bibliography driver is used to print all entries rather than a specific driver being used for each entry depending on the entry type.

```
\printbiblist[⟨key=value, ...⟩]{⟨biblistname⟩}
```

This command prints a bibliography list. It takes an optional argument, which is a list of options given in `⟨key⟩=⟨value⟩` notation. Valid options are all options supported by `\printbibliography` (§ 3.8.2) except `resetnumbers` and `omitnumbers`. Additionally, the two options `driver` and `biblistfilter` are available. If there are any `refsection` environments in the document, the bibliography list will be local to these environments; see § 3.8.4 for details. By default, this command uses the heading `biblist`. See § 3.8.7 for details.

The `⟨biblistname⟩` is a mandatory argument which names the bibliography list. This name is used to identify:

- The default bibliography driver used to print the list entries
- A default bibliography list filter declared with `\DeclareBiblistFilter` (see § 4.5.7) used to filter the entries returned from `biber`
- A default check declared with `\defbibcheck` (see § 3.8.9) used to post-process the list entries
- The default bib environment to use
- The default sorting template to use

The two additional options can be used to change some of the defaults set by the mandatory argument.

```
driver=⟨driver⟩                                default: ⟨biblistname⟩
```

Change the bibliography driver used to print the list entries.

```
biblistfilter=⟨biblistfilter⟩                  default: ⟨biblistname⟩
```

Change the bibliography list filter used to filter the entries. `⟨biblistfilter⟩` must be a valid bibliography list filter defined with `\DeclareBiblistFilter` (see § 4.5.7).

In terms of sorting the list, the default is to sort using the sorting template named after the bibliography list (if it exists) and only then to fall back to the current context sorting template if this is not defined (see § 3.8.10).

The most common bibliography list is a list of shorthand abbreviations for certain entries and so this has a convenience alias `\printshorthands[...]` for backwards compatibility which is defined as:

```
\printbiblist[...]{shorthand}
```

`biblatex` provides automatic support for data source fields in the default data model marked as ‘Label fields’ (See § 2.2.2). Such fields automatically have defined for them:

- A default bib environment (See § 3.8.7)

- A bibliography list filter (See § 4.5.7)
- Some supporting formats and lengths (See § 4.10.5 and § 4.10.4)

Therefore only a minimal setup is required to print bibliography lists with such fields. For example, to print a list of journal title abbreviations, you can minimally put this in your preamble:

```
\DeclareBibliographyDriver{shortjournal}{%
  \printfield{journaltitle}}
```

Then you can put this in your document where you want to print the list:

```
\printbiblist[title={Journal Shorthands}]{shortjournal}
```

Since `shortjournal` is defined in the default data model as a ‘Label field’, this example:

- Uses the automatically created ‘shortjournal’ bib environment
- Uses the automatically created ‘shortjournal’ bibliography list filter to return only entries with a `shortjournal` field in the `.bbl`
- Uses the defined ‘shortjournal’ bibliography driver to print the entries
- Uses the default ‘biblist’ heading but overrides the title with ‘Journal Shorthands’
- Uses the current bibliography context sorting template if no template exists with the name `shortjournal`

Often, you will want to sort on the label field of the list and since a sorting template is automatically picked up if it is named after the list, in this case you could simply do:

```
\DeclareSortingTemplate{shortjournal}{
  \sort{
    \field{shortjournal}
  }
}
```

Naturally all defaults can be overridden by options to `\printbiblist` and definitions of the environments, filters etc. and in this way arbitrary types of bibliography lists can be printed containing a variety of information from the bibliography data.

Bibliography lists are often used to print lists of various kinds of shorthands and this can result in duplicate entries if more than one bibliography entry has the same shorthand. For example, several journal articles in the same journal would result in duplicate entries in a list of journal shorthands. You can use the fact that such lists automatically pick up a `\bibcheck` with the same name as the list to define a check to remove duplicates. If you are defining a list to print all of the journal shorthands using the `shortjournal` field, you could define a `\bibcheck` like this:

```

\defbibcheck{shortjournal}{%
  \iffieldundef{shortjournal}
  {\skipentry}
  {\iffieldundef{journaltitle}
    {\skipentry}
    {\ifcsdef{sjcheck@}\therefsection
      -\strfield{shortjournal}=\strfield{journaltitle}}
    {\skipentry}
    {\savefieldcs{journaltitle}{sjcheck@}\therefsection
      -\strfield{shortjournal}=\strfield{journaltitle}}}}}}

```

### 3.8.4 Bibliography Sections

The `refsection` environment is used in the document body to mark a reference section. This environment is useful if you want separate, independent bibliographies and bibliography lists in each chapter, section, or any other part of a document. Within a reference section, all cited works are assigned labels which are local to the environment. Technically, reference sections are completely independent from document divisions such as `\chapter` and `\section` even though they will most likely be used per chapter or section. See the `refsection` package option in § 3.1.2.1 for a way to automate this. Also see § 3.14.3 for usage examples.

```

\begin{refsection}[\langle resource, ... \rangle]
\end{refsection}

```

The optional argument is a comma-separated list of resources specific to the reference section. If the argument is omitted, the reference section will use the default resource list, as specified with `\addbibresource` in the preamble. If the argument is provided, it replaces the default resource list. Global resources specified with `\addglobalbib` are always considered. `refsection` environments may not be nested, but you may use `refsegment` environments within a `refsection` to subdivide it into segments. Use the `section` option of `\printbibliography` to select a section when printing the bibliography, and the corresponding option of `\printbiblist` when printing bibliography lists. Bibliography sections are numbered starting at 1. The number of the current section is also written to the transcript file. All citations given outside a `refsection` environment are assigned to section 0. If `\printbibliography` is used within a `refsection`, it will automatically select the current section. The `section` option is not required in this case. This also applies to `\printbiblist`. Beginning a new reference section automatically ends the active reference context (see § 3.8.10).

```

\newrefsection[\langle resource, ... \rangle]

```

This command is similar to the `refsection` environment except that it is a stand-alone command rather than an environment. It automatically ends the previous reference section (if any) and immediately starts a new one. Note that the reference section started by the last `\newrefsection` command in the document will extend to the very end of the document. Use `\endrefsection` if you want to terminate it earlier.

### 3.8.5 Bibliography Segments

The `refsegment` environment is used in the document body to mark a reference segment. This environment is useful if you want one global bibliography which

is subdivided by chapter, section, or any other part of the document. Technically, reference segments are completely independent from document divisions such as `\chapter` and `\section` even though they will typically be used per chapter or section. See the `refsegment` package option in § 3.1.2.1 for a way to automate this. Also see § 3.14.3 for usage examples.

```
\begin{refsegment}
\end{refsegment}
```

The difference between a `refsection` and a `refsegment` environment is that the former creates labels which are local to the environment whereas the latter provides a target for the segment filter of `\printbibliography` without affecting the labels. They will be unique across the entire document. `refsegment` environments may not be nested, but you may use them in conjunction with `refsection` to subdivide a reference section into segments. In this case, the segments are local to the enclosing `refsection` environment. Use the `segment` option of `\printbibliography` to select a segment when printing the bibliography. Within a section, the reference segments are numbered starting at 1 and the number of the current segment will be written to the transcript file. All citations given outside a `refsegment` environment are assigned to segment 0. In contrast to the `refsection` environment, the current segment is not selected automatically if `\printbibliography` is used within a `refsegment` environment.

`\newrefsegment` This command is similar to the `refsegment` environment except that it is a stand-alone command rather than an environment. It automatically ends the previous reference segment (if any) and immediately starts a new one. Note that the reference segment started by the last `\newrefsegment` command will extend to the end of the document. Use `\endrefsegment` if you want to terminate it earlier.

### 3.8.6 Bibliography Categories

Bibliography categories allow you to split the bibliography into multiple parts dedicated to different topics or different types of references, for example primary and secondary sources. See § 3.14.4 for usage examples.

```
\DeclareBibliographyCategory{<category>}
```

Declares a new `<category>`, to be used in conjunction with `\addtocategory` and the `category` and `notcategory` filters of `\printbibliography`. This command is used in the document preamble.

```
\addtocategory{<category>}{<key>}
```

Assigns a `<key>` to a `<category>`, to be used in conjunction with the `category` and `notcategory` filters of `\printbibliography`. This command may be used in the preamble and in the document body. The `<key>` may be a single entry key or a comma-separated list of keys. The assignment is global.

### 3.8.7 Bibliography Headings and Environments

```
\defbibenvironment{<name>}{<begin code>}{<end code>}{<item code>}
```

This command defines bibliography environments. The `<name>` is an identifier passed to the `env` option of `\printbibliography` and `\printbiblist` when selecting the environment. The `<begin code>` is LaTeX code to be executed at the beginning

of the environment; the *end code* is executed at the end of the environment; the *item code* is code to be executed at the beginning of each entry in the bibliography or a bibliography list. Here is an example of a definition based on the standard LaTeX list environment:

```
\defbibenvironment{bibliography}
  {\list{}
    {\setlength{\leftmargin}{\bibhang}%
     \setlength{\itemindent}{-\leftmargin}%
     \setlength{\itemsep}{\bibitemsep}%
     \setlength{\parsep}{\bibparsep}}}
  {\endlist}
  {\item}
```

As seen in the above example, usage of `\defbibenvironment` is roughly similar to `\newenvironment` except that there is an additional mandatory argument for the *item code*.

`\defbibheading{<name>}[<title>]{<code>}`

This command defines bibliography headings. The *name* is an identifier to be passed to the heading option of `\printbibliography` or `\printbibheading` and `\printbiblist` when selecting the heading. The *code* should be LaTeX code generating a fully-fledged heading, including page headers and an entry in the table of contents, if desired. If `\printbibliography` or `\printbiblist` are invoked with a *title* option, the title will be passed to the heading definition as #1. If not, the default title specified by the optional *title* argument is passed as #1 instead. The *title* argument will typically be `\bibname`, `\refname`, or `\biblistname` (see § 4.9.2.1). This command is often needed after changes to document headers in the preamble. Here is an example of a simple heading definition:

```
\defbibheading{bibliography}[\bibname]{%
  \chapter*{#1}%
  \markboth{#1}{#1}}
```

The following headings, which are intended for use with `\printbibliography` and `\printbibheading`, are predefined:

### `bibliography`

This is the default heading used by `\printbibliography` if the heading option is not given. Its default definition depends on the document class. If the class provides a `\chapter` command, the heading is similar to the bibliography heading of the standard LaTeX book class, i.e., it uses `\chapter*` to create an unnumbered chapter heading which is not included in the table of contents. If there is no `\chapter` command, it is similar to the bibliography heading of the standard LaTeX article class, i.e., it uses `\section*` to create an unnumbered section heading which is not included in the table of contents. The string used in the heading also depends on the document class. With book-like classes the localisation string `bibliography` is used, with other classes it is `references` (see § 4.9.2). See also §§ 3.15.1 and 3.15.2 for class-specific hints.



### subbibliography

Similar to bibliography but one sectioning level lower. This heading definition uses `\section*` instead of `\chapter*` with a book-like class and `\subsection*` instead of `\section*` otherwise.

### bibintoc

Similar to bibliography above but adds an entry to the table of contents.

### subbibintoc

Similar to subbibliography above but adds an entry to the table of contents.

### bibnumbered

Similar to bibliography above but uses `\chapter` or `\section` to create a numbered heading which is also added to the table of contents.

### subbibnumbered

Similar to subbibliography above but uses `\section` or `\subsection` to create a numbered heading which is also added to the table of contents.

### none

A blank heading definition. Use this to suppress the heading.

The following headings intended for use with `\printbiblist` are predefined:

### biblist

This is the default heading used by `\printbiblist` if the heading option is not given. It is similar to bibliography above except that it uses the localisation string shorthands instead of bibliography or references (see § 4.9.2). See also §§ 3.15.1 and 3.15.2 for class-specific hints.

### biblistintoc

Similar to biblist above but adds an entry to the table of contents.

### biblistnumbered

Similar to biblist above but uses `\chapter` or `\section` to create a numbered heading which is also added to the table of contents.

## 3.8.8 Bibliography Notes

`\defbibnote{⟨name⟩}{⟨text⟩}`

Defines the bibliography note `⟨name⟩`, to be used via the `prenote` and `postnote` options of `\printbibliography` and `\printbiblist`. The `⟨text⟩` may be any arbitrary piece of text, possibly spanning several paragraphs and containing font declarations. Also see § 3.15.6.

### 3.8.9 Bibliography Filters and Checks

`\defbibfilter{<name>}{<expression>}`

Defines the custom bibliography filter `<name>`, to be used via the `filter` option of `\printbibliography`. The `<expression>` is a complex test based on the logical operators `and`, `or`, `not`, the group separator `( . . . )`, and the following atomic tests:

`segment=<integer>`

Matches all entries cited in reference segment `<integer>`.

`type=<entrytype>`

Matches all entries whose entry type is `<entrytype>`.

`subtype=<subtype>`

Matches all entries whose `entrysubtype` is `<subtype>`.

`keyword=<keyword>`

Matches all entries whose `keywords` field includes `<keyword>`. If the `<keyword>` contains spaces, it needs to be wrapped in braces.

`category=<category>`

Matches all entries assigned to `<category>` with `\addtocategory`.

Here is an example of a filter expression:

```
\defbibfilter{example}{%
  ( type=book or type=inbook )
  and keyword=abc
  and not keyword={x y z}
}
```

This filter will match all entries whose entry type is either `@book` or `@inbook` and whose `keywords` field includes the keyword `'abc'` but not `'x y z'`. As seen in the above example, all elements are separated by whitespace (spaces, tabs, or line endings). There is no spacing around the equal sign. The logical operators are evaluated with the `\ifboolexpr` command from the `etoolbox` package. See the `etoolbox` manual for details about the syntax. The syntax of the `\ifthenelse` command from the `ifthen` package, which has been employed in older versions of `biblatex`, is still supported. This is the same test using `ifthen`-like syntax:

```
\defbibfilter{example}{%
  \ ( \type{book} \or \type{inbook} \ )
  \and \keyword{abc}
  \and \not \keyword{x y z}
}
```

Note that custom filters are local to the reference section in which they are used. Use the `section filter` of `\printbibliography` to select a different section. This is not possible from within a custom filter.

`\defbibcheck{⟨name⟩}{⟨code⟩}`

Defines the custom bibliography filter `⟨name⟩`, to be used via the `check` option of `\printbibliography`. `\defbibcheck` is similar in concept to `\defbibfilter` but much more low-level. Rather than a high-level expression, the `⟨code⟩` is LaTeX code, much like the code used in driver definitions, which may perform arbitrary tests to decide whether or not a given entry is to be printed. The bibliographic data of the respective entry is available when the `⟨code⟩` is executed. Issuing the command `\skipentry` in the `⟨code⟩` will cause the current entry to be skipped. For example, the following filter will only output entries with an `abstract` field:

```
\defbibcheck{abstract}{%
  \iffieldundef{abstract}{\skipentry}{}}
...
\printbibliography[check=abstract]
```

The following check will exclude all entries published before the year 2000:

```
\defbibcheck{recent}{%
  \iffieldint{year}
  {\ifnumless{\thefield{year}}{2000}
   {\skipentry}
   {}}
  {\skipentry}}
```

See the author guide, in particular §§ 4.6.2 and 4.6.3, for further details.

### 3.8.10 Reference Contexts

References in a bibliography are cited and printed in a ‘context’. The context determines the data which is actually used to cite or provide bibliographic data for an entry. A context consists of the following information:

- A sorting template
- A template for constructing the sorting keys for names
- A string prefix for citation schemes which use alphabetic or numeric labels
- A template for calculating name uniqueness information
- A template for constructing alphabetic labels for names

The purpose of bibliography contexts is twofold. Firstly, they are used to set options which influence a printed bibliography and secondly to influence the data printed by citation commands. The former use is the most common when one needs to print more than one bibliography list with different, for example, sorting.

```
\usepackage[sorting=nyt]{biblatex}
\begin{document}
\cite{one}
```

```

\cite{two}
\printbibliography
\newrefcontext[sorting=ydnt]
\printbibliography

```

Here we print two bibliographies, one with the default ‘nyt’ sorting template and one with the ‘ydnt’ sorting template.

To demonstrate the second type of use of bibliography contexts, we have to understand that the actual data for an entry can vary depending on the context. This is most obvious in the case of the `extra*` fields like `extradate` which are generated by the backend according to the order of entries *after* sorting so that they come out in the expected ‘a, b, c’ order. This clearly shows that the *data* in an entry can be different between sorting templates. If a document contains more than one bibliography list with different sorting templates, it can happen then that the `.bbl` contains sorting lists with the same entry but containing different data (a different value for `extradate`, for example). The purpose of bibliography contexts is to encapsulate things inside a context so that `biblatex` can use the correct entry data. An example is printing a bibliography list with a different sorting order to the global sorting order where the `extra*` fields are different for the same entry between sorting lists:

```

\usepackage[sorting=nyt,style=authoryear]{biblatex}
\DeclareSortingTemplate{yntd}{
  \sort{
    \field[strside=left,strwidth=4]{sortyear}
    \field[strside=left,strwidth=4]{year}
    \literal{9999}
  }
  \sort{
    \field{sortname}
    \field{author}
    \field{editor}
  }
  \sort[direction=descending]{
    \field{sorttitle}
    \field{title}
  }
}
\begin{document}
\cite{one}
\cite{two}
\printbibliography
\newrefcontext[sorting=yntd]
\cite{one}
\cite{two}
\printbibliography

```

Here, the second use of the citations, along with the `\printbibliography` command will use data from the context of the custom ‘yntd’ sorting template which may well be different from the data associated with the default ‘nyt’ template. That is, the citation labels (in an authoryear style which uses `extradate`) may be different

for the exact same entries between different bibliography contexts and so the citations themselves may look different.

Reference contexts can be declared with `\DeclareRefcontext` and referred to by name, see below.

By default, data for a citation is drawn from the reference context of the last bibliography in which it was printed. For example:

```
\DeclareRefcontext{ap}{labelprefix=A}
\begin{document}

\cite{book, article, misc}

\printbibliography[type=book]

\newrefcontext{ap}
\printbibliography[type=article]

\newrefcontext[sorting=ydnt]
\printbibliography[type=misc]

\end{document}
```

This example also shows the declaration and use of a named reference context. Assuming the entrykeys are indicative of their entrytypes, this is the default situation for the citations which corresponds to what users normally expect:

- The citation of entry `book` would draw its data from the global reference context, because the last bibliography in which it was printed was the one in the global reference context.
- The citation of entry `article` would draw its data from reference context with `labelprefix=A` and would therefore have a ‘A’ prefix when cited.
- The citation of entry `misc` would draw its data from the reference context with `sorting=ydnt`

In cases where the user has entries which occur in multiple bibliographies in different forms or with potentially different labels (in a numeric scheme with different `labelprefix` values for example), it may be necessary to tell `biblatex` from which reference context you wish to draw the citation information. As shown above this can be done by explicitly putting citations inside reference contexts. This can be onerous in a large document and so there is specific functionality for assigning citations to reference contexts programatically, see the `\assignrefcontext*` macros below.

`\DeclareRefcontext`{*<name>*}{*<key=value, ...>*}

Declares a named reference context with name *<name>*. The *<key=value>* options define the context attributes. All context attributes are optional and default to the global settings if absent. The valid options are:

`sorting=<name>`

Specify a sorting template defined previously with `\DeclareSortingTemplate`. This template is used to determine which data to retrieve and/or print for an entry in the commands inside the context.

`sortingnamekeytemplatename=⟨name⟩`

Specify a sorting name key template defined previously with `\DeclareSortingNamekeyTemplate`. This template is used to construct sorting keys for names inside the context. The template name can also be specified (in increasing order of preference) per-entry, per-name list and per-name. See § E for information on setting per-option, per-namelist and per-name options.

`uniquenametemplatename=⟨name⟩`

Specify a uniqueness template defined previously with `\DeclareUniquenameTemplate` (see § 4.11.4). This template is used to calculate uniqueness information for names inside the context. The template name can also be specified (in increasing order of preference) per-entry, per-name list and per-name. See § E for information on setting per-option, per-namelist and per-name options.

`labelalphanametemplatename=⟨name⟩`

Specify a template defined previously with `\DeclareLabelalphaNameTemplate` (see § 4.5.5). This template is used to construct name parts of alphabetic labels for names inside the context. The template name can also be specified (in increasing order of preference) per-entry, per-name list and per-name. See § E for information on setting per-option, per-namelist and per-name options.

`nametemplates=⟨name⟩`

A convenience meta-option which sets `sortingnamekeytemplate`, `uniquenametemplate` and `labelalphanametemplate` to the same template name. This option can also be specified (in increasing order of preference) per-entry, per-name list and per-name. See § E for information on setting per-option, per-namelist and per-name options.

`labelprefix=⟨string⟩`

This option applies to numerical citation/bibliography styles only and requires that the `defernumbers` option from § 3.1.2.1 be enabled globally. Setting this option will implicitly enable `resetnumbers` for the any `\printbibliography` in the scope of the context (unless overridden by a user-specified value for `resetnumbers`). The option assigns the `⟨string⟩` as a prefix to all entries in the reference context. For example, if the `⟨string⟩` is A, the numerical labels printed will be [A1], [A2], [A3], etc. This is useful for subdivided numerical bibliographies where each subbibliography uses a different prefix. The `⟨string⟩` is available to styles in the `labelprefix` field of all affected entries. Note that the `⟨string⟩` is fully expanded, which means that you can use context-dependent macros like `\thechapter`, but not unexpandable commands such as `\dag`. If you need to pass unexpandable code to `⟨string⟩`, protect it from expansion with `\detokenize`. See § 4.2.4.2 for details.

```
\begin{refcontext}[⟨key=value, ...⟩]{⟨name⟩}
\end{refcontext}
```

Wraps a reference context environment. The possible `⟨key=value⟩` optional arguments are as for `\DeclareRefcontext` and override options given for the named reference context `⟨name⟩`. `⟨name⟩` can also be omitted as `{ }` or by omitting even the empty braces<sup>22</sup>.

---

<sup>22</sup>This slightly odd syntax possibility is a result of backwards compatibility with `biblatex <3.5`

The `refcontext` environment cannot be nested and `biblatex` will generate an error if you try to do so.

`\newrefcontext` [*<key=value, ...>*] {*<name>*}

This command is similar to the `refcontext` environment except that it is a stand-alone command rather than an environment. It automatically ends any previous reference context section begun with `\newrefcontext` (if any) and immediately starts a new one. Note that the context section started by the last `\newrefcontext` command in the document will extend to the very end of the document. Use `\endrefcontext` if you want to terminate it earlier.

`\localrefcontext` [*<key=value, ...>*] {*<name>*}

This command is similar to the `newrefcontext` command except that it sets up the reference context only locally. This is useful if the reference context needs to be changed within a group. There is no need to end a local reference context, it will automatically be reset once the group ends.

At the beginning of the document, there is always a global context containing global settings for each of the reference context options. Here is an example summarising the reference contexts with various settings:

```
\usepackage[sorting=nty]{biblatex}

\DeclareRefcontext{testrc}{sorting=nyt}

% Global reference context:
%   sorting=nty
%   sortingnamekeytemplate=global
%   labelprefix=

\begin{document}

\begin{refcontext}{testrc}
% reference context:
%   sorting=nyt
%   sortingnamekeytemplate=global
%   labelprefix=
\end{refcontext}

\begin{refcontext}[labelprefix=A]{testrc}
% reference context:
%   sorting=nyt
%   sortingnamekeytemplate=global
%   labelprefix=A
\end{refcontext}

\begin{refcontext}[sorting=ydnt,labelprefix=A]
% reference context:
%   sorting=ydnt
%   sortingnamekeytemplate=global
%   labelprefix=A
\end{refcontext}
```



```

\end{refcontext}

\newrefcontext[labelprefix=B]
% reference context:
%   sorting=nty
%   sortingnamekeytemplate=global
%   labelprefix=B
\endrefcontext

\newrefcontext[sorting=ynt,labelprefix=C]{testrc}
% reference context:
%   sorting=ynt
%   sortingnamekeytemplate=global
%   labelprefix=C
\endrefcontext

```

```

\assignrefcontextkeywords[⟨key=value, ...⟩]{⟨keyword1,keyword2, ...⟩}
\assignrefcontextkeywords*[⟨key=value, ...⟩]{⟨keyword1,keyword2, ...⟩}
\assignrefcontextcats[⟨key=value, ...⟩]{⟨category1, category2, ...⟩}
\assignrefcontextcats*[⟨key=value, ...⟩]{⟨category1, category2, ...⟩}
\assignrefcontextentries[⟨key=value, ...⟩]{⟨entrykey1, entrykey2, ...⟩}
\assignrefcontextentries*[⟨key=value, ...⟩]{⟨entrykey1, entrykey2, ...⟩}
\assignrefcontextentries[⟨key=value, ...⟩]{⟨*⟩}
\assignrefcontextentries*[⟨key=value, ...⟩]{⟨*⟩}

```

These commands automate putting citations into refcontexts when the default behaviour is not sufficient. The  $\langle key=value \rangle$  options are as for `\DeclareRefcontext` with the addition of the `name=refcontextname` option which sets all options from those defined for the named refcontext  $\langle refcontextname \rangle$ . Use `name=default` to use the global default refcontext options. The specific  $\langle key \rangle = \langle value \rangle$  options override those set by any named  $\langle refcontextname \rangle$ . The default behaviour is that the data for a citation is drawn from the refcontext of the most recently processed bibliography in which it was printed<sup>23</sup>. For citations that are used in some way but not printed in a bibliography or bibliography list, they default to drawing their data from the global refcontext established at the beginning of the document. To override this behaviour, instead of manually wrapping citation commands in `refcontext` environments, which might be error-prone and tedious, you can register a comma-separated list of  $\langle keywords \rangle$ ,  $\langle categories \rangle$  or  $\langle entrykeys \rangle$  which, respectively, make the entries with any of the specified keywords, entries in any of the specified categories (see § 3.14.4) or entries with any of the specified citation keys draw their data from a particular named refcontext and/or specified  $\langle refcontext key/values \rangle$ . Such refcontext auto-assignments are specific to the current refsection. You may specify the same citation key in any of these commands but be aware that assignment is done in the order  $\langle keywords \rangle$ ,  $\langle categories \rangle$ ,  $\langle entrykeys \rangle$  with the later specifications overriding the earlier. `\assignrefcontextentries` accepts a single asterisk instead of a list of entrykeys which allows the assignment

<sup>23</sup>This does not always mean what one might think. In a document containing multiple bibliographies, the last bibliography will be the context for any citations *before* the first bibliography because all bibliographies are processed when the `.bbl` is read.

of all keys in a refsection to a refcontext with having to explicitly list them. An example:

```
\assignrefcontextentries[labelprefix=A]{key2}
\cite{key1}
\begin{refcontext}[labelprefix=B]
\cite{key2}
\end{refcontext}
```

Here, the data for the citation of `key2` will be drawn from `refcontext labelprefix=A` and not `labelprefix=B` (resulting in a label with prefix ‘A’ and not ‘B’). The starred versions do not override a local `refcontext` and so with:

```
\assignrefcontextentries*[labelprefix=A]{key2}
\cite{key1}
\begin{refcontext}[labelprefix=B]
\cite{key2}
\end{refcontext}
```

the data for the citation of `key2` will be drawn from `refcontext labelprefix=B`. Note that these commands are rarely necessary unless you have multiple bibliographies in which the same citations occur and `biblatex` cannot by default tell which bibliography list a citation should refer to. See the example file `94-labelprefix.tex` for more details.

```
\DeclareRefcontext{testrc}{labelprefix=A}
\assignrefcontextentries[name=testrc]{key2}
\cite{key1}
\begin{refcontext}[labelprefix=B]
\cite{key2}
\end{refcontext}
```

Here, the data for the citation of `key2` will be drawn from the `refcontext` named ‘testrc’ which has `labelprefix=A` and not `labelprefix=B` (resulting in a label with prefix ‘A’ and not ‘B’).

```
\DeclareRefcontext{testrc}{labelprefix=A}
\assignrefcontextentries[name=testrc,labelprefix=C]{
  ↪ key2}
\cite{key1}
\begin{refcontext}[labelprefix=B]
\cite{key2}
\end{refcontext}
```

Here, the data for the citation of `key2` will be drawn from `refcontext` with `labelprefix=C` and not `labelprefix=A` since the explicit options override the named `refcontext` (resulting in a label with prefix ‘C’ and not ‘A’ or ‘B’).

`\GenRefcontextData{⟨key=value, ...⟩}`

This command takes the same key/value options as `\DeclareRefcontext`. It forces the currently active `refcontext`, optionally modified by the key/-

value options, to be written to the `.bcf` so that `biber` will create a sorted data list for the specified `refcontext`. Normally this is automatic when `\printbibliography/\prinbiblist` is used in a reference context but there are situations where the data for a `refcontext` will be needed but no reference list is generated in that context e.g. to sort citations with the `sortcites` option when the sorting of citations requires a different `refcontext` to that used for the actual reference list.

### 3.8.11 Dynamic Entry Sets

In addition to the `@set` entry type, `biblatex` also supports dynamic entry sets defined on a per-document/per-refsection basis. The following command, which may be used in the document preamble or the document body, defines the set `<key>`:

```
\defbibentryset{<key>}{<key1,key2,key3,...>}
```

The `<key>` is the entry key of the set, which is used like any other entry key when referring to the set. The `<key>` must be unique and it must not conflict with any other entry key. The second argument is a comma-separated list of the entry keys which make up the set. `\defbibentryset` implies the equivalent of a `\nocite` command, i. e., all sets which are declared are also added to the bibliography. When declaring the same set more than once, only the first invocation of `\defbibentryset` will define the set. Subsequent definitions of the same `<key>` are ignored and work like `\nocite<key>`. Dynamic entry sets defined in the document body are local to the enclosing `refsection` environment, if any. Otherwise, they are assigned to reference section 0. Those defined in the preamble are assigned to reference section 0. See § 3.14.5 for further details.

## 3.9 Citation Commands

All citation commands generally take one mandatory and two optional arguments. The `<prenote>` is text to be printed at the beginning of the citation. This is usually a notice such as ‘see’ or ‘compare’. The `<postnote>` is text to be printed at the very end of the citation. This is usually a page number. If only one of these arguments is given, it is taken as a postnote. If you want to specify a prenote but no postnote, you need to leave the second optional argument empty, as in `\cite[see][]{key}`. The `<key>` argument to all citation commands is mandatory. This is the entry key or a comma-separated list of keys corresponding to the entry keys in the `bib` file. In sum, all basic citations commands listed further down have the following syntax:

```
\command[<prenote>][<postnote>]{<keys>}<punctuation>
```

If the `autopunct` package option from § 3.1.2.1 is enabled, they will scan ahead for any `<punctuation>` immediately following their last argument. This is useful to avoid spurious punctuation marks after citations. This feature is configured with `\DeclareAutoPunctuation`, see § 4.7.5 for details.

### 3.9.1 Standard Commands

The following commands are defined by the citation style. Citation styles may provide any arbitrary number of specialized commands, but these are the standard commands typically provided by general-purpose styles.

```
\cite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Cite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

These are the bare citation commands. They print the citation without any additions such as parentheses. The numeric and alphabetic styles still wrap the label in square brackets since the reference may be ambiguous otherwise. `\Cite` is similar to `\cite` but capitalizes the name prefix of the first name in the citation if the `useprefix` option is enabled, provided that there is a name prefix and the citation style prints any name at all.

```
\parencite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Parencite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

These commands use a format similar to `\cite` but enclose the entire citation in parentheses. The numeric and alphabetic styles use square brackets instead. `\Parencite` is similar to `\parencite` but capitalizes the name prefix of the first name in the citation if the `useprefix` option is enabled, provided that there is a name prefix and the citation style prints any name at all.

```
\footcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\footcitetext[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

These command use a format similar to `\cite` but put the entire citation in a footnote and add a period at the end. In the footnote, they automatically capitalize the name prefix of the first name if the `useprefix` option is enabled, provided that there is a name prefix and the citation style prints any name at all. `\footcitetext` differs from `\footcite` in that it uses `\footnotetext` instead of `\footnote`.

### 3.9.2 Style-specific Commands

The following additional citation commands are only provided by some of the citation styles which come with this package.

```
\textcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Textcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

These citation commands are provided by all styles that come with this package. They are intended for use in the flow of text, replacing the subject of a sentence. They print the authors or editors followed by a citation label which is enclosed in parentheses. Depending on the citation style, the label may be a number, the year of publication, an abridged version of the title, or something else. The numeric and alphabetic styles use square brackets instead of parentheses. In the verbose styles, the label is provided in a footnote. Trailing punctuation is moved between the author or editor names and the footnote mark. `\Textcite` is similar to `\textcite` but capitalizes the name prefix of the first name in the citation if the `useprefix` option is enabled, provided that there is a name prefix.

```
\smartcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Smartcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

Like `\parencite` in a footnote and like `\footcite` in the body.

```
\cite*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

This command is provided by all author-year and author-title styles. It is similar to the regular `\cite` command but merely prints the year or the title, respectively.

`\parencite*[\langle prenote\rangle][\langle postnote\rangle]{\langle key\rangle}`

This command is provided by all author-year and author-title styles. It is similar to the regular `\parencite` command but merely prints the year or the title, respectively.

`\supercite{\langle key\rangle}`

This command, which is only provided by the numeric styles, prints numeric citations as superscripts without brackets. It uses `\supercitedelim` instead of `\multicitedelim` as citation delimiter. Note that any `\langle prenote\rangle` and `\langle postnote\rangle` arguments are ignored. If they are given, `\supercite` will discard them and issue a warning message.

### 3.9.3 Qualified Citation Lists

This package supports a class of special citation commands called ‘multicite’ commands. The point of these commands is that their argument is a list of citations where each item forms a fully qualified citation with a pre- and/or postnote. This is particularly useful with parenthetical citations and citations given in footnotes. It is also possible to assign a pre- and/or postnote to the entire list. The multicite commands are built on top of backend commands like `\parencite` and `\footcite`. The citation style provides a multicite definition with `\DeclareMultiCiteCommand` (see § 4.3.1). The following example illustrates the syntax of multicite commands:

```
\parencites[35]{key1}[88--120]{key2}[23]{key3}
```

The format of the arguments is similar to that of the regular citation commands, except that only one citation command is given. If only one optional argument is given for an item in the list, it is taken as a postnote. If you want to specify a prenote but no postnote, you need to leave the second optional argument of the respective item empty:

```
\parencites[35]{key1}[chapter 2 in][]{key2}[23]{key3}
```

In addition to that, the entire citation list may also have a pre- and/or postnote. The syntax of these global notes differs from other optional arguments in that they are given in parentheses rather than the usual brackets:

```
\parencites(and chapter 3)[35]{key1}[78]{key2}[23]{key3}
  ↪ }
\parencites(Compare)()[35]{key1}[78]{key2}[23]{key3}
\parencites(See)(and the introduction)[35]{key1}[78]{
  ↪ key2}[23]{key3}
```

Note that the multicite commands keep on scanning for arguments until they encounter a token that is not the start of an optional or mandatory argument. If a left brace or bracket follows a multicite command, you need to mask it by adding `\relax` or a control space (a backslash followed by a space) after the last valid argument. This will cause the scanner to stop.

```
\parencites[35]{key1}[78]{key2}\relax[...]
\parencites[35]{key1}[78]{key2}\ {...}
```

By default, this package provides the following multicite commands which correspond to regular commands from §§ 3.9.1 and 3.9.2:

```
\cites (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
\Cites (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
```

The multicite version of `\cite` and `\Cite`, respectively.

```
\parencites (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
\Parencites (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
```

The multicite version of `\parencite` and `\Parencite`, respectively.

```
\footcites (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
\footcitetexts (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
```

The multicite version of `\footcite` and `\footcitetext`, respectively.

```
\smartcites (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
\Smartcites (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
```

The multicite version of `\smartcite` and `\Smartcite`, respectively.

```
\textcites (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
\Textcites (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
```

The multicite version of `\textcite` and `\Textcite`, respectively.

```
\supercites (<multiprenote>) (<multi postnote>) [<prenote>] [<postnote>] {<key>} . . . [<prenote>] [<postnote>] {<key>}
```

The multicite version of `\supercite`. This command is only provided by the numeric styles.

### 3.9.4 Style-independent Commands

Sometimes it is desirable to give the citations in the source file in a format that is not tied to a specific citation style and can be modified globally in the preamble. The format of the citations is easily changed by loading a different citation style. However, when using commands such as `\parencite` or `\footcite`, the way the citations are integrated with the text is still effectively hard-coded. The idea behind the `\autocite` command is to provide higher-level citation markup which makes global switching from inline citations to citations given in footnotes (or as superscripts) possible. The `\autocite` command is built on top of backend commands like `\parencite` and `\footcite`. The citation style provides an `\autocite` definition with `\DeclareAutoCiteCommand` (see § 4.3.1). This definition may be activated with the `autocite` package option from § 3.1.2.1. The citation style will usually initialize this package option to a value which is suitable for the style, see § 3.3.1 for details. Note that there are certain limits to high-level citation markup. For example, inline author-year citation schemes often integrate citations so tightly with the text that it is virtually impossible to automatically convert them to footnotes. The `\autocite` command is only applicable in cases in which you would normally use `\parencite` or `\footcite` (or `\supercite`, with a numeric style). The citations should be given at the end of a sentence or a partial sentence, immediately preceding the terminal punctuation mark, and they should not be a part of the sentence in a grammatical sense (like `\textcite`, for example).

```
\autocite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Autocite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

In contrast to other citation commands, the `\autocite` command does not only scan ahead for punctuation marks following its last argument to avoid double punctuation marks, it actually moves them around if required. For example, with `autocite=footnote`, a trailing punctuation mark will be moved such that the footnote mark is printed after the punctuation. `\Autocite` is similar to `\autocite` but capitalizes the name prefix of the first name in the citation if the `useprefix` option is enabled, provided that there is a name prefix and the citation style prints any name at all.

```
\autocite*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Autocite*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

The starred variants of `\autocite` do not behave differently from the regular ones. The asterisk is simply passed on to the backend command. For example, if `\autocite` is configured to use `\parencite`, then `\autocite*` will execute `\parencite*`.

```
\autocites(⟨multiprenote⟩)(⟨multipostnote⟩)[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}...[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Autocites(⟨multiprenote⟩)(⟨multipostnote⟩)[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}...[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

This is the multicite version of `\autocite`. It also detects and moves punctuation if required. Note that there is no starred variant. `\Autocites` is similar to `\autocites` but capitalizes the name prefix of the first name in the citation if the `useprefix` option is enabled, provided that there is a name prefix and the citation style prints any name at all.

### 3.9.5 Text Commands

The following commands are provided by the core of `biblatex`. They are intended for use in the flow of text. Note that all text commands are excluded from citation tracking.

```
\citeauthor[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\citeauthor*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Citeauthor[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Citeauthor*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

These commands print the authors. Strictly speaking, it prints the `labelname` list, which may be the author, the editor, or the translator. `\Citeauthor` is similar to `\citeauthor` but capitalizes the name prefix of the first name in the citation if the `useprefix` option is enabled, provided that there is a name prefix. The starred variants effectively force `maxcitenames` to 1 for just this command on so only print the first name in the `labelname` list (potentially followed by the “et al” string if there are more names). This allows more natural textual flow when referring to a paper in the singular when otherwise `\citeauthor` would generate a (naturally plural) list of names.



```
\citetitle[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\citetitle*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

This command prints the title. It will use the abridged title in the `shorttitle` field, if available. Otherwise it falls back to the full title found in the `title` field. The starred variant always prints the full title.

```
\citeyear[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\citeyear*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

This command prints the year (`year` field or year component of `date`). The starred variant includes the `extradate` information, if any.

```
\citedate[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\citedate*[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

This command prints the full date (`date` or `year`). The starred variant includes the `extradate` information, if any.

```
\citeurl[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

This command prints the `url` field.

```
\parentext{⟨text⟩}
```

This command wraps the `⟨text⟩` in context sensitive parentheses.

```
\brackettext{⟨text⟩}
```

This command wraps the `⟨text⟩` in context sensitive brackets.

### 3.9.6 Special Commands

The following special commands are also provided by the core of `biblatex`.

```
\nocite{⟨key⟩}
\nocite{*}
```

This command is similar to the standard LaTeX `\nocite` command. It adds the `⟨key⟩` to the bibliography without printing a citation. If the `⟨key⟩` is an asterisk, all entries available in the in-scope bibliography `datasource(s)` are added to the bibliography. Like all other citation commands, `\nocite` commands in the document body are local to the enclosing `refsection` environment, if any. In contrast to standard LaTeX, `\nocite` may also be used in the document preamble. In this case, the references are assigned to reference section 0. For the purposes of ordering citations by appearance `\nocite` will behave like all other `cite` commands, with the added rule that a `\nocite` issued in the preamble is treated as coming before all explicit citations in reference section 0 from the document body.

```
\fullcite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

This command uses the bibliography driver for the respective entry type to create a full citation similar to the bibliography entry. It is thus related to the bibliography style rather than the citation style.

`\footfullcite` [*<prenote>*] [*<postnote>*] {*<key>*}

Similar to `\fullcite` but puts the entire citation in a footnote and adds a period at the end.

`\volcite` [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

`\Volcite` [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

These commands are similar to `\cite` and `\Cite` but intended for references to multi-volume works which are cited by volume and page number. Instead of the *<postnote>*, they take a mandatory *<volume>* and an optional *<pages>* argument. Since they merely compose the postnote and pass it to the `\cite` command provided by the citation style as a *<postnote>* argument, these commands are style independent. The volume and pages/text portion are formatted with the macro `\mkvolcitenote` when they are passed on to the citation command. Additionally they are made available in the special fields `volcitevolume` and `volcitevolume` (§ 4.3.2). The format of the volume portion is controlled by the field formatting directive `volcitevolume`, the format of the pages/text portion is controlled by the field formatting directive `volcitepages` (§ 4.10.4). The delimiter printed between the volume portion and the pages/text portion may be modified by redefining the macro `\volcitedelim` (§ 4.10.1).

`\volcites` (*<multiprenote>*) (*<multi-postnote>*) [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}  
... [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

`\Volcites` (*<multiprenote>*) (*<multi-postnote>*) [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}  
... [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

The multicite version of `\volcite` and `\Volcite`, respectively.

`\pvolcite` [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

`\Pvolcite` [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

Similar to `\volcite` but based on `\parencite`.

`\pvolcites` (*<multiprenote>*) (*<multi-postnote>*) [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}  
... [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

`\Pvolcites` (*<multiprenote>*) (*<multi-postnote>*) [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}  
... [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

The multicite version of `\pvolcite` and `\Pvolcite`, respectively.

`\fvolcite` [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

`\ftvolcite` [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

Similar to `\volcite` but based on `\footcite` and `\footcitetext`, respectively.

`\fvolcites` (*<multiprenote>*) (*<multi-postnote>*) [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}  
... [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

`\Fvolcites` (*<multiprenote>*) (*<multi-postnote>*) [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}  
... [*<prenote>*] {*<volume>*} [*<pages>*] {*<key>*}

The multicite version of `\fvolcite` and `\Fvolcite`, respectively.

```
\svolcite[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
\Svolcite[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
```

Similar to \volcite but based on \smartcite.

```
\svolcites(⟨multiprenote⟩)(⟨multipostnote⟩)[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
...[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
\Svolcites(⟨multiprenote⟩)(⟨multipostnote⟩)[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
...[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
```

The multicite version of \svolcite and \Svolcite, respectively.

```
\tvolcite[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
\Tvolcite[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
```

Similar to \volcite but based on \textcite.

```
\tvolcites(⟨multiprenote⟩)(⟨multipostnote⟩)[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
...[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
\Tvolcites(⟨multiprenote⟩)(⟨multipostnote⟩)[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
...[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
```

The multicite version of \tvolcite and \Tvolcite, respectively.

```
\avolcite[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
\Avolcite[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
```

Similar to \volcite but based on \autocite.

```
\avolcites(⟨multiprenote⟩)(⟨multipostnote⟩)[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
...[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
\Avolcites(⟨multiprenote⟩)(⟨multipostnote⟩)[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
...[⟨prenote⟩]{⟨volume⟩}[⟨pages⟩]{⟨key⟩}
```

The multicite version of \avolcite and \Avolcite, respectively.

```
\notecite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Notecite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

These commands print the ⟨prenote⟩ and ⟨postnote⟩ arguments but no citation. This may be useful for authors who incorporate implicit citations in their writing, only giving information not mentioned before in the running text, but who still want to take advantage of the automatic ⟨postnote⟩ formatting and citation tracking. This is a generic, style-independent citation command. Special citation styles may provide smarter facilities for the same purpose. The capitalized version forces capitalization (note that this is only applicable if the note starts with a command which is sensitive to biblatex’s punctuation tracker).

```
\pnotecite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
\Pnotecite[⟨prenote⟩][⟨postnote⟩]{⟨key⟩}
```

Similar to \notecite but the notes are printed in parentheses.

`\fnotecite` [`<prenote>`] [`<postnote>`] {`<key>`}

Similar to `\notecite` but the notes are printed in a footnote.

### 3.9.7 Low-level Commands

The following commands are also provided by the core of `biblatex`. They grant access to all lists and fields at a lower level.

`\citename` [`<prenote>`] [`<postnote>`] {`<key>`} [`<format>`] {`<name list>`}

The `<format>` is a formatting directive defined with `\DeclareNameFormat`. Formatting directives are discussed in § 4.4.2. If this optional argument is omitted, this command falls back to the format `citename`. The last argument is the name of a `<name list>`, in the sense explained in § 2.2.

`\citelist` [`<prenote>`] [`<postnote>`] {`<key>`} [`<format>`] {`<literal list>`}

The `<format>` is a formatting directive defined with `\DeclareListFormat`. Formatting directives are discussed in § 4.4.2. If this optional argument is omitted, this command falls back to the format `citelist`. The last argument is the name of a `<literal list>`, in the sense explained in § 2.2.

`\citefield` [`<prenote>`] [`<postnote>`] {`<key>`} [`<format>`] {`<field>`}

The `<format>` is a formatting directive defined with `\DeclareFieldFormat`. Formatting directives are discussed in § 4.4.2. If this optional argument is omitted, this command falls back to the format `citefield`. The last argument is the name of a `<field>`, in the sense explained in § 2.2.

### 3.9.8 Miscellaneous Commands

The commands in this section are little helpers related to citations.

`\citereset` This command resets the citation style. This may be useful if the style replaces repeated citations with abbreviations like *ibidem*, *idem*, *op. cit.*, etc. and you want to force a full citation at the beginning of a new chapter, section, or some other location. The command executes a style specific initialization hook defined with the `\InitializeCitationStyle` command from § 4.3.1. It also resets the internal citation trackers of this package. The reset will affect the `\ifciteseen`, `\ifentryseen`, `\ifciteibid`, and `\ifciteidem` tests discussed in § 4.6.2. When used inside a `refsection` environment, the reset of the citation tracker is local to the current `refsection` environment. Also see the `citereset` package option in § 3.1.2.1.

`\citereset*` Similar to `\citereset` but only executes the style's initialization hook, without resetting the internal citation trackers.

`\mancite` Use this command to mark manually inserted citations if you mix automatically generated and manual citations. This is particularly useful if the citation style replaces repeated citations by an abbreviation like *ibidem* which may get ambiguous or misleading otherwise. Always use `\mancite` in the same context as the manual citation, e. g., if the citation is given in a footnote, include `\mancite` in the footnote. The `\mancite` command executes a style specific reset hook defined with the `\OnManualCitation` command from § 4.3.1. It also resets the internal 'ibidem' and 'idem' trackers of this package. The reset will affect the `\ifciteibid` and `\ifciteidem` tests discussed in § 4.6.2.

- `\pno` This command forces a single page prefix in the  $\langle postnote \rangle$  argument to a citation command. See § 3.15.3 for further details and usage instructions. Note that this command is only available locally in citations and the bibliography.
- `\ppno` Similar to `\pno` but forces a range prefix. See § 3.15.3 for further details and usage instructions. Note that this command is only available locally in citations and the bibliography.
- `\nopp` Similar to `\pno` but suppresses all prefixes. See § 3.15.3 for further details and usage instructions. Note that this command is only available locally in citations and the bibliography.
- `\psq` In the  $\langle postnote \rangle$  argument to a citation command, this command indicates a range of two pages where only the starting page is given. See § 3.15.3 for further details and usage instructions. The suffix printed is the localisation string *sequens*, see § 4.9.2. The spacing inserted between the suffix and the page number may be modified by redefining the macro `\sqspace`. The default is an unbreakable interword space. Note that this command is only available locally in citations and the bibliography.
- `\psqq` Similar to `\psq` but indicates an open-ended page range. See § 3.15.3 for further details and usage instructions. The suffix printed is the localisation string *sequentes*, see § 4.9.2. This command is only available locally in citations and the bibliography.
- `\pnfmt{ $\langle text \rangle$ }`

This command formats its argument  $\langle text \rangle$  in the same format as `postnote`. The command can be used to format a page range while adding additional text in the `postnote` argument of a `cite` command.

```
\autocite[\pnfmt{378–381, 383} and more]{sigfridsson}
```

`\RN{ $\langle integer \rangle$ }`

This command prints an integer as an uppercase Roman numeral. The formatting applied to the numeral may be modified by redefining the macro `\RNfont`.

`\Rn{ $\langle integer \rangle$ }`

Similar to `\RN` but prints a lowercase Roman numeral. The formatting applied to the numeral may be modified by redefining the macro `\Rnfont`.

### 3.9.9 natbib Compatibility Commands

The `natbib` package option loads a `natbib` compatibility module. The module defines aliases for the citation commands provided by the `natbib` package. This includes aliases for the core citation commands `\citet` and `\citep` as well as the variants `\citealt` and `\citealp`. The starred variants of these commands, which print the full author list, are also supported. The `\cite` command, which is handled in a particular way by `natbib`, is not treated in a special way. The text commands (`\citeauthor`, `\citeyear`, etc.) are also supported, as are all commands which capitalize the name prefix (`\Citet`, `\Citep`, `\Citeauthor`, etc.). Aliasing with `\defcitealias`, `\citetalias`, and `\citepalias` is possible as well. Note that the compatibility commands will not emulate the citation format of the `natbib` package. They merely alias `natbib`'s commands to functionally equivalent facilities

of the `biblatex` package. The citation format depends on the main citation style. However, the compatibility style will adapt `\nameyear delim` to match the default style of the `natbib` package.

### 3.9.10 `mcite`-like Citation Commands

The `mcite` package option loads a special citation module which provides `mcite`/`mciteplus`-like citation commands. Strictly speaking, what the module provides are wrappers for the commands of the main citation style. For example, the following command:

```
\mcite{key1, setA, *keyA1, *keyA2, *keyA3, key2, setB, *keyB1
↪ , *keyB2, *keyB3}
```

is essentially equivalent to this:

```
\defbibentryset{setA}{keyA1, keyA2, keyA3}%
\defbibentryset{setB}{keyB1, keyB2, keyB3}%
\cite{key1, setA, key2, setB}
```

The `\mcite` command will work with any style since the `\cite` backend command is controlled by the main citation style as usual. The `mcite` module provides wrappers for the standard commands in §§ 3.9.1 and 3.9.2. See table 9 for an overview. Pre and postnotes as well as starred variants of all commands are also supported. The parameters will be passed to the backend command. For example:

```
\mcite*[pre][post]{setA, *keyA1, *keyA2, *keyA3}
```

will execute:

```
\defbibentryset{setA}{keyA1, keyA2, keyA3}%
\cite*[pre][post]{setA}
```

Note that the `mcite` module is not a compatibility module. It provides commands which are very similar but not identical in syntax and function to `mcite`'s commands. When migrating from `mcite`/`mciteplus` to `biblatex`, legacy files must be updated. With `mcite`, the first member of the citation group is also the identifier of the group as a whole. Borrowing an example from the `mcite` manual, this group:

```
\cite{glashow, *salam, *weinberg}
```

consists of three entries and the entry key of the first one also serves as identifier of the entire group. In contrast to that, a `biblatex` entry set is an entity in its own right. Therefore, it requires a unique entry key which is assigned to the set as it is defined:

```
\mcite{set1, *glashow, *salam, *weinberg}
```

**Table 8: mcite-like commands**

Standard Command	mcite-like Command
<code>\cite</code>	<code>\mcite</code>
<code>\Cite</code>	<code>\Mcite</code>
<code>\parencite</code>	<code>\mparencite</code>
<code>\Parencite</code>	<code>\Mparencite</code>
<code>\footcite</code>	<code>\mfootcite</code>
<code>\footcitetext</code>	<code>\mfootcitetext</code>
<code>\textcite</code>	<code>\mtextcite</code>
<code>\Textcite</code>	<code>\Mtextcite</code>
<code>\supercite</code>	<code>\msupercite</code>
<code>\autocite</code>	<code>\mautocite</code>
<code>\Autocite</code>	<code>\Mautocite</code>

Once defined, an entry set is handled like any regular entry in a bib file. When using one of the numeric styles which come with `biblatex` and activating its `subentry` option, it is even possible to refer to set members. See table 9 for some examples. Restating the original definition of the set is redundant, but permissible. In contrast to `mciteplus`, however, restating a part of the original definition is invalid. Use the entry key of the set instead.

### 3.10 Localization Commands

The `biblatex` package provides translations for key terms such as ‘edition’ or ‘volume’ as well as definitions for language specific features such as the date format and ordinals. These definitions, which are loaded automatically, may be modified or extended in the document preamble or the configuration file with the commands introduced in this section.

`\DefineBibliographyStrings{⟨language⟩}{⟨definitions⟩}`

This command is used to define localisation strings. The `⟨language⟩` must be a language name known to the `babel/polyglossia` packages, i.e., one of the identifiers listed in table 2 on page 29. The `⟨definitions⟩` are `⟨key⟩=⟨value⟩` pairs which assign an expression to an identifier:

```
\DefineBibliographyStrings{american}{%
  bibliography = {Bibliography},
  shorthands   = {Abbreviations},
  editor       = {editor},
  editors      = {editors},
}
```

A complete list of all keys supported by default is given in § 4.9.2. Note that all expressions should be capitalized as they usually are when used in the middle of a sentence. The `biblatex` package will automatically capitalize the first word when required at the beginning of a sentence. Expressions intended for use in headings should be capitalized in a way that is suitable for titling. In contrast to `\DeclareBibliographyStrings`, `\DefineBibliographyStrings` overrides both the full and the abbreviated version of the string. See § 4.9.1 for further details.



**Table 9: mcite-like syntax (sample output with `style = numeric` and `subentry option`)**

Input	Output	Comment
<code>\mcite{set1,*glashow,*salam,*weinberg}</code>	[1]	Defining and citing the set
<code>\mcite{set1}</code>	[1]	Subsequent citation of the set
<code>\cite{set1}</code>	[1]	Regular <code>\cite</code> works as usual
<code>\mcite{set1,*glashow,*salam,*weinberg}</code>	[1]	Redundant, but permissible
<code>\mcite{glashow}</code>	[1a]	Citing a set member
<code>\cite{weinberg}</code>	[1c]	Regular <code>\cite</code> works as well

`\DefineBibliographyExtras{⟨language⟩}{⟨code⟩}`

This command is used to adapt language specific features such as the date format and ordinals. The `⟨language⟩` must be a language name known to the `babel/polyglossia` packages. The `⟨code⟩`, which may be arbitrary LaTeX code, will usually consist of redefinitions of the formatting commands from § 3.12.3.

`\UndefineBibliographyExtras{⟨language⟩}{⟨code⟩}`

This command is used to restore the original definition of any commands modified with `\DefineBibliographyExtras`. If a redefined command is included in § 3.12.3, there is no need to restore its previous definition since these commands are adapted by all language modules anyway.

`\DefineHyphenationExceptions{⟨language⟩}{⟨text⟩}`

This is a LaTeX frontend to TeX’s `\hyphenation` command which defines hyphenation exceptions. The `⟨language⟩` must be a language name known to the `babel/polyglossia` packages. The `⟨text⟩` is a whitespace-separated list of words. Hyphenation points are marked with a dash:

```
\DefineHyphenationExceptions{american}{%
  hy-phen-ation ex-cep-tion
}
```

`\NewBibliographyString{⟨key⟩}`

This command declares new localisation strings, i. e., it initializes a new `⟨key⟩` to be used in the `⟨definitions⟩` of `\DefineBibliographyStrings`. The `⟨key⟩` argument may also be a comma-separated list of key names. The keys listed in § 4.9.2 are defined by default.

### 3.11 Entry Querying Commands

The commands in this section are user-facing equivalents of the identically-named commands in section § 4.6.2. They can be used to test for the presence and attributes of specific bibliography entries. See section § 4.6.2 for usage.

```
\ifentryseen{⟨entrykey⟩}{⟨true⟩}{⟨false⟩}
\ifentryinbib{⟨entrykey⟩}{⟨true⟩}{⟨false⟩}
\ifentrycategory{⟨entrykey⟩}{⟨category⟩}{⟨true⟩}{⟨false⟩}
\ifentrykeyword{⟨entrykey⟩}{⟨keyword⟩}{⟨true⟩}{⟨false⟩}
```

## 3.12 Formatting Commands

The commands and facilities presented in this section may be used to adapt the format of citations and the bibliography.

### 3.12.1 Generic Commands and Hooks

The commands in this section may be redefined with `\renewcommand` in the document preamble. Those marked as ‘Context Sensitive’ in the margin can also (and generally should) be customised with `\DeclareDelimFormat` and are printed with `\printdelim` (§ 3.12.2). Note that all commands starting with `\mk...` take one argument. All of these commands are defined in `biblatex.def`.

- `\bibsetup` Arbitrary code to be executed at the beginning of the bibliography, intended for commands which affect the layout of the bibliography.
- `\bibfont` Arbitrary code setting the font used in the bibliography. This is very similar to `\bibsetup` but intended for switching fonts.
- `\citesetup` Arbitrary code to be executed at the beginning of each citation command.
- `\newblockpunct` The separator inserted between ‘blocks’ in the sense explained in § 4.7.1. The default definition is controlled by the package option `block` (see § 3.1.2.1).
- `\newunitpunct` The separator inserted between ‘units’ in the sense explained in § 4.7.1. This will usually be a period or a comma plus an interword space. The default definition is a period and a space.
- `\finentrypunct` The punctuation printed at the very end of every bibliography entry, usually a period. The default definition is a period.
- `\entrysetpunct` The punctuation printed between bibliography subentries of an entry set. The default definition is a semicolon and a space.
- `\bibnamedelima` This delimiter controls the spacing between the elements which make up a name part. It is inserted automatically by the backend after the first name element if the element is less than three characters long and before the last element. The default definition is `\addhighpenpace`, i.e., a space penalized by the value of the `highnamepenalty` counter (§ 3.12.4). Please refer to § 3.15.4 for further details.
- `\bibnamedelimb` This delimiter controls the spacing between the elements which make up a name part. It is inserted automatically by the backend between all name elements where `\bibnamedelima` does not apply. The default definition is `\addlowpenpace`, i.e., a space penalized by the value of the `lownamepenalty` counter (§ 3.12.4). Please refer to § 3.15.4 for further details.
- `\bibnamedelimc` This delimiter controls the spacing between name parts. The default name formats use it between the name prefix and the family name if `useprefix=true`. The default definition is `\addhighpenpace`, i.e., a space penalized by the value of the `highnamepenalty` counter (§ 3.12.4). Please refer to § 3.15.4 for further details.
- `\bibnamedelimd` This delimiter controls the spacing between name parts. The default name formats use it between all name parts where `\bibnamedelimc` does not apply. The default definition is `\addlowpenpace`, i.e., a space penalized by the value of the `lownamepenalty` counter (§ 3.12.4). Please refer to § 3.15.4 for further details.

`\bibnamedelimi` This delimiter replaces `\bibnamedelima/b` after initials. Note that this only applies to initials given as such in the `bib` file, not to the initials automatically generated by `biblatex` which use their own set of delimiters.

`\bibinitperiod` The punctuation inserted automatically by the backend after all initials unless `\bibinithyphendelim` applies. The default definition is a period (`\addot`). Please refer to § 3.15.4 for further details.

`\bibinitdelim` The spacing inserted automatically by the backend between multiple initials unless `\bibinithyphendelim` applies. The default definition is an unbreakable interword space. Please refer to § 3.15.4 for further details.

`\bibinithyphendelim` The punctuation inserted automatically by the backend between the initials of hyphenated name parts, replacing `\bibinitperiod` and `\bibinitdelim`. The default definition is a period followed by an unbreakable hyphen. Please refer to § 3.15.4 for further details.

`\bibindexnamedelima` Replaces `\bibnamedelima` in the index.

`\bibindexnamedelimb` Replaces `\bibnamedelimb` in the index.

`\bibindexnamedelimc` Replaces `\bibnamedelimc` in the index.

`\bibindexnamedelimd` Replaces `\bibnamedelimd` in the index.

`\bibindexnamedelimi` Replaces `\bibnamedelimi` in the index.

`\bibindexinitperiod` Replaces `\bibinitperiod` in the index.

`\bibindexinitdelim` Replaces `\bibinitdelim` in the index.

`\bibindexinithyphendelim` Replaces `\bibinithyphendelim` in the index.

`\revsdnamepunct` The punctuation to be printed between the given and family name parts when a name is reversed. The default is a comma. Here is an example showing a name with the default comma as `\revsdnamedelim`:

Jones, Edward

This command should be used with `\bibnamedelimd` as a reversed-name separator in formatting directives for name lists. Please refer to § 3.15.4 for further details.

`\bibnamedash` The dash to be used as a replacement for recurrent authors or editors in the bibliography. The default is an ‘em’ or an ‘en’ dash, depending on the indentation of the list of references.

`\labelnamepunct` A separator to be printed after the name used for alphabetizing in the bibliography (author or editor, if the author field is undefined) instead of `\newunitpunct`. The default is `\newunitpunct`, i.e., it is not handled differently from regular unit punctuation but permits convenient reconfiguration. This punctuation command is deprecated and has been superseded by the context-sensitive `\nametitledelim` (see § 3.12.2). For backwards compatibility reasons, however, `\nametitledelim` still defaults to `\labelnamepunct` in the `bib` and `biblist` contexts. Style authors may want to consider replacing `\labelnampunct` with `\printdelim{nametitledelim}` and users may

Deprecated

want to prefer modifying the context-sensitive `nametitledelim` in the bib context with `\DeclareDelimFormat` over redefining `\labelnamepunct`, e.g.,

```
\DeclareDelimFormat[bib]{nametitledelim}{%
  \addcolon\space}
```

`\subtitlepunct` The separator printed between the fields `title` and `subtitle`, `booktitle` and `booksubtitle`, as well as `maintitle` and `mainsubtitle`. With the default styles, this separator replaces `\newunitpunct` at this location. The default definition is `\newunitpunct`, i.e., it is not handled differently from regular unit punctuation.

`\intitlepunct` The separator between the word “in” and the following title in entry types such as `@article`, `@inbook`, `@incollection`, etc. The default definition is a colon plus an interword space (e.g., “Article, in: *Journal*” or “Title, in: *Book*”). Note that this is the separator string, not only the punctuation mark. If you don’t want a colon after “in”, `\intitlepunct` should still insert a space.

`\bibpagespunct` The separator printed before the `pages` field. The default is a comma plus an interword space.

`\bibpagerefspunct` The separator printed before the `pageref` field. The default is an interword space.

`\bibeidpunct` The separator printed before the `eid` field (similar to `\bibpagespunct`). The default is a comma plus an interword space.

`\multinamedelim` The delimiter printed between multiple items in a name list like `author` or `editor` if there are more than two names in the list. The default is a comma plus an interword space. See `\finalnamedelim` for an example.<sup>24</sup> Context Sensitive

`\finalnamedelim` The delimiter printed instead of `\multinamedelim` before the final name in a name list. The default is the localised term ‘and’, separated by interword spaces. Here is an example: Context Sensitive

```
Michel Goossens, Frank Mittelbach and Alexander Samarin
Edward Jones and Joe Williams
```

The comma in the first example is the `\multinamedelim` whereas the string ‘and’ in both examples is the `\finalnamedelim`. See also `\finalandcomma` in § 3.12.3.

`\revsdnamedelim` An extra delimiter printed after the first name in a name list if the first name is reversed (only in lists with two names). The default is an empty string, i.e., no extra delimiter will be printed. Here is an example showing a name list with a comma as `\revsdnamedelim`: Context Sensitive

```
Jones, Edward, and Joe Williams
```

In this example, the comma after ‘Edward’ is the `\revsdnamedelim` whereas the string ‘and’ is the `\finalnamedelim`, printed in addition to the former.

<sup>24</sup>Note that `\multinamedelim` is not used at all if there are only two names in the list. In this case, the default styles use the `\finalnamedelim`.

<code>\andothersdelim</code>	The delimiter printed before the localisation string ‘andothers’ if a name list like <code>author</code> or <code>editor</code> is truncated. The default is an interword space.	Context Sensitive
<code>\multilistdelim</code>	The delimiter printed between multiple items in a literal list like <code>publisher</code> or <code>location</code> if there are more than two items in the list. The default is a comma plus an interword space. See <code>\multinamedelim</code> for further explanation.	Context Sensitive
<code>\finallistdelim</code>	The delimiter printed instead of <code>\multilistdelim</code> before the final item in a literal list. The default is the localised term ‘and’, separated by interword spaces. See <code>\finalnamedelim</code> for further explanation.	Context Sensitive
<code>\andmoredelim</code>	The delimiter printed before the localisation string ‘andmore’ if a literal list like <code>publisher</code> or <code>location</code> is truncated. The default is an interword space.	Context Sensitive
<code>\multicitedelim</code>	The delimiter printed between citations if multiple entry keys are passed to a single citation command. The default is a semicolon plus an interword space.	
<code>\multiciterangedelim</code>	The delimiter printed between two citations if they are compressed to a range. The default is <code>\bibrangedash</code> .	
<code>\multicitesubentrydelim</code>	The delimiter printed between subentry citations of the same set. This delimiter is only used in citation styles that reduce citations of the same set to a more compact form (subentry of <code>numeric-comp</code> ). The default is a comma.	
<code>\multicitesubentryrangedelim</code>	The delimiter printed between two citations of the same set if they are compressed to a range. The default is <code>\multiciterangedelim</code> .	
<code>\supercitedelim</code>	Similar to <code>\multicitedelim</code> , but used by the <code>\supercite</code> command only. The default is a comma.	
<code>\superciterangedelim</code>	Analogue of <code>\multiciterangedelim</code> for <code>\supercite</code> . The default is <code>\bibrangedash</code> .	
<code>\supercitesubentrydelim</code>	Analogue of <code>\multicitesubentrydelim</code> for <code>\supercite</code> . The default is <code>\supercitedelim</code> .	
<code>\supercitesubentryrangedelim</code>	Analogue of <code>\multicitesubentryrangedelim</code> for <code>\supercite</code> . The default is <code>\superciterangedelim</code> .	
<code>\compcitedelim</code>	Similar to <code>\multicitedelim</code> , but used by certain citation styles when ‘compressing’ multiple citations. The default definition is a comma plus an interword space.	
<code>\textcitedelim</code>	Similar to <code>\multicitedelim</code> , but used by <code>\textcite</code> and related commands (§ 3.9.2). The default is a comma plus an interword space. The standard styles modify this provisional definition to ensure that the delimiter before the final citation is the localised term ‘and’, separated by interword spaces. See also <code>\finalandcomma</code> and <code>\finalandsemicolon</code> in § 3.12.3.	
<code>\nametitledelim</code>	The delimiter printed between the author/editor and the title by author-title and some verbose citation styles and in the bibliography. In author-year bibliography styles this delimiter is placed after the author/editor and year and before the title. The default definition inside bibliographies is the now deprecated <code>\labelnamepunct</code> and is a comma plus an interword space otherwise.	Context Sensitive
<code>\nameyear delim</code>	The delimiter printed between the author/editor and the year by author-year citation and bibliography styles. The default definition is an interword space.	Context Sensitive

<code>\namelabeldelim</code>	The delimiter printed between the name/title and the label by alphabetic and numeric citation styles. The default definition is an interword space.	Context Sensitive
<code>\nonameyeardelim</code>	The delimiter printed between the substitute for the labelname when it does not exist (usually the label or title in standard styles) and the year in author-year citation and bibliography styles. This is only used when there is no labelname since when the labelname exists, <code>\nameyeardelim</code> is used. The default definition is an interword space.	Context Sensitive
<code>\authortypedelim</code>	The delimiter printed between the author and the <code>authortype</code> . The default is a comma followed by a space.	Context Sensitive
<code>\editortypedelim</code>	The delimiter printed between the editor and the <code>editor</code> or <code>editortype</code> string. The default is a comma followed by a space.	Context Sensitive
<code>\translatortypedelim</code>	The delimiter printed between the translator and the <code>translator</code> string. The default is a comma followed by a space.	Context Sensitive
<code>\labelalphaothers</code>	A string to be appended to the non-numeric portion of the <code>labelalpha</code> field (i. e., the field holding the citation label used by alphabetic citation styles) if the number of authors/editors exceeds the <code>maxalphanames threshold</code> or the <code>author/editor</code> list was truncated in the <code>bib</code> file with the keyword ‘and others’. This will typically be a single character such as a plus sign or an asterisk. The default is a plus sign. This command may also be redefined to an empty string to disable this feature. In any case, it must be redefined in the preamble.	
<code>\sortalphaothers</code>	Similar to <code>\labelalphaothers</code> but used in the sorting process. Setting it to a different value is advisable if the latter contains formatting commands, for example:	
<pre>\renewcommand*{\labelalphaothers}{\textbf{+}} \renewcommand*{\sortalphaothers}{+}</pre>		
	If <code>\sortalphaothers</code> is not redefined, it defaults to <code>\labelalphaothers</code> .	
<code>\volcitedelim</code>	The delimiter printed between the volume portion and the page/text portion of <code>\volcite</code> and related commands (§ 3.9.6).	
<code>\mkvolcitenote{⟨volume⟩}{⟨pages⟩}</code>	This macro formats the <code>⟨volume⟩</code> and <code>⟨pages⟩</code> arguments of <code>\volcite</code> and related commands (§ 3.9.6) when they are passed on to the underlying citation command.	
<code>\prenotedelim</code>	The delimiter printed after the <code>⟨prenote⟩</code> argument of a citation command. See § 3.9 for details. The default is an interword space.	Context Sensitive
<code>\postnotedelim</code>	The delimiter printed before the <code>⟨postnote⟩</code> argument of a citation command. See § 3.9 for details. The default is a comma plus an interword space.	Context Sensitive
<code>\extpostnotedelim</code>	The delimiter printed between the citation and the parenthetical <code>⟨postnote⟩</code> argument of a citation command when the postnote occurs outside of the citation parentheses. In the standard styles, this occurs when the citation uses the shorthand field of the entry. See § 3.9 for details. The default is an interword space.	Context Sensitive
<code>\multiprenotedelim</code>	The delimiter printed after the <code>⟨multiprenote⟩</code> argument of a citation command. See § 3.9 for details. The default is <code>\prenotedelim</code> .	Context Sensitive



`\multipostnotedelim` The delimiter printed before the `\multipostnote` argument of a citation command. See § 3.9 for details. The default is `\postnotedelim`. Context Sensitive

`\mkbibname'namepart'` `{\text}` This command, which takes one argument, is used to format the name part 'namepart' of name list fields. The default datamodel defines the name parts 'family', 'given', 'prefix' and 'suffix' and therefore the following macros are automatically defined:

```
\mkbibnamefamily
\mkbibnamegiven
\mkbibnameprefix
\mkbibnamesuffix
```

For backwards compatibility with the legacy BibTeX name parts, the following are also defined, will generate warnings and will set the correct macro:

```
\mkbibnamelast
\mkbibnamefirst
\mkbibnameaffix
```

`\mkbibcompletenamefamily` `{\text}` This command, which takes one argument, is used to format the complete name in family format order.

`\mkbibcompletenamefamilygiven` `{\text}` This command, which takes one argument, is used to format the complete name in family-given format order.

`\mkbibcompletenamegivenfamily` `{\text}` This command, which takes one argument, is used to format the complete name in given-family format order.

`\mkbibcompletename` `{\text}` The initial value of all default formatting hooks `\mkbibcompletename'formatorder'`.

`\datecircadelim` When formatting dates with the global option `datecirca` enabled, the delimiter printed after any localised 'circa' term. Defaults to interword space. Context Sensitive

`\dateeradelim` When formatting dates with the global option `dateera` set, the delimiter printed before the localisation era term. Defaults to interword space. Context Sensitive

`\dateuncertainprint` Prints date uncertainty information when the global option `dateuncertain` is enabled and the `\ifdateuncertain` test is true. By default, prints the language specific `\bibdateuncertain` string (§ 3.12.3).

`\enddateuncertainprint` Prints date uncertainty information when the global option `dateuncertain` is enabled and the `\ifenddateuncertain` test is true. By default, prints the language specific `\bibdateuncertain` string (§ 3.12.3).

`\datecircaprint` Prints date circa information when the global option `datecirca` is enabled and the `\ifdatecirca` test is true. By default, prints the 'circa' localised term (§ 4.9.2.21) and the `datecircadelim` delimiter.



`\enddatecirca` Prints date circa information when the global option `datecirca` is enabled and the `\ifenddatecirca` test is true. By default, prints the ‘circa’ localised term (§ 4.9.2.21) and the `datecircadelim` delimiter.

`\datecircaprintiso` Prints iso8601-2 format date circa information when the global option `datecirca` is enabled and the `\ifdatecirca` test is true. Prints `\textasciitilde`.

`\enddatecircaprintiso` Prints iso8601-2 format date circa information when the global option `datecirca` is enabled and the `\ifenddatecirca` test is true. Prints `\textasciitilde`.

`\dateera``print`{*<yearfield>*} Prints date era information when the global option `dateera` is set to ‘secular’ or ‘christian’. By default, prints the `dateeradelim` delimiter and the appropriate localised era term (§ 4.9.2.21). If the `dateeraauto` option is set, then the passed *<yearfield>* (which is the name of a year field such as ‘year’, ‘origyear’, ‘endeventyear’ etc.) is tested to see if its value is earlier than the `dateeraauto` threshold and if so, then the BCE/CE localisation will be output too. The default setting for `dateeraauto` is 0 and so only BCE/BC localisation strings are candidates for output. Detects whether the start or end year era information is to be printed by looking at the *<yearfield>* name passed to it.

`\dateera``print``pre` Prints date era information when the global option `dateera` is set to ‘astronomical’. By default, prints `bibdataera``prefix`. Detects whether the start or end year era information is to be printed by looking at the *<yearfield>* name passed to it.

`\relatedpunct` The separator between the `relatedtype` bibliography localisation string and the data from the first related entry. Here is an example with `\relatedpunct` set to a dash:

```
A. Smith. Title. 2000, (Orig. pub. as-Origtitle)
```

`\relateddelim` The generic separator between the data of multiple related entries. The default definition is an optional dot plus linebreak. Here is an example where volumes A-E are related entries of the 5 volume main work:

```
Donald E. Knuth. Computers & Typesetting. 5 vols.  
  ↳ Reading, Mass.: Addison-Wesley, 1984-1986.  
Vol. A: The TEXbook. 1984.  
Vol. B: TEX: The Program. 1986.  
Vol. C: The METAFONTbook. By. 1986.  
Vol. D: METAFONT: The Program. 1986.  
Vol. E: Computer Modern Typefaces. 1986.
```

`\relateddelim`*<relatedtype>* The separator between the data of multiple related entries inside related entries of type ‘relatedtype’. There is no default, if such a type-specific delimiter does not exist, `\relateddelim` is used.

`\begrelateddelim` The generic separator before the block of related entries. The default definition is `\newunitpunct`.

`\begrelateddelim<relatedtype>` The separator between the block of related entries of type ‘relatedtype’. There is no default, if such a type-specific delimiter does not exist, `\relateddelim` is used.

### 3.12.2 Context-sensitive Delimiters

Many delimiters described in § 3.12.1 are globally defined. That is, no matter where you use them, they print the same thing. This is not necessarily desirable for delimiters which you might want to print different things in different contexts. Here ‘context’ means things like ‘inside a text citation’ or ‘inside a bibliography item’. For this reason, `biblatex` provides a more sophisticated delimiter specification and user interface alongside the standard one based on normal macros defined with `\newcommand`.

For backwards compatibility reasons all context-sensitive delimiters (i.e., all delimiters marked as ‘context sensitive’ in § 3.12.1) can be redefined with `\renewcommand` in the global context. It is, however, strongly recommended to use the interface documented below (primarily `\DeclareDelimFormat`) to redefine these delimiters—even if `\renewcommand` would suffice for the job at hand.

```
\DeclareDelimFormat[<context, ...>]{<name>}{<code>}
\DeclareDelimFormat* [ <context, ...> ] { <name> } { <code> }
```

Declares the delimiter macro `<name>` with the replacement text `<code>`. If the optional comma-separated list of `<contexts>` is given, declare `<name>` only for those contexts. `<name>` defined without any `<contexts>` behaves just like the global delimiter definitions which `\newcommand` gives—just a plain macro with a replacement which can be used as `\name`. However, you can also call delimiter macros defined in this way by using `\printdelim`, which is context-aware. The starred version clears all `<context>` specific declarations for all `<names>` first.

```
\DeclareDelimAlias[<alias context, ...>]{<alias>}[<delim context>]{<delim>}
```

Declares `<alias>` to be an alias for the delimiter `<delim>`. If the optional `<alias context, ...>` nor `<delim context>` are given, the assignment is performed for all existing contexts of the target `<delim>` separately, so that `<alias>` becomes an exact copy of `<delim>` in all contexts. If only the second optional argument `<delim context>` is given, all existing contexts of `<alias>` will be cleared and the global/empty context becomes an alias of `<delim>` in the context `<delim context>`. The first optional argument `<alias context, ...>` may hold a list of contexts for which the alias is assigned. In that case the second optional argument `<delim context>` specifies the context of the target delimiter. This argument may not be a list, it can only hold one context. If it is missing, the `<alias context>` is assumed (if `<alias context>` is a list, the assignment is performed separately for each list item), if it is empty the global context is used.

```
\DeclareDelimAlias[bib,biblist]{finalnamedelim}[] {
  ↪ multinamedelim}
```

Defines the `bib` and `biblist` contexts of `\finalnamedelim` as aliases of `\multinamedelim` in global context. On the other hand

```
\DeclareDelimAlias[bib,biblist]{finalnamedelim}{
  ↪ multinamedelim}
```

defines `\finalnamedelim` in the context `bib` to be an alias of `\multinamedelim` in the `bib` context and defines `\finalnamedelim` in `biblist` context to be an alias of `\multinamedelim` in `biblist`.

```
\DeclareDelimAlias*[\langle alias context, ... \rangle]{\langle alias \rangle}[\langle delim context \rangle]{\langle delim \rangle}
```

Deprecated

The starred version of `\DeclareDelimAlias` is deprecated in favour of using unstarred `\DeclareDelimAlias` with optional arguments.

It assigns the delimiter alias for specific contexts only. The first optional argument `\langle alias context \rangle` holds a list of contexts for which the assignment is going to be performed. If it is empty or missing the global/empty context is assumed. The second optional argument `\langle delim context \rangle` specifies the context of the target delimiter. This argument may not be a list, it can only hold one context. If it is missing the `\langle alias context \rangle` is assumed (if `\langle alias context \rangle` is a list, the assignment is performed separately for each list item), if it is empty the global context is used.

```
\printdelim[\langle context \rangle]{\langle name \rangle}
```

Prints a delimiter with name `\langle name \rangle`, locally establishing a optional `\langle context \rangle` first. Without the optional `\langle context \rangle`, `\printdelim` uses the currently active delimiter context.

Delimiter contexts are simply a string, the value of the internal macro `\blx@delimcontext` which can be set manually by the command `\delimcontext`

```
\delimcontext{\langle context \rangle}
```

Set the delimiter context to `\langle context \rangle`. This setting is not global so that delimiter contexts can be nested using the usual LaTeX group method.

```
\DeclareDelimcontextAlias{\langle alias \rangle}{\langle name \rangle}
```

The context-sensitive delimiter system creates delimiter contexts based on the name of citation commands (`'parencite'`, `'textcite'` etc.) passed to `\DeclareCiteCommand`. In certain cases where there are nested definitions of citation commands where `\DeclareCiteCommand` calls itself (see the definition of `\textcite` in `authoryear-icomp` for example). The delimiter context is then usually incorrect and the delimiter specifications do not work. For example, the definition of `\textcite` in fact defines and uses `\cbx@textcite` and so the context is automatically set to `cbx@textcite` when printing the citation. Delimiter definitions expecting to see the context `textcite` therefore do not work. Therefore this command is provided for style authors which aliases the context `\langle alias \rangle` to the context `\langle name \rangle`. For example:

```
\DeclareDelimcontextAlias{cbx@textcite}{textcite}
```

This (which is a default setting), makes sure that when inside the `\cbx@textcite` citation command, the context is in fact `textcite` as expected.

`\UndeclareDelimcontextAlias{⟨alias⟩}`

Removes the delimiter context alias declared for  $\langle alias \rangle$ .

`biblatex` has several default contexts which are established automatically in various places:

**none** At begin document

**bib** Inside a bibliography begun with `\printbibliography` or inside a `\usedriver`

**biblist** Inside a bibliography list begun with `\printbiblist`

**‘citecommand’** Inside a citation command `\citecommand` defined with `\DeclareCiteCommand`

For example, the defaults for `\nametitledelim` are:

```
\DeclareDelimFormat{nametitledelim}{\addcomma\space}
\DeclareDelimFormat[bib,biblist]{nametitledelim}{
  ↪ \labelnamepunct}
\DeclareDelimFormat[textcite]{nametitledelim}{\addspace
  ↪ }
```

This means that `\nametitledelim` is defined globally as `‘\addcomma\space’` as per the standard delimiter interface. However, in addition, the delimiter can be printed using `\printdelim` which would print the same as `\nametitledelim` apart from inside a `\textcite`, in which it would print `\addspace` which is more suitable for running text, and in a bibliography (list) in which it takes the value of `\labelnamepunct` for compatibility reasons. If desired, a context can be forced with the optional argument to `\printdelim`, so

```
\printdelim[textcite]{nametitledelim}
```

would print `\addspace` regardless of the surrounding context of the `\printdelim`. Contexts are just arbitrary strings and so you can establish them at any time, using `\delimcontext`. If `\printdelim` finds no special value for the delimiter  $\langle name \rangle$  in the current context, it simply prints `\name`. This means that style authors can use `\printdelim` and users expecting to be able to use `\renewcommand` to redefine delimiters can do so with one caveat—such a definition won’t change any context-specific delimiters which are defined:

```
\DeclareDelimFormat{delima}{X}
\DeclareDelimFormat[textcite]{delima}{Y}
\renewcommand*{\delima}{Z}
```

Here, `\delima` always prints `‘Z’`. `\printdelim{delima}` in any context other than `‘textcite’` also prints `\delima` and hence `‘Z’` but in a `‘textcite’` context prints `‘Y’`. See the `04-delimiters.tex` example file that comes with `biblatex` for more information.

### 3.12.3 Language-specific Commands

The commands in this section are language specific. When redefining them, you need to wrap the new definition in a `\DeclareBibliographyExtras` command (in an `.lbx` file) or a `\DefineBibliographyExtras` command (user documents), see § 3.10 for details. Note that all commands starting with `\mk...` take one or more arguments.

- `\bibrangedash` The language specific dash to be used for ranges of numbers. Defaults to `\textendash`.
- `\bibrangesep` The language specific separator to be used between multiple ranges. Defaults to a comma followed by a space.
- `\bibdatesep` The language specific separator used between date components in terse date formats. Defaults to `\hyphen`.
- `\bibdaterangesep` The language specific separator to be used for date ranges. Defaults to `\textendash` for all date formats apart from `ymd` which defaults to a `\slash`. The date format option `iso` is hard-coded to `\slash` since this is a standards compliant format.
- `\mkbibdatelong` Takes the names of three field as arguments which correspond to three date components (in the order year/month/day) and uses their values to print the date in the language specific long date format.
- `\mkbibdateshort` Similar to `\mkbibdatelong` but using the language specific short date format.
- `\mkbibtimezone` Modifies a timezone string passed in as the only argument. By default this changes ‘Z’ to the value of `\bibtimezone`.
- `\bibdateuncertain` The language specific marker to be used after uncertain dates when the global option `dateuncertain` is enabled. Defaults to a space followed by a question mark.
- `\bibdateeraprefix` The language specific marker which is printed as a prefix to beginning BCE/BC dates in a date range when the option `dateera` is set to ‘astronomical’. Defaults to `\textminus`, if defined and `\textendash` otherwise.
- `\bibdateeraendprefix` The language specific marker which is printed as a prefix to end BCE/BC dates in a date range when the option `dateera` is set to ‘astronomical’. Defaults to a thin space followed by `\bibdateeraprefix` when `\bibdaterangesep` is set to a dash and to `\bibdateeraprefix` otherwise. This is a separate macro so that you may add extra space before a negative date marker which, for example follows a dash date range marker as this can look a little odd.
- `\bibtimesep` The language specific marker which separates time components. Defaults to a colon.
- `\bibutctimezone` The language specific string printed for the UTC timezone. Defaults to ‘Z’.
- `\bibtimezonesep` The language specific marker which separates an optional time zone component from a time. Empty by default.
- `\bibtzminsep` The language specific marker which separates hour and minute component of offset timezones. Defaults to a `\bibtimesep`.

`\bibdatetimesep` The language specific separator printed between date and time components when printing time components along with date components (see the `<datatype>dateusetime` option in § 3.1.2.1). Defaults to a space for non-ISO8601-2 output formats, and 'T' for ISO8601-2 output format.

`\finalandcomma` Prints the comma to be inserted before the final 'and' in a list, if applicable in the respective language. Here is an example:

```
Michel Goossens, Frank Mittelbach, and Alexander  
↪ Samarin
```

`\finalandcomma` is the comma before the word 'and'. See also `\multinamedelim`, `\finalnamedelim`, `\textcitedelim`, and `\revsdnamedelim` in § 3.12.1.

`\finalandsemicolon` Prints the semicolon to be inserted before the final 'and' in a list of lists, if applicable in the respective language. Here is an example:

```
Goossens, Mittelbach, and Samarin; Bertram and Wenworth  
↪ ; and Knuth
```

`\finalandsemicolon` is the semicolon before the word 'and'. See also `\textcitedelim` in § 3.12.1.

`\mkbibordinal`{*<integer>*}

This command, which takes an integer as its argument, prints an ordinal number.

`\mkbibmascord`{*<integer>*}

Similar to `\mkbibordinal`, but prints a masculine ordinal, if applicable in the respective language.

`\mkbibfemord`{*<integer>*}

Similar to `\mkbibordinal`, but prints a feminine ordinal, if applicable in the respective language.

`\mkbibneutord`{*<integer>*}

Similar to `\mkbibordinal`, but prints a neuter ordinal, if applicable in the respective language.

`\mkbibordedition`{*<integer>*}

Similar to `\mkbibordinal`, but intended for use with the term 'edition'.

`\mkbibordseries`{*<integer>*}

Similar to `\mkbibordinal`, but intended for use with the term 'series'.

### 3.12.4 Lengths and Counters

The length registers and counters in this section may be changed in the document preamble with `\setlength` and `\setcounter`, respectively.

- `\bibhang` The hanging indentation of the bibliography, if applicable. This length is initialized to `\parindent` at load-time. If `\parindent` is zero length for some reason, `\bibhang` will default to `1em`.
- `\biblabelsep` The horizontal space between entries and their corresponding labels in the bibliography. This only applies to bibliography styles which print labels, such as the `numeric` and `alphabetic` styles. This length is initialized to twice the value of `\labelsep` at load-time.
- `\bibitemsep` The vertical space between the individual entries in the bibliography. This length is initialized to `\itemsep` at load-time. Note that `\bibitemsep`, `\bibnamesep`, and `\bibinitsep` obey the rules for `\addvspace`, that is, when vertical space introduced by any of these commands immediately follows on from space introduced by another of them, the resulting total space is equal to the largest of them.
- `\bibnamesep` Vertical space to be inserted between two entries in the bibliography whenever an entry starts with a name which is different from the initial name of the previous entry. The default value is zero. Setting this length to a positive value greater than `\bibitemsep` will group the bibliography by author/editor name. Note that `\bibitemsep`, `\bibnamesep`, and `\bibinitsep` obey the rules for `\addvspace`, that is, when vertical space introduced by any of these commands immediately follows on from space introduced by another of them, the resulting total space is equal to the largest of them.
- `\bibinitsep` Vertical space to be inserted between two entries in the bibliography whenever an entry starts with a letter which is different from the initial letter of the previous entry. The default value is zero. Setting this length to a positive value greater than `\bibitemsep` will group the bibliography alphabetically. Note that `\bibitemsep`, `\bibnamesep`, and `\bibinitsep` obey the rules for `\addvspace`, that is, when vertical space introduced by any of these commands immediately follows on from space introduced by another of them, the resulting total space is equal to the largest of them.
- `\bibparsep` The vertical space between paragraphs within an entry in the bibliography. The default value is zero.
- `abbrvpenalty` This counter, which is used by the localisation modules, holds the penalty used in short or abbreviated localisation strings. For example, a linebreak in expressions such as “et al.” or “ed. by” is unfortunate, but should still be possible to prevent overfull boxes. This counter is initialized to `\hyphenpenalty` at load-time. The idea is making TeX treat the whole expression as if it were a single, hyphenatable word as far as line-breaking is concerned. If you dislike such linebreaks, use a higher value. If you do not mind them at all, set this counter to zero. If you want to suppress them unconditionally, set it to ‘infinite’ (10 000 or higher).<sup>25</sup>

---

<sup>25</sup>The default values assigned to `abbrvpenalty`, `lownamepenalty`, and `highnamepenalty` are deliberately very low to prevent overfull boxes. This implies that you will hardly notice any effect on line-breaking if the text is set justified. If you set these counters to 10 000 to suppress the respective breakpoints, you will notice their effect but you may also be confronted with overfull boxes. Keep in mind that line-breaking in the bibliography is often more difficult than in the body



`highnamepenalty` This counter holds a penalty affecting line-breaking in names. Please refer to §§ 3.15.4 and 3.12.1 for explanation. The counter is initialized to `\hyphenpenalty` at load-time. Use a higher value if you dislike the respective linebreaks. If you do not mind them at all, set this counter to zero. If you prefer the traditional BibTeX behavior (no linebreaks at `highnamepenalty` breakpoints), set it to ‘infinite’ (10 000 or higher).

`lownamepenalty` Similar to `highnamepenalty`. Please refer to §§ 3.15.4 and 3.12.1 for explanation. The counter is initialized to half the `\hyphenpenalty` at load-time. Use a higher value if you dislike the respective linebreaks. If you do not mind them at all, set this counter to zero.

`biburlnumpenalty` If this counter is set to a value greater than zero, `biblatex` will permit linebreaks after numbers in all strings formatted with the `\url` command from the `url` package. This will affect URLs and DOIs in the bibliography. The breakpoints will be penalized by the value of this counter. If URLs and/or DOIs in the bibliography run into the margin, try setting this counter to a value greater than zero but less than 10000 (you normally want to use a high value like 9000). Setting the counter to zero disables this feature. This is the default setting.

`biburlucpenalty` Similar to `biburlnumpenalty`, except that it will add a breakpoint after all uppercase letters.

`biburlllcpenalty` Similar to `biburlnumpenalty`, except that it will add a breakpoint after all lowercase letters.

`biburlbigbreakpenalty` The `biblatex` version of `url`’s `\UrlBigBreakPenalty`. The default value is 100.

`biburlbreakpenalty` The `biblatex` version of `url`’s `\UrlBreakPenalty`. The default value is 200.

`\biburlbigskip` The `biblatex` version of `\Urlmuskip`. This length holds the additional (stretchable) space inserted around breakable characters in the `\url` command from the `url` package. The default value is `0mu plus 3mu`.

`\biburlnumskip` The additional space inserted after numbers in strings formatted with the `\url` command from the `url` package. This will affect URLs and DOIs in the bibliography. If URLs and/or DOIs in the bibliography run into the margin, it may help to set this length to add some small stretchable space, for example `0mu plus 1mu`. The default setting is `0mu`. This value is only used if `biburlnumpenalty` is set to a value different from zero.

`\biburlucskip` Similar to `biburlnumskip`, except that it will add space after all uppercase letters.

`\biburlllcskip` Similar to `biburlnumskip`, except that it will add space after all lowercase letters.

### 3.12.5 All-purpose Commands

The commands in this section are all-purpose text commands which are generally available, not only in citations and the bibliography.

`\bibellipsis` An ellipsis symbol with brackets: ‘[...]’.

---

text and that you can not resort to rephrasing a sentence. In some cases it may be preferable to set the entire bibliography `\raggedright` to prevent suboptimal linebreaks. In this case, even the fairly low default penalties will make a visible difference.

- `\noligature` Disables ligatures at this position and adds some space. Use this command to break up standard ligatures like ‘fi’ and ‘fl’. It is similar to the “| shorthand provided by some language modules of the babel/polyglossia packages.
- `\hyphenate` A conditional hyphen. In contrast to the standard \- command, this one allows hyphenation in the rest of the word. It is similar to the “- shorthand provided by some language modules of the babel/polyglossia packages.
- `\hyphen` An explicit, breakable hyphen intended for compound words. In contrast to a literal ‘-’, this command allows hyphenation in the rest of the word. It is similar to the “= shorthand provided by some language modules of the babel/polyglossia packages.
- `\nbhyphen` An explicit, non-breakable hyphen intended for compound words. In contrast to a literal ‘-’, this command does not permit line breaks at the hyphen but still allows hyphenation in the rest of the word. It is similar to the “~ shorthand provided by some language modules of the babel/polyglossia packages.
- `\nohyphenation` A generic switch which suppresses hyphenation locally. Its scope should normally be confined to a group. The command uses a language without hyphenation patterns to suppress hyphenation. The idea was taken from Peter Wilson’s hyphenat package. Note that this command should only be used for small portions of text and that its effects are negated if babel/polyglossia is used to switch the language while it is active.

`\textnohyphenation{⟨text⟩}`

Similar to `\nohyphenation` but restricted to the `⟨text⟩` argument.

`\mknumalph{⟨integer⟩}`

Takes an integer in the range 1–702 as its argument and converts it to a string as follows: 1=a, ..., 26=z, 27=aa, ..., 702=zz. This is intended for use in formatting directives for the `extradate`, `extraname` and `extraalpha` fields.

`\mkbibacro{⟨text⟩}`

Generic command which typesets an acronym using the small caps variant of the current font, if available, and as-is otherwise. The acronym should be given in uppercase letters.

`\autocap{⟨character⟩}`

Automatically converts the `⟨character⟩` to its uppercase form if bibl<sub>at</sub>ex’s punctuation tracker would capitalize a localisation string at the current location. This command is robust. It is useful for conditional capitalization of certain strings in an entry. Note that the `⟨character⟩` argument is a single character given in lowercase. For example:

```
\autocap{s}pecial issue
```

will yield ‘Special issue’ or ‘special issue’, as appropriate. If the string to be capitalized starts with an inflected character given in US-ASCII notation, include the accent command in the `⟨character⟩` argument as follows:

```
\autocap{\'e}dition sp\'eciale
```

This will yield ‘Édition spéciale’ or ‘édition spéciale’. If the string to be capitalized starts with a command which prints a character, such as `\ae` or `\oe`, simply put the command in the *⟨character⟩* argument:

```
\autocap{\oe}uvres
```

This will yield ‘Œuvres’ or ‘œuvres’.

### 3.13 Language-specific Notes

The facilities discussed in this section are specific to certain localisation modules.

#### 3.13.1 American

The American localisation module uses `\uspunctuation` from § 4.7.5 to enable ‘American-style’ punctuation. If this feature is enabled, all trailing commas and periods after `\mkbibquote` will be moved inside the quotes. If you want to disable this feature, use `\stdpunctuation` as follows:

```
\DefineBibliographyExtras{american}{%  
  \stdpunctuation  
}
```

By default, the ‘American punctuation’ feature is enabled by the `american` localisation module only. The above code is only required if you want American localisation without American punctuation. Since standard punctuation is the package default, it would be redundant with any other language.

It is highly advisable to always specify `american`, `british`, `australian`, etc. rather than `english` when loading the `babel/polyglossia` packages to avoid any possible confusion. Older versions of the `babel` package used to treat `english` as an alias for `british`; more recent ones treat it as an alias for `american`. The `biblatex` package essentially treats `english` as an alias for `american`, except for the above feature which is only enabled if `american` is requested explicitly.

#### 3.13.2 Bulgarian

Like the Greek localisation module, the Bulgarian module also requires UTF-8 support. It will not work with any other encoding.

#### 3.13.3 Greek

The Greek localisation module requires UTF-8 support. It will not work with any other encoding. Generally speaking, the `biblatex` package is compatible with the `inputenc` package and with the Unicode engines `LuaLaTeX` and `XeLaTeX`. The `ucs` package will not work. Note that you may need to load additional packages which set up Greek fonts. As a rule of thumb, a setup which works for regular Greek documents should also work with `biblatex`. However, there is one fundamental limitation. As of this writing, `biblatex` has no support for switching scripts. Greek titles in

the bibliography should work fine, but English and other titles in the bibliography may be rendered in Greek letters. If you need multi-script bibliographies, using a Unicode engine is the only sensible choice.

#### **3.13.4 Hungarian**

The Hungarian localisation module needs to redefine certain field formats to obtain the grammatically correct word order. This means that these field formats are overwritten whenever the Hungarian localisation is active, no matter whether they were defined in the preamble or by a custom style. So please be aware that using the Hungarian localisation module may cause the bibliography output to deviate from the format dictated by the loaded style and preamble definitions. Changes to this behaviour need to be made using `\DefineBibliographyExtras`. In particular `\mkpageprefix` is redefined to output the ‘page’ or ‘pages’ string as a suffix after the page number following Hungarian conventions, and all formats of fields involving pages, chapters and volumes were modified so that numbers are printed as ordinals.

#### **3.13.5 Latvian**

The Latvian localisation module, like the Hungarian language module, needs to redefine certain field formats to obtain the grammatically correct word order. This means that these field formats are overwritten whenever the Latvian localisation is active, no matter whether they were defined in the preamble or by a custom style. So please be aware that using the Latvian localisation module may cause the bibliography output to deviate from the format dictated by the loaded style and preamble definitions. Changes to this behaviour need to be made using `\DefineBibliographyExtras`. In particular `\mkpageprefix` is redefined to output the ‘page’ or ‘pages’ string as a suffix after the page number following Latvian conventions, and all formats of fields involving pages, chapters and volumes were modified so that numbers are printed as ordinals.

#### **3.13.6 Lithuanian**

The Lithuanian localisation module needs UTF-8 support and will only work with this encoding.

#### **3.13.7 Marathi**

The Marathi localisation module needs UTF-8 support and will only work with this encoding, but users typesetting significant portions of Marathi will probably be using a Unicode engine anyway.

Like the Hungarian language module, the Marathi localisation needs to redefine certain field formats and internal formatting macros to obtain acceptable output. This means that these field formats are overwritten whenever the Marathi localisation is active, no matter whether they were defined in the preamble or by a custom style. So please be aware that using the Marathi localisation module may cause the bibliography output to deviate from the format dictated by the loaded style and preamble definitions. Changes to this behaviour need to be made using `\DefineBibliographyExtras`.

There is some limited support for numeric operations with non-US-ASCII Devanagari numerals. Due to the limitations of arithmetic operations to US-ASCII numerals

and backwards compatibility reasons additional work may be needed to support Devanagari numerals in places where they do not work at the moment.

### 3.13.8 Romanian

The Romanian localisation module needs UTF-8 support and will only work with this encoding.

Like the Hungarian and Latvian localisation modules, the Romanian `lbr` file applies some changes to macros that are usually not affected by localisation. `\newunitpunct` is set to produce a comma followed by a space. `\intitlepunct` only produces a space.

### 3.13.9 Russian

Like the Greek and Lithuanian localisation module, the Russian module also requires UTF-8 support. It will not work with any other encoding.

### 3.13.10 Spanish

Handling the word ‘and’ is more difficult in Spanish than in the other languages supported by this package because it may be ‘y’ or ‘e’, depending on the initial sound of the following word. Therefore, the Spanish localisation module does not use the localisation string ‘and’ but a special internal ‘smart and’ command. The behavior of this command is controlled by the `smartand` counter.

`smartand` This counter controls the behavior of the internal ‘smart and’ command. When set to 1, it prints ‘y’ or ‘e’, depending on the context. When set to 2, it always prints ‘y’. When set to 3, it always prints ‘e’. When set to 0, the ‘smart and’ feature is disabled. This counter is initialized to 1 at load-time and may be changed in the preamble. Note that setting this counter to a positive value implies that the Spanish localisation module ignores `\finalnamedelim` and `\finallistdelim`.

`\forceE` Use this command in bib files if `biblatex` gets the ‘and’ before a certain name wrong. As its name suggests, it will enforce ‘e’. This command must be used in a special way to be correct BibTeX datafile format. Here is an example:

```
author = {Edward Jones and Eoin Maguire},  
author = {Edward Jones and {\forceE{E}}oin Maguire},
```

Note that the initial letter of the respective name component is given as an argument to `\forceE` and that the entire construct is wrapped in an additional pair of curly braces.

`\forceY` Similar to `\forceE` but enforces ‘y’.

### 3.13.11 Turkish

By default `babel`’s Turkish localisation module makes ‘=’ a ‘shorthand’, which breaks the `\langle key \rangle = \langle value \rangle` parser uses by `biblatex`. This problem can be resolved by telling `babel` not to make ‘=’ a shorthand (for example by loading `babel` with the option `shorthands=:!`) or by loading a `\langle key \rangle = \langle value \rangle` package that can deal with active characters (`kvsetkeys` and `xkeyval`)<sup>26</sup>.

<sup>26</sup><https://tex.stackexchange.com/a/160428/35864>

### 3.14 Usage Notes

The following sections give a basic overview of the `biblatex` package and discuss some typical usage scenarios.

#### 3.14.1 Overview

Using the `biblatex` package is slightly different from using traditional BibTeX styles and related packages. Before we get to specific usage scenarios, we will therefore have a look at the structure of a typical document first:

```
\documentclass{...}
\usepackage[...]{biblatex}
\addbibresource{bibfile.bib}
\begin{document}
\cite{...}
...
\printbibliography
\end{document}
```

With traditional BibTeX, the `\bibliography` command serves two purposes. It marks the location of the bibliography and it also specifies the `bib` file(s). The file extension is omitted. With `biblatex`, resources are specified in the preamble with `\addbibresource` using the full name with `.bib` suffix. The bibliography is printed using the `\printbibliography` command which may be used multiple times (see § 3.8 for details). The document body may contain any number of citation commands (§ 3.9). Processing this example file requires that a certain procedure be followed. Suppose our example file is called `example.tex` and our bibliographic data is in `bibfile.bib`. The procedure, then, is as follows:

1. Run `latex` on `example.tex`. If the file contains any citations, `biblatex` will request the respective data from `biber` by writing commands to the auxiliary file `example.bcf`.
2. Run `biber` on `example.bcf`. `biber` will retrieve the data from `bibfile.bib` and write it to the auxiliary file `example.bbl` in a format which can be processed by `biblatex`.
3. Run `latex` on `example.tex`. `biblatex` will read the data from `example.bbl` and print all citations as well as the bibliography.

#### 3.14.2 Auxiliary Files

The `biblatex` package uses one auxiliary `bcf` file only. Even if there are citation commands in a file included via `\include`, you only need to run `biber` on the main `bcf` file. All information `biber` needs is in the `bcf` file, including information about all refsections if using multiple `refsection` environments (see § 3.14.3).

#### 3.14.3 Multiple Bibliographies

In a collection of articles by different authors, such as a conference proceedings volume for example, it is very common to have one bibliography for each article rather than a global one for the entire book. In the example below, each article would be presented as a separate `\chapter` with its own bibliography.

```

\documentclass{...}
\usepackage{biblatex}
\addbibresource{...}
\begin{document}
\chapter{...}
\begin{refsection}
...
\printbibliography[heading=subbibliography]
\end{refsection}
\chapter{...}
\begin{refsection}
...
\printbibliography[heading=subbibliography]
\end{refsection}
\end{document}

```

If `\printbibliography` is used inside a `refsection` environment, it automatically restricts the scope of the list of references to the enclosing `refsection` environment. For a cumulative bibliography which is subdivided by chapter but printed at the end of the book, use the `section` option of `\printbibliography` to select a reference section, as shown in the next example.

```

\documentclass{...}
\usepackage{biblatex}
\defbibheading{subbibliography}{%
  \section*{References for Chapter \ref{refsection:
    ↪ \therefsection}}}%
\addbibresource{...}
\begin{document}
\chapter{...}
\begin{refsection}
...
\end{refsection}
\chapter{...}
\begin{refsection}
...
\end{refsection}
\printbibheading
\printbibliography[section=1,heading=subbibliography]
\printbibliography[section=2,heading=subbibliography]
\end{document}

```

Note the definition of the bibliography heading in the above example. This is the definition taking care of the subheadings in the bibliography. The main heading is generated with a plain `\chapter` command in this case. The `biblatex` package automatically sets a label at the beginning of every `refsection` environment, using the standard `\label` command. The identifier used is the string `refsection:` followed by the number of the respective `refsection` environment. The number of the current section is accessible via the `refsection` counter. When using the `section` option of `\printbibliography`, this counter is also set locally. This



means that you may use the counter in heading definitions to print subheadings like “References for Chapter 3”, as shown above. You could also use the title of the respective chapter as a subheading by loading the `nameref` package and using `\nameref` instead of `\ref`:

```
\usepackage{nameref}
\defbibheading{subbibliography}{%
  \section*{\nameref{refsection:\therefsection}}}
```

Since giving one `\printbibliography` command for each part of a subdivided bibliography is tedious, `biblatex` provides a shorthand. The `\bibbysection` command automatically loops over all reference sections. This is equivalent to giving one `\printbibliography` command for every section but has the additional benefit of automatically skipping sections without references. In the example above, the bibliography would then be generated as follows:

```
\printbibheading
\bibbysection[heading=subbibliography]
```

When using a format with one cumulative bibliography subdivided by chapter (or any other document division) it may be more appropriate to use `refsegment` rather than `refsection` environments. The difference is that the `refsection` environment generates labels local to the environment while `refsegment` does not affect the generation of labels, hence they will be unique across the entire document. The next example could also be given in § 3.14.4 because, visually, it creates one global bibliography subdivided into multiple segments.

```
\documentclass{...}
\usepackage{biblatex}
\defbibheading{subbibliography}{%
  \section*{References for Chapter \ref{refsegment:
    ↪ \therefsection\therefsegment}}}%
\addbibresource{...}
\begin{document}
\chapter{...}
\begin{refsegment}
...
\end{refsegment}
\chapter{...}
\begin{refsegment}
...
\end{refsegment}
\printbibheading
\printbibliography[segment=1,heading=subbibliography]
\printbibliography[segment=2,heading=subbibliography]
\end{document}
```

The use of `refsegment` is similar to `refsection` and there is also a corresponding `segment` option for `\printbibliography`. The `biblatex` package automatically sets a label at the beginning of every `refsegment` environment using

the string `refsegment` : followed by the number of the respective `refsegment` environment as an identifier. There is a matching `refsegment` counter which may be used in heading definitions, as shown above. As with reference sections, there is also a shorthand command which automatically loops over all reference segments:

```
\printbibheading
\bibbysegment[heading=subbibliography]
```

This is equivalent to giving one `\printbibliography` command for every segment in the current `refsection`.

### 3.14.4 Subdivided Bibliographies

It is very common to subdivide a bibliography by certain criteria. For example, you may want to list printed and online resources separately or divide a bibliography into primary and secondary sources. The former case is straightforward because you can use the entry type as a criterion for the `type` and `notttype` filters of `\printbibliography`. The next example also demonstrates how to generate matching subheadings for the two parts of the bibliography.

```
\documentclass{...}
\usepackage{biblatex}
\addbibresource{...}
\begin{document}
...
\printbibheading
\printbibliography[notttype=online,heading=
    ↪ subbibliography,
                    title={Printed Sources}]
\printbibliography[type=online,heading=subbibliography,
                    title={Online Sources}]

\end{document}
```

You may also use more than two subdivisions:

```
\printbibliography[type=article,...]
\printbibliography[type=book,...]
\printbibliography[notttype=article,notttype=book,...]
```

It is even possible to give a chain of different types of filters:

```
\printbibliography[section=2,type=book,keyword=abc,
    ↪ notkeyword=xyz]
```

This would print all works cited in reference section 2 whose entry type is `@book` and whose keywords field includes the keyword `'abc'` but not `'xyz'`. When using bibliography filters in conjunction with a numeric style, see § 3.15.5. If you need complex filters with conditional expressions, use the `filter` option in conjunction with a custom filter defined with `\defbibfilter`. See § 3.8.9 for details on custom filters.

```

\documentclass{...}
\usepackage{biblatex}
\addbibresource{...}
\begin{document}
...
\printbibheading
\printbibliography[keyword=primary,heading=
    ↪ subbibliography,%
                    title={Primary Sources}]
\printbibliography[keyword=secondary,heading=
    ↪ subbibliography,%
                    title={Secondary Sources}]
\end{document}

```

Dividing a bibliography into primary and secondary sources is possible with a keyword filter, as shown in the above example. In this case, with only two subdivisions, it would be sufficient to use one keyword as filter criterion:

```

\printbibliography[keyword=primary,...]
\printbibliography[notkeyword=primary,...]

```

Since `biblatex` has no way of knowing if an item in the bibliography is considered to be primary or secondary literature, we need to supply the bibliography filter with the required data by adding a `keywords` field to each entry in the `bib` file. These keywords may then be used as targets for the `keyword` and `notkeyword` filters, as shown above. It may be a good idea to add such keywords right away while building a `bib` file.

```

@Book{key,
  keywords      = {primary,some,other,keywords},
  ...
}

```

An alternative way of subdividing the list of references are bibliography categories. They differ from the keywords-based approach shown in the example above in that they work on the document level and do not require any changes to the `bib` file.

```

\documentclass{...}
\usepackage{biblatex}
\DeclareBibliographyCategory{primary}
\DeclareBibliographyCategory{secondary}
\addtocategory{primary}{key1,key3,key6}
\addtocategory{secondary}{key2,key4,key5}
\addbibresource{...}
\begin{document}
...
\printbibheading
\printbibliography[category=primary,heading=
    ↪ subbibliography,%
                    title={Primary Sources}]

```

```
\printbibliography[category=secondary,heading=
  ↳ subbibliography,%
                        title={Secondary Sources}]
\end{document}
```

In this case it would also be sufficient to use one category only:

```
\printbibliography[category=primary,...]
\printbibliography[notcategory=primary,...]
```

It is still a good idea to declare all categories used in the bibliography explicitly because there is a `\bibbycategory` command which automatically loops over all categories. This is equivalent to giving one `\printbibliography` command for every category, in the order in which they were declared.

```
\documentclass{...}
\usepackage{biblatex}
\DeclareBibliographyCategory{primary}
\DeclareBibliographyCategory{secondary}
\addtocategory{primary}{key1,key3,key6}
\addtocategory{secondary}{key2,key4,key5}
\defbibheading{primary}{\section*{Primary Sources}}
\defbibheading{secondary}{\section*{Secondary Sources}}
\addbibresource{...}
\begin{document}
...
\printbibheading
\bibbycategory
\end{document}
```

The handling of the headings is different from `\bibbysection` and `\bibbysegment` in this case. `\bibbycategory` uses the name of the current category as a heading name. This is equivalent to passing `heading=<category>` to `\printbibliography` and implies that you need to provide a matching heading for every category.

### 3.14.5 Entry Sets

An entry set is a group of entries which are cited as a single reference and listed as a single item in the bibliography. The individual entries in the set are separated by `\entrysetpunct` (§ 4.10.1). The `biblatex` package supports two types of entry sets. Static entry sets are defined in the `bib` file like any other entry. Dynamic entry sets are defined with `\defbibentryset` (§ 3.8.11) on a per-document/per-refsection basis in the document preamble or the document body. This section deals with the definition of entry sets; style authors should also see § 4.11.1 for further information. Please note that entry sets only make sense for styles which refer to entries by labels such as the provided `numeric` and `alphabetic` styles. Styles which refer to entries via names, titles etc. (`authoryear`, `authortitle`, `verbose` etc.) rarely employ sets and do not support them by default when they are cited directly. Custom styles may of course choose to implement some manner of set citation support in any manner they choose.

### 3.14.5.1 Static entry sets

Static entry sets are defined in the `bib` file like any other entry. Defining an entry set is as simple as adding an entry of type `@set`. The entry has an `entryset` field defining the members of the set as a separated list of entry keys:

```
@Set{set1,  
  entryset = {key1, key2, key3},  
}
```

Entries may be part of a set in one document/refsection and stand-alone references in another one, depending on the presence of the `@set` entry. If the `@set` entry is cited, the set members are grouped automatically. If not, they will work like any regular entry. Note that with BibTeX as the backend, there must also be an `entryset` field in the set members which point to the set parent. With biber, this is not necessary.

### 3.14.5.2 Dynamic entry sets

Dynamic entry sets are set up and work much like static ones. The main difference is that they are defined in the document preamble or on the fly in the document body using the `\defbibentryset` command from § 3.8.11:

```
\defbibentryset{set1}{key1, key2, key3}
```

Dynamic entry sets in the document body are local to the enclosing `refsection` environment, if any. Otherwise, they are assigned to reference section 0. Those defined in the preamble are assigned to reference section 0.

### 3.14.6 Data Containers

The `@xdata` entry type serves as a data container holding one or more fields. Data in `@xdata` entries may be referenced and used by other entries. `@xdata` entries may not be cited or added to the bibliography, they only serve as a data source for other entries (including other `@xdata` entries). This data inheritance mechanism is useful for fixed field combinations such as `publisher/location` and for other frequently used data:

```
@XData{hup,  
  publisher = {Harvard University Press},  
  location  = {Cambridge, Mass.},  
}  
@Book{...,  
  author    = {...},  
  title     = {...},  
  date      = {...},  
  xdata     = {hup},  
}
```

Using a separated list of keys in its `xdata` field, an entry may inherit data from several `@xdata` entries. Cascading `@xdata` entries are supported as well, i.e., an `@xdata` entry may reference one or more other `@xdata` entries:

```

@XData{macmillan:name,
  publisher = {Macmillan},
}
@XData{macmillan:place,
  location  = {New York and London},
}
@XData{macmillan,
  xdata     = {macmillan:name,macmillan:place},
}
@Book{...,
  author    = {...},
  title     = {...},
  date      = {...},
  xdata     = {macmillan},
}

```

More granular @xdata entry data may be referenced. It is not necessary to reference only entire fields. For example:

```

@XData{someauthors,
  author    = {John Smith and Brian Brown}
}
@XData{somelocations,
  location   = {Location1 and Location2}
}
@XData{somenotes,
  note      = {A note}
}
@Book{...,
  author     = {Alan Drudge and xdata=someauthors-author
    ↪ -2},
  editor     = {xdata=someauthors-author and Ann Editor
    ↪ },
  location   = {xdata=somelocations-location-1 and
    ↪ Location3},
  note       = {xdata=somenotes-note}
}

```

The format of granular @xdata references are as follows:

`|xdata|=|<key>|<field>|<index>`

1. The value of the biber option `--xdatamarker` (by default 'xdata')
2. The value of the biber option `--xnamesep` (by default '=')
3. A valid entry key of an @xdata entry
4. The value of the biber option `--xdatasep` (by default '-')
5. A valid entry field in the source @xdata entry
6. (Optional) The value of the biber option `--xdatasep` (by default '-')

7. (Optional) A valid 1-based index into a list/name field in the source @xdata entry

There are `--output-*` variants of the above options for `biber` tool mode output so that these separators and markers can be programmatically changed. Taking the example above, this @book would resolve to:

```
@Book{...,
  author      = {Alan Drudge and Brian Brown},
  editor      = {John Smith and Brian Brown and Ann
    ↪ Editor},
  location    = {Location1 and Location3},
  note        = {A note}
}
```

Things to note with granular @xdata references:

- References must be made only to @xdata fields. A warning will be generated otherwise and the reference will not be resolved
- References must be made only to @xdata fields of the same type (list/name and datatype) as the referencing field. A warning will be generated otherwise and the reference will not be resolved
- References to fields of datatype 'date' are not possible. References to legacy year and month fields are possible
- References to missing entries, fields or list/name indices will generate a warning and the reference will not be resolved
- If an index is missing for a reference to a list/name field, the entire xdata name/list field will be spliced into the referencing field at the desired position.

See also §§ 2.1.1 and 2.2.3.

### 3.14.7 Electronic Publishing Information

The `biblatex` package provides three fields for electronic publishing information: `eprint`, `eprinttype`, and `eprintclass`. The `eprint` field is a verbatim field similar to `doi` which holds the identifier of the item. The `eprinttype` field holds the resource name, i.e., the name of the site or electronic archive. The optional `eprintclass` field is intended for additional information specific to the resource indicated by the `eprinttype` field. This could be a section, a path, classification information, etc. If the `eprinttype` field is available, the standard styles will use it as a literal label. In the following example, they would print “Resource: identifier” rather than the generic “eprint: identifier”:

```
eprint       = {identifier},
eprinttype   = {Resource},
```

The standard styles feature dedicated support for a few online archives. For arXiv references, put the identifier in the `eprint` field and the string `arxiv` in the `eprinttype` field:



```
eprint      = {math/0307200v3},  
eprinttype  = {arxiv},
```

For papers which use the new identifier scheme (April 2007 and later) add the primary classification in the `eprintclass` field:

```
eprint      = {1008.2849v1},  
eprinttype  = {arxiv},  
eprintclass = {cs.DS},
```

There are two aliases which ease the integration of arXiv entries. `archiveprefix` is treated as an alias for `eprinttype`; `primaryclass` is an alias for `eprintclass`. If hyperlinks are enabled, the `eprint` identifier will be transformed into a link to `arxiv.org`. See the package option `arxiv` in § 3.1.2.1 for further details.

For JSTOR references, put the stable JSTOR number in the `eprint` field and the string `jstor` in the `eprinttype` field:

```
eprint      = {number},  
eprinttype  = {jstor},
```

When using JSTOR's export feature to export citations in BibTeX format, JSTOR uses the `url` field by default (where the `<number>` is a unique and stable identifier):

```
url = {http://www.jstor.org/stable/number},
```

While this will work as expected, full URLs tend to clutter the bibliography. With the `eprint` fields, the standard styles will use the more readable “JSTOR: `<number>`” format which also supports hyperlinks. The `<number>` becomes a clickable link if `hyperref` support is enabled.

For PubMed references, put the stable PubMed identifier in the `eprint` field and the string `pubmed` in the `eprinttype` field. This means that:

```
url = {http://www.ncbi.nlm.nih.gov/pubmed/pmid},
```

becomes:

```
eprint      = {pmid},  
eprinttype  = {pubmed},
```

and the standard styles will print “PMID: `<pmid>`” instead of the lengthy URL. If `hyperref` support is enabled, the `<pmid>` will be a clickable link to PubMed.

For handles (HDLs), put the handle in the `eprint` field and the string `hdl` in the `eprinttype` field:

```
eprint      = {handle},  
eprinttype  = {hdl},
```

For Google Books references, put Google's identifier in the `eprint` field and the string `googlebooks` in the `eprinttype` field. This means that, for example:

```
url = {http://books.google.com/books?id=XXu4AkRVBBoC},
```

would become:

```
eprint      = {XXu4AkRVBBoC},  
eprinttype = {googlebooks},
```

and the standard styles would print “Google Books: XXu4AkRVBBoC” instead of the full URL. If `hyperref` support is enabled, the identifier will be a clickable link to Google Books.<sup>27</sup>

Note that `eprint` is a verbatim field. Always give the identifier in its unmodified form. For example, there is no need to replace `_` with `\_`. Also see § 4.11.2 on how to add dedicated support for other `eprint` resources.

### 3.14.8 External Abstracts and Annotations

Styles which print the fields `abstract` and/or `annotation` may support an alternative way of adding abstracts or annotations to the bibliography. Instead of including the text in the `bib` file, it may also be stored in an external LaTeX file. For example, instead of saying

```
@Article{key1,  
  ...  
  abstract = {This is an abstract of entry `key1'}.  
}
```

in the `bib` file, you may create a file named `bibabstract-key1.tex` and put the abstract in this file:

```
This is an abstract of entry `key1'.  
\endinput
```

The name of the external file must be the entry key prefixed with `bibabstract-` or `bibannotation-`, respectively. You can change these prefixes by redefining `\bibabstractprefix` and `\bibannotationprefix`. Note that this feature needs to be enabled explicitly by setting the package option `loadfiles` from § 3.1.2.1. The option is disabled by default for performance reasons. Also note that any `abstract` and `annotation` fields in the `bib` file take precedence over the external files. Using external files is strongly recommended if you have long abstracts or a lot of annotations since this may increase memory requirements significantly. It is also more convenient to edit the text in a dedicated LaTeX file. Style authors should see § 4.11.3 for further information.

## 3.15 Hints and Caveats

This section provides additional usage hints and addresses some common problems and potential misconceptions.

---

<sup>27</sup>Note that the Google Books ID seems to be a bit of an ‘internal’ value. As of this writing, there does not seem to be any way to search for an ID on Google Books. You may prefer to use the `url` in this case.

### 3.15.1 Usage with KOMA-Script Classes

When used in conjunction with a recent version<sup>28</sup> one of the `scrbook`, `scrreprt`, or `scrartcl` classes, `biblatex` passes control over the (default) headings bibliography and `biblist` from § 3.8.7 to the class. Hence, bibliography-heading-related class options can be used as usual. You can override the default headings by using the heading option of `\printbibliography`, `\printbibheading` and `\printbiblist`. See §§ 3.8.2, 3.8.3, 3.8.7 for details.

`biblatex` also tries to detect bibliography-related class options and settings itself.<sup>29</sup> This was required to be able to adapt the bibliography headings to the class settings in older versions of KOMA-Script. If one of the above classes is detected, `biblatex` will provide the following additional tests which may be useful in custom heading definitions. Since these tests rely on the error-prone external detection of KOMA-Script settings and are no longer used with newer KOMA-Script versions, these tests are deprecated and should no longer be used.

`\ifkomabibtotoc{<true>}{<false>}`

Deprecated

Expands to `<true>` if the class would add the bibliography to the table of contents, and to `<false>` otherwise. This test is deprecated.

`\ifkomabibtotocnumbered{<true>}{<false>}`

Deprecated

Expands to `<true>` if the class would add the bibliography to the table of contents as a numbered section, and to `<false>` otherwise. If this test yields `<true>`, `\ifkomabibtotoc` will always yield `<true>` as well, but not vice versa. This test is deprecated.

### 3.15.2 Usage with the Memoir Class

When using `biblatex` with the `memoir` class, most class facilities for adapting the bibliography have no effect. Use the corresponding facilities of this package instead (§§ 3.8.2, 3.8.7, 3.8.8). Instead of redefining `memoir`'s `\bibsection`, use the heading option of `\printbibliography` and `\defbibheading` (§§ 3.8.2 and 3.8.7). Instead of `\prebibhook` and `\postbibhook`, use the `prenote` and `postnote` options of `\printbibliography` and `\defbibnote` (§§ 3.8.2 and 3.8.8). All default headings are adapted at load-time such that they blend well with the default layout of this class. The default headings `bibliography` and `biblist` (§ 3.8.7) are also responsive to `memoir`'s `\bibintoc` and `\nobibintoc` switches. The length register `\bibitemsep` is used by `biblatex` in a way similar to `memoir` (§ 3.12.4). This section also introduces some additional length registers which correspond to `memoir`'s `\biblistextra`. Lastly, `\setbiblabel` does not map to a single facility of the `biblatex` package since the style of all labels in the bibliography is controlled by the bibliography style. See § 4.2.2 in the author section of this manual for details. If the `memoir` class is detected, `biblatex` will also provide the following additional test which may be useful in custom heading definitions:

<sup>28</sup>At least KOMA-Script 3.25 (2018/03/30).

<sup>29</sup>This applies to the traditional syntax of these options (`bibtotoc` and `bibtotocnumbered`) as well as to the `<key>=<value>` syntax introduced in KOMA-Script 3.x, i.e., to `bibliography=nottotoc`, `bibliography=totoc`, and `bibliography=totocnumbered`. The global `toc=bibliography` and `toc=bibliographynumbered` options as well as their aliases are detected as well. In any case, the options must be set globally in the optional argument to `\documentclass`.

`\ifmemoirbibintoc{<true>}{<false>}`

Expands to `<true>` or `<false>`, depending on memoir's `\bibintoc` and `\nobibintoc` switches. This is a LaTeX frontend to memoir's `\ifnobibintoc` test. Note that the logic of the test is reversed.

### 3.15.3 Page Numbers in Citations

If the `<postnote>` argument to a citation command is a page number or page range, biblatex will automatically prefix it with 'p.' or 'pp.' by default. This works reliably in typical cases, but sometimes manual intervention may be required. In this case, it is important to understand how this argument is handled in detail. First, biblatex checks if the postnote is an Arabic or Roman numeral (case insensitive). If this test succeeds, the postnote is considered as a single page or other number which will be prefixed with 'p.' or some other string which depends on the `pagination` field (see § 2.3.12). If it fails, a second test is performed to find out if the postnote is a range or a list of Arabic or Roman numerals. If this test succeeds, the postnote will be prefixed with 'pp.' or some other string in the plural form. If it fails as well, the postnote is printed as is. Note that both tests expand the `<postnote>`. All commands used in this argument must therefore be robust or prefixed with `\protect`. Here are a few examples of `<postnote>` arguments which will be correctly recognized as a single number, a range of numbers, or a list of numbers, respectively:

```
\cite[25]{key}
\cite[vii]{key}
\cite[XIV]{key}
\cite[34--38]{key}
\cite[iv--x]{key}
\cite[185/86]{key}
\cite[XI \& XV]{key}
\cite[3, 5, 7]{key}
\cite[vii--x; 5, 7]{key}
```

In some other cases, however, the tests may get it wrong and you need to resort to the auxiliary commands `\pnfmt`, `\pno`, `\ppno`, and `\nopp` from § 3.9.8. For example, suppose a work is cited by a special pagination scheme consisting of numbers and letters. In this scheme, the string '27a' would mean 'page 27, part a'. Since this string does not look like a number or a range to biblatex, you need to force the prefix for a single number manually:

```
\cite[\pno~27a]{key}
```

There is also a `\ppno` command which forces a range prefix as well as a `\nopp` command which suppresses all prefixes:

```
\cite[\ppno~27a--28c]{key}
\cite[\nopp 25]{key}
```

These commands may be used anywhere in the `<postnote>` argument. They may also be used multiple times. For example, when citing by volume and page number, you may want to suppress the prefix at the beginning of the postnote and add it in the middle of the string:

```
\cite[VII, \pno~5]{key}
\cite[VII, \pno~3, \ppno~40--45]{key}
\cite[see][\ppno~37--46, in particular \pno~40]{key}
```

The command `\pnfmt` can be used for *⟨postnote⟩*s consisting of a page range and some additional text. `\pnfmt` prints its argument in the format specified for the postnote and can be used to format the page range automatically without the need for `\pno` and `\ppno`.

```
\cite[\pnfmt{37-46}, in particular \pnfmt{40}]{key}
```

There are also two auxiliary command for suffixes like ‘the following page(s)’. Instead of inserting such suffixes literally (which would require `\ppno` to force a prefix):

```
\cite[\ppno~27~sq.]{key}
\cite[\ppno~55~sqq.]{key}
```

use the auxiliary commands `\psq` and `\psqq`. Note that there is no space between the number and the command. This space will be inserted automatically and may be modified by redefining the macro `\sqspace`.

```
\cite[27\psq]{key}
\cite[55\psqq]{key}
```

Since the postnote is printed without any prefix if it includes any character which is not an Arabic or Roman numeral, you may also type the prefix manually—though this is discouraged:

```
\cite[p.~5]{key}
```

It is possible to suppress the prefix on a per-entry basis by setting the pagination field of an entry to ‘none’, see § 2.3.12 for details. If you do not want any prefixes at all or prefer to type them manually, you can also disable the entire mechanism in the document preamble or the configuration file as follows:

```
\DeclareFieldFormat{postnote}{#1}
```

The *⟨postnote⟩* argument is handled as a field and the formatting of this field is controlled by a field formatting directive which may be freely redefined. The above definition will simply print the postnote as is. See §§ 4.3.2 and 4.4.2 in the author guide for further details.

### 3.15.4 Name Parts and Name Spacing

The `biblatex` package gives users and style authors very fine-grained control of name spacing and the line-breaking behavior of names. The commands discussed in the following are documented in §§ 3.12.1 and 4.10.1. This section is meant to give an overview of how they are put together. A note on terminology: a name *part* is a basic part of the name, for example the given or the family name. Each part of a

name may be a single name or it may be composed of multiple names. For example, the name part ‘given name’ may be composed of a given and a middle name. The latter are referred to as name *elements* in this section. Let’s consider a simple name first: “John Edward Doe”. This name is composed of the following parts:

```
Given   John Edward
Prefix  —
Family  Doe
Suffix  —
```

The spacing, punctuation and line-breaking behavior of names is controlled by six macros:

<code>a=\bibnamedelima</code>	Inserted by the backend after the first element of every name part if that element is less than three characters long and before the last element of every name part.
<code>b=\bibnamedelimb</code>	Inserted by the backend between all elements of a name part where <code>\bibnamedelima</code> does not apply.
<code>c=\bibnamedelimc</code>	Inserted by a formatting directive between the name prefix and the family name if <code>useprefix=true</code> . If <code>useprefix=false</code> , <code>\bibnamedelimd</code> is used instead.
<code>d=\bibnamedelimd</code>	Inserted by a formatting directive between name parts where <code>\bibnamedelimc</code> does not apply.
<code>i=\bibnamedelimi</code>	Replaces <code>\bibnamedelima/b</code> after initials
<code>p=\revsdsnamepunct</code>	Inserted by a formatting directive after the family name when the name parts are reversed.

This is how the delimiters are employed:

```
John|_a Edward|_d Doe
Doe|_p|_d John|_a Edward
```

Initials in the `bib` file get a special delimiter:

```
J.|_i Edward|_d Doe
```

Let’s consider a more complex name: “Charles-Jean Étienne Gustave Nicolas de La Vallée Poussin”. This name is composed of the following parts:

```
Given   Charles-Jean Étienne Gustave Nicolas
Prefix  de
Family  La Vallée Poussin
Suffix  —
```

The delimiters:

```
Charles-Jean|_b Étienne|_b Gustave|_a Nicolas|_d de|_c La|_a Vallée|_a Poussin
```

Note that `\bibnamedelima/b/i` are inserted by the backend. The backend processes the name parts and takes care of the delimiters between the elements that make up a name part, processing each part individually. In contrast to that, the delimiters between the parts of the complete name (`\bibnamedelimc/d`) are added by name formatting directives at a later point in the processing chain. The spacing and punctuation of initials is also handled by the backend and may be customized by redefining the following three macros:

<code>a=\bibinitperiod</code>	Inserted by the backend after initials.
<code>b=\bibinitdelim</code>	Inserted by the backend between multiple initials.
<code>c=\bibinithyphendelim</code>	Inserted by the backend between the initials of hyphenated name parts, replacing <code>\bibinitperiod</code> and <code>\bibinitdelim</code> .

This is how they are employed:

J<sub>a</sub>.|<sub>b</sub>E<sub>a</sub>. Doe  
K<sub>c</sub>.-H<sub>a</sub>. Mustermann

### 3.15.5 Split Bibliographies and Citation Labels

The citation labels generated by this package are assigned to the full list of references before it is split up by any bibliography filters. They are guaranteed to be unique across the entire document (or a `refsection` environment), no matter how many bibliography filters you are using. When using a numeric citation scheme, however, this will most likely lead to discontinuous numbering in split bibliographies. Use the `defernumbers` package option to avoid this problem. If this option is enabled, numeric labels are assigned the first time an entry is printed in any bibliography.

Compare the output of the following example with `defernumbers=true` and `defernumbers=false`.

```
\documentclass{article}
\usepackage[defernumbers=true]{biblatex}

\addbibresource{biblatex-examples.bib}

\begin{document}
Lorem \autocite{worman} ipsum \autocite{sigfridsson}
dolor \autocite{nussbaum} sit \autocite{aksin}

\printbibheading[title={Bibliography}]
\printbibliography[heading=subbibliography,
  type=book, title={Books}]
\printbibliography[heading=subbibliography,
  type=article, title={Articles}]
\end{document}
```

There are pathological cases where neither `defernumbers=true` nor `defernumbers=false` produce fully desirable output. This may be the case when entries can end up in several of the split bibliographies—or if there is an additional global bibliography. But in most cases with non-overlapping split bibliographies `defernumbers=true` produces better results. `biblatex` will therefore suggest setting `defernumbers` to `true` in a warning when a split bibliography setup is detected. That warning can be suppressed in case setting `defernumbers` to `true` is not desirable.

### 3.15.6 Active Characters in Bibliography Headings

Packages using active characters, such as `babel`, `polyglossia`, `csquotes`, or `underscore`, usually do not make them active until the beginning of the document body to avoid interference with other packages. A typical example of such



an active character is the US-ASCII quote `"`, which is used by various language modules of the `babel/polyglossia` packages. If shorthands such as `"<` and `"a` are used in the argument to `\defbibheading` and the headings are defined in the document preamble, the non-active form of the characters is saved in the heading definition. When the heading is typeset, they do not function as a command but are simply printed literally. The most straightforward solution consists in moving `\defbibheading` after `\begin{document}`. Alternatively, you may use `babel's \shorthandon` and `\shorthandoff` commands to temporarily make the shorthands active in the preamble. The above also applies to bibliography notes and the `\defbibnote` command.

### 3.15.7 Grouping in Reference Sections and Segments

All LaTeX environments enclosed in `\begin` and `\end` form a group. This may have undesirable side effects if the environment contains anything that does not expect to be used within a group. This issue is not specific to `refsection` and `refsegment` environments, but it obviously applies to them as well. Since these environments will usually enclose much larger portions of the document than a typical `itemize` or similar environment, they are simply more likely to trigger problems related to grouping. If you observe any malfunctions after adding `refsection` environments to a document (for example, if anything seems to be ‘trapped’ inside the environment), try the following syntax instead:

```
\chapter{...}  
\refsection  
...  
\endrefsection
```

This will not form a group, but otherwise works as usual. As far as `biblatex` is concerned, it does not matter which syntax you use. The alternative syntax is also supported by the `refsegment` environment. Note that the commands `\newrefsection` and `\newrefsegment` do not form a group. See §§ 3.8.4 and 3.8.5 for details.

## 3.16 Using the fallback BibTeX backend

To utilise all of the features described here, `biblatex` must be used with the `biber` program as a backend. Indeed, the documentation in general assumes this. However, for a *limited* subset of use cases it is possible to use the long-established BibTeX program (either the 7-bit `bibtex` or 8-bit `bibtex8`) as the supporting backend. This works in much the same way as for `biber` with the only proviso being that BibTeX is much more limited as a backend.

Using BibTeX as the backend requires that the option `backend=bibtex` or `backend=bibtex8` is given at load time. The `biblatex` package will then write appropriate data for use by BibTeX into the auxiliary file(s) and a special data file (automatically included in those to be read by BibTeX). The BibTeX (8) program should then be run on each auxiliary file: `biblatex` will list all of the required files in the log.

Key limitations of the BibTeX backend are:

- Sorting is global and is limited to US-ASCII ordering

- No re-encoding is possible and thus database entries must be in LICR form to work reliably
- The data model is fixed
- Cross-referencing is more limited and entry sets must be written into the `.bib` file
- Fixed memory capacity (using the `--wolfgang` option with `bibtex8` is strongly recommended to minimize the likelihood of an issue here)

## 4 Author Guide

This part of the manual documents the author interface of the `biblatex` package. The author guide covers everything you need to know in order to write new citation and bibliography styles or localisation modules. You should read the user guide first before continuing with this part of the manual.

### 4.1 Overview

Before we get to the commands and facilities provided by `biblatex`, we will have a look at some of its fundamental concepts. The `biblatex` package uses auxiliary files in a special way. Most notably, the `bbl` file is used differently and there is no concept of a style-dependent `bst` file. With LaTeX's standard bibliographic facilities, a document includes any number of citation commands in the document body plus `\bibliographystyle` and `\bibliography`, usually towards the end of the document. The location of the former is arbitrary, the latter marks the spot where the list of references is to be printed:

```
\documentclass{...}
\begin{document}
\cite{...}
...
\bibliographystyle{...}
\bibliography{...}
\end{document}
```

Processing this files requires that a certain procedure be followed. This procedure is as follows:

1. Run `latex`: On the first run, `\bibstyle` and `\bibdata` commands are written to the `aux` file, along with `\citation` commands for all citations. At this point, the references are undefined because LaTeX is waiting for BibTeX to supply the required data. There is also no bibliography yet.
2. Run `bibtex`: BibTeX writes a `thebibliography` environment to the `bbl` file, supplying all entries from the `bib` file which were requested by the `\citation` commands in the `aux` file.
3. Run `latex`: Starting with the second run, the `\bibitem` commands in the `thebibliography` environment write one `\bibcite` command for each bibliography entry to the `aux` file. These `\bibcite` commands define the citation labels used by `\cite`. However, the references are still undefined because the labels are not available until the end of this run.

4. Run `latex`: Starting with the third run, the citation labels are defined as the `aux` file is read in at the end of the preamble. All citations can now be printed.

Note that all bibliographic data is written to the `bbl` file in the final format. The `bbl` file is read in and processed like any printable section of the document. For example, consider the following entry in a `bib` file:

```
@Book{companion,
  author    = {Michel Goossens and Frank Mittelbach and
    ↪ Alexander Samarin},
  title     = {The LaTeX Companion},
  publisher = {Addison-Wesley},
  address   = {Reading, Mass.},
  year      = {1994},
}
```

With the `plain.bst` style, BibTeX exports this entry to the `bbl` file as follows:

```
\bibitem{companion}
Michel Goossens, Frank Mittelbach, and Alexander
  ↪ Samarin.
\newblock {\em The LaTeX Companion}.
\newblock Addison-Wesley, Reading, Mass., 1994.
```

By default, LaTeX generates numeric citation labels, hence `\bibitem` writes lines such as the following to the `aux` file:

```
\bibcite{companion}{1}
```

Implementing a different citation style implies that more data has to be transferred via the `aux` file. With the `natbib` package, for example, the `aux` file contains lines like this one:

```
\bibcite{companion}{{1}{1994}{{Goossens et~al.}}{{
  ↪ Goossens, Mittelbach,
and Samarin}}}
```

The `biblatex` package supports citations in any arbitrary format, hence citation commands need access to all bibliographic data. What this would mean within the scope of the procedure outlined above becomes obvious when looking at the output of the `jurabib` package which also makes all bibliographic data available in citations:

```
\bibcite{companion}{{Goossens\jbbfsasep
  ↪ Mittelbach\jbbstasep Samarin}%
{{{0}}{book}{1994}}{}}{Reading, Mass.\bpubaddr
  ↪ }Addison-Wesley%
\bibbdsep{} 1994}{{The LaTeX Companion
  ↪ }{}}{2}}{}}{\bibnf
```

```

{Goossens}{Michel}{M.}{}{}{}{}\\Bibbfsasep\\bibnf{
  ↳ Mittelbach}{Frank}{F.}%
{}{}{}\\Bibbstasep\\bibnf{Samarin}{Alexander}{A.}{}{}{}{}{
  ↳ \\bibtfont{The
LaTeX Companion}.\\ \\apyformat{Reading, Mass.\\bpubaddr
  ↳ {}
Addison-Wesley\\bibbdsep{} 1994}}

```

In this case, the contents of the entire `thebibliography` environment are effectively transferred via the `aux` file. The data is read from the `bbl` file, written to the `aux` file, read back from the `aux` file and then kept in memory. The bibliography itself is still generated as the `bbl` file is read in. The `biblatex` package would also be forced to cycle all data through the `aux` file. This implies processing overhead and is also redundant because the data has to be kept in memory anyway.

The traditional procedure is based on the assumption that the full bibliographic data of an entry is only required in the bibliography and that all citations use short labels. This makes it very effective in terms of memory requirements, but it also implies that it does not scale well. That is why `biblatex` takes a different approach. First of all, the document structure is slightly different. Instead of using `\bibliography` in the document body, database files are specified in the preamble with `\addbibresource`, `\bibliographystyle` is omitted entirely (all features are controlled by package options), and the bibliography is printed using `\printbibliography`:

```

\documentclass{...}
\usepackage[...]{biblatex}
\addbibresource{...}
\begin{document}
\cite{...}
...
\printbibliography
\end{document}

```

In order to streamline the whole procedure, `biblatex` essentially employs the `bbl` file like an `aux` file, rendering `\bibcite` obsolete. We then get the following procedure:

1. Run `latex`: The first step is similar to the traditional procedure described above: `\bibstyle` and `\bibdata` commands are written to the `bcbf` file, along with `\citation` commands for all citations. We then wait for the backend to supply the required data.
2. Run `biber`: The backend supplies those entries from the `bib` file which were requested by the `\citation` commands in the auxiliary file. However, it does not write a printable bibliography to the `bbl` file, but rather a structured representation of the bibliographic data. Just like an `aux` file, this `bbl` file does not print anything when read in. It merely puts data in memory.
3. Run `latex`: Starting with the second run, the `bbl` file is processed right at the beginning of the document body, just like an `aux` file. From this point on, all bibliographic data is available in memory so that all citations can be printed

right away.<sup>30</sup> The citation commands have access to the complete bibliographic data, not only to a predefined label. The bibliography is generated from memory using the same data and may be filtered or split as required.

Let's consider the sample entry given above once more:

```
@Book{companion,
  author    = {Michel Goossens and Frank Mittelbach and
    ↪ Alexander Samarin},
  title     = {The LaTeX Companion},
  publisher = {Addison-Wesley},
  address   = {Reading, Mass.},
  year      = {1994},
}
```

This entry is essentially exported in the following format:

```
\entry{companion}{book}{}
  \labelname{author}{3}{}{%
    {{uniquename=0,hash=...}{Goossens}{G.}{Michel}{M
    ↪ .}{}{}{}{}{}%
    {{uniquename=0,hash=...}{Mittelbach}{M.}{Frank}{F
    ↪ .}{}{}{}{}{}%
    {{uniquename=0,hash=...}{Samarin}{S.}{Alexander}{A
    ↪ .}{}{}{}{}{}%
  }
  \name{author}{3}{}{%
    {{uniquename=0,hash=...}{Goossens}{G.}{Michel}{M
    ↪ .}{}{}{}{}{}%
    {{uniquename=0,hash=...}{Mittelbach}{M.}{Frank}{F
    ↪ .}{}{}{}{}{}%
    {{uniquename=0,hash=...}{Samarin}{S.}{Alexander}{A
    ↪ .}{}{}{}{}{}%
  }
  \list{publisher}{1}{}%
    {Addison-Wesley}%
  }
  \list{location}{1}{}%
    {Reading, Mass.}%
  }
  \field{title}{The LaTeX Companion}
  \field{year}{1994}
\endentry
```

As seen in this example, the data is presented in a structured format that resembles the structure of a bib file to some extent. At this point, no decision concerning the final format of the bibliography entry has been made. The formatting of the bibliography and all citations is controlled by LaTeX macros, which are defined in bibliography and citation style files.

<sup>30</sup>If the `defernumbers` package option is enabled `biblatex` uses an algorithm similar to the traditional procedure to generate numeric labels. In this case, the numbers are assigned as the bibliography is printed and then cycled through the backend auxiliary file. It will take an additional LaTeX run for them to be picked up in citations.

## 4.2 Bibliography Styles

A bibliography style is a set of macros which print the entries in the bibliography. Such styles are defined in files with the suffix `bbx`. The `biblatex` package loads the selected bibliography style file at the end of the package. Note that a small repertory of frequently used macros shared by several of the standard bibliography styles is included in `biblatex.def`. This file is loaded at the end of the package as well, prior to the selected bibliography style.

### 4.2.1 Bibliography Style Files

Before we go over the individual components of a bibliography style, consider this example of the overall structure of a typical `bbx` file:

```
\ProvidesFile{example.bbx}[2006/03/15 v1.0 biblatex
  ↪ bibliography style]

\defbibenvironment{bibliography}
{...}
{...}
{...}
\defbibenvironment{shorthand}
{...}
{...}
{...}
\InitializeBibliographyStyle{...}
\DeclareBibliographyDriver{article}{...}
\DeclareBibliographyDriver{book}{...}
\DeclareBibliographyDriver{inbook}{...}
...
\DeclareBibliographyDriver{shorthand}{...}
\endinput
```

The main structure of a bibliography style file consists of the following commands:

`\RequireBibliographyStyle{⟨style⟩}`

This command is optional and intended for specialized bibliography styles built on top of a more generic style. It loads the bibliography style `style.bbx`.

`\InitializeBibliographyStyle{⟨code⟩}`

Specifies arbitrary `⟨code⟩` to be inserted at the beginning of the bibliography, but inside the group formed by the bibliography. This command is optional. It may be useful for definitions which are shared by several bibliography drivers but not used outside the bibliography. Keep in mind that there may be several bibliographies in a document. If the bibliography drivers make any global assignments, they should be reset at the beginning of the next bibliography.

`\DeclareBibliographyDriver{⟨entrytype⟩}{⟨code⟩}`

Defines a bibliography driver. A ‘driver’ is a macro which handles a specific entry type (when printing bibliography lists) or a specific named bibliography list (when printing bibliography lists). The `⟨entrytype⟩` corresponds to the entry type used in

bib files, specified in lowercase letters (see § 2.1). The  $\langle entrytype \rangle$  argument may also be an asterisk. In this case, the driver serves as a fallback which is used if no specific driver for the entry type has been defined. The  $\langle code \rangle$  is arbitrary code which typesets all bibliography entries of the respective  $\langle entrytype \rangle$ . This command is mandatory. Every bibliography style should provide a driver for each entry type.

`\DeclareBibliographyAlias`{ $\langle alias \rangle$ }{ $\langle entrytype \rangle$ }

If a bibliography driver covers more than one entry type, this command may be used to define an alias where  $\langle entrytype \rangle$  is the name of a defined driver. This command is optional. The  $\langle alias \rangle$  argument may also be an asterisk. In this case, the  $\langle entrytype \rangle$  driver serves as a fallback which is used if no specific driver for an entry has been defined.

Note that an alias declared with `\DeclareBibliographyAlias` only ‘reroutes’ the bibliography driver from  $\langle alias \rangle$  to  $\langle entrytype \rangle$ . Type-specific formatting directives still operate with the old  $\langle alias \rangle$  name. `\DeclareBibliographyAlias` thus provides only a ‘soft’ alias. If a complete alias is desired so that  $\langle alias \rangle$  and  $\langle entrytype \rangle$  are completely indistinguishable and use the same type-specific formatting, an approach with source mapping would be more appropriate (cf. the mappings for § 2.1.2 in § A.1, this would give a ‘hard’ alias).

`\DeclareBibliographyOption`[ $\langle datatype \rangle$ ]{ $\langle key \rangle$ }[ $\langle value \rangle$ ]{ $\langle code \rangle$ }

This command defines additional preamble options in  $\langle key \rangle = \langle value \rangle$  format. The  $\langle key \rangle$  is the option key. The  $\langle code \rangle$  is arbitrary TeX code to be executed whenever the option is used. The value passed to the option is passed on to the  $\langle code \rangle$  as #1. The optional  $\langle value \rangle$  is a default value to be used if the bare key is given without any value. This is useful for boolean switches. The  $\langle datatype \rangle$  is the datatype for the option. If omitted, it defaults to ‘boolean’. For example, with a definition like the following:

```
\DeclareBibliographyOption[boolean]{somekey}[true]{...}
```

giving ‘somekey’ without a value is equivalent to ‘somekey=true’. Valid  $\langle datatype \rangle$  values are defined in the default biber Datamodel as:

```
\DeclareDatamodelConstant[type=list]{optiondatatypes}{
  ↪ boolean, integer, string, xml}
```

`\DeclareTypeOption`[ $\langle datatype \rangle$ ]{ $\langle key \rangle$ }[ $\langle value \rangle$ ]{ $\langle code \rangle$ }

Similar to `\DeclareBibliographyOption` but defines options which are settable on a per-type basis using the optional argument of `\ExecuteBibliographyOptions` (see § 3.2.2). The  $\langle code \rangle$  is executed whenever biblatex prepares the data of an entry of the type for which the option has been set for use by a citation command or a bibliography driver.

`\DeclareEntryOption`[ $\langle datatype \rangle$ ]{ $\langle key \rangle$ }[ $\langle value \rangle$ ]{ $\langle code \rangle$ }

Similar to `\DeclareBibliographyOption` but defines options which are settable on a per-entry basis in the options field from § 2.2.3. The  $\langle code \rangle$  is executed whenever biblatex prepares the data of the entry for use by a citation command or a bibliography driver.



`\DeclareBiblatexOption{⟨scope,...⟩}[⟨datatype⟩]{⟨key⟩}[⟨value⟩]{⟨code⟩}`

This command is a convenient interface to declare an option for several scopes at once. The `⟨scope⟩` argument may be a comma-separated list of scopes for which the option will be declared. Currently the scopes `global`, `type`, `entry`, `namelist` and `name` are supported, the first three of which are equivalent to defining the option with `\DeclareBibliographyOption`, `\DeclareTypeOption` and `\DeclareEntryOption`, respectively.

#### 4.2.2 Bibliography Environments

Apart from defining bibliography drivers, the bibliography style is also responsible for the environments which control the layout of the bibliography and bibliography lists. These environments are defined with `\defbibenvironment`. By default, `\printbibliography` uses the environment `bibliography`. Here is a definition suitable for a bibliography style which does not print any labels in the bibliography:

```
\defbibenvironment{bibliography}
{
  \list
  {}
  {\setlength{\leftmargin}{\bibhang}%
   \setlength{\itemindent}{-\leftmargin}%
   \setlength{\itemsep}{\bibitemsep}%
   \setlength{\parsep}{\bibparsep}}
{\endlist}
{\item}
```

This definition employs a `list` environment with hanging indentation, using the `\bibhang` length register provided by `biblatex`. It allows for a certain degree of configurability by using `\bibitemsep` and `\bibparsep`, two length registers provided by `biblatex` for this very purpose (see § 4.10.3). The `authoryear` and `authortitle` bibliography styles use a definition similar to this example.

```
\defbibenvironment{bibliography}
{
  \list
  {\printfield[labelnumberwidth]{labelnumber}}
  {\setlength{\labelwidth}{\labelnumberwidth}%
   \setlength{\leftmargin}{\labelwidth}%
   \setlength{\labelsep}{\biblabelsep}%
   \addtolength{\leftmargin}{\labelsep}%
   \setlength{\itemsep}{\bibitemsep}%
   \setlength{\parsep}{\bibparsep}}%
  \renewcommand*{\makelabel}[1]{\hss#1}}
{\endlist}
{\item}
```

Some bibliography styles print labels in the bibliography. For example, a bibliography style designed for a numeric citation scheme will print the number of every entry such that the bibliography looks like a numbered list. In the first example, the first argument to `\list` was empty. In this example, we need it to insert the number,

which is provided by `biblatex` in the `labelnumber` field. We also employ several length registers and other facilities provided by `biblatex`, see §§ 4.10.4 and 4.10.5 for details. The numeric bibliography style uses the definition given above. The alphabetic style is similar, except that `labelnumber` is replaced by `labelalpha` and `labelnumberwidth` by `labelalphawidth`.

Bibliography lists are handled in a similar way. `\printbiblist` uses the environment named after the bibliography list by default. A typical example is given below. See §§ 4.10.4 and 4.10.5 for details on the length registers and facilities used in this example.

```
\defbibenvironment{shorthand}
{
  \list
    {
      \printfield[shorthandwidth]{shorthand}%
      \setlength{\labelwidth}{\shorthandwidth}%
      \setlength{\leftmargin}{\labelwidth}%
      \setlength{\labelsep}{\biblabelsep}%
      \addtolength{\leftmargin}{\labelsep}%
      \setlength{\itemsep}{\bibitemsep}%
      \setlength{\parsep}{\bibparsep}%
      \renewcommand*{\makelabel}[1]{##1\hss}}
  \endlist
}
\item
```

### 4.2.3 Bibliography Drivers

Before we go over the commands which form the data interface of the `biblatex` package, it may be instructive to have a look at the structure of a bibliography driver. Note that the example given below is greatly simplified, but still functional. For the sake of readability, we omit several fields which may be part of a `@book` entry and also simplify the handling of those which are considered. The main point is to give you an idea of how a driver is structured. For information about the mapping of the BibTeX file format fields to `biblatex`'s data types, see § 2.2.

```
\DeclareBibliographyDriver{book}{%
  \printnames{author}%
  \newunit\newblock
  \printfield{title}%
  \newunit\newblock
  \printlist{publisher}%
  \newunit
  \printlist{location}%
  \newunit
  \printfield{year}%
  \finentry}
```

The standard bibliography styles employ two bibliography macros `begentry` and `finentry`:

```
\DeclareBibliographyDriver{entrytype}{%
  \usebibmacro{begentry}
```

```
...
\usebibmacro{finentry}}
```

with the default definitions

```
\newbibmacro*{begentry}{}
\newbibmacro*{finentry}{\finentry}
```

Use of these macros is recommended for easy hooks into the beginning and end of the driver.

Returning to the driver for the `book` entrytype above, there is still one piece missing: the formatting directives used by `\printnames`, `\printlist`, and `\printfield`. To give you an idea of what a formatting directive looks like, here are some fictional ones used by our sample driver. Field formats are straightforward, the value of the field is passed to the formatting directive as an argument which may be formatted as desired. The following directive will simply wrap its argument in an `\emph` command:

```
\DeclareFieldFormat{title}{\emph{#1}}
```

List formats are slightly more complex. After splitting up the list into individual items, `biblatex` will execute the formatting directive once for every item in the list. The item is passed to the directive as an argument. The separator to be inserted between the individual items in the list is also handled by the corresponding directive, hence we have to check whether we are in the middle of the list or at the end when inserting it.

```
\DeclareListFormat{location}{%
  #1%
  \ifthenelse{\value{listcount}<\value{liststop}}
    {\addcomma\space}
  {}}
```

Formatting directives for names are similar to those for literal lists.

Names depend on the datamodel constant ‘nameparts’ which has the default definition:

```
\DeclareDatamodelConstant[type=list]{nameparts}
                                     {prefix,family,
  ↪ suffix,given}
```

This can be customised to add more name parts to deal with things like patronymics (see the example file `93-nameparts.tex`). This needs an extended name format for data sources since the standard BibTeX name format is very limited. `biblatexml` (§ D) handles this natively and there is an extended name format which can handle custom nameparts when using `biber` (see § 3.4).

Inside name formats, the ‘nameparts’ constant declaration makes available two or three macros for each name part defined in the datamodel:

```

\namepart<namepart>    \% The full <namepart>
\namepart<namepart>i    \% The initials of the <namepart>
\namepart<namepart>un \% Numeric value indicating
    ↪ uniqueness level for <namepart>

```

`\namepart 'namepart' un` only exists if the package option `uniquename` is not set to `'false'` and can take the following values.

- 0 'namepart' was not used in disambiguating the name (because `disambiguation=none` was set in `\DeclareUniquenameTemplate`, see § 4.11.4). In this case the style should decide what to print for this 'namepart'
- 1 Initials only should be printed for 'namepart' to ensure uniqueness according to the `uniquename` package option setting
- 2 The full 'namepart' should be printed to ensure uniqueness according to the `uniquename` package option setting

Note these per-namepart uniqueness macros are essentially an override of the `uniquename` value (see § 4.6.2) for the name as a whole. Styles can choose to use either the less granular `uniquename` value or the more detailed per-namepart values. Usually the general `uniquename` value is enough for ordinary Western names but the more granular information per-namepart is provided to allow sophisticated name uniqueness processing for more complex name schemata.

The name formatting directive is executed once for each name in the name list. Here is a simplified example—the standard name formats are more intricate:

```

\DeclareNameFormat{author}{%
  \ifthenelse{\value{listcount}=1}
  {\namepartfamily%
    \ifdefvoid{\namepartgiven}{}{
      ↪ \addcomma\space\namepartgiven}
    {\ifdefvoid{\namepartgiven}{}{\namepartgiven\space
      ↪ }%
    \namepartfamily}%
  \ifthenelse{\value{listcount}<\value{liststop}}
  {\addcomma\space}
  {}
}

```

The above directive reverses the name of the first author (“Family, Given”) and prints the remaining names in their regular sequence (“Given Family”). Note that the only component which is guaranteed to be available is the family name, hence we have to check which parts of the name are actually present. If a certain name part is not available, the corresponding macro will be empty. As with directives for literal lists, the separator to be inserted between the individual items in the name list is also handled by the formatting directive, hence we have to check whether we are in the middle of the list or at the end when inserting it. This is what the second `\ifthenelse` test does. See also § 4.4.2.

A similar output that also respects the `\multinamedelim` and `\finalnamedelim` commands as well as the ‘prefix’ and ‘suffix’ name parts can be achieved with

```
\DeclareNameAlias{author}{family-given/given-family}
```

## 4.2.4 Special Fields

The following lists and fields are used by `biblatex` to pass data to bibliography drivers and citation commands. They are not used in `bib` files but defined automatically by the package. From the perspective of a bibliography or citation style, they are not different from the fields in a `bib` file.

### 4.2.4.1 Generic Fields

`<datatype>dateunspecified` field (string)

If `<datatype>date` held an iso8601-2 4.3 ‘unspecified’, this field will be set to one of `yearindecade`, `yearincentury`, `monthinyear`, `dayinmonth` or `dayinyear` which specifies the granularity of the unspecified information. These strings can be tested for and along with the date ranges which are automatically created for such ‘unspecified’ dates, a style may choose to format the date in a special way. See § 2.3.8. For example, an entry with dates such as:

```
@book{key,  
  date      = {19uu},  
  origdate = {199u}  
}
```

would result in the same information in the `.bbl` as:

```
@book{key,  
  date      = {1900/1999},  
  origdate = {1990/1999}  
}
```

but would additionally have the field `dateunspecified` set to ‘`yearincentury`’ and `origdateunspecified` set to ‘`yearindecade`’. This information could be used to render the date as perhaps ‘20th century’ and `origdate` as ‘The 1990s’, information which cannot be derived from the date ranges alone. Since such auto-generated ranges have known values, given the ‘unspecified’ meta-information, it is relatively easy to use the range values to format special cases. While the standard styles do not do this, examples are given in the file `96-dates.tex`.

`entrykey` field (string)

The entry key of an item in the `bib` file. This is the string used by `biblatex` and the backend to identify an entry in the `bib` file.

Note that the set of characters allowed and usable in the string for `entrykey` depends on the backend (`biber`, `BibTeX`) as well as the LaTeX engine (`pdfLaTeX`, `LuaLaTeX`, `XeLaTeX`). Generally, US-ASCII-letters (`a-z`, `A-Z`) and numbers (`0-9`) are safe, so are the punctuation characters full stop (`.`) and solidus (`/`). The punctuation characters `-_ ; ! ?` are also safe even if they are made active by `babel/polyglossia`. If a Unicode engine is used, non-US-ASCII characters are also acceptable. Curly braces

{ }), commas, spaces, backslashes (\), hashes (#), percent characters (%) and tildes (~) are always forbidden. `biber` additionally forbids round brackets ( ( ) ), quotation marks ( " , ' ), and the equals sign (=). The `entrykey` is case sensitive, but it is not recommended to exploit that fact too much by introducing two different entries whose key differs only in capitalisation (e.g., `sigfridsson` and `Sigfridsson`). For full portability it is advisable to stick to a scheme of lowercase (and if so desired uppercase) US-ASCII-letters, numbers and a small set of acceptable punctuation characters, say . : - .

`childentrykey` field (string)

This field is no longer necessary or recommended. For backwards compatibility, it is merely a copy of the `entrykey` field in any set children. Deprecated

`labelnamesource` field (literal)

Holds the name of the field used to populate `labelname`, determined by `\DeclareLabelname`.

`labeltitlesource` field (literal)

Holds the name of the field used to populate `labeltitle`, determined by `\DeclareLabeltitle`.

`labeldatesource` field (literal)

Holds one of:

- The prefix coming before ‘date’ of the date field name chosen by `\DeclareLabeldate`
- The name of a field
- A literal or localisation string

Normally holds the prefix coming before ‘date’ of the date field name chosen by `\DeclareLabeldate`. For example, if the `labeldate` field is `eventdate`, then `labeldatesource` will be ‘event’. In case `\DeclareLabeldate` selects the date field, then `labeldatesource` will be defined but will be an empty string as the prefix coming before ‘date’ in the date label name is empty. This is so that the contents of `labeldatesource` can be used in constructing references to the field which `\DeclareLabeldate` chooses. Since `\DeclareLabeldate` can also select literal strings for fallbacks, `labeldatesource` may not refer to a field or may be undefined. Bear in mind that `\DeclareLabeldate` can also be used to select non-date fields as a fallback and so `labeldatesource` might contain a field name. So, in summary, the rules are

```
\iffieldundef{labeldatesource}
  {}% labeldate package option is not set
  {\iffieldundef{\thefield{labeldatesource}year}
    % \DeclareLabeldate resolved to either a literal/
    ↪ localisation
    % string or a non-date field since
    % if a date is defined by a date field, there is
    % at least a year
    {\iffieldundef{\thefield{labeldatesource}}}
```

```

    {}% \DeclareLabeldate resolved to a literal/
    ↪ localisation string
    {}% \DeclareLabeldate resolved to a non-date
    ↪ field
    }
    {} % \DeclareLabeldate resolved a date field name
    ↪ prefix like "" or "orig"
}

```

**entrytype** field (string)

The entry type (@book, @inbook, etc.), given in lowercase letters.

**childentrytype** field (string)

This field is no longer necessary or recommended. For backwards compatibility, it is merely a copy of the **entrytype** field in any set children. Deprecated

**entrysetcount** field (integer)

This field holds an integer indicating the position of a set member in the entry set (starting at 1). This field is only available in the subentries of an entry set.

**hash** field (string)

This field is special in that it is only available locally in name formatting directives. It holds a hash string which uniquely identifies individual names in a name list. This information is available for all names in all name lists. See also **namehash** and **fullhash**.

**namehash** field (string)

A hash string which uniquely identifies the **labelname** list. This is useful for recurrence checks. For example, a citation style which replaces recurrent authors or editors with a string like ‘idem’ could save the **namehash** field with `\savefield` and use it in a comparison with `\iffieldequals` later (see §§ 4.6.1 and 4.6.2). The **namehash** is derived from the truncated **labelname** list, i.e., it is responsive to **maxcitenames** and **mincitenames**. See also **hash** and **fullhash**.

**bibnamehash** field (string)

As **namehash** but responsive to **maxbibnames** and **minbibnames**. This is not used in standard styles but may be used to make tests in bibliography lists (such as those used to determine whether dashes should replace repeated authors) behave differently.

**<namelist>namehash** field (string)

As **namehash** for the name list called ‘namelist’.

**<namelist>bibnamehash** field (string)

As **bibnamehash** for the name list called ‘namelist’.



**fullhash** field (string)

A hash string which uniquely identifies the `labelname` list. This field differs from `namehash` in two details: 1) The `shortauthor` and `shorteditor` lists are ignored when generating the hash. 2) The hash always refers to the full list, ignoring `maxnames` and `minnames`. See also `hash` and `namehash`.

**<namelist>fullhash** field (string)

As `fullhash` for the name list called ‘`namelist`’.

**pageref** list (literal)

If the `backref` package option is enabled, this list holds the page numbers of the pages on which the respective bibliography entry is cited. If there are `refsection` environments in the document, the back references are local to the reference sections.

**sortinit** field (literal)

This field holds the initial character of the information used during sorting.

**sortinithash** field (string)

This field holds a hash of the (locale-specific) Unicode Collation Algorithm primary weight of the first extended grapheme cluster (essentially the first character) of the string used during sorting. This is useful when subdividing the bibliography alphabetically and is used internally by `\bibinitsep` (see § 3.12.4).

**clonesourcekey** field (string)

This field holds the entry key of the entry from which an entry was cloned. Clones are created for entries which are mentioned in `related` fields as part of related entry processing, for example.

**urlraw** field (verbatim)

This is the unencoded, raw version of any `url`. This is intended for use when the display version and clickable link version of a URL are different. This can be the case when the URL contains special or Unicode characters. In the case where no such characters occur, may be identical to the `url`.

#### 4.2.4.2 Fields for Use in Citation Labels

**labelalpha** field (literal)

A label similar to the labels generated by the `alpha.bst` style of traditional BibTeX. This default label consists of initials drawn from the `labelname` list plus the last two digits of the publication year. The `label` field may be used to override its non-numeric portion. If the `label` field is defined, `biblatex` will use its value and append the last two digits of the publication year when generating `labelalpha`. The `shorthand` field may be used to override the entire label. If defined, `labelalpha` is the `shorthand` rather than an automatically generated label. Users can specify a template used to construct the alphabetic label (see § 4.5.5) and the default template mirrors the format mentioned for `bibtex` above. A complete ‘alphabetic’ label consists of the fields `labelalpha` plus `extraalpha`. Note that the `labelalpha` and `extraalpha` fields need to be requested with the package option `labelalpha` (§ 3.1.2.3). See also `extraalpha` as well as `\labelalphaothers` in § 3.12.1.

**extraalpha** field (integer)

The ‘alphabetic’ citation scheme usually requires a letter to be appended to the label if the bibliography contains two or more works by the same author which were all published in the same year. In this case, the `extraalpha` field holds an integer which may be converted to a letter with `\mknumalph` or formatted in some other way. This field is similar to the role of `extradate` in the author-year scheme. A complete ‘alphabetic’ label consists of the fields `labelalpha` plus `extraalpha`. Note that the `labelalpha` and `extraalpha` fields need to be requested with the package option `labelalpha`, see § 3.1.2.3 for details. See also `labelalpha` as well as `\labelalphaothers` in § 3.12.1. Table 7 summarises the various `extra*` disambiguation counters and what they track.

**labelname** list (name)

The name to be printed in citations. This list is a copy of either the `shortauthor`, the `author`, the `shorteditor`, the `editor`, or the `translator` list, which are normally checked for in this order. If no authors and editors are available, this list is undefined. Note that this list is also responsive to the `use<name>`, options, see § 3.1.3. Citation styles should use this list when printing the name in a citation. This list is provided for convenience only and does not carry any additional meaning. This field may be customized. See § 4.5.11 for details.

**extraname** field (integer)

Holds a count of the number of bibliography entries within a refsection which derive from the same `labelname` list. This counter takes account of `uniquename` settings (see § 3.1.2.3). While not used by any standard styles, this field is useful in styles which wish to number bibliography entries on a per-`labelname` basis. This field will only exist if there is a `labelname`. The `extraname` counter is related to, but conceptually different from `\ifsingletitle` (see § 3.1.2.3 and § 4.6.2).

**labelnumber** field (literal)

The number of the bibliography entry, as required by numeric citation schemes. If the `shorthand` field is defined, `biblatex` does not assign a number to the respective entry. In this case `labelnumber` is the shorthand rather than a number. Numeric styles must use the value of this field instead of a counter. Note that this field needs to be requested with the package option `labelnumber`, see § 3.1.2.3 for details. Also see the package option `defernumbers` in § 3.1.2.1.

**labelprefix** field (literal)

If the `labelprefix` option of `\newrefcontext` has been set in order to prefix all entries in a subbibliography with a fixed string, this string is available in the `labelprefix` field of all affected entries. If no prefix has been set, the `labelprefix` field of the respective entry is undefined. See the `labelprefix` option of `\newrefcontext` in § 3.8.10 for details. If the `shorthand` field is defined, `biblatex` does not assign the prefix to the `labelprefix` field of the respective entry. In this case, the `labelprefix` field is undefined.

**labeltitle** field (literal)

The printable title of a work. In some circumstances, a style might need to choose a title from a list of a possible title fields. For example, citation styles printing short

titles may want to print the `shorttitle` field if it exists but otherwise print the `title` field. The list of fields to be considered when constructing `labeltitle` may be customized. See § 4.5.11 for details. Note that the `extratitle` field needs to be requested with the package option `labeltitle`, see § 3.1.2.3 for details. See also `extratitle`. Note also that the `extratitleyear` field needs to be requested with the package option `labeltitleyear`. See also `extratitleyear`.

`extratitle` field (integer)

It is sometimes useful, for example in author-title citation schemes, to be able to disambiguate works with the same title. For works by the same `labelname` with the same `labeltitle`, the `extratitle` field holds an integer which may be converted to a letter with `\mknumalph` or formatted in some other way (or it can be merely used as a flag to say that some other field such as a date should be used in conjunction with the `labeltitle` field). This field is undefined if there is only one work with the same `labeltitle` by the same `labelname` in the bibliography. Note that the `extratitle` field needs to be requested with the package option `labeltitle`, see § 3.1.2.3 for details. See also `labeltitle`. Table 7 summarises the various `extra*` disambiguation counters and what they track.

`extratitleyear` field (integer)

It is sometimes useful, for example in author-title citation schemes, to be able to disambiguate works with the same title in the same year but with no author. For works with the same `labeltitle` and with the same `labelyear`, the `extratitleyear` field holds an integer which may be converted to a letter with `\mknumalph` or formatted in some other way (or it can be merely used as a flag to say that some other field such as a publisher should be used in conjunction with the `labelyear` field). This field is undefined if there is only one work with the same `labeltitle` and `labelyear` in the bibliography. Note that the `extratitleyear` field needs to be requested with the package option `labeltitleyear`, see § 3.1.2.3 for details. See also `labeltitleyear`. Table 7 summarises the various `extra*` disambiguation counters and what they track.

`labelyear` field (literal)

The year of the date field selected by `\DeclareLabeldate` (§ 4.5.11) or the `year` field, for use in author-year labels. A complete author-year label consists of the fields `labelyear` plus `extradate`. Note that the `labelyear` and `extradate` fields need to be requested with the package option `labeldateparts`, see § 3.1.2.3 for details. See also `extradate`.

`labelendyear` field (literal)

The end year of the date field selected by `\DeclareLabeldate` (§ 4.5.11) if the selected date is a range.

`labelmonth` field (datepart)

The month of the date field selected by `\DeclareLabeldate` (§ 4.5.11), or the `month` field for use in author-year labels. Note that the `labelmonth` field needs to be requested with the package option `labeldateparts`, see § 3.1.2.3 for details.

`labelendmonth` field (datepart)

The end month of the date field selected by `\DeclareLabeldate` (§ 4.5.11) if the selected date is a range.

`labelday` field (datepart)

The month of the date field selected by `\DeclareLabeldate` (§ 4.5.11) for use in author-year labels. Note that the `labelday` field needs to be requested with the package option `labeldateparts`, see § 3.1.2.3 for details.

`labelendday` field (datepart)

The end day of the date field selected by `\DeclareLabeldate` (§ 4.5.11) if the selected date is a range.

`extradate` field (integer)

The author-year citation scheme usually requires a letter to be appended to the year if the bibliography contains two or more works by the same author which were all published in the same year. In this case, the `extradate` field holds an integer which may be converted to a letter with `\mknumalph` or formatted in some other way. This field is undefined if there is only one work by the author in the bibliography or if all works by the author have different publication years. A complete author-year label consists of the fields `labelyear` plus `extradate`. Note that the `labelyear` and `extradate` fields need to be requested with the package option `labeldateparts`, see § 3.1.2.3 for details. See also `labelyear`. Table 7 summarises the various `extra*` disambiguation counters and what they track.

`extradatescope` field (literal)

This field contains the name of the most specific field which determined the value of `extradate`. It is not used by the standard styles but may be useful in controlling the placement of the `extradate` field value.

#### 4.2.4.3 Date Component Fields

Note that it is possible to define new date fields in the `datamodel` which behave exactly like the default data model date fields described in this section.

See table 10 for an overview of how the date fields in `bib` files are related to the date fields provided by the style interface. When testing for a field like `origdate` in a style, use code like:

```
\iffieldundef{origyear}{...}{...}
```

This will tell you if the corresponding date is defined at all. This test:

```
\iffieldundef{origendyear}{...}{...}
```

will tell you if the corresponding date is defined and a (fully specified) range. This test:

```
\iffieldequalstr{origendyear}{}{...}{...}
```

will tell you if the corresponding date is defined and an open-ended range. Open-ended ranges are indicated by an empty `endyear` component (as opposed to an undefined `endyear` component). See § 2.3.8 and table 3 on page 39 for further examples.

Table 10: Date Interface

bib File		Data Interface	
Field	Value (Example)	Field	Value (Example)
date	1988	day	undefined
		month	undefined
		year	1988
		yeardivision	undefined
		endday	undefined
		endmonth	undefined
		endyear	undefined
		endyeardivision	undefined
		hour	undefined
		minute	undefined
		second	undefined
		timezone	undefined
		endhour	undefined
		endminute	undefined
		endsecond	undefined
date	1997/	endtimezone	undefined
		day	undefined
		month	undefined
		year	1997
		yeardivision	undefined
		endday	undefined
		endmonth	undefined
		endyear	empty
		endyeardivision	undefined
		hour	undefined
		minute	undefined
		second	undefined
		timezone	undefined
		endhour	undefined
		endminute	undefined
urldate	2009-01-31	endsecond	undefined
		endtimezone	undefined
		urlday	31
		urlmonth	01
		urlyear	2009
		urlyeardivision	undefined
		urlendday	undefined
		urlendmonth	undefined
		urlendyear	undefined
		urlendyeardivision	undefined
		urlhour	undefined
		urlminute	undefined
		urlsecond	undefined
		urvertimezone	undefined
		urlendhour	undefined
urldate	2009-01-31T15:34:04Z	urlendminute	undefined
		urlendsecond	undefined
		urlendtimezone	undefined
		urlday	31
		urlmonth	01
		urlyear	2009
		urlyeardivision	undefined
		urlendday	undefined
		urlendmonth	undefined
		urlendyear	undefined
		urlendyeardivision	undefined
		urlhour	15
		urlminute	34

**Table 10: Date Interface (cont'd)**

urldate	2009-01-31T15:34:04+05:00	urlsecond	04
		urltimezone	Z
		urlendhour	undefined
		urlendminute	undefined
		urlendsecond	undefined
		urlendtimezone	undefined
		urlday	31
		urlmonth	01
		urlyear	2009
		urlyeardivision	undefined
		urlendday	undefined
		urlendmonth	undefined
		urlendyear	undefined
		urlendyeardivision	undefined
		urlhour	15
		urlminute	34
		urlsecond	04
		urltimezone	+0500
		urlendhour	undefined
urldate	2009-01-31T15:34:04/ 2009-01-31T16:04:34	urlendminute	undefined
		urlendsecond	undefined
		urlendtimezone	undefined
		urlday	31
		urlmonth	1
		urlyear	2009
		urlyeardivision	undefined
		urlendday	31
		urlendmonth	1
		urlendyear	2009
		urlendyeardivision	undefined
		urlhour	15
		urlminute	34
		urlsecond	4
		urltimezone	floating
		urlendhour	16
		urlendminute	4
		urlendsecond	34
origdate	2002-21/2002-23	urlendtimezone	floating
		origday	undefined
		origmonth	01
		origyear	2002
		origyeardivision	spring
		origendday	undefined
		origendmonth	02
		origendyear	2002
		origendyeardivision	autumn
		orighour	undefined
		origminute	undefined
		origsecond	undefined
		origtimezone	undefined
		origendhour	undefined
		origendminute	undefined
		origendsecond	undefined
		origendtimezone	undefined
eventdate	1995-01-31/1995-02-05	eventday	31
		eventmonth	01
		eventyear	1995
		eventyeardivision	undefined
		eventendday	05
		eventendmonth	02
		eventendyear	1995

**Table 10: Date Interface (cont'd)**

eventendyeardivision	undefined
eventhour	undefined
eventminute	undefined
eventsecond	undefined
eventtimezone	undefined
eventendhour	undefined
eventendminute	undefined
eventendsecond	undefined
eventendtimezone	undefined

**hour** field (datepart)

This field holds the hour component of the `date` field. If the date is a range, it holds the hour component of the start date.

**minute** field (datepart)

This field holds the minute component of the `date` field. If the date is a range, it holds the minute component of the start date.

**second** field (datepart)

This field holds the second component of the `date` field. If the date is a range, it holds the second component of the start date.

**timezone** field (datepart)

This field holds the timezone component of the `date` field. If the date is a range, it holds the timezone component of the start date.

**day** field (datepart)

This field holds the day component of the `date` field. If the date is a range, it holds the day component of the start date.

**month** field (datepart)

This field is the `month` as given in the database file or it holds the month component of the `date` field. If the date is a range, it holds the month component of the start date.

**year** field (datepart)

This field is the `year` as given in the database file or it holds the year component of the `date` field. If the date is a range, it holds the year component of the start date.

**yeardivision** field (datepart)

This field holds the year division (season, quarter, quadrimester etc.) component of the `date` field as specified by ISO8601-2 4.8 (§ 2.3.8). It contains a localisation string (§ 4.9.2.21). If the date is a range, it holds the year division component of the start date.

**season** field (datepart)

Deprecated

This field holds the season component of the `date` field as specified by ISO8601-2 4.8 (§ 2.3.8). It contains a season localisation string (§ 4.9.2.21). If the date is a range,



it holds the season component of the start date. This is deprecated in favour of `yeardivision` which is more generalised.

`endhour` field (datepart)

If the date specification in the `date` field is a range, this field holds the hour component of the end date.

`endminute` field (datepart)

If the date specification in the `date` field is a range, this field holds the minute component of the end date.

`endsecond` field (datepart)

If the date specification in the `date` field is a range, this field holds the second component of the end date.

`endtimezone` field (datepart)

If the date specification in the `date` field is a range, this field holds the timezone component of the end date.

`endday` field (datepart)

If the date specification in the `date` field is a range, this field holds the day component of the end date.

`endmonth` field (datepart)

If the date specification in the `date` field is a range, this field holds the month component of the end date.

`endyear` field (datepart)

If the date specification in the `date` field is a range, this field holds the year component of the end date. A blank (but defined) `endyear` component indicates an open ended date range.

`endyeardivision` field (datepart)

If the date specification in the `date` field is a range, this field holds the year division (season, quarter, quadrimester etc.) component of the end date as specified by ISO8601-2 4.8 (§ 2.3.8). It contains a year division localisation string (§ 4.9.2.21). A blank (but defined) `endyeardivision` component indicates an open ended date range.

`endseason` field (datepart)

Deprecated

If the date specification in the `date` field is a range, this field holds the season component of the end date as specified by ISO8601-2 4.8 (§ 2.3.8). It contains a season localisation string (§ 4.9.2.21). A blank (but defined) `endseason` component indicates an open ended date range. This is deprecated in favour of `endyeardivision` which is more generalised.

`orighour` field (datepart)

This field holds the hour component of the `origdate` field. If the date is a range, it holds the hour component of the start date.

`origminute` field (datepart)

This field holds the minute component of the `origdate` field. If the date is a range, it holds the minute component of the start date.

`origsecond` field (datepart)

This field holds the second component of the `origdate` field. If the date is a range, it holds the second component of the start date.

`origtimezone` field (datepart)

This field holds the timezone component of the `origdate` field. If the date is a range, it holds the timezone component of the start date.

`origday` field (datepart)

This field holds the day component of the `origdate` field. If the date is a range, it holds the day component of the start date.

`origmonth` field (datepart)

This field holds the month component of the `origdate` field. If the date is a range, it holds the month component of the start date.

`origyear` field (datepart)

This field holds the year component of the `origdate` field. If the date is a range, it holds the year component of the start date.

`origyeardivision` field (datepart)

This field holds the year division (season, quarter, quadrimester etc.) component of the `origdate` field as specified by ISO8601-2 4.7 (§ 2.3.8). It contains a year division localisation string (§ 4.9.2.21). If the date is a range, it holds the year division component of the start date. This is deprecated in favour of `origyeardivision` which is more generalised.

`origseason` field (datepart)

Deprecated

This field holds the season component of the `origdate` field as specified by ISO8601-2 4.7 (§ 2.3.8). It contains a season localisation string (§ 4.9.2.21). If the date is a range, it holds the season component of the start date. This is deprecated in favour of `origyeardivision` which is more generalised.

`origendhour` field (datepart)

If the date specification in the `origdate` field is a range, this field holds the hour component of the end date.

<code>origendminute</code>	field (datepart)	
		If the date specification in the <code>origdate</code> field is a range, this field holds the minute component of the end date.
<code>origendsecond</code>	field (datepart)	
		If the date specification in the <code>origdate</code> field is a range, this field holds the second component of the end date.
<code>origendtimezone</code>	field (datepart)	
		If the date specification in the <code>origdate</code> field is a range, this field holds the timezone component of the end date.
<code>origendday</code>	field (datepart)	
		If the date specification in the <code>origdate</code> field is a range, this field holds the day component of the end date.
<code>origendmonth</code>	field (datepart)	
		If the date specification in the <code>origdate</code> field is a range, this field holds the month component of the end date.
<code>origendyear</code>	field (datepart)	
		If the date specification in the <code>origdate</code> field is a range, this field holds the year component of the end date. A blank (but defined) <code>origendyear</code> component indicates an open ended <code>origdate</code> range.
<code>origendyeardivision</code>	field (datepart)	
		If the date specification in the <code>origdate</code> field is a range, this field holds the year division (season, quarter, quadrimester etc.) component of the end date as specified by iso8601-2 4.8 (§ 2.3.8). It contains a year division localisation string (§ 4.9.2.21). A blank (but defined) <code>origendyeardivision</code> component indicates an open ended <code>origdate</code> range.
<code>origendseason</code>	field (datepart)	Deprecated
		If the date specification in the <code>origdate</code> field is a range, this field holds the season component of the end date as specified by iso8601-2 4.8 (§ 2.3.8). It contains a season localisation string (§ 4.9.2.21). A blank (but defined) <code>origendseason</code> component indicates an open ended <code>origdate</code> range. This is deprecated in favour of <code>origendyeardivision</code> which is more generalised.
<code>eventhour</code>	field (datepart)	
		This field holds the hour component of the <code>eventdate</code> field. If the date is a range, it holds the hour component of the start date.
<code>eventminute</code>	field (datepart)	
		This field holds the minute component of the <code>eventdate</code> field. If the date is a range, it holds the minute component of the start date.

`eventsecond` field (datepart)

This field holds the second component of the `eventdate` field. If the date is a range, it holds the second component of the start date.

`eventtimezone` field (datepart)

This field holds the timezone component of the `eventdate` field. If the date is a range, it holds the timezone component of the start date.

`eventday` field (datepart)

This field holds the day component of the `eventdate` field. If the date is a range, it holds the day component of the start date.

`eventmonth` field (datepart)

This field holds the month component of the `eventdate` field. If the date is a range, it holds the month component of the start date.

`eventyear` field (datepart)

This field holds the year component of the `eventdate` field. If the date is a range, it holds the year component of the start date.

`eventyeardivision` field (datepart)

This field holds the year division (season, quarter, quadrimester etc.) component of the `eventdate` field as specified by iso8601-2 4.8 (§ 2.3.8). It contains a year division localisation string (§ 4.9.2.21). If the date is a range, it holds the year division component of the start date.

`eventseason` field (datepart)

Deprecated

This field holds the season component of the `eventdate` field as specified by iso8601-2 4.8 (§ 2.3.8). It contains a season localisation string (§ 4.9.2.21). If the date is a range, it holds the season component of the start date. This is deprecated in favour of `eventyeardivision` which is more generalised.

`eventendhour` field (datepart)

If the date specification in the `eventdate` field is a range, this field holds the hour component of the end date.

`eventendminute` field (datepart)

If the date specification in the `eventdate` field is a range, this field holds the minute component of the end date.

`eventendsecond` field (datepart)

If the date specification in the `eventdate` field is a range, this field holds the second component of the end date.

`eventendtimezone` field (datepart)

If the date specification in the `eventdate` field is a range, this field holds the timezone component of the end date.

<code>eventendday</code>	field (datepart)	
		If the date specification in the <code>eventdate</code> field is a range, this field holds the day component of the end date.
<code>eventendmonth</code>	field (datepart)	
		If the date specification in the <code>eventdate</code> field is a range, this field holds the month component of the end date.
<code>eventendyear</code>	field (datepart)	
		If the date specification in the <code>eventdate</code> field is a range, this field holds the year component of the end date. A blank (but defined) <code>eventendyear</code> component indicates an open ended <code>eventdate</code> range.
<code>eventendyeardivision</code>	field (datepart)	
		If the date specification in the <code>eventdate</code> field is a range, this field holds the year division (season, quarter, quadrimester etc.) component of the end date as specified by iso8601-2 4.8 (§ 2.3.8). It contains a year division localisation string (§ 4.9.2.21). A blank (but defined) <code>eventendyeardivision</code> component indicates an open ended <code>eventdate</code> range.
<code>eventendseason</code>	field (datepart)	
		If the date specification in the <code>eventdate</code> field is a range, this field holds the season component of the end date as specified by iso8601-2 4.8 (§ 2.3.8). It contains a season localisation string (§ 4.9.2.21). A blank (but defined) <code>eventendseason</code> component indicates an open ended <code>eventdate</code> range. This is deprecated in favour of <code>eventendyeardivision</code> which is more generalised.
<code>urlhour</code>	field (datepart)	
		This field holds the hour component of the <code>urldate</code> field. If the date is a range, it holds the hour component of the start date.
<code>urlminute</code>	field (datepart)	
		This field holds the minute component of the <code>urldate</code> field. If the date is a range, it holds the minute component of the start date.
<code>urlsecond</code>	field (datepart)	
		This field holds the second component of the <code>urldate</code> field. If the date is a range, it holds the second component of the start date.
<code>timezone</code>	field (urldatepart)	
		This field holds the timezone component of the <code>urldate</code> field. If the date is a range, it holds the timezone component of the start date.
<code>urlday</code>	field (datepart)	
		This field holds the day component of the <code>urldate</code> field.

Deprecated

`urlmonth` field (datepart)

This field holds the month component of the `urldate` field.

`urlyear` field (datepart)

This field holds the year component of the `urldate` field.

`urlyeardivision` field (datepart)

This field holds the year division (season, quarter, quadrimester etc.) component of the `urldate` field as specified by ISO8601-2 4.8 (§ 2.3.8). It contains a year division localisation string (§ 4.9.2.21). If the date is a range, it holds the year division component of the start date.

`urlseason` field (datepart)

Deprecated

This field holds the season component of the `urldate` field as specified by ISO8601-2 4.8 (§ 2.3.8). It contains a season localisation string (§ 4.9.2.21). If the date is a range, it holds the season component of the start date. This is deprecated in favour of `urlyeardivision` which is more generalised.

`urlendhour` field (datepart)

If the date specification in the `urldate` field is a range, this field holds the hour component of the end date.

`urlendminute` field (datepart)

If the date specification in the `urldate` field is a range, this field holds the minute component of the end date.

`urlendsecond` field (datepart)

If the date specification in the `urldate` field is a range, this field holds the second component of the end date.

`urlendtimezone` field (datepart)

If the date specification in the `urldate` field is a range, this field holds the timezone component of the end date.

`urlendday` field (datepart)

If the date specification in the `urldate` field is a range, this field holds the day component of the end date.

`urlendmonth` field (datepart)

If the date specification in the `urldate` field is a range, this field holds the month component of the end date.

`urlendyear` field (datepart)

If the date specification in the `urldate` field is a range, this field holds the year component of the end date. A blank (but defined) `urlendyear` component indicates an open ended `urldate` range.

`urlendyeardivision` field (datepart)

If the date specification in the `urldate` field is a range, this field holds the year division (season, quarter, quadrimester etc.) component of the end date as specified by iso8601-2 4.8 (§ 2.3.8). It contains a year division localisation string (§ 4.9.2.21). A blank (but defined) `urlendyeardivision` component indicates an open ended `urldate` range.

`urlendseason` field (datepart)

Deprecated

If the date specification in the `urldate` field is a range, this field holds the season component of the end date as specified by iso8601-2 4.8 (§ 2.3.8). It contains a season localisation string (§ 4.9.2.21). A blank (but defined) `urlendseason` component indicates an open ended `urldate` range. This is deprecated in favour of `urlendyeardivision` which is more generalised.

### 4.3 Citation Styles

A citation style is a set of commands such as `\cite` which print different types of citations. Such styles are defined in files with the suffix `cbx`. The `biblatex` package loads the selected citation style file at the end of the package. Note that a small repertory of frequently used macros shared by several of the standard citation styles is also included in `biblatex.def`. This file is loaded at the end of the package as well, prior to the selected citation style. It also contains the definitions of the commands from § 3.9.5.

#### 4.3.1 Citation Style Files

Before we go over the individual commands available in citation style files, consider this example of the overall structure of a typical `cbx` file:

```
\ProvidesFile{example.cbx}[2006/03/15 v1.0 biblatex  
  ↪ citation style]  
  
\DeclareCiteCommand{\cite}{...}{...}{...}{...}  
\DeclareCiteCommand{\parencite}{\mkbibparens  
  ↪ }{...}{...}{...}{...}  
\DeclareCiteCommand{\footcite}{\mkbibfootnote  
  ↪ }{...}{...}{...}{...}  
\DeclareCiteCommand{\textcite}{...}{...}{...}{...}  
\endinput
```

`\RequireCitationStyle{<style>}`

This command is optional and intended for specialized citation styles built on top of a more generic style. It loads the citation style `style.cbx`.



`\InitializeCitationStyle{<code>}`

Specifies arbitrary *<code>* required to initialize or reset the citation style. This hook will be executed once at package load-time and every time the `\citereset` command from § 3.9.8 is used. The `\citereset` command also resets the internal citation trackers of this package. The reset will affect the `\ifciteseen`, `\ifentryseen`, `\ifciteibid`, and `\ifciteidem` tests discussed in § 4.6.2. When used in a `refsection` environment, the reset of the citation tracker is local to the current `refsection` environment.

`\OnManualCitation{<code>}`

Specifies arbitrary *<code>* required for a partial reset of the citation style. This hook will be executed every time the `\mancite` command from § 3.9.8 is used. It is particularly useful in citation styles which replace repeated citations by abbreviations like ‘ibidem’ or ‘op. cit.’ which may get ambiguous if automatically generated and manual citations are mixed. The `\mancite` command also resets the internal ‘ibidem’ and ‘idem’ trackers of this package. The reset will affect the `\ifciteibid` and `\ifciteidem` tests discussed in § 4.6.2.

`\DeclareCiteCommand{<command>}[<wrapper>]{<precode>}{<loopcode>}{<sepcode>}{<postcode>}`  
`\DeclareCiteCommand*{<command>}[<wrapper>]{<precode>}{<loopcode>}{<sepcode>}{<postcode>}`

This is the core command used to define all citation commands. It takes one optional and five mandatory arguments. The *<command>* is the command to be defined, for example `\cite`. If the optional *<wrapper>* argument is given, the entire citation will be passed to the *<wrapper>* as an argument, i. e., the wrapper command must take one mandatory argument.<sup>31</sup> The *<precode>* is arbitrary code to be executed at the beginning of the citation. It will typically handle the *<prenote>* argument which is available in the `prenote` field. It may also be used to initialize macros required by the *<loopcode>*. The *<loopcode>* is arbitrary code to be executed for each entry key passed to the *<command>*. This is the core code which prints the citation labels or any other data. The *<sepcode>* is arbitrary code to be executed after each iteration of the *<loopcode>*. It will only be executed if a list of entry keys is passed to the *<command>*. The *<sepcode>* will usually insert some kind of separator, such as a comma or a semicolon. The *<postcode>* is arbitrary code to be executed at the end of the citation. The *<postcode>* will typically handle the *<postnote>* argument which is available in the `postnote` field.<sup>32</sup> The starred variant of `\DeclareCiteCommand` defines a starred *<command>*. For example, `\DeclareCiteCommand*{cite}` would define `\cite*`.<sup>33</sup>

`\DeclareMultiCiteCommand{<command>}[<wrapper>]{<cite>}{<delimiter>}`

This command defines ‘multicite’ commands (§ 3.9.3). The *<command>* is the multicite command to be defined, for example `\cites`. It is automatically made robust. Multicite commands are built on top of backend commands defined with

---

<sup>31</sup>Typical examples of wrapper commands are `\mkbibparens` and `\mkbibfootnote`.

<sup>32</sup>The bibliographic data available to the *<loopcode>* is the data of the entry currently being processed. In addition to that, the data of the first entry is available to the *<precode>* and the data of the last one is available to the *<postcode>*. ‘First’ and ‘last’ refer to the order in which the citations are printed. If the `sortcites` package option is active, this is the order of the list after sorting. Note that no bibliographic data is available to the *<sepcode>*.

<sup>33</sup>Note that the regular variant of `\DeclareCiteCommand` defines a starred version of the *<command>* implicitly, unless the starred version has been defined before. This is intended as a fallback. The implicit definition is an alias for the regular variant.

`\DeclareCiteCommand` and the  $\langle cite \rangle$  argument specifies the name of the backend command to be used. Note that the wrapper of the backend command (i. e., the  $\langle wrapper \rangle$  argument passed to `\DeclareCiteCommand`) is ignored. Use the optional  $\langle wrapper \rangle$  argument to specify an alternative wrapper. The  $\langle delimiter \rangle$  is the string to be printed as a separator between the individual citations in the list. This will typically be `\multicitedelim`. The following examples are real definitions taken from `biblatex.def`:

```
\DeclareMultiCiteCommand{\cites}%
    {\cite}{\multicitedelim}
\DeclareMultiCiteCommand{\parencites}[\mkbibparens]%
    {\parencite}{\multicitedelim}
\DeclareMultiCiteCommand{\footcites}[\mkbibfootnote]%
    {\footcite}{\multicitedelim}
```

`\DeclareAutoCiteCommand` $\{\langle name \rangle\}[\langle position \rangle]\{\langle cite \rangle\}\{\langle multicite \rangle\}$

This command provides definitions for the `\autocite` and `\autocites` commands from § 3.9.4. The definitions are enabled with the `autocite` package option from § 3.1.2.1. The  $\langle name \rangle$  is an identifier which serves as the value passed to the package option. The autocite commands are built on top of backend commands like `\parencite` and `\parencites`. The arguments  $\langle cite \rangle$  and  $\langle multicite \rangle$  specify the backend commands to use. The  $\langle cite \rangle$  argument refers to `\autocite` and  $\langle multicite \rangle$  refers to `\autocites`. The  $\langle position \rangle$  argument controls the handling of any punctuation marks after the citation. Possible values are `l`, `r`, `f`. `r` means that the punctuation is placed to the right of the citation, i. e., it will not be moved around. `l` means that any punctuation after the citation is moved to the left of the citation. `f` is like `r` in a footnote and like `l` otherwise. This argument is optional and defaults to `r`. See also `\DeclareAutoPunctuation` in § 4.7.5 and the `autopunct` package option in § 3.1.2.1. The following examples are real definitions taken from `biblatex.def`:

```
\DeclareAutoCiteCommand{plain}{\cite}{\cites}
\DeclareAutoCiteCommand{inline}{\parencite}{\parencites}
↪ }
\DeclareAutoCiteCommand{footnote}[l]{\footcite}{
↪ \footcites}
\DeclareAutoCiteCommand{footnote}[f]{\smartcite}{
↪ \smartcites}
```

A definition provided in the document preamble can be subsequently adopted with the following: (see § 3.2.2).

```
\ExecuteBibliographyOptions{autocite=name}
```

`\DeclareCitePunctuationPosition` $\{\langle command \rangle\}\{\langle position \rangle\}$

Set up the cite command  $\langle command \rangle$  to move punctuation marks after the citation like `\autocite`. The  $\langle position \rangle$  argument can take the values `r`, `l`, `f`, `c`, `o` and `d`. If an unknown  $\langle position \rangle$  identifier is used, it defaults to `o`.

- `r`            The punctuation mark is not moved and remains to the right of the citation.
- `l`            The punctuation mark is moved to the left of the citation and thus appears before it.
- `f`            Like `r` in footnotes and like `l` otherwise.
- `c`            Pass the punctuation on to the internal implementation of the citation commands. It will then be executed within the `\wrapper` command if given.
- `o`            Retain the default setup of `c` for citation defined commands without `\wrapper` command and `l` for citation commands defined with a `\wrapper` command.
- `d`            Drop the explicit punctuation mark. It will only be available as the field `postpunct`.

This command can not be used for `\autocite`, to configure `\autocite` use the optional `\position` argument for `\DeclareAutoCiteCommand`.

### 4.3.2 Special Fields

The following fields are used by `biblatex` to pass data to citation commands. They are not used in `bib` files but defined automatically by the package. From the perspective of a citation style, they are not different from the fields in a `bib` file. See also § 4.2.4.

`prenote`    field (literal)

The `\prenote` argument passed to a citation command. This field is specific to citations and not available in the bibliography. If the `\prenote` argument is missing or empty, this field is undefined.

`postnote`    field (literal)

The `\postnote` argument passed to a citation command. This field is specific to citations and not available in the bibliography. If the `\postnote` argument is missing or empty, this field is undefined.

`multiprenote`    field (literal)

The `\multiprenote` argument passed to a multicite command. This field is specific to citations and not available in the bibliography. If the `\multiprenote` argument is missing or empty, this field is undefined.

`multipostnote`    field (literal)

The `\multipostnote` argument passed to a multicite command. This field is specific to citations and not available in the bibliography. If the `\multipostnote` argument is missing or empty, this field is undefined.

`volcitevolume`    field (literal)

The `\volume` argument passed to `\volcite` or a related citation command (§ 3.9.6). This field is specific to `\volcite` citations and not available in the bibliography or other citations.

`volcitepages` field (literal)

The `<pages>` argument passed to `\volcite` or a related citation command (§ 3.9.6). This field is specific to `\volcite` citations and not available in the bibliography or other citations. If the `<pages>` argument is missing or empty, this field is undefined.

`postpunct` field (punctuation command)

The trailing punctuation argument implicitly passed to a citation command. This field is specific to citations and not available in the bibliography. If the character following a given citation command is not specified in `\DeclareAutoPunctuation` (§ 4.7.5), this field is undefined.

## 4.4 Data Interface

The data interface are the facilities used to format and print all bibliographic data. These facilities are available in both bibliography and citation styles.

### 4.4.1 Data Commands

This section introduces the main data interface of the `biblatex` package. These are the commands doing most of the work, i. e., they actually print the data provided in lists and fields.

```
\DeprecateField{<field>}{<message>}
\DeprecateList{<list>}{<message>}
\DeprecateName{<name>}{<message>}
```

When an attempt is made to print `<field>`, `<list>`, `<name>`, a deprecation warning is issued with the additional `<message>`. This aids style authors who are changing field names in their style. Note that the deprecated item must no longer be defined in the datamodel for this to work; `<field>`, `<list>` or `<name>` cannot be listed anywhere as an argument to `\DeclareDatamodelFields`.

```
\DeprecateFieldWithReplacement{<field>}{<replacement>}
\DeprecateListWithReplacement{<list>}{<replacement>}
\DeprecateNameWithReplacement{<name>}{<replacement>}
```

Similar to `\DeprecateField`, `\DeprecateList` and `\DeprecateName`. The commands do not only issue a deprecation warning, they try to define a replacement for the deprecated field that is printed in its stead. The `\replacement` must be of the same type as the deprecated `<field>`, `<list>` or `<name>`. If the formatting of `<replacement>` should be applied when printing the deprecated field, that needs to be requested with `\DeclareFieldAlias` (see § 4.4.2). Note that the deprecated item must no longer be defined in the datamodel for this work; `<field>`, `<list>` or `<name>` cannot be listed anywhere as an argument to `\DeclareDatamodelFields`.

```
\printfield[<format>]{<field>}
```

This command prints a `<field>` using the formatting directive `<format>`, as defined with `\DeclareFieldFormat`. If a type-specific `<format>` has been declared, the type-specific formatting directive takes precedence over the generic one. If the `<field>` is undefined, nothing is printed. If the `<format>` is omitted, `\printfield` tries using the name of the field as a format name. For example, if the `title` field is to be

printed and the  $\langle format \rangle$  is not specified, it will try to use the field format `title`.<sup>34</sup> In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to `default` as a last resort. Note that `\printfield` provides the name of the field currently being processed in `\currentfield` for use in field formatting directives.

`\printlist` [ $\langle format \rangle$ ] [ $\langle start \rangle$ – $\langle stop \rangle$ ] {  $\langle literal list \rangle$  }

This command loops over all items in a  $\langle literal list \rangle$ , starting at item number  $\langle start \rangle$  and stopping at item number  $\langle stop \rangle$ , including  $\langle start \rangle$  and  $\langle stop \rangle$  (all lists are numbered starting at 1). Each item is printed using the formatting directive  $\langle format \rangle$ , as defined with `\DeclareListFormat`. If a type-specific  $\langle format \rangle$  has been declared, the type-specific formatting directive takes precedence over the generic one. If the  $\langle literal list \rangle$  is undefined, nothing is printed. If the  $\langle format \rangle$  is omitted, `\printlist` tries using the name of the list as a format name. In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to `default` as a last resort. The  $\langle start \rangle$  argument defaults to 1;  $\langle stop \rangle$  defaults to the total number of items in the list. If the total number is greater than  $\langle maxitems \rangle$ ,  $\langle stop \rangle$  defaults to  $\langle minitems \rangle$  (see § 3.1.2.1). See `\printnames` for further details. Note that `\printlist` provides the name of the literal list currently being processed in `\currentlist` for use in list formatting directives.

`\printnames` [ $\langle format \rangle$ ] [ $\langle start \rangle$ – $\langle stop \rangle$ ] {  $\langle name list \rangle$  }

This command loops over all items in a  $\langle name list \rangle$ , starting at item number  $\langle start \rangle$  and stopping at item number  $\langle stop \rangle$ , including  $\langle start \rangle$  and  $\langle stop \rangle$  (all lists are numbered starting at 1). Each item is printed using the formatting directive  $\langle format \rangle$ , as defined with `\DeclareNameFormat`. If a type-specific  $\langle format \rangle$  has been declared, the type-specific formatting directive takes precedence over the generic one. If the  $\langle name list \rangle$  is undefined, nothing is printed. If the  $\langle format \rangle$  is omitted, `\printnames` tries using the name of the list as a format name. In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to `default` as a last resort. The  $\langle start \rangle$  argument defaults to 1;  $\langle stop \rangle$  defaults to the total number of items in the list. If the total number is greater than  $\langle maxnames \rangle$ ,  $\langle stop \rangle$  defaults to  $\langle minnames \rangle$  (see § 3.1.2.1). If you want to select a range but use the default list format, the first optional argument must still be given, but is left empty:

```
\printnames[] [1-3] { ... }
```

One of  $\langle start \rangle$  and  $\langle stop \rangle$  may be omitted, hence the following arguments are all valid:

```
\printnames[...] [-1] { ... }
\printnames[...] [2-] { ... }
\printnames[...] [1-3] { ... }
```

If you want to override  $\langle maxnames \rangle$  and  $\langle minnames \rangle$  and force printing of the entire list, you may refer to the `listtotal` counter in the second optional argument:

<sup>34</sup>In other words, `\printfield{title}` is equivalent to `\printfield[title]{title}`.

```
\printnames[...][-value{listtotal}]{...}
```

Whenever `\printnames` and `\printlist` process a list, information concerning the current state is accessible by way of four counters: the `listtotal` counter holds the total number of items in the current list, `listcount` holds the number of the item currently being processed, `liststart` is the `<start>` argument passed to `\printnames` or `\printlist`, `liststop` is the `<stop>` argument. These counters are intended for use in list formatting directives. `listtotal` may also be used in the second optional argument to `\printnames` and `\printlist`. Note that these counters are local to list formatting directives and do not hold meaningful values when used anywhere else. For every list, there is also a counter by the same name which holds the total number of items in the corresponding list. For example, the `author` counter holds the total number of items in the `author` list. These counters are similar to `listtotal` except that they may also be used independently of list formatting directives. There are also `maxnames` and `minnames` as well as `maxitems` and `minitems` counters which hold the values of the corresponding package options. See § 4.10.5 for a complete list of such internal counters. Note that `\printnames` provides the name of the name list currently being processed in `\currentname` for use in name formatting directives.

```
\printtext[<format>]{<text>}
```

This command prints `<text>`, which may be printable text or arbitrary code generating printable text. It clears the punctuation buffer before inserting `<text>` and informs `biblatex` that printable text has been inserted. This ensures that all preceding and following `\newblock` and `\newunit` commands have the desired effect. `\printfield` and `\printnames` as well as `\bibstring` and its companion commands (see § 4.8) do that automatically. Using this command is required if a bibliography style inserts literal text (including the commands from §§ 4.7.3 and 4.7.4) to ensure that block and unit punctuation works as advertised in § 4.7.1. The optional `<format>` argument specifies a field formatting directive to be used to format `<text>`. This may also be useful when several fields are to be printed as one chunk, for example, by enclosing the entire chunk in parentheses or quotation marks. If a type-specific `<format>` has been declared, the type-specific formatting directive takes precedence over the generic one. If the `<format>` is omitted, the `<text>` is printed as is. See also § 4.11.7 for some practical hints.

```
\printfile[<format>]{<file>}
```

This command is similar to `\printtext` except that the second argument is a file name rather than literal text. The `<file>` argument must be the name of a valid LaTeX file found in TeX's search path. `\printfile` will use `\input` to load this `<file>`. If there is no such file, `\printfile` does nothing. The optional `<format>` argument specifies a field formatting directive to be applied to the `<file>`. If a type-specific `<format>` has been declared, the type-specific formatting directive takes precedence over the generic one. If the `<format>` is omitted, the `<file>` is printed as is. Note that this feature needs to be enabled explicitly by setting the package option `loadfiles` from § 3.1.2.1. By default, `\printfile` will not input any files.

`\printdate` This command prints the date of the entry, as specified in the fields `date` or `month/year`. The date format is controlled by the package option `date` from § 3.1.2.1. Additional formatting (fonts etc.) may be applied by adjusting the field format `date`



(§ 4.10.4). Note that this command interfaces with the punctuation tracker. There is no need to wrap it in a `\printtext` command.

`\printdateextra` Similar to `\printdate` but incorporates the `extradate` field in the date specification. This is useful for bibliography styles designed for author-year citations.

`\printlabeldate` Similar to `\printdate` but prints the date field determined by `\DeclareLabeldate`. The date format is controlled by the package option `labeldate` from § 3.1.2.1. Additional formatting may be applied by adjusting the field format `labeldate` (§ 4.10.4).

`\printlabeldateextra` Similar to `\printlabeldate` but incorporates the `extradate` field in the date specification. This is useful for bibliography styles designed for author-year citations.

`\print<datatype>date` As `\printdate` but prints the `<datatype>date` of the entry. The date format is controlled by the package option `<datatype>date` from § 3.1.2.1. Additional formatting may be applied by adjusting the field format `<datatype>date` (§ 4.10.4). The `<datatype>s` in the default data model are ‘’ (for the main date field), ‘orig’, ‘event’ and ‘url’.

`\printtime` This command prints the time range of the entry, as specified in the date field (see § 2.3.8). The time format is controlled by the package option `time` from § 3.1.2.1. Additional formatting (fonts etc.) may be applied by adjusting the field format `time` (§ 4.10.4). Relevant to time formatting are the `timezeros` option and the `\bibtimesep` and `\bibtimezonesep` macros (§ 3.12.3). Note that this command interfaces with the punctuation tracker. There is no need to wrap it in a `\printtext` command. Note that this command prints a stand-alone time range apart from the date elements. With the `<datepart>dateusetime` option, you can have the printed along with a date when printing a date range instead of printing the time range completely separately, which is what this command allows for.

`\print<datatype>time` As `\printtime` but prints the `<datatype>time` of the entry. The time format is controlled by the package option `<datatype>time` from § 3.1.2.1. Additional formatting may be applied by adjusting the field format `<datatype>time` (§ 4.10.4). The `<datatype>s` in the default data model are ‘’ (for the main date field), ‘orig’, ‘event’ and ‘url’.

`\indexfield[<format>]{<field>}`

This command is similar to `\printfield` except that the `<field>` is not printed but added to the index using the formatting directive `<format>`, as defined with `\DeclareIndexFieldFormat`. If a type-specific `<format>` has been declared, it takes precedence over the generic one. If the `<field>` is undefined, this command does nothing. If the `<format>` is omitted, `\indexfield` tries using the name of the field as a format name. In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to default as a last resort.

`\indexlist[<format>][<start>-<stop>]{<literal list>}`

This command is similar to `\printlist` except that the items in the list are not printed but added to the index using the formatting directive `<format>`, as defined with `\DeclareIndexListFormat`. If a type-specific `<format>` has been declared, the type-specific formatting directive takes precedence over the generic one. If the



`<literal list>` is undefined, this command does nothing. If the `<format>` is omitted, `\indexlist` tries using the name of the list as a format name. In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to `default` as a last resort.

```
\indexnames[<format>][<start>-<stop>]{<name list>}
```

This command is similar to `\printnames` except that the items in the list are not printed but added to the index using the formatting directive `<format>`, as defined with `\DeclareIndexNameFormat`. If a type-specific `<format>` has been declared, the type-specific formatting directive takes precedence over the generic one. If the `<name list>` is undefined, this command does nothing. If the `<format>` is omitted, `\indexnames` tries using the name of the list as a format name. In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to `default` as a last resort.

```
\entrydata{<key>}{<code>}
\entrydata*{<key>}{<code>}
```

Data commands like `\printfield` normally use the data of the entry currently being processed. You may use `\entrydata` to switch contexts locally. The `<key>` is the entry key of the entry to use locally. The `<code>` is arbitrary code to be executed in this context. This code will be executed in a group. See § 4.11.6 for an example. Note that this command will automatically switch languages if the `autolang` package option is enabled. The starred version `\entrydata*` will clone all fields of the enclosing entry, using `field`, `counter`, and other resource names prefixed with the string ‘`saved`’. This is useful when comparing two data sets. For example, inside the `<code>` argument, the `author` field holds the author of entry `<key>` and the author of the enclosing entry is available as `savedauthor`. The `author` counter holds the number of names in the `author` field of `<key>`; the `savedauthor` counter refers to the author count of the enclosing entry.

```
\entryset{<precode>}{<postcode>}
```

This command is intended for use in bibliography drivers handling `@set` entries. It will loop over all members of the set, as indicated by the `entryset` field, and execute the appropriate driver for the respective set member. This is similar to executing the `\usedriver` command from § 4.6.4 for each set member. The `<precode>` is arbitrary code to be executed prior to processing each item in the set. The `<postcode>` is arbitrary code to be executed immediately after processing each item. Both arguments are mandatory in terms of the syntax but may be left empty. See § 4.11.1 for usage examples.

```
\DeclareFieldInputHandler{<field>}{<code>}
```

This command can be used to define a data input handler for `<field>` when it is read from the `.bb1`. The `<code>` is passed one argument (`#1`), which contains the input field value, it should then redefine the command `\NewValue`, which holds the desired output field value. For example, to ignore the `volumes` field when it appears, you could do

```
\DeclareFieldInputHandler{volumes}{\def\NewValue{}}
```

Generally, you would want to use `\DeclareSourceMap` (see § 4.5.3) to remove and modify fields but this alternative method may be useful in some circumstances when the emphasis is on appearance rather than data since the `<code>` can be arbitrary TeX.

In general, `\DeclareFieldInputHandler` should not be used to apply formatting to a field, since that should happen with `\DeclareFieldFormat`, so the following is just a toy example that shows how `\DeclareFieldInputHandler` works.

```
\DeclareFieldInputHandler{volumes}{\def\NewValue{
  ↪ \textbf{#1}}}
```

```
\DeclareListInputHandler{<list>}{<code>}
```

As `\DeclareFieldInputHandler` but for lists. Within the `<code>`, the macro `\NewValue` contains the value of the list and `\NewCount` contains the number of items in the list. Note that `\NewValue` as well as the single argument to `<code>` contain the internal representation of the list.

```
\DeclareNameInputHandler{<name>}{<code>}
```

As `\DeclareFieldInputHandler` but for names. Within the `<code>`, the macro `\NewValue` contains the value of the name, `\NewCount` contains the number of individual names in the name and `\NewOption` contains any per-name options passed in the `.bbl`. Note that `\NewValue` as well as the single argument to `<code>` contain the internal representation of the name list.

#### 4.4.2 Formatting Directives

This section introduces the commands used to define the formatting directives required by the data commands from § 4.4.1. Note that all standard formats are defined in `biblatex.def`.

```
\DeclareFieldFormat[<entrytype, ...>]{<format>}{<code>}
\DeclareFieldFormat*{<format>}{<code>}
```

Defines the field format `<format>`. This formatting directive is arbitrary `<code>` to be executed by `\printfield`. The value of the field will be passed to the `<code>` as its first and only argument. The name of the field currently being processed is available to the `<code>` as `\currentfield`. If an `<entrytype>` is specified, the format is specific to that type. The `<entrytype>` argument may be a comma-separated list of values. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

```
\DeclareListFormat[<entrytype, ...>]{<format>}{<code>}
\DeclareListFormat*{<format>}{<code>}
```

Defines the literal list format `<format>`. This formatting directive is arbitrary `<code>` to be executed for every item in a list processed by `\printlist`. The current item will be passed to the `<code>` as its first and only argument. The name of the literal list currently being processed is available to the `<code>` as `\currentlist`. If an `<entrytype>` is specified, the format is specific to that type. The `<entrytype>` argument may be a comma-separated list of values. Note that the formatting directive also

handles the punctuation to be inserted between the individual items in the list. You need to check whether you are in the middle of or at the end of the list, i. e., whether `listcount` is smaller than or equal to `liststop`. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

```
\DeclareNameFormat[⟨entrytype, ...⟩]{⟨format⟩}{⟨code⟩}
\DeclareNameFormat*{⟨format⟩}{⟨code⟩}
```

Defines the name list format  $\langle format \rangle$ . This formatting directive is arbitrary  $\langle code \rangle$  to be executed for every name in a list processed by `\printnames`. If an  $\langle entrytype \rangle$  is specified, the format is specific to that type. The  $\langle entrytype \rangle$  argument may be a comma-separated list of values. The individual parts of a name will be available in automatically created macros (see below). The default data mode defines four name part which correspond to the standard BibTeX name parts arguments:

`family` The family name(s), know as ‘last’ in BibTeX. If a name consists of a single part only (for example, ‘Aristotle’), this part will be treated as the family name.

`given` The given name(s). Note that given names are referred to as the ‘first’ names in the BibTeX file format documentation.

`prefix` Any name prefixes, for example von, van, of, da, de, del, della, etc. Note that name prefixes are referred to as the ‘von’ part of the name in the BibTeX file format documentation.

`suffix` Any name suffices, for example Jr, Sr. Note that name suffices are referred to as the ‘Jr’ part of the name in the BibTeX file format documentation.

The value of the datamodel ‘nameparts’ constant (see § 4.2.3) creates two macros for each name part in the datamodel for the name. So, for example, in the default data model, name formats will have defined the following macros:

```
\namepartprefix
\namepartprefixi
\namepartfamily
\namepartfamilyi
\namepartsuffix
\namepartsuffixi
\namepartgiven
\namepartgiveni
```

If a certain part of a name is not available, the corresponding macro will be empty, hence you may use, for example, the `etoolbox` tests like `\ifdefvoid` to check for the individual parts of a name. The name of the name list currently being processed is available to the  $\langle code \rangle$  as `\currentname`. Note that the formatting directive also handles the punctuation to be inserted between separate names and between the individual parts of a name. You need to check whether you are in the middle of or at the end of the list, i. e., whether `listcount` is smaller than or equal to `liststop`. See also § 3.15.4. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

```
\DeclareListWrapperFormat[⟨entrytype, ...⟩]{⟨format⟩}{⟨code⟩}
\DeclareListWrapperFormat*{⟨format⟩}{⟨code⟩}
```

Defines the list wrapper format *⟨format⟩*. This formatting directive is arbitrary *⟨code⟩* to be executed once for the entire list processed by `\printlist`. The name of the literal list currently being processed is available to the *⟨code⟩* as `\currentlist`. If an *⟨entrytype⟩* is specified, the format is specific to that type. The *⟨entrytype⟩* argument may be a comma-separated list of values. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

```
\DeclareNameWrapperFormat[⟨entrytype, ...⟩]{⟨format⟩}{⟨code⟩}
\DeclareNameWrapperFormat*{⟨format⟩}{⟨code⟩}
```

Defines the list wrapper format *⟨format⟩*. This formatting directive is arbitrary *⟨code⟩* to be executed once for the entire name list processed by `\printnames`. The name of the literal list currently being processed is available to the *⟨code⟩* as `\currentname`. If an *⟨entrytype⟩* is specified, the format is specific to that type. The *⟨entrytype⟩* argument may be a comma-separated list of values. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

```
\DeclareIndexFieldFormat[⟨entrytype, ...⟩]{⟨format⟩}{⟨code⟩}
\DeclareIndexFieldFormat*{⟨format⟩}{⟨code⟩}
```

Defines the field format *⟨format⟩*. This formatting directive is arbitrary *⟨code⟩* to be executed by `\indexfield`. The value of the field will be passed to the *⟨code⟩* as its first and only argument. The name of the field currently being processed is available to the *⟨code⟩* as `\currentfield`. If an *⟨entrytype⟩* is specified, the format is specific to that type. The *⟨entrytype⟩* argument may be a comma-separated list of values. This command is similar to `\DeclareFieldFormat` except that the data handled by the *⟨code⟩* is not intended to be printed but written to the index. Note that `\indexfield` will execute the *⟨code⟩* as is, i.e., the *⟨code⟩* must include `\index` or a similar command. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

```
\DeclareIndexListFormat[⟨entrytype, ...⟩]{⟨format⟩}{⟨code⟩}
\DeclareIndexListFormat*{⟨format⟩}{⟨code⟩}
```

Defines the literal list format *⟨format⟩*. This formatting directive is arbitrary *⟨code⟩* to be executed for every item in a list processed by `\indexlist`. The current item will be passed to the *⟨code⟩* as its only argument. The name of the literal list currently being processed is available to the *⟨code⟩* as `\currentlist`. If an *⟨entrytype⟩* is specified, the format is specific to that type. The *⟨entrytype⟩* argument may be a comma-separated list of values. This command is similar to `\DeclareListFormat` except that the data handled by the *⟨code⟩* is not intended to be printed but written to the index. Note that `\indexlist` will execute the *⟨code⟩* as is, i.e., the *⟨code⟩* must include `\index` or a similar command. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

```
\DeclareIndexNameFormat [⟨entrytype, ...⟩] {⟨format⟩} {⟨code⟩}
\DeclareIndexNameFormat* {⟨format⟩} {⟨code⟩}
```

Defines the name list format *⟨format⟩*. This formatting directive is arbitrary *⟨code⟩* to be executed for every name in a list processed by `\indexnames`. The name of the name list currently being processed is available to the *⟨code⟩* as `\currentname`. If an *⟨entrytype⟩* is specified, the format is specific to that type. The *⟨entrytype⟩* argument may be a comma-separated list of values. The parts of the name will be passed to the *⟨code⟩* as separate arguments. This command is very similar to `\DeclareNameFormat` except that the data handled by the *⟨code⟩* is not intended to be printed but written to the index. Note that `\indexnames` will execute the *⟨code⟩* as is, i. e., the *⟨code⟩* must include `\index` or a similar command. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

```
\DeclareFieldAlias [⟨entry type⟩] {⟨alias⟩} [⟨format entry type⟩] {⟨format⟩}
```

Declares *⟨alias⟩* to be an alias for the field format *⟨format⟩*. If an *⟨entrytype⟩* is specified, the alias is specific to that type. The *⟨format entry type⟩* is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

```
\DeclareListAlias [⟨entry type⟩] {⟨alias⟩} [⟨format entry type⟩] {⟨format⟩}
```

Declares *⟨alias⟩* to be an alias for the literal list format *⟨format⟩*. If an *⟨entrytype⟩* is specified, the alias is specific to that type. The *⟨format entry type⟩* is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

```
\DeclareNameAlias [⟨entry type⟩] {⟨alias⟩} [⟨format entry type⟩] {⟨format⟩}
```

Declares *⟨alias⟩* to be an alias for the name list format *⟨format⟩*. If an *⟨entrytype⟩* is specified, the alias is specific to that type. The *⟨format entry type⟩* is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

```
\DeclareListWrapperAlias [⟨entry type⟩] {⟨alias⟩} [⟨format entry type⟩] {⟨format⟩}
```

Declares *⟨alias⟩* to be an alias for the outer list format *⟨format⟩*. If an *⟨entrytype⟩* is specified, the alias is specific to that type. The *⟨format entry type⟩* is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

```
\DeclareNameWrapperAlias [⟨entry type⟩] {⟨alias⟩} [⟨format entry type⟩] {⟨format⟩}
```

Declares *⟨alias⟩* to be an alias for the outer name list format *⟨format⟩*. If an *⟨entrytype⟩* is specified, the alias is specific to that type. The *⟨format entry type⟩* is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

```
\DeclareIndexFieldAlias [⟨entry type⟩] {⟨alias⟩} [⟨format entry type⟩] {⟨format⟩}
```

Declares *⟨alias⟩* to be an alias for the field format *⟨format⟩*. If an *⟨entrytype⟩* is specified, the alias is specific to that type. The *⟨format entry type⟩* is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

`\DeclareIndexListAlias` [*⟨entry type⟩*] {*⟨alias⟩*} [*⟨format entry type⟩*] {*⟨format⟩*}

Declares *⟨alias⟩* to be an alias for the literal list format *⟨format⟩*. If an *⟨entrytype⟩* is specified, the alias is specific to that type. The *⟨format entry type⟩* is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

`\DeclareIndexNameAlias` [*⟨entry type⟩*] {*⟨alias⟩*} [*⟨format entry type⟩*] {*⟨format⟩*}

Declares *⟨alias⟩* to be an alias for the name list format *⟨format⟩*. If an *⟨entrytype⟩* is specified, the alias is specific to that type. The *⟨format entry type⟩* is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

`\DeprecateFieldFormatWithReplacement` [*⟨entry type⟩*] {*⟨alias⟩*} [*⟨format entry type⟩*] {*⟨format⟩*}

Declares *⟨alias⟩* to be an alias for the name list format *⟨format⟩* and issue a deprecation warning. If an *⟨entrytype⟩* is specified, the alias is specific to that type. The *⟨format entry type⟩* is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

`\DeprecateListFormatWithReplacement` [*⟨entry type⟩*] {*⟨alias⟩*} [*⟨format entry type⟩*] {*⟨format⟩*}

Similar to `\DeprecateFieldFormatWithReplacement` but for list formats.

`\DeprecateNameFormatWithReplacement` [*⟨entry type⟩*] {*⟨alias⟩*} [*⟨format entry type⟩*] {*⟨format⟩*}

Similar to `\DeprecateFieldFormatWithReplacement` but for name formats.

`\DeprecateListWrapperFormatWithReplacement` [*⟨entry type⟩*] {*⟨alias⟩*} [*⟨format entry type⟩*] {*⟨format⟩*}

Similar to `\DeprecateFieldFormatWithReplacement` but for outer list formats.

`\DeprecateNameWrapperFormatWithReplacement` [*⟨entry type⟩*] {*⟨alias⟩*} [*⟨format entry type⟩*] {*⟨format⟩*}

Similar to `\DeprecateFieldFormatWithReplacement` but for outer name formats.

`\DeprecateIndexFieldFormatWithReplacement` [*⟨entry type⟩*] {*⟨alias⟩*} [*⟨format entry type⟩*] {*⟨format⟩*}

Similar to `\DeprecateFieldFormatWithReplacement` but for index field formats.

`\DeprecateIndexListFormatWithReplacement` [*⟨entry type⟩*] {*⟨alias⟩*} [*⟨format entry type⟩*] {*⟨format⟩*}

Similar to `\DeprecateFieldFormatWithReplacement` but for index list formats.

`\DeprecateIndexNameFormatWithReplacement` [*⟨entry type⟩*] {*⟨alias⟩*} [*⟨format entry type⟩*] {*⟨format⟩*}

Similar to `\DeprecateFieldFormatWithReplacement` but for index name formats.



## 4.5 Customization

### 4.5.1 Related Entries

The related entries feature comprises the following components:

- Special fields in an entry to set up and describe relationships
- Optionally, localisation strings to prefix the related data
- Macros to extract and print the related data
- Formats to format the localisation string and related data

The special fields are `related`, `relatedtype`, `relatedstring` and `relatedoptions`:

**related** A separated list of keys of entries which are related to this entry in some way. Note the order of the keys is important. The data from multiple related entries is printed in the order of the keys listed in this field.

**relatedtype** The type of relationship. This serves three purposes. If the value of this field resolves to a localisation string identifier, then the resulting localised string is printed before the data from the related entries. Secondly, if there is a macro called `related:⟨relatedtype⟩`, this is used to format the data from the related entries. If no such macro exists, then the macro `related:default` is used. Lastly, if there is a format named `related:⟨relatedtype⟩`, then it is used to format both the localised string and related entry data. If there is no related type specific format, the `related` format is used.

**relatedstring** If an entry contains this field, then if value of the field resolves to a localisation string identifier, the localisation key value specified is printed before data from the related entries. If the field does not specify a localisation key, its value is printed literally. If both `relatedtype` and `relatedstring` are present in an entry, `relatedstring` is used for the pre-data string (but `relatedtype` is still used to determine the macro and format to use when printing the data).

**relatedoptions** A list of per-entry options to set on the related entry (actually on the clone of the related entry which is used as a data source—the actual related entry is not modified because it might be cited directly itself).

The related entry feature is enabled by default by the package option `related` from § 3.1.2.1. The related information entry data from the related entries is included via a `\usebibmacro{related}` call. Standard styles call this macro towards the end of each driver. Style authors should ensure the existence of (or take note of existing) localisation strings which are useful as values for the `relatedtype` field, such as `translationof` or perhaps `translatedas`. A plural variant can be identified with the localisation key `⟨relatedtype⟩s`. This key's corresponding string is printed whenever more than one entry is specified in `related`. Bibliography macros and formatting directives for printing entries related by `⟨relatedtype⟩` should be defined using the name `related:⟨relatedtype⟩`. The file `biblatex.def` contains macros and formats for some common relation types which can be used as templates. In particular, the `\entrydata*` command is essential in such macros in order to make the data of the related entries available. Examples of entries using this feature can be found in the `biblatex` distribution examples file `biblatex-examples.bib`. There are some specific formatting macros for this feature which control delimiters and separators in related entry information, see § 4.10.1.



### 4.5.2 Datasource Sets

It is useful to be able to define named sets of datasource field names for use in loops etc. In addition, `biber` can use such sets in order to apply options and perform operations on particular sets of datasource fields. The following macros allow the user to define arbitrary sets of datasource fields, exposed to `biblatex` as `etoolbox` lists and to `biber` in the `.bcf`.

`\DeclareDatafieldSet{⟨name⟩}{⟨specification⟩}`

Declare a set of datasource fields with name `⟨name⟩`.

`name=⟨set name⟩`

The name of the set.

The `⟨specification⟩` is one or more `\member` items:

`\member`

`fieldtype=⟨fieldtype⟩`

`datatype=⟨datatype⟩`

`field=⟨fieldname⟩`

A `\member` specification appends fields to the set. Fields can be specified by data-model `⟨fieldtype⟩` and/or `⟨datatype⟩` (see § 4.5.4). Alternatively, fields can be explicitly added by name using the `⟨field⟩` option. Once defined, the set is available as an `etoolbox` list called `\datafieldset 'setname'` and is also passed via the `.bcf` to `biber`.

For example, here are the default sets defined by `biblatex` for name fields and title fields:

```
\DeclareDatafieldSet{setnames}{
  \member[datatype=name, fieldtype=list]
}

\DeclareDatafieldSet{settitles}{
  \member[field=title]
  \member[field=booktitle]
  \member[field=eventtitle]
  \member[field=issuetitle]
  \member[field=journaltitle]
  \member[field=maintitle]
  \member[field=origtitle]
}
```

This defines the macros `\datafieldsetsetnames` and `\datafieldsetsettitles` as `etoolbox` lists containing the names of the member datasource fields specified.

### 4.5.3 Dynamic Modification of Data

Bibliographic data sources which are automatically generated or which you have no control over can be a problem if you need to edit them in some way. For this reason, `biber` has the ability to modify data as it is read so that you can apply modifications to the source data stream without actually changing it. The modification can be defined in `biber`'s config file (see `biber docs`), or via `biblatex` macros in which case you can apply the modification only for specific documents, styles or globally.

Source mapping happens during data parsing and therefore before any other operation such as inheritance and sorting.

Source mappings can be defined at different “levels” which are applied in a defined order. See the `biblatex` manual regarding these macros:

```
user-level maps defined with \DeclareSourcemap→
  user-level maps defined in the biber config file (see biber docs)→
    style-level maps defined with \DeclareStyleSourcemap→
      driver-level maps defined with \DeclareDriverSourcemap
```

`\DeclareSourcemap{⟨specification⟩}`

Defines source data modification (mapping) rules which can be used to perform any combination of the following tasks:

- Map data source entrytypes to different entrytypes
- Map datasource fields to different fields
- Add new fields to an entry
- Remove fields from an entry
- Modify the contents of a field using standard Perl regular expression match and replace<sup>35</sup>
- Restrict any of the above operations to entries coming from particular data-sources which you defined in `\addsource` macros
- Restrict any of the above operations to entries only of a certain entrytype
- Restrict any of the above operations to entries in a particular reference section

The `⟨specification⟩` is an undelimited list of `\maps` directives which specify containers for mappings rules applying to a particular data source type (§ 3.8.1). Spaces, tabs, and line endings may be used freely to visually arrange the `⟨specification⟩`. Blank lines are not permissible. This command may only be used in the preamble and can be used multiple times, the maps being run in order of definition.

`\maps[⟨options⟩]{⟨elements⟩}`

Contains an ordered set of `\map` elements each of which is a logically related set of mapping steps to apply to the data source. The `⟨options⟩` are:

`datatype=bibtex,biblatexml` default: bibtex

Data source type to which the contained `\map` directives apply (§ 3.8.1).

<sup>35</sup>See for example <https://perldoc.perl.org/perlretut.html>, <https://perldoc.perl.org/perlrequick.html> and <https://perldoc.perl.org/perlre.html>. There are many more resources available about regular expressions in Perl.

`overwrite=true, false` default: false

Specify whether a mapping rule is allowed to overwrite already existing data in an entry. If this option is not specified, the default is `false`. The short form `overwrite` is equivalent to `overwrite=true`.

`\map[⟨options⟩]{⟨restrictions,steps⟩}`

A container for an ordered set of `\map \steps`, optionally restricted to particular entrytypes or data sources. This is a grouping element to allow a set of mapping steps to apply only to specific entrytypes or data sources. Mapping steps must always be contained within a `\map` element. The `⟨options⟩` are:

`overwrite=true, false`

As the same option on the parent `\maps` element. This option allows an override on a per-map group basis. If this option is not specified, the default is the parent `\maps` element option value. The short form `overwrite` is equivalent to `overwrite=true`.

`foreach=⟨loopval⟩`

Loop over all `\steps` in this `\map`, setting the special variable `$MAPLOOP` to each of the comma-separated values contained in `⟨loopval⟩`. `⟨loopval⟩` can either be the name of a datafield set defined with `\DeclareDatafieldSet` (see § 4.5.2), a datasource field which is fetched and parsed as a comma-separated values list or an explicit comma-separated values list. `⟨loopval⟩` is determined in this order. This allows the user to repeat a group of `\steps` for each value `⟨loopval⟩`. Using regexp maps, it is possible to create a CSV field for use with this functionality. The special variable `$MAPUNIQ` may also be used in the `\steps` to generate a random unique string. This can be useful when creating keys for new entries. An example:

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map[overwrite, foreach={author,editor, translator
    ↪ }]{
      \step[fieldsource=\regexp{$MAPLOOP}, match={Smith
    ↪ }, replace={Jones}]
    }
  }
}
```

`refsection=⟨integer⟩`

Only apply the contained `\step` commands to entries in the reference section with number `⟨refsection⟩`.

`\perdatasource{⟨datasource⟩}`

Restricts all `\steps` in this `\map` element to entries from the named `⟨datasource⟩`. The `⟨datasource⟩` name should be exactly as given in a `\addresource` macro defining a data source for the document. Multiple `\perdatasource` restrictions are allowed within a `\map` element.

`\pertype{⟨entrytype⟩}`

Restricts all `\steps` in this `\map` element to entries of the named `⟨entrytype⟩`. Multiple `\pertype` restrictions are allowed within a `\map` element.

`\pernottype{⟨entrytype⟩}`

Restricts all `\steps` in this `\map` element to entries not of the named `⟨entrytype⟩`. Multiple `\pernottype` restrictions are allowed within a `\map` element.

`\step[⟨options⟩]`

A mapping step. Each step is applied sequentially to every relevant entry where ‘relevant’ means those entries which correspond to the data source type, `entrytype` and data source name restrictions mentioned above. Each step is applied to the entry as it appears after the application of all previous steps. The mapping performed by the step is determined by the following `⟨option⟩`s:

<code>typesource=⟨entrytype⟩</code>	
<code>typetarget=⟨entrytype⟩</code>	
<code>fieldsource=⟨entryfield⟩</code>	
<code>notfield=⟨entryfield⟩</code>	
<code>fieldtarget=⟨entryfield⟩</code>	
<code>match=⟨regexp⟩</code>	
<code>matchi=⟨regexp⟩</code>	
<code>notmatch=⟨regexp⟩</code>	
<code>notmatchi=⟨regexp⟩</code>	
<code>matches=⟨regexp⟩</code>	
<code>matchesi=⟨regexp⟩</code>	
<code>replace=⟨regexp⟩</code>	
<code>fieldset=⟨entryfield⟩</code>	
<code>fieldvalue=⟨string⟩</code>	
<code>entryclone=⟨clonekey⟩</code>	
<code>entrynew=⟨entrynewkey⟩</code>	
<code>entrynewtype=⟨string⟩</code>	
<code>entrytarget=⟨string⟩</code>	
<code>cited=true, false</code>	default: false
<code>nocited=true, false</code>	default: false
<code>citedornocited=true, false</code>	default: false
<code>allnocited=true, false</code>	default: false
<code>starnocited=true, false</code>	default: false
<code>entrynocite=true, false</code>	default: false
<code>entrynull=true, false</code>	default: false
<code>append=true, false</code>	default: false
<code>appendstrict=true, false</code>	default: false
<code>final=true, false</code>	default: false
<code>null=true, false</code>	default: false
<code>origfield=true, false</code>	default: false

`origfieldval=true, false` default: false

`origentrytype=true, false` default: false

For all boolean `\step` options, the short form option is equivalent to `option=true`. The following rules for a mapping step apply:

Note that the options `cited`, `nocited`, `citedornocited`, `allnocited` and `starnocited` are unique in that they can make the results of a `sourcemap` differ depending on the refsection. This is because a `datasource` to which source mapping applies may be used in several refsections and source mappings are applied when fetching the data from the `datasources` for a refsection. Citation commands are local to a refsection and therefore may differ for the same entry from refsection to refsection. For example, the same entry may be `\cited` in one refsection but `\nocited` in another, resulting in different source map results and therefore data between the refsections. This can be avoided if desired, by limiting source maps to specific refsections only (see `refsection` option to the `\map` command above).

- If `entrynew` is set, a new entry is created with the entry key `entrynewkey` and the entry type given in the option `entrynewtype`. This entry is only in-scope during the processing of the current entry and can be referenced by `entrytarget`. In `entrynewkey`, you may use standard Perl regular expression backreferences to captures from a previous match step.
- When a `fieldset` step has `entrytarget` set to the `entrykey` of an entry created by `entrynew`, the target for the field set will be the `entrytarget` entry rather than the entry being currently processed. This allows users to create new entries and set fields in them.
- If `entrynocite` is used in a `entrynew` or `entryclone` step, the new/clone entry will be included in the `.bbl` as if the entry/clone had been `\nociteed` in the document.
- If `entrynull` is set, processing of the `\map` immediately terminates and the current entry is not created. It is as if it did not exist in the `datasource`. Obviously, you should select the entries which you want to apply this to using prior mapping steps.
- If `entryclone` is set, a clone of the entry is created with an entry key `clonekey`. Obviously this may cause labelling problems in author/year styles etc. and should be used with care. The cloned entry is in-scope during the processing of the current entry and can be modified by passing its key as the value to `entrytarget`. In `clonekey`, you may use standard Perl regular expression backreferences to captures from a previous match step.
- If `cited` is used then only apply the step if the entry key of an entry was specifically cited via `\cite`.
- If `nocited` is used then only apply the step if the entry key of an entry was specifically `\nocite`d via `\nocite` or was included via `\nocite{*}`.
- If `citedornocited` is used then only apply the step if the entry key of an entry was specifically cited via `\cite` or specifically `\nocite`d via `\nocite`.
- If `allnocited` is used then only apply the step if the entry key of an entry was included via `\nocite{*}`.
- If `starnocited` is used then only apply the step if the entry key of an entry was included solely because of `\nocite{*}`. This implies that the entry was neither explicitly `\citeed` nor explicitly `\nociteed`.

- Change the `typesource`  $\langle entrytype \rangle$  to the `typetarget`  $\langle entrytype \rangle$ , if defined. If `final` is true then if the  $\langle entrytype \rangle$  of the entry is not `typesource`, processing of the parent `\map` immediately terminates.
- Change the `fieldsource`  $\langle entryfield \rangle$  to `fieldtarget`, if defined. If `final` is true then if there is no `fieldsource`  $\langle entryfield \rangle$  in the entry, processing of the parent `\map` immediately terminates.
- If `notfield` is true only if the  $\langle entryfield \rangle$  does not exist. Usually used with `final` so that if an entry does contain  $\langle entryfield \rangle$ , the map terminates.
- If `match` is defined but `replace` is not, only apply the step if the `fieldsource`  $\langle entryfield \rangle$  matches the `match` regular expression (logic is reversed if you use `notmatch` and case-insensitive if you use the versions ending in ‘i’)<sup>36</sup>. You may use capture parenthesis as usual and refer to these (\$1...\$9) in later `fieldvalue` specifications. This allows you to pull out parts of some fields and put these parts in other fields.
- Perform a regular expression match and replace on the value of the `fieldsource`  $\langle entryfield \rangle$  if `match` and `replace` are defined.
- If `matches` is defined, it should be a comma-separated list of literal strings which are replaced by corresponding locations in a comma-separated list provided in `replace`. The lists must have the same number of elements or the step will be skipped. `matchesi` is the same but case-insensitive.
- If `fieldset` is defined, then its value is  $\langle entryfield \rangle$  which will be set to a value specified by further options. If `overwrite` is false for this step and the field to set already exists then the map step is ignored. If `final` is also true for this step, then processing of the parent map stops at this point. If `append` is true, then the value to set is appended to the current value of  $\langle entryfield \rangle$ . `appendstrict` only appends to  $\langle entryfield \rangle$  if  $\langle entryfield \rangle$  is not empty. The value to set is specified by a mandatory one and only one of the following options:
  - `fieldvalue` – The fieldset  $\langle entryfield \rangle$  is set to the `fieldvalue`  $\langle string \rangle$
  - `null` – The fieldset  $\langle entryfield \rangle$  is ignored, as if it did not exist in the `datasource`
  - `origentrytype` – The fieldset  $\langle entryfield \rangle$  is set to the most recently mentioned `typesource`  $\langle entrytype \rangle$  name
  - `origfield` – The fieldset  $\langle entryfield \rangle$  is set to the most recently mentioned `fieldsource`  $\langle entryfield \rangle$  name
  - `origfieldval` – The fieldset  $\langle entryfield \rangle$  is set to the most recently mentioned `fieldsource` value

With BibTeX `datasources`, you may specify the pseudo-field `entrykey` for `fieldsource` which is the citation key of the entry. With `biblatexml` the `entrykey` is a normal attribute and can be reference like any other attribute. Naturally, this ‘field’ cannot be changed (used as `fieldset`, `fieldtarget` or changed using `replace`).

Macros used in `\step` are expanded. Unexpandable contents should be protected with `\detokenize`, regular expressions can be escaped using the dedicated `\regexp` command (see the examples below).

<sup>36</sup>Regular expressions are full Perl 5.16 regular expressions. This means you may need to deal with special characters, see examples.

`\DeclareStyleSourcemap{⟨specification⟩}`

This command sets the source mappings used by a style. Such mappings are conceptually separate from user mappings defined with `\DeclareSourcemap` and are applied directly after user maps. The syntax is identical to `\DeclareSourcemap`. This command is provided for style authors so that any maps defined for the style do not interfere with user maps or the default driver maps defined with `\DeclareDriverSourcemap`. This command is for use in style files and can be used multiple times, the maps being run in order of definition.

`\DeclareDriverSourcemap[⟨datatype=driver⟩]{⟨specification⟩}`

This command sets the driver default source mappings for the specified *driver*. Such mappings are conceptually separate from user mappings defined with `\DeclareSourcemap` and style mapping defined with `\DeclareStyleSourcemap`. They consist of mappings which are part of the driver setup. Users should not normally need to change these. Driver default mappings are applied after user mappings (`\DeclareSourcemap`) and style mappings (`\DeclareStyleSourcemap`). These defaults are described in Appendix § A. The *specification* is identical to that for `\DeclareSourcemap` but without the `\maps` elements: the *specification* is just a list of `\map` elements since each `\DeclareDriverSourcemap` only applies to one datatype driver. See the default definitions in Appendix § A for examples.

`\regex{⟨PCRE⟩}`

This command can be used with any command accepting a regular expression key to protect a regular expression from being interpreted by  $\text{\TeX}$  so that it is passed through to `biber` correctly. Regular expressions often contain sequences of characters that are also valid  $\text{\TeX}$  commands but which should not be interpreted as such. The argument is a normal PCRE (Perl Compatible Regular Expression<sup>37</sup>). Perl escape sequences like `\t` for a tab, `\n` for a newline, `\A` for the start of a string or `\d` for a digit can be used, without  $\text{\TeX}$  trying to execute them as commands, as can be special characters like `^`, `_` or `{ . . }` and `#`. Only the `%` must be protected: to match a single `%` in the bib, use `\%` in the regular expression, a `\%` is matched by `\\%`.

Here are some data source mapping examples:

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map{
      \perdatasource{example1.bib}
      \perdatasource{example2.bib}
      \step[fieldset=keywords, fieldvalue={keyw1, keyw2
↪   }]
      \step[fieldsource=entrykey]
      \step[fieldset=note, origfieldval]
    }
  }
}
```

<sup>37</sup><https://perldoc.perl.org/perlre>



This would add a keywords field with value 'keyw1, keyw2' and set the note field to the entry key to all entries which are found in either the examples1.bib or examples2.bib files.

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map{
      \step[fieldsource=title]
      \step[fieldset=note, origfieldval]
    }
  }
}
```

Copy the title field to the note field unless the note field already exists.

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map{
      \step[typesource=chat, typetarget=customa, final]
      \step[fieldset=type, origentrytype]
    }
  }
}
```

Any chat entrytypes would become customa entrytypes and would automatically have a type field set to 'chat' unless the type field already exists in the entry (because overwrite is false by default). This mapping applies only to entries of type @chat since the first step has final set and so if the typesource does not match the entry entrytype, processing of this \map immediately terminates.

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map{
      \perdatasource{examples.bib}
      \pertype{article}
      \pertype{book}
      \step[fieldset=abstract, null]
      \step[fieldset=note, fieldvalue={Auto-created
↪ this field}]
    }
  }
}
```

Any entries of entrytype @article or @book from the examples.bib data-source would have their abstract fields removed and a note field added with value 'Auto-created this field'.

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map{
```

```

\step[fieldset=abstract, null]
\step[fieldsource=conductor, fieldtarget=namea]
\step[fieldsource=gps, fieldtarget=usera]
}
}
}

```

This removes abstract fields from any entry, changes conductor fields to namea fields and changes gps fields to usera fields.

```

\DeclareSourceMap{
  \maps[datatype=bibtex]{
    \map{
      \step[fieldsource=pubmedid, fieldtarget=eprint,
↪ final]
      \step[fieldset=eprinttype, origfield]
      \step[fieldset=userd, fieldvalue={Some string of
↪ things}]
    }
  }
}

```

Applies only to entries with pubmed fields and maps pubmedid fields to eprint fields, sets the eprinttype field to ‘pubmedid’ and also sets the userd field to the string ‘Some string of things’.

```

\DeclareSourceMap{
  \maps[datatype=bibtex]{
    \map{
      \step[fieldsource=series,
          match=\regexp{\A\d*(.+)},
          replace=\regexp{L$1}]
    }
  }
}

```

Here, the contents of the series field have leading numbers stripped and the remainder of the contents lowercased. Since regular expressions usually contain all sort of special characters, it is best to enclose them in the provided \regexp macro as shown—this will pass the expression through to biber correctly.

```

\DeclareSourceMap{
  \maps[datatype=bibtex]{
    \map{
      \step[fieldsource=maintitle,
          match=\regexp{Collected\s+Works.+Freud},
          final]
      \step[fieldset=keywords, fieldvalue=freud]
    }
  }
}

```

```
}
```

Here, if for an entry, the `maintitle` field matches a particular regular expression, we set a special keyword so we can, for example, make a references section just for certain items.

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map{
      \step[fieldsource=lista, match=\regexp{regexp},
↪ final]
      \step[fieldset=lista, null]
    }
  }
}
```

If an entry has a `lista` field which matches regular expression ‘`regexp`’, then it is removed.

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map[overwrite=false]{
      \step[fieldsource=author]
      \step[fieldset=editor, origfieldval, final]
      \step[fieldsource=editor, match=\regexp{\A(.+?)
↪ \s+and.*}, replace={$1}]
    }
  }
}
```

For any entry with an `author` field, try to set `editor` to the same as `author`. If this fails because `editor` already exists, stop, otherwise truncate `editor` to just the first name in the name list.

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map{
      \step[fieldsource=author,
        match={Smith, Bill},
        replace={Smith, William}]
      \step[fieldsource=author,
        match={Jones, Baz},
        replace={Jones, Barry}]
    }
  }
}
```

Here, we use multiple match/replace for the same field to regularise some inconstant name variants. Bear in mind that `\step` processing within a `map` element is sequential and so the changes from a previous `\steps` are already committed. Note

that we don't need the `\regexp` macro to protect the regular expressions in this example as they contain no characters which need special escaping. Please note that due to the difficulty of protecting regular expressions in  $\text{\LaTeX}$ , there should be no literal spaces in the argument to `\regexp`. Please use escape code equivalents if spaces are needed. For example, this example, if using `\regexp`, should be:

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map{
      \step[fieldsource=author,
            match=\regexp{Smith,\s+Bill},
            replace=\regexp{Smith,\x20William}]
      \step[fieldsource=author,
            match=\regexp{Jones,\s+Baz},
            replace=\regexp{Jones,\x20Barry}]
    }
  }
}
```

Here, we have used the hexadecimal escape sequence '`\x20`' in place of literal spaces in the replacement strings.

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map[overwrite]{
      \step[fieldsource=author, match={Doe,}, final]
      \step[fieldset=shortauthor, origfieldval]
      \step[fieldset=sortname, origfieldval]
      \step[fieldsource=shortauthor,
            match=\regexp{Doe,\s*(?:\.|ohn) (?:[-]*) (?:
↪ P\.|Paul)*},
            replace={Doe, John Paul}]
      \step[fieldsource=sortname,
            match=\regexp{Doe,\s*(?:\.|ohn) (?:[-]*) (?:
↪ P\.|Paul)*},
            replace={Doe, John Paul}]
    }
  }
}
```

Only applies to entries with an author field matching 'Doe.'. First the author field is copied to both the shortauthor and sortname fields, overwriting them if they already exist. Then, these two new fields are modified to canonicalise a particular name, which presumably has some variants in the data source.

```
\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map[overwrite]{
      \step[fieldsource=verba, final]
      \step[fieldset=verbb, fieldvalue=/, append]
```

```

\step[fieldset=verbb, origfieldval, append]
\step[fieldsource=verbb, final]
\step[fieldset=verbc, fieldvalue=/, append]
\step[fieldset=verbc, origfieldval, append]
}
}
}

```

This example demonstrates the sequential nature of the step processing and the append option. If an entry has a verba field then first, a forward slash is appended to the verbb field. Then, the contents of verba are appended to the verbb field. A slash is then appended to the verbc field and the contents of verbb are appended to the verbc field.

```

\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map[overwrite]{
      \step[fieldset=autourl, fieldvalue={http://
↪ scholar.google.com/scholar?q=""}]
      \step[fieldsource=title]
      \step[fieldset=autourl, origfieldval, append]
      \step[fieldset=autourl, fieldvalue={"author:"},
↪ append]
      \step[fieldsource=author, match=\regexp{\A([^\,]+)
↪ \s*,}]
      \step[fieldset=autourl, fieldvalue={$1}, append]
      \step[fieldset=autourl, fieldvalue={\&as_ylo=},
↪ append]
      \step[fieldsource=year]
      \step[fieldset=autourl, origfieldval, append]
      \step[fieldset=autourl, fieldvalue={\&as_yhi=},
↪ append]
      \step[fieldset=autourl, origfieldval, append]
    }
  }
}

```

This example assumes you have created a field called `autourl` using the `datamodel` macros from § 4.5.4 in order to hold, for example, a Google Scholar query URL auto-created from elements of the entry. The example progressively extracts information from the entry, constructing the URL as it goes. It demonstrates that it is possible to refer to parenthetical matches from the most recent match in any following `fieldvalue` which allows extracting the family name from the `author`, assuming a ‘family, given’ format. The resulting field could then be used as a hyperlink from, for example, the title of the work in the bibliography.

```

\DeclareSourcemap{
  \maps[datatype=bibtex]{
    \map{
      \step[fieldsource=title, match={A Title}, final]
      \step[entrynull]
    }
  }
}

```

```

    }
  }
}

```

Any entry with a `title` field matching 'A Title' will be completely ignored.

```

\DeclareSourceMap{
  \maps[datatype=bibtex]{
    \map{
      \pernottype{book}
      \pernottype{article}
      \step[entrynull]
    }
  }
}

```

Any entry which is not a `@book` or `@article` will be ignored.

```

\DeclareSourceMap{
  \maps[datatype=bibtex]{
    \map{
      \perdatasource{biblatex-examples.bib}
      \step[entryclone={rel-}]
    }
  }
}

```

Here, a clone of an entry from the specified data source will be created. The entry key of the clone will be the same as the original but prefixed by the value of the `entryclone` parameter. The cloned entry would still need to be cited in the document using its new entry key. This type of mapping step should be used with care as it may produce labelling problems in author-year styles which use, for example, `extradate`. One use case is for numeric styles which contain multiple bibliographies containing the same entry. In this case, you may need different bibliography number labels for the same entry and this is very tricky when there is only one entry which needs different labels. Creating clones with different entry keys solves this problem.

```

\DeclareSourceMap{
  \maps[datatype=bibtex]{
    \map{
      \step[fieldsource=note]
      \step[fieldset=usera, origfieldval]
      \step[fieldsource=usera, matchesi={string1,
↪ string2, StriNg3}, replace={1,2,3}]
    }
  }
}

```

Here, any note field is copied to `usera` and then ‘string1’, ‘string2’ and ‘string3’ are matched case-insensitively in the `usera` field and replaced with ‘1’, ‘2’ and ‘3’ respectively. The value of `matches` and `matchesi` are not regular expressions, they are CSV lists of literal strings, as is the value of `replace` when either of `matches` or `matchesi` are used. The lengths of the match/replace CSV lists must be the same. This is useful when creating a new field to sort by in a custom sorting scheme when the field you wish to sort by has a defined order which is not alphabetical or numeric, such as when sorting by level of court in legal bibliographies. Using `matches` is simply more efficient than using many individual match maps in `serial`.

`biblatexml` datasources are more structured than BibTeX since they are XML. Sourcemappping is possible with `biblatexml` too but the specifications of source and target fields etc. also support XPath 1.0 paths in order to be able to work with the structured data. Fields can be specified as per the BibTeX examples above and these are converted into XPath 1.0 queries internally as necessary. For example:

```
\DeclareSourcemap{
  \maps[datatype=biblatexml]{
    \map{
      \step[fieldsource=\regex{./bltx:names[@type='author
↪ ']/bltx:name[2]/bltx:namepart[@type='family']},
      match=\regex{ASmith},
      replace={Jones}]
    }
    \map{
      \step[fieldsource=editor, fieldtarget=translator]
    }
    \map{
      \step[fieldsource=\regex{./bltx:names[@type='
↪ editor']},
      fieldtarget=\regex{./bltx:names[@type='
↪ translator']}]
    }
    \map{
      \step[fieldset=\regex{./bltx:names[@type='author
↪ ']/bltx:name[2]/@useprefix},
      fieldvalue={false}]
    }
  }
}
```

These maps, respectively,

- Replace the family name ‘Smith’ of the second author name with ‘Jones’
- Move the editor to translator
- Move the editor to translator but with explicit XPaths
- Set the per-namelist `useprefix` option on the author name list to ‘false’



#### 4.5.4 Data Model Specification

The data model which `biblatex` uses consists of four main elements:

- Specification of constant strings and lists of strings
- Specification of valid Entrytypes
- Specification of valid Fields along with their type, datatype and any special flags
- Specification of which Fields are valid in which Entrytypes
- Specification of constraints which can be used to validate data against the data model

The default data model is defined in the core `biblatex` file `blx-dm.def` using the macros described in this section. The default data model is described in detail in § 2. The data model is used internally by `biblatex` and also by the backend. In practice, changing the data model means that you can define the entrytypes and fields for your datasources and validate your data against the data model. Naturally, this is not much use unless your style supports any new entrytypes or fields and it raises issues of portability between styles (although this can be mitigated by using the dynamic data modification functionality described in § 4.5.3).

Note that while the `biber`/BibTeX input site is not case sensitive when it comes to entry types and field names (Perl’s Unicode case folding is used to normalise field names and entry types), the LaTeX side is case sensitive and uses the exact capitalisation from the data model.

Validation against the data model means that after mapping your data sources into the data model, `biber` (using its `--validate_datamodel` option) can check:

- Whether all entrytypes are valid entrytypes
- Whether all fields are valid fields for their entrytype
- Whether the fields obey various constraints on their format which you specify

Redefining the data model can be done in several places. Style authors can create a `.dbx` file which contains the data model macros required and this will be loaded automatically when using the `biblatex` package `style` option by looking for a file named after the style with a `.dbx` extension (just like the `.cbx` and `.bbx` files for a style). If the `style` option is not used but rather the `citestyle` and `bibstyle` options, then the package will try to load `.dbx` files called `<citestyle>.dbx` and `<bibstyle>.dbx`. Alternatively, the name of the data model file can be different from any of the style option names by specifying the name (without `.dbx` extension) to the package `datamodel` option. After loading the style data model file, `biblatex` then loads, if present, a users `biblatex-dm.cfg` which should be put somewhere `biblatex` can find it, just like the main configuration file `biblatex.cfg`. To summarise, the data model is determined by adding to the data model from each of these locations, in order:

```
blx-dm.def →  
  <datamodel option>.dbx →  
    <style option>.dbx →  
      <citestyle option>.dbx and <bibstyle option>.dbx →
```

It is not possible to add to a loaded data model by using the macros below in your preamble as the preamble is read after `biblatex` has defined critical internal macros based on the data model. If any data model macro is used in a document, it will be ignored and a warning will be generated. The data model is defined using the following macros:

```
\DeclareDatamodelConstant[⟨options⟩]{⟨name⟩}{⟨constantdef⟩}
```

Declares the `⟨name⟩` as a datamodel constant with definition `⟨constantdef⟩`. Such constants are typically used internally by `biber`.

`type=string, list` default: string

A constant can be a simple string (default if the `⟨type⟩` option is omitted) or a comma-separated list of strings.

```
\DeclareDatamodelEntrytypes[⟨options⟩]{⟨entrytypes⟩}
```

Declares the comma-separated list of `⟨entrytypes⟩` to be valid entrytypes in the data model. As usual in TeX csv lists, make sure each element is immediately followed by a comma or the closing brace—no extraneous whitespace.

`skipout=true, false` default: false

This entrytype is not output to the `.bbl`. Typically used for special entrytypes which are processed and consumed by the backend such as `@xdata`.

```
\DeclareDatamodelFields[⟨options⟩]{⟨fields⟩}
```

Declares the comma-separated list of `⟨fields⟩` to be valid fields in the data model with associated comma-separated `⟨options⟩`. The `⟨type⟩` and `⟨datatype⟩` options are mandatory. All valid `⟨options⟩` are:

`type=⟨field type⟩`

Set the type of the field as described in § 2.2.1, typically ‘field’ or ‘list’.

`format=⟨field format⟩`

Any special format of the field. Normally unspecified but can take the value ‘xsv’ which tells `biber` that this field has a separated values format. The exact separator can be controlled with the `biber` option `xsvsep` and defaults to the expected comma surrounded by optional whitespace.

`datatype=⟨field datatype⟩`

Set the datatype of the field as described in § 2.2.1. For example, ‘name’ or ‘literal’.

`nullok=true, false` default: false

The field is allowed to be defined but empty.

`skipout=true, false` default: false

The field is not output to the `.bbl` and is therefore not present during `biblatex` style processing. As usual in TeX csv lists, make sure each element is immediately followed by a comma or the closing brace—no extraneous whitespace.

`label=true, false` default: false

The field can be used as a label in a bibliography or bibliography list. Specifying this causes `biblatex` to create several helper macros for the field so that there are some internal lengths and headings etc. defined.

`\DeclareDatamodelEntryfields` [*⟨entrytypes⟩*] {*⟨fields⟩*}

Declares that the comma-separated list of *⟨fields⟩* is valid for the comma-separated list of *⟨entrytypes⟩*. If *⟨entrytypes⟩* is not given, the fields are valid for all entrytypes. As usual in TeX csv lists, make sure each element is immediately followed by a comma or the closing brace—no extraneous whitespace.

`\DeclareDatamodelConstraints` [*⟨entrytypes⟩*] {*⟨specification⟩*}

If a comma-separated list of *⟨entrytypes⟩* is given, the constraints apply only to those entrytypes. The *⟨specification⟩* is an undelimited list of `\constraint` directives which specify a constraint. Spaces, tabs, and line endings may be used freely to visually arrange the *⟨specification⟩*. Blank lines are not permissible.

`\constraint` [*⟨type=constrainttype⟩*] {*⟨elements⟩*}

Specifies a constraint of type *⟨constrainttype⟩*. Valid constraint types are:

`type=data,mandatory,conditional`

Constraints of type ‘data’ put restrictions on the value of a field. Constraints of type ‘mandatory’ specify which fields or combinations of fields an entrytype should have. Constraints of type ‘conditional’ allow more sophisticated conditional and quantified field constraints.

`datatype=integer,isbn,issn,ismn,datepart,pattern`

For constraints of type *⟨data⟩*, constrain field values to be the given datatype.

`rangemin=⟨num⟩`

For constraints of *⟨type⟩* ‘data’ and *⟨datatype⟩* ‘integer’, constrain field values to be at least *⟨num⟩*.

`rangemax=⟨num⟩`

For constraints of *⟨type⟩* ‘data’ and *⟨datatype⟩* ‘integer’, constrain field values to be at most *⟨num⟩*.

`pattern=⟨patt⟩`

For constraints of *⟨type⟩* ‘data’ and *⟨datatype⟩* ‘pattern’, constrain field values to match regular expression pattern *⟨patt⟩*. It is best to wrap any regular expression in the macro `\regexp`, see § 4.5.3.

A `\constraint` macro may contain any of the following:

`\constraintfieldsor` {*⟨fields⟩*}

For constraints of *⟨type⟩* ‘mandatory’, specifies that an entry must contain a boolean OR of the `\constraintfields`.

`\constraintfieldsxor` {*⟨fields⟩*}

For constraints of *⟨type⟩* ‘mandatory’, specifies that an entry must contain a boolean XOR of the `\constraintfields`.

`\antecedent` [*<quantifier=quantspec>*] {*<fields>*}

For constraints of *<type>* ‘conditional’, specifies a quantified set of `\constraintfields` which must be satisfied before the `\consequent` of the constraint is checked. *<quantspec>* should have one of the following values:

`quantifier`=all, one, none

Specifies how many of the `\constraintfield`’s inside the `\antecedent` have to be present to satisfy the antecedent of the conditional constraint.

`\consequent` [*<quantifier=quantspec>*] {*<fields>*}

For constraints of *<type>* ‘conditional’, specifies a quantified set of `\constraintfields` which must be satisfied if the preceding `\antecedent` of the constraint was satisfied. *<quantspec>* should have one of the following values:

`quantifier`=all, one, none

Specifies how many of the `\constraintfield`’s inside the `\consequent` have to be present to satisfy the consequent of the conditional constraint.

`\constraintfield`{*<field>*}

For constraints of *<type>* ‘data’, the constraint applies to this *<field>*. For constraints of *<type>* ‘mandatory’, the entry must contain this *<field>*.

The data model declaration macros may be used multiple times as they append to the previous definitions. In order to replace, change or remove existing definitions (such as the default model which is loaded with `biblatex`), you should reset (clear) the current definition and then set what you want using the following macros. Typically, these macros will be the first things in any `biblatex-dm.cfg` file:

`\ResetDatamodelEntrytypes`

Clear all data model entrytype information.

`\ResetDatamodelFields`

Clear all data model field information.

`\ResetDatamodelEntryfields`

Clear all data model fields for entrytypes information.

`\ResetDatamodelConstraints`

Clear all data model fields Constraints information.

Here is an example of a simple data model. Refer to the core `biblatex` file `blx-dm.def` for the default data model specification.

```
\ResetDatamodelEntrytypes
\ResetDatamodelFields
\ResetDatamodelEntryfields
\ResetDatamodelConstraints

\DeclareDatamodelEntrytypes{entrytype1, entrytype2}
```

```

\DeclareDatamodelFields[type=field, datatype=literal]{
    ↪ field1,field2,field3,field4}

\DeclareDatamodelEntryfields{field1}
\DeclareDatamodelEntryfields[entrytype1]{field2,field3}
\DeclareDatamodelEntryfields[entrytype2]{field2,field3,
    ↪ field4}

\DeclareDatamodelConstraints[entrytype1]{
    \constraint[type=data, datatype=integer, rangemin=3,
        ↪ rangemax=10]{
        \constraintfield{field1}
    }
    \constraint[type=mandatory]{
        \constraintfield{field1}
        \constraintfieldsxor{
            \constraintfield{field2}
            \constraintfield{field3}
        }
    }
}
\DeclareDatamodelConstraints{
    \constraint[type=conditional]{
        \antecedent[quantifier=none]{
            \constraintfield{field2}
        }
        \consequent[quantifier=all]{
            \constraintfield{field3}
            \constraintfield{field4}
        }
    }
}

```

This model specifies:

- Clear the default data model completely
- Two valid entry types @entrytype1 and @entrytype2
- Four valid literal field fields
- field1 is valid for all entrytypes
- field2 and field3 are valid for entrytype1
- field2, field3 and field4 are valid for @entrytype2
- For @entrytype1:
  - field1 must be an integer between 3 and 10
  - field1 must be present
  - One and only one of field2 or field3 must be present
- For any entrytype, if field2 is not present, field3 and field4 must be present

### 4.5.5 Labels

Alphabetic styles use a label to identify bibliography entries. This label is constructed from components of the entry using a template which describes how to build the label. The template can be customised on a global or per-type basis. A separate template is used to specify how to extract parts of name fields for labels, since names can be quite complex fields.

`\DeclareLabelalphaTemplate[] {⟨specification⟩}`

Defines the alphabetic label template for the given entrytypes. If no entrytypes are specified in the first argument, then the global label template is defined. The `⟨specification⟩` is an undelimited list of `\labelelement` directives which specify the elements used to build the label. Spaces, tabs, and line endings may be used freely to visually arrange the `⟨specification⟩`. Blank lines are not permissible. This command may only be used in the preamble.

`\labelelement {⟨elements⟩}`

Specifies the elements used to build the label. The `⟨elements⟩` are an undelimited list of `\field` or `\literal` commands which are evaluated in the order in which they are given. The first `\field` or `\literal` which expands to a non-empty string is used as the `\labelelement` expansion and the next `\labelelement`, if any, is then processed.

`\field [⟨options⟩] {⟨field⟩}`

If `⟨field⟩` is non-empty, use it as the current label `\labelelement`, subject to the options below. Useful values for `⟨field⟩` are typically the name list type fields, date fields, and title fields. You may also use the ‘citekey’ or ‘entrykey’ pseudo-fields to specify the citation/entry key as part of the label. Name list fields are treated specially and when a name list field is specified, the template defined with `\DeclareLabelalphaNameTemplate` is used to extract parts from the name which then returns the string that the `\field` option uses.

`final=true, false` default: false

This option marks a `\field` directive as the final one in the `⟨specification⟩`. If the `⟨field⟩` is non-empty, then this field is used for the label and the remainder of the `⟨specification⟩` will be ignored. The short form `final` is equivalent to `final=true`.

`lowercase=true, false` default: false

Forces the label part derived from the field to lowercase. By default, the case is taken from the field source and not modified.

`strwidth=⟨integer⟩` default: 1

The number of characters of the `⟨field⟩` to use. This setting may be overridden by an individual name part when extracting characters from a name. See `\DeclareLabelalphaNameTemplate` below.

`strside=left, right` default: left

The side of the string from which to take the `strwidth` number of characters. This setting may be overridden by an individual name part when extracting characters from a name. See `\DeclareLabelalphaNameTemplate` below.

`padside=left, right` default: right

Side to pad the label part when using the `padchar` option. Only for use with fixed-width label strings (`strwidth`).

`padchar=<character>`

If present, pads the label part on the `padside` side with the specified character to the length of `strwidth`. Only for use with fixed-width label strings (`strwidth`).

`uppercase=true, false` default: false

Forces the label part derived from the field to uppercase. By default, the case is taken from the field source and not modified.

`varwidth=true, false` default: false

Use a variable width, left-side substring of characters from the string returned for `<field>`. The length of the string is determined by the minimum length needed to disambiguate the substring from all other `<field>` elements in the same position in the label. For name list fields, this means that each name substring is disambiguated from all other name substrings which occur in the same position in the name list (see examples below). This option overrides `strwidth` if both are used. The short form `varwidth` is equivalent to `varwidth=true`. For name list fields, the `\nameparts` with the `pre` option set are prepended to the string returned from this disambiguation.

`varwidthnorm=true, false` default: false

As `varwidth` but will force the disambiguated substrings for the `<field>` to be the same length as the longest disambiguated substring. This can be used to regularise the format of the labels if desired. This option overrides `strwidth` if both are used. The short form `varwidthnorm` is equivalent to `varwidthnorm=true`.

`varwidthlist=true, false` default: false

Alternative method of automatic label disambiguation where the field as a whole is disambiguated from all other fields in the same label position. For non-name list fields, this is equivalent to `varwidth`. For name list fields, names in a name list are not disambiguated from other names in the same position in their name lists but instead the entire name list is disambiguated as a whole from other name lists (see examples below). This option overrides `strwidth` if both are used. The short form `varwidthlist` is equivalent to `varwidthlist=true`. For name list fields, the `\nameparts` with the `pre` option set are prepended to the string returned from this disambiguation.

`strwidthmax=<integer>`

When using `varwidth`, this option sets a limit (in number of characters) on the length of variable width substrings. This option can be used to regularise the label.

`strfixedcount=<integer>` default: 1

When using `varwidthnorm`, there must be at least `strfixedcount` disambiguated substrings with the same, maximal length to trigger the forcing of all disambiguated substrings to this same maximal length.

`ifnames=<range>`

Only use this `\field` specification if it is a name list field with a number of names matching the `ifnames` range value. This allows a `\label element` to be conditionalised on name length (see below). The range can specified as in the following examples:



```

ifnames=3      -> Only apply to name lists containing
    ↪ exactly 3 names
ifnames={2-4} -> Only apply to name lists containing
    ↪ minimum 2 and maximum 4 names
ifnames={-3}   -> Only apply to name lists containing at
    ↪ most 3 names
ifnames={2-}   -> Only apply to name lists containing at
    ↪ least 2 names

```

`names=<range>`

By default, for name list fields, the names used range from the first name to the `maxalphanames`/`minalphanames` truncation. This option can be used to override this with an explicit range of names to consider. The plus '+' sign is a special end of range marker denoting the truncation point of `max`/`minalphanames`. The range separator can be any number of characters with the Unicode Dash property. For example:

```

names=3      -> Use first 3 names in the name list
names={2-3}  -> Use second and thirds names only
names={-3}   -> Same as 1-3
names={2-}   -> Use all names starting with the second
    ↪ name (ignoring max/minalphanames truncation)
names={2-+}  -> Use all names starting with the second
    ↪ name (respecting max/minalphanames truncation)

```

`namessep=<string>`

default: empty

An arbitrary string separator to put between names in a namelist.

`noalphaothers=true, false`

default: false

By default, `\labelalphaothers` is appended to label parts derived from name lists if there are more names in the list than are shown in the label part. This option can be used to disable the default behaviour.

`\literal{<characters>}`

Insert the literal `<characters>` into the label at this point.

When a name list `\field` is specified, the method of extracting the string is specified by a separate template specified by the following command:

`\DeclareLabelalphaNameTemplate[<name>]{<specification>}`

Defines the `labelalphaname` template `<name>`. The `<name>` is optional and defaults to `<global>`.

Such templates specify how to extract a label string from a name list when a `\field` specification in `\DeclareLabelalphaTemplate` contains a name list.

`\namepart[ $\langle options \rangle$ ]{ $\langle namepart \rangle$ }`

$\langle namepart \rangle$  is one of the datamodel nameparts defined with the `\DeclareDatamodelConstant` command (see § 4.2.3). The  $\langle options \rangle$  are:

`use=true, false` default: false

Only use the  $\langle namepart \rangle$  in constructing the label information if there is a corresponding option `use 'namepart'` and that option is true.

`pre=true, false` default: false

When constructing label strings from names, the `\namepart` *without* a `pre` option will be used to construct label string, passing through disambiguation, substring etc. operations as specified by the `\field` options in `\DeclareLabelalphaTemplate`. Then the `\namepart` options *with* the `pre` option set will be prepended to the result, (in the order given, if there are more than one such `\nameparts`). This allows to unconditionally prepend certain namepart information to name label strings, like name prefixes. Note that the uppercase and lowercase options of `\field` in `\DeclareLabelalphaTemplate` are applied to the entire label returned from `\DeclareLabelalphaTemplate`, both `pre` parts and non `pre`.

`compound=true, false` default: false

For static (non-varwidth) disambiguation in `\DeclareLabelalphaTemplate`, treat nameparts separated by whitespace or hyphens (compound names) as separate names for label generation. This means that when forming a label out of, for example the surname 'Ballam Forsyth' with a 1 character, left-side substring, this name would give 'BF' with `compound=true` and 'B' with `compound=false`. The short form `compound` is equivalent to `compound=true`.

`strwidth= $\langle integer \rangle$`  default: 1

The number of characters of the  $\langle namepart \rangle$  to use.

`strside=left, right` default: left

The side of the string from which to take the `strwidth` number of characters.

Note that the templates for labels can be defined per-type and you should be aware of this when using the automatically disambiguated label functionality. Disambiguation is not per-type as this might lead to ambiguity due to different label formats for different types being isolated from each others disambiguation process. Normally, you will want to use very different label formats for different types to make the type obvious by the label.

Here are some examples. The default global `biblatex` alphabetic label template is defined below. Firstly, `shorthand` has `final=true` and so if there is a `shorthand` field, it is used as the label and nothing more of the template is considered. Next, the `label` field is used as the first label element if it exists. Otherwise, if there is only one name (`ifnames=1`) in the `labelname` list, then three characters from the left side of the family name in the `labelname` are used as the first label element. If the `labelname` has more than one name in it, one character from the left side of each family name is used as the first label element. The second label element consists of 2 characters from the right side of the `year` field.

The default template for constructing labels from names is also shown. This prepends the first character from the left side of any prefix (if the `useprefix`

option is true) to a label extracted from the family name (according to the options on the calling `\field` option from `\DeclareLabelalphaTemplate`), allowing for compound family names.

```
\DeclareLabelalphaTemplate{
  \labelelement{
    \field[final]{shorthand}
    \field[label]{label}
    \field[strwidth=3, strside=left, ifnames=1]{labelname}
    ↪ }
    \field[strwidth=1, strside=left]{labelname}
  }
  \labelelement{
    \field[strwidth=2, strside=right]{year}
  }
}

\DeclareLabelalphaNameTemplate{
  \namepart[use=true, pre=true, strwidth=1, compound=
  ↪ true]{prefix}
  \namepart{family}
}
```

To get an idea of how the label automatic disambiguation works, consider the following author lists:

Agassi, Chang, Laver	(2000)
Agassi, Connors, Lendl	(2001)
Agassi, Courier, Laver	(2002)
Borg, Connors, Edberg	(2003)
Borg, Connors, Emerson	(2004)

Assuming a template declaration such as:

```
\DeclareLabelalphaTemplate{
  \labelelement{
    \field[varwidth]{labelname}
  }
}
```

Then the labels would be:

Agassi, Chang, Laver	[AChLa]
Agassi, Connors, Lendl	[AConLe]
Agassi, Courier, Laver	[ACouLa]
Borg, Connors, Edberg	[BConEd]
Borg, Connors, Emerson	[BConEm]

With normalised variable width labels defined:

```
\DeclareLabelalphaTemplate{
  \labelelement{
    \field[varwidthnorm]{labelname}
  }
}
```

You would get the following as the substrings of names in each position are extended to the length of the longest substring in that same position:

Agassi, Chang, Laver	[AChLa]
Agassi, Connors, Lendl	[AConLe]
Agassi, Courier, Laver	[ACouLa]
Borg, Connors, Edberg	[BConEd]
Borg, Connors, Emerson	[BConEm]

With a restriction to two characters for the name components of the label element defined like this:

```
\DeclareLabelalphaTemplate{
  \labelelement{
    \field[varwidthnorm, strwidthmax=2]{labelname}
  }
}
```

This would be the result (note that the individual family name label parts are no longer unambiguous):

Agassi, Chang, Laver	[AChLa]
Agassi, Connors, Lendl	[ACoLe]
Agassi, Courier, Laver	[ACoLa]
Borg, Connors, Edberg	[BCoEd]
Borg, Connors, Emerson	[BCoEm]

Alternatively, you could choose to disambiguate the name lists as a whole with:

```
\DeclareLabelalphaTemplate{
  \labelelement{
    \field[varwidthlist]{labelname}
  }
}
```

Which would result in:

Agassi, Chang, Laver	[AChL]
Agassi, Connors, Lendl	[ACoL]
Agassi, Courier, Laver	[ACL]
Borg, Connors, Edberg	[BCED]
Borg, Connors, Emerson	[BCE]

Perhaps you only want to consider at most two names for label generation but disambiguate at the whole name list level:

```
\DeclareLabelalphaTemplate{
  \labelelement{
    \field[varwidthlist,names=2]{labelname}
  }
}
```

Which would result in:

Agassi, Chang, Laver	[ACh+]
Agassi, Connors, Lendl	[ACo+]
Agassi, Courier, Laver	[AC+]
Borg, Connors, Edberg	[BC+a]
Borg, Connors, Emerson	[BC+b]

In this last example, you can see `\labelalphaothers` has been appended to show that there are more names. The last two labels now require disambiguating with `\extraalpha` as there is no way of disambiguating this label name list with only two names.

Finally, here is an example using multiple label elements:

```
\DeclareLabelalphaTemplate{
  \labelelement{
    \field[varwidthlist]{labelname}
  }
  \labelelement{
    \literal{-}
  }
  \labelelement{
    \field[strwidth=3,strside=right]{labelyear}
  }
}
```

Which would result in:

Agassi, Chang, Laver	[AChL-000]
Agassi, Connors, Lendl	[AConL-001]
Agassi, Courier, Laver	[ACouL-002]
Borg, Connors, Edberg	[BCEd-003]
Borg, Connors, Emerson	[BCEm-004]

Here is another rather contrived example showing that you don't need to specially quote LaTeX special characters (apart from `'%`', obviously) when specifying padding characters and literals:

```
\DeclareLabelalphaTemplate{
  \labelelement{
    \literal{>}
  }
  \labelelement{
    \literal{\%}
  }
}
```

```

}
\labelelement{
  \field[namessep={/}, strwidth=4, padchar=_]{
    ↪ labelname}
}
\labelelement{
  \field[strwidth=3, padchar=&, padside=left]{title}
}
\labelelement{
  \field[strwidth=2, strside=right]{year}
}
}

```

which given:

```

@Book{test,
  author   = {XXX YY and WWW ZZ},
  title    = {T},
  year     = {2007},
}

```

would resulting a label looking like this:

```
[>%YY/ZZ__&&T07]
```

Generating labels from fields may involve some difficulties when you have fields containing diacritics, hyphens, spaces etc. Often, you want to ignore things like separator characters or spaces when generating labels. An option is provided to customise the regular expression(s) to strip from a field before it is passed to the label generation system.

`\DeclareNolabel{⟨specification⟩}`

Defines regular expressions to strip from any field before generating a label part for the field. The *⟨specification⟩* is an undelimited list of `\nolabel` directives which specify the regular expressions to remove from fields. Spaces, tabs and line endings may be used freely to visually arrange the *⟨specification⟩*. Blank lines are not permissible. This command may only be used in the preamble.

`\nolabel{⟨regexp⟩}`

Any number of `\nolabel` commands can be given each of which specifies to remove the *⟨regexp⟩* from the copy of the field which the label generation system sees. Since regular expressions usually contain special characters, it is best to enclose them in the provided `\regexp` macro as shown—this will pass the expression through to biber correctly.

If there is no `\DeclareNolabel` specification, biber will default to:

```

\DeclareNolabel{
  % strip punctuation, symbols, separator and control
  ↪ characters
  \nolabel{\regexp{[\p{P}\p{S}\p{C}]+}}
}

```

This `biber` default strips punctuation, symbol, separator and control characters from fields before passing the field string to the label generation system.

`\DeclareNolabelwidthcount{⟨specification⟩}`

Defines regular expressions to ignore from any field when counting characters in fixed-width substrings. The `⟨specification⟩` is an unlimited list of `\nolabelwidthcount` directives which specify the regular expressions to ignore when counting characters for fixed-width substrings. Spaces, tabs and line endings may be used freely to visually arrange the `⟨specification⟩`. Blank lines are not permissible. This command may only be used in the preamble.

`\nolabelwidthcount{⟨regex⟩}`

Any number of `\nolabelwidthcount` commands can be given each of which specifies to ignore the `⟨regex⟩` when generating fixed-width substrings during label generation. Since regular expressions usually contain special characters, it is best to enclose them in the provided `\regex` macro as shown—this will pass the expression through to `biber` correctly.

There is no default `\DeclareNolabelwidthcount` specification. Note that this setting is only taken into account when using fixed-width substrings (non-varwidth) during label part generation. See § 4.5.5.

#### 4.5.6 Sorting

In addition to the predefined sorting templates discussed in § 3.6, it is possible to define new ones or modify the default definitions. The sorting process may be customized further by excluding certain fields from sorting on a per-type basis and by automatically populating the `presort` field on a per-type basis.

`\DeclareSortingTemplate[⟨options⟩]{⟨name⟩}{⟨specification⟩}`

Defines the sorting template `⟨name⟩`. The `⟨name⟩` is the identifier passed to the sorting option (§ 3.1.2.1) when selecting the sorting template. The `\DeclareSortingTemplate` command supports the following optional arguments:

`locale=⟨locale⟩`

The locale for the sorting template which then overrides the global sorting locale in the `sortlocale` option discussed in § 3.1.2.1.

The `⟨specification⟩` is an unlimited list of `\sort` directives which specify the elements to be considered in the sorting process. Spaces, tabs, and line endings may be used freely to visually arrange the `⟨specification⟩`. Blank lines are not permissible. This command may only be used in the preamble.

`\sort{⟨elements⟩}`

Specifies the elements considered in the sorting process. The `⟨elements⟩` are an unlimited list of `\field`, `\literal`, `\citecount`, `\intciteorder` and `\citeorder` commands which are evaluated in the order in which they are given. If an element is defined, it is added to the sort key and the sorting routine skips to the next `\sort` directive. If it is undefined, the next element is evaluated. Since literal strings are always defined, any `\literal` commands should be the sole or



the last element in a `\sort` directive. All  $\langle elements \rangle$  should be the same datatype as described in § 2.2.2 since they will be potentially compared to any of the other  $\langle elements \rangle$  in other entries.. The `\sort` command supports the following optional arguments:

`locale`= $\langle locale \rangle$

Override the locale used for sorting at the level of a particular set of sorting elements. If specified, the locale overrides the locale set at the level of `\DeclareSortingTemplate` and also the global setting. See also the discussion of the global sorting locale option `sortlocale` in § 3.1.2.1.

`direction`=ascending, descending default: ascending

The sort direction, which may be either ascending or descending. The default is ascending order.

`final`=true, false default: false

This option marks a `\sort` directive as the final one in the  $\langle specification \rangle$ . If one of the  $\langle elements \rangle$  is available, the remainder of the  $\langle specification \rangle$  will be ignored. The short form `final` is equivalent to `final=true`.

`sortcase`=true, false

Whether or not to sort case-sensitively. The default setting depends on the global `sortcase` option.

`sortupper`=true, false

Whether or not to sort in ‘uppercase before lowercase’ (true) or ‘lowercase before uppercase’ order (false). The default setting depends on the global `sortupper` option.

`\field`[ $\langle key=value, \dots \rangle$ ]{ $\langle field \rangle$ }

The `\field` element adds a  $\langle field \rangle$  to the sorting specification. If the  $\langle field \rangle$  is undefined, the element is skipped. The `\field` command supports the following optional arguments:

`padside`=left, right default: left

Pads a field on the left or right side using `padchar` so that its width is `padwidth`. If no padding option is set, no padding is done at all. If any padding option is specified, then padding is performed and the missing options are assigned built-in default values. If padding and substring matching are both specified, the substring match is performed first.

`padwidth`= $\langle integer \rangle$  default: 4

The target width in characters.

`padchar`= $\langle character \rangle$  default: 0

The character to be used when padding the field.

`strside`=left, right default: left

Performs a substring match on the left or right side of the field. The number of characters to match is specified by the corresponding `strwidth` option. If no substring option is set, no substring matching is performed at all. If any substring option is specified, then substring matching is performed and the missing options are assigned built-in default values. If padding and substring matching are both specified, the substring match is performed first.

`strwidth=<integer>`

default: 4

The number of characters to match.

`\literal{<string>}`

The `\literal` element adds a literal `<string>` to the sorting specification. This is useful as a fallback if some fields are not available.

`\citecount` The `\citecount` element has a special meaning. It requests a sort based on the number of times an item was cited. The standard `count` sorting template uses this to provide a sort in descending order of number of citations. Note that the option `citecounter` must also be enabled for this to work. In addition, an additional `biber` run is required in order to calculate the data for this option correctly and so the typical invocation sequence for this option is *latex*→*biber*→*latex*→*latex*→*biber*→*latex*.

`\citeorder` The `\citeorder` element has a special meaning. It requests a sort based on the lexical order of the actual citations. For entries cited within the same citation command like:

```
\cite{one,two}
```

there is a distinction between the lexical order and the semantic order. Here “one” and “two” have the same semantic order but a unique lexical order. The semantic order only matters if you specify further sorting to disambiguate entries with the same semantic order. For example, this is the definition of the `none` sorting template:

```
\DeclareSortingTemplate{lexical}{
  \sort{\citeorder}
}
```

This sorts the bibliography purely lexically by the order of the keys in the citation commands. In the example above, it sorts “one” before “two”. However, suppose that you consider “one” and “two” to have the same order (semantic order) since they are cited at the same time and want to further sort these by year. Suppose “two” has an earlier year than “one”:

```
\DeclareSortingTemplate{lexicalyear}{
  \sort{\citeorder}
  \sort{year}
}
```

This sorts “two” before “one”, even though lexically, “one” would sort before “two”. This is possible because the semantic order can be disambiguated by the further sorting on year. With the standard `none` sorting template, the lexical order and semantic order are identical because there is nothing further to disambiguate them. This means that you can use `\citeorder` just like any other sorting specification element, choosing how to further sort entries cited at the same time (in the same citation command).

See also `\intciteorder` below.

`\intciteorder` The `\intciteorder` element has a special meaning. It requests a sort based on the lexical order internal to the same citation command. For example:

```
\cite{one,two}
```

Here both citations have the same `\citeorder` but different `\intciteorder`. This sorting command is basically a more granular form of `\citeorder` so that order can be distinguished for citations within the same citation command. So, for example, with the above example, this will guarantee sorting of ‘one’ before ‘two’:

```
\DeclareSortingTemplate{fulllexical}{  
  \sort{\citeorder}  
  \sort{\intciteorder}  
}
```

`\DeclareSortingNamekeyTemplate` [*<name>*] { *<specification>* }

Defines how the sorting keys for names are constructed. This can change the sorting order of names arbitrarily because you can choose how to put together the name parts when constructing the string to compare when sorting. The sorting key construction template so defined is called *<name>* which defaults to “global” if this optional parameter is absent. When constructing the sorting key for a name, a sorting key for each name part is constructed and the key for each name is formed into an ordered key list with a special internal separator. The point of this option is to accommodate languages or situations where sorting of names needs to be customised (for example, Icelandic names are sometimes sorted by given names rather than by family names). This macro may be used multiple times to define templates with different names which can then be referred to later. Sorting name key templates can be specified at the following scopes, in order of increasing precedence:

- The default template defined without the optional name argument
- Given as the `sortingnamekeytemplate` option to a reference context (see § 3.8.10)
- Given as a per-entry option `sortnamekeytemplate` in a bibliography data source entry
- Given as a per-namelist option `sortnamekeytemplate`
- Given as a per-name option `sortnamekeytemplate`

By default there is only a global template which has the following *<specification>*:

```
\DeclareSortingNamekeyTemplate{  
  \keypart{  
    \namepart[use=true]{prefix}  
    \namepart{family}  
  }  
  \keypart{  
    \namepart{given}  
  }  
  \keypart{
```

```

\namepart{suffix}
}
\keypart{
\namepart[use=false]{prefix}
}
}

```

This means that the key is constructed by concatenating, in order, the name prefix (only if the `useprefix` option is true) with the family name(s), the given names(s), the name suffix and then the name prefix (only if the `useprefix` option is false). The visible number of names in the name list used to construct the key is the default sorting visibility, see below.

`\visibility{<visibilityscope>}`

`<visibilityscope>` determines which visibility settings to use for the name list. This determines how many names in the name list are visible to the sorting algorithm. This is by default set to 'sort', which is the standard visibility for sorting determined by the `max*/min*names` and `uniquelist` options. `\visibility` can be omitted entirely if this default is desired. The only other scope is 'cite' which forces the sorting algorithm to use the name list visibility of the citations rather than that of the reference list sorting. This is useful when using the `sortcites` option in the situation when a style has different name list truncation rules for citations than it has for the reference list. Citations can then be forced to sort using a different reference context that uses a modified sorting name key template that enforces the correct name list truncation for citation sorting with:

```

\DeclareSortingNamekeyTemplate[mycitesorttemplate]{
\visibility{cite}
.
.
.

```

and then force this to be used with e.g.:

```

\newrefcontext[sortingnamekeytemplate=
↪ mycitesorttemplate]
\cite{a,b,c}

```

One thing to note is that a reference context will not be written to the `.bcf` if no `\printbibliography` or `\printbiblist` occurs within it which will mean that biber will not generate any sorted data for the refcontext. Therefore if the requirement is to just correctly sort citations using this refcontext, you will need to force the writing of the refcontext using `\GenRefcontextData` (see § 3.8.10):

```

% make sure sorting data using this template is
% generated since no \printbibliography/\printbiblist
% occurs in the refcontext with
% sortingnamekeytemplatename=mycitesorttemplate,
% this won't happen by default

```

```

\GenRefcontextData{sortingnamekeytemplatename=
  ↪ mycitesorttemplate}
% Switch to this refcontext to use the correct
% sorted data using the sorting name key template
% which uses "cite" visibility for the name lists
\newrefcontext[sortingnamekeytemplate=
  ↪ mycitesorttemplate]
% citations are correctly sorted
\cite{a,b,c}
% Switch to the default sorting name key template
% for the actual list of references which uses the
% default sorting visibility for the name lists
\newrefcontext[sortingnamekeytemplate=global]
% references are correctly sorted
\printbibliography

```

`\keypart{⟨part⟩}`

⟨part⟩ is an ordered list of of `\namepart` and `\literal` specifications which are concatenated together when constructing a part of the name sorting key. The `\keyparts` are then concatenated together with terminal padding to ensure correct sorting.

`\literal{⟨string⟩}`

A literal string to insert into the name sorting key.

`\namepart{⟨name⟩}`

Specifies the ⟨name⟩ of a namepart to use in constructing the name sorting key.

`use=true, false` default: true

Indicates that the namepart ⟨name⟩ is only to be used in this concatenation position if the corresponding `use 'name'` option is set to the specified boolean value.

`inits=true, false` default: true

Indicates that only the initials of namepart ⟨name⟩ are to be used in constructing the sorting specification.

As an example, suppose you wanted to be able to sort names by given name rather than family name, you could define a sorting name key template like this:

```

\DeclareNamekeyTemplate[givenfirst]{
  \keypart{
    \namepart{given}
  }
  \keypart{
    \namepart[use=true]{prefix}
  }
  \keypart{
    \namepart{family}
  }
  \keypart{

```

```

\namepart[use=false]{prefix}
}
}

```

You can then use the name `givenfirst` at the appropriate scope in order to make `biber` use this template when constructing sorting name keys. For example, you could enable this for one bibliography list like this:

```

\begin{refcontext}[sortnamekeytemplate=givenfirst]
\printbibliography
\end{refcontext}

```

or perhaps you only want to do this for a particular entry:

```

@BOOK{key,
  OPTIONS = {sortnamekeytemplate=givenfirst},
  AUTHOR = {Arnar Vigfusson}
}

```

or just a name list by using the option as a pseudo-name which will be ignored:

```

@BOOK{key,
  AUTHOR = {sortnamekeytemplate=givenfirst and Arnar
    ↪ Vigfusson}
}

```

or just a single name by passing the option as part of the extended name information format which `biber` supports (see § 3.4):

```

@BOOK{key,
  AUTHOR = {given=Arnar, family=Vigfusson,
    ↪ sortnamekeytemplate=givenfirst}
}

```

Now we give some examples of sorting templates. In the first example, we define a simple name/title/year template. The name element may be either the author, the editor, or the translator. Given this specification, the sorting routine will use the first element which is available and continue with the title. Note that the options `use<name>` options are considered automatically in the sorting process:

```

\DeclareSortingTemplate{sample}{
  \sort{
    \field{author}
    \field{editor}
    \field{translator}
  }
  \sort{
    \field{title}
  }
  \sort{
    \field{year}
  }
}

```

```

}
}

```

In the next example, we define the same template in a more elaborate way, considering special fields such as `presort`, `sortkey`, `sortname`, etc. Since the `sortkey` field specifies the master sort key, it needs to override all other elements except for `presort`. This is indicated by the `final` option. If the `sortkey` field is available, processing will stop at this point. If not, the sorting routine continues with the next `\sort` directive. This setup corresponds to the default definition of the `nty` template:

```

\DeclareSortingTemplate{nty}{
  \sort{
    \field{presort}
  }
  \sort[final]{
    \field{sortkey}
  }
  \sort{
    \field{sortname}
    \field{author}
    \field{editor}
    \field{translator}
    \field{sorttitle}
    \field{title}
  }
  \sort{
    \field{sorttitle}
    \field{title}
  }
  \sort{
    \field{sortyear}
    \field{year}
  }
}

```

Finally, here is an example of a sorting template which overrides the global sorting locale and additionally overrides again when sorting by the `origtitle` field. Note the use in the template-level override of a babel/polyglossia language name instead of a real locale identifier. `biber` will map this to a suitable, real locale identifier (in this case, `sv_SE`):

```

\DeclareSortingTemplate[locale=swedish]{custom}{
  \sort{
    \field{sortname}
    \field{author}
    \field{editor}
    \field{translator}
    \field{sorttitle}
    \field{title}
  }
}

```



```
\sort[locale=de_DE_phonebook]{
  \field{origtitle}
}
}
```

`\DeclareSortExclusion{⟨entrytype, ...⟩}{⟨field, ...⟩}`

Specifies fields to be excluded from sorting on a per-type basis. The *⟨entrytype⟩* argument and the *⟨field⟩* argument may be a comma-separated list of values. A blank *⟨field⟩* argument will clear all exclusions for this *⟨entrytype⟩*. A value of '\*' for *⟨entrytype⟩* will exclude *⟨field,...⟩* for every entrytype. This is equivalent to simply deleting the field from the sorting specification and is only normally used in combination with `\DeclareSortInclusion` when one wishes to exclude a field for all but explicitly included entrytypes. See example in `\DeclareSortInclusion` below. This command may only be used in the preamble.

`\DeclareSortInclusion{⟨entrytype, ...⟩}{⟨field, ...⟩}`

Only used along with `\DeclareSortExclusion`. Specifies fields to be included in sorting on a per-type basis. This allows the user to exclude a field from sorting for all entrytypes and then to override this for certain entrytypes. This is easier sometimes than using `\DeclareSortExclusion` to list exclusions for many entrytypes. The *⟨entrytype⟩* argument and the *⟨field⟩* argument may be a comma-separated list of values. This command may only be used in the preamble. For example, this would use `title` during sorting only for `@articles`:

```
\DeclareSortExclusion{*}{title}
\DeclareSortInclusion{article}{title}
```

`\DeclarePresort[⟨entrytype, ...⟩]{⟨string⟩}`

Specifies a string to be used to automatically populate the `presort` field of entries without a `presort` field. The `presort` may be defined globally or on a per-type basis. If the optional *⟨entrytype⟩* argument is given, the *⟨string⟩* applies to the respective entry type. If not, it serves as the global default value. Specifying an *⟨entrytype⟩* in conjunction with a blank *⟨string⟩* will clear the type-specific setting. The *⟨entrytype⟩* argument may be a comma-separated list of values. This command may only be used in the preamble.

`\DeclareSortTranslit[⟨entrytype⟩]{⟨specification⟩}`

Languages which can be written in different scripts or alphabets often only have CLDR sorting tailoring for one script and it is expected that you transliterate into the supported script for sorting purposes. A common example is Sanskrit which is often written in academic contexts in IAST romanised script but which needs to be sorted in the 'sa' locale which expects the Devanāgarī script. Another common case is transliteration of Russian Cyrillic into Latin as defined by the ALA-LC standard. Such requirement means that it is necessary to transliterate into the sorting script internally. `\DeclareSortTranslit` declares which parts of an entry you would like to transliterate for sorting purposes. Without the *⟨entrytype⟩* parameter, the *⟨specification⟩* applies to all entrytypes. The *⟨specification⟩* is one or more `\translit` commands:

**Table 11: Valid transliteration pairs**

From	To	Description
iast	devanagari	Sanskrit IAST to Devanāgarī
russian	ala-lc	ALA-LC romanisation for Russian
russian	bgn/pcgn-standard	BGN/PCGN:1947 (Standard Variant), Cyrillic to Latin, Russian

`\translit[⟨langids⟩]{⟨field or fieldset⟩}{⟨from⟩}{⟨to⟩}`

Specifies that the data field `field` or all fields in a fieldset `⟨fieldset⟩` declared with `\DeclareDatafieldSet` (see § 4.5.2) should be transliterated from script `⟨from⟩` to script `⟨to⟩` for sorting purposes. The field/set argument should be “\*” to apply transliteration to all fields. The valid `⟨from⟩` and `⟨to⟩` values are given in table 11. The optional `⟨langids⟩` parameter is a comma-separated list of `langid` fields and the transliteration will apply only to bibliography entries containing one of the `langids` in the list. Note that `biblatex` does not aim to support general transliteration, only those which are useful for sorting purposes. Please open a GitHub ticket for `biblatex` if you think you need additional transliterations.

An example of transliterating titles so that they sort correctly in Sanskrit. This example assumes that entries that should have their title fields transliterated have a `langid` field set to ‘sanskrit’.

```
\DeclareDatafieldSet{setttitles}{
  \member[field=title]
  \member[field=booktitle]
  \member[field=eventtitle]
  \member[field=issuetitle]
  \member[field=journaltitle]
  \member[field=maintitle]
  \member[field=origtitle]
}

\DeclareSortTranslit{
  \translit[sanskrit]{setttitles}{iast}{devanagari}
}
```

#### 4.5.7 Bibliography List Filters

When using customisable bibliography lists (See § 3.8.3), usually one wants to return in the `.bbl` only those entries which have the particular fields which the bibliography list is summarising. For example, when printing a normal list of short-hands, you want the list returned by `biber` in the `.bbl` to contain only those entries which have a `shorthand` field. This is accomplished by defining a bibliography list filter using the `\DeclareBiblistFilter` command. This differs from the filters defined using `\defbibfilter` (see § 3.8.9) since the filters defined by `\defbibfilter` run inside `biblatex` after the `.bbl` has been generated.

`\DeclareBiblistFilter{<name>}{<specification>}`

Defines a bibliography list filter with *<name>*. The *<specification>* consists of one or more `\filter` or `\filteror` macros, all of which must be satisfied for the entry to pass the filter:

`\filter[<filterspec>]{<filter>}`

Filter entries according to the *<filterspec>* and *<filter>*. *<filterspec>* can be one of:

**type/nottype** Entry is/is not of *entrytype* *<filter>*

**subtype/notsubtype** Entry is/is not of *subtype* *<filter>*

**keyword/notkeyword** Entry has/does not have *keyword* *<filter>*

**field/notfield** Entry has/does not have a field called *<filter>*

`\filteror{<type>}{<filters>}`

A wrapper around one or more `\filter` commands specifying that they form a disjunctive set, i.e. any one of the *<filters>* must be satisfied.

Fields in the datamodel which are marked as ‘Label fields’ (see § 4.5.4) automatically have a filter defined for them with the same name and which filters out any entries which do not contain the field. For example, `biblatex` automatically generates a filter for the `shorthand` field:

```
\DeclareBiblistFilter{shorthand}{
  \filter[type=field,filter=shorthand]
}
```

#### 4.5.8 Controlling Name Initials Generation

Generating initials for name parts from a given name involves some difficulties when you have names with prefixes, diacritics, hyphens etc. Often, you want to ignore things like prefixes when generating initials so that the initials for “al-Hasan” is just “H” instead of “a-H”. This is tricky when you also have names like “Ho-Pun” where you want the initials to be “H-P”, for example.

`\DeclareNoinit{<specification>}`

Defines regular expressions to strip from names before generating initials. The *<specification>* is an undelimited list of `\noinit` directives which specify the regular expressions to remove from the name. Spaces, tabs and line endings may be used freely to visually arrange the *<specification>*. Blank lines are not permissible. This command may only be used in the preamble.

`\noinit{⟨regex⟩}`

Any number of `\noinit` commands can be given each of which specifies to remove the `⟨regex⟩` from the copy of the name which the initials generation system sees. Since regular expressions usually contain special characters, it is best to enclose them in the provided `\regex` macro as shown—this will pass the expression through to biber correctly.

If there is no `\DeclareNoinit` specification, biber will default to:

```
\DeclareNoinit{
  % strip lowercase prefixes like 'al-' when generating
  ↪ initials from names
  \noinit{\regex{\b\p{Ll}{2}\p{Pd}}}}
  % strip some common diacritics when generating
  ↪ initials from names
  \noinit{\regex{[\x{2bf}\x{2018}]}}
}
```

This biber default strips a couple of diacritics and also strips lowercase prefixes from names before generating initials.

#### 4.5.9 Fine Tuning Sorting

It can be useful to fine tune sorting so that it ignores certain parts of particular fields.

`\DeclareNosort{⟨specification⟩}`

Defines regular expressions to strip from particular fields or types of fields when sorting. The `⟨specification⟩` is an undelimited list of `\nosort` directives which specify the regular expressions to remove from particular fields or type of field. Spaces, tabs and line endings may be used freely to visually arrange the `⟨specification⟩`. Blank lines are not permissible. This command may only be used in the preamble.

`\nosort{⟨field or datafield set⟩}{⟨regex⟩}`

Any number of `\nosort` commands can be given each of which specifies to remove the `⟨regex⟩` from the `⟨field⟩` or `⟨datafield set⟩`. A `⟨datafield set⟩` is simply a convenience grouping of semantically similar fields from which you might want to remove a `regex`. See § 4.5.2 for the available sets, their members and customisation. Since regular expressions usually contain special characters, it is best to enclose them in the provided `\regex` macro as shown—this will pass the expression through to biber correctly.

The default is:

```
\DeclareNosort{
  % strip prefixes like 'al-' when sorting names
  \nosort{setnames}{\regex{\A\p{L}{2}\p{Pd}}}}
  % strip some diacritics when sorting names
  \nosort{setnames}{\regex{[\x{2bf}\x{2018}]}}
}
```

This `biber` default strips a couple of diacritics and also strips two-letter prefixes (like “Al-”) from names when sorting. Suppose you wanted to ignore “The” at the beginning of the `title` field when sorting:

```
\DeclareNosort{
  \nosort{title}{\regexp{\AThe\s+}}
}
```

Or if you wanted to ignore “The” at the beginning of any title field:

```
\DeclareNosort{
  \nosort{settitles}{\regexp{\AThe\s+}}
}
```

#### 4.5.10 Fine Tuning hashing and uniqueness

`\DeclareNonamestring{<specification>}`

Defines regular expressions to strip from name fields when generating `fullhash` and `uniquename`. The `<specification>` is an undelimited list of `\nonamestring` directives which specify the regular expressions to remove from particular name fields. Spaces, tabs and line endings may be used freely to visually arrange the `<specification>`. Blank lines are not permissible. This command may only be used in the preamble.

`\nonamestring{<namefield or datafield name set>}{<regexp>}`

Any number of `\nonamestring` commands can be given each of which specifies to remove the `<regexp>` from the `<namefield>` or `<datafield name set>`. A `<datafield name set>` is simply a convenience grouping of semantically similar fields from which you might want to remove a regexp. See § 4.5.2 for the available sets, their members and customisation. Only set of name lists are relevant to this command. Since regular expressions usually contain special characters, it is best to enclose them in the provided `\regexp` macro as shown—this will pass the expression through to `biber` correctly.

Suppose you wanted to ignore square brackets in names in the `author` name field and treat ‘D[onald] Knuth’ the same as ‘Donald Knuth’ for purposes `uniquename` and hashing so that both variants appeared together in a dashed bibliography style and were also treated the same when calculating `uniquename`:

```
\DeclareNonamestring{
  \nonamestring{author}{\regexp{[\[\]]}}
}
```

For consistency, it is often desirable to use the same regexp in `\DeclareNosort`.

#### 4.5.11 Special Fields

Some of the automatically generated fields from § 4.2.4.2 may be customized.

`\DeclareLabelname[⟨entrytype, ...⟩]{⟨specification⟩}`

Defines the fields to consider when generating the `labelname` field (see § 4.2.4.2). The `⟨specification⟩` is an ordered list of `\field` commands. The fields are checked in the order listed and the first field which is available will be used as `labelname`. This is the default definition:

```
\DeclareLabelname{%
  \field{shortauthor}
  \field{author}
  \field{shorteditor}
  \field{editor}
  \field{translator}
}
```

The `labelname` field may be customized globally or on a per-type basis. If the optional `⟨entrytype⟩` argument is given, the specification applies to the respective entry type. If not, it is applied globally. The `⟨entrytype⟩` argument may be a comma-separated list of values. This command may only be used in the preamble.

`\DeclareLabeldate[⟨entrytype, ...⟩]{⟨specification⟩}`

Defines the date components to consider when generating `labelyear`, `labelmonth`, `labelday`, `labelendyear`, `labelendmonth` and `labelendday` fields (see § 4.2.4.2). The `⟨specification⟩` is an ordered list of `\field` or `\literal` commands. The items are checked in the order listed and the first item which is available will be used to populate the mentioned fields. Note that the `\field` items do not have to be datatype ‘date’ in the data model so that you can create pseudo-year labels by, for example, using a `pubstate` field contents, if available, as the year label by defining `\DeclareLabeldate` suitably. Note also that a `\literal` command will always be used when found and so this should always be the last thing in the list. If the value of a `\literal` command is a valid localisation string, then this will be resolved in the current language, otherwise the value is used as a literal string as-is. This is the default definition:

```
\DeclareLabeldate{%
  \field{date}
  \field{year}
  \field{eventdate}
  \field{origdate}
  \field{urldate}
  \literal{nodate}
}
```

Note that the `date` field is split by the backend into `year`, `month` which are also valid fields in the default data model. In order to support legacy data which directly sets `year` and/or `month`, the specification ‘date’ in `\DeclareLabeldate` will also match `year` and `month` fields, if present. The `label*` fields may be customized globally or on a per-type basis. If the optional `⟨entrytype⟩` argument is given, the specification applies to the respective entry type. If not, it is applied globally. The `⟨entrytype⟩` argument may be a comma-separated list of values. This command may only be used in the preamble. See also § 4.2.4.3.

`\DeclareExtradata{⟨specification⟩}`

Defines how `biber` tracks information used to construct the `extradata` field. This field (see § 4.2.4.2) is printed to disambiguate works by the same author which occur in the same date scope. By default, the date scope is the year and so two works by the same author within the same year will have different `extradata` values which are used to disambiguate the works in the bibliography in the usual manner seen in many `authoryear` type styles. The `⟨specification⟩` is one or more `\scope` specifications which can contain one or more `\field` specifications. Within a `\scope`, the existence of each `\field` will be checked and if found, the first `\field` is used and the rest are ignored. This allows a fallback in case certain fields are not available in all entries. All `\scopes` are used to track information and `\scopes` should be specified in decreasing order of generality (e.g. year then month then day etc) The default definition is:

```
\DeclareExtradata{%
  \scope{
    \field{labelyear}
    \field{year}
  }
}
```

This means that the `labelyear` field only (or `year` if this does not exist) will be used to track works by the same author. With the following `datasource` entries:

```
@BOOK{extra1,
  AUTHOR = {John Doe},
  DATE   = {2001-01}
}

@BOOK{extra2,
  AUTHOR = {John Doe},
  DATE   = {2001-02}
}
```

The default definition would result in:

```
Doe 2001a
Doe 2001b
```

Here, `extradata` only considers the `((label)year)` information and since this is identical, disambiguation is required. However, consider the following definition:

```
\DeclareExtradata{%
  \scope{
    \field{labelyear}
    \field{year}
  }
  \scope{
    \field{labelmonth}
  }
}
```



```
}  
}
```

The result would be:

```
Doe 2001  
Doe 2001
```

If only years were printed, this would be ambiguous because `extradate` now considers `labelmonth` and since this differs, no disambiguation is necessary. Care should therefore be taken to synchronise the printed information with the `extradate` disambiguation settings. Notice that the second definition is ‘month-in-year’ disambiguation and quite different from:

```
\DeclareExtradata{%  
  \scope{  
    \field{labelmonth}  
  }  
}
```

which is just plain ‘month’ disambiguation which is very unlikely to be what you ever want to do since this disambiguation only based on month and ignores the year entirely. `extradate` calculation should almost always be based on all information down to the resolution you require. For example, if you wish to disambiguate right down to the hour level (perhaps useful in large bibliographies of rapidly changing online material), you would specify something like this:

```
\DeclareExtradata{%  
  \scope{  
    \field{labelyear}  
    \field{year}  
  }  
  \scope{  
    \field{labelmonth}  
  }  
  \scope{  
    \field{labelday}  
  }  
  \scope{  
    \field{labelhour}  
  }  
}
```

Entries without the specified granularity of information will disambiguate at the lowest granularity they contain, so, for example, with:

```
\DeclareExtradata{%  
  \scope{  
    \field{labelyear}  
  }  
}
```

```

    \field{year}
  }
  \scope{
    \field{labelmonth}
  }
}

```

```

@BOOK{extra1,
  AUTHOR = {John Doe},
  DATE   = {2001}
}

@BOOK{extra2,
  AUTHOR = {John Doe},
  DATE   = {2001}
}

```

The result would still be:

```

Doe 2001a
Doe 2001b

```

This command may only be used in the preamble.

`\DeclareLabeltitle[<entrytype>, ...]{<specification>}`

Defines the fields to consider when generating the `labeltitle` field (see § 4.2.4.2). The *<specification>* is an ordered list of `\field` commands. The fields are checked in the order listed and the first field which is available will be used as `labeltitle`. This is the default definition:

```

\DeclareLabeltitle{%
  \field{shorttitle}
  \field{title}
}

```

The `labeltitle` field may be customized globally or on a per-type basis. If the optional *<entrytype>* argument is given, the specification applies to the respective entry type. If not, it is applied globally. The *<entrytype>* argument may be a comma-separated list of values. This command may only be used in the preamble.

#### 4.5.12 Data Inheritance (**crossref**)

`biber` features a highly customizable cross-referencing mechanism with flexible data inheritance rules. This sections deals with the configuration interface. See appendix B for the default configuration. A note on terminology: the *child* or *target* is the entry with the `crossref` field, the *parent* or *source* is the entry the `crossref` field points to. The child inherits data from the parent.

`\DefaultInheritance[<exceptions>]{<options>}`

Configures the default inheritance behavior. This command may only be used in the preamble. The default behavior may be customized by setting the following *<options>*:

`all=true, false` default: true

Whether or not to inherit all fields from the parent by default.

`all = true` means that the child entry inherits all fields from the parent, unless a more specific inheritance rule has been set up with `\DeclareDataInheritance`. If an inheritance rule is defined for a field, data inheritance is controlled by that rule. `all=false` means that no data is inherited from the parent by default and each field to be inherited requires an explicit inheritance rule set up with `\DeclareDataInheritance`. The package default is `all=true`.

`override=true, false` default: false

Whether or not to overwrite target fields with source fields if both are defined. This applies both to automatic inheritance and to explicit inheritance rules. The package default is `override=false`, i.e., existing fields of the child entry are not overwritten.

`ignore=<csv list of uniqueness options>`

This option takes a comma-separated list of one or more of ‘singletitle’, ‘uniquetitle’, ‘uniquebaretitle’ and/or ‘uniquework’. The purpose of this option is to ignore tracking information for these three options when the field which would trigger the tracking (table 6) is inherited. An example—Suppose that you have several `@book` entries which all crossref a `@mvbook` from which they get their `author` field. You might reasonably want the `\ifsingletitle` test to return ‘true’ for this author as their only ‘work’ is the `@mvbook`. Similar comments would apply to situations involving the `\ifuniquetitle`, `\ifuniquebaretitle` and `\ifuniquework` tests. The `ignore` option lists which of these should have their tracking information ignored when the fields which would trigger them are inherited. The idea is that the presence of an inherited field does not contribute towards the determination of whether some combination of name/title is unique in the bibliographic data. For example, this modified default setting would ignore `singletitle` and `uniquetitle` tracking:

```
\DefaultInheritance{ignore={singletitle,uniquetitle},  
  ↪ all=true, override=false}
```

Of course, the ignoring of tracking does nothing if the fields inherited do not play a role in tracking. Only the fields listed in table 6 are relevant to this option.

The optional *<exceptions>* are an undelimited list of `\except` directives. Spaces, tabs, and line endings may be used freely to visually arrange the *<exceptions>*. Blank lines are not permissible.

`\except{<source>}{<target>}{<options>}`

Defines an exception to the default inheritance rules.

`\DeclareDataInheritance` sets the inheritance *<options>* for a specific *<source>* and *<target>* combination. The *<source>* and *<target>* arguments specify

the parent and the child entry type. The asterisk matches all types and is permissible in either argument.

`\DeclareDataInheritance` [*options*] {*source*, ...} {*target*, ...} {*rules*}

Declares inheritance rules. The *source* and *target* arguments specify the parent and the child entry type. Either argument may be a single entry type, a comma-separated list of types, or an asterisk. The asterisk matches all entry types. The *rules* are an undelimited list of `\inherit` and/or `\noinherit` directives. Spaces, tabs, and line endings may be used freely to visually arrange the *rules*. Blank lines are not permissible. This command may only be used in the preamble. The options are:

`ignore`=(*csv list of uniqueness options*)

As the `ignore` option on `\DefaultInheritance` explained above. When set here, it takes precedence over any global options set with `\DefaultInheritance`. For example, this would ignore `singletitle` and `uniquetitle` tracking for a `@book` inheriting from a `@mvbook`.

```
\DeclareDataInheritance[ignore={singletitle,uniquetitle
↪ }]{mvbook}{book}{...}
```

`\inherit` [*option*] {*source*} {*target*}

Defines an inheritance rule by mapping a *source* field to a *target* field. *option* can be one of

`override`=true, false default: false

As the `override` option for `\DefaultInheritance` explained above. When set here, it takes precedence over any global options set with `\DefaultInheritance`.

`\noinherit` {*source*}

Unconditionally prevents inheritance of the *source* field.

`\ResetDataInheritance` Clears all inheritance rules defined with `\DeclareDataInheritance`. This command may only be used in the preamble.

Here are some practical examples:

```
\DefaultInheritance{all=true,override=false}
```

This example shows how to configure the default inheritance behavior. The above settings are the package defaults.

```
\DefaultInheritance[
  \except{*}{online}{all=false}
]{all=true,override=false}
```

This example is similar to the one above but adds one exception: entries of type `@online` will, by default, not inherit any data from any parent.

```
\DeclareDataInheritance{collection}{incollection}{
  \inherit{title}{booktitle}
  \inherit{subtitle}{booksubtitle}
  \inherit{titleaddon}{booktitleaddon}
}
```

So far we have looked at setting up standard inheritance. For example, `all=true` means that the `publisher` field of a source entry is copied to the `publisher` field of the target entry. In some cases, however, asymmetric mappings are required. They are defined with `\DeclareDataInheritance`. The above example sets up three typical rules for `@incollection` entries referencing a `@collection`. We map the `title` and related fields of the source to the corresponding `booktitle` fields of the target.

```
\DeclareDataInheritance{mvbook,book}{inbook,bookinbook
  ↔ }{
  \inherit{author}{author}
  \inherit{author}{bookauthor}
}
```

This rule is an example of one-to-many mapping: it maps the `author` field of the source to both the `author` and the `bookauthor` fields of the target in order to allow for compact `inbook/bookinbook` entries. The source may be either a `@mvbook` or a `@book` entry, the target either an `@inbook` or a `@bookinbook` entry.

```
\DeclareDataInheritance{*}{inbook,incollection}{
  \noinherit{introduction}
}
```

This rule prevents inheritance of the `introduction` field. It applies to all targets of type `@inbook` or `@incollection`, regardless of the source entry type.

```
\DeclareDataInheritance{*}{*}{
  \noinherit{abstract}
}
```

This rule, which applies to all entries, regardless of the source and target entry types, prevents inheritance of the `abstract` field.

```
\DefaultInheritance{all=true,override=false}
\ResetDataInheritance
```

This example demonstrates how to emulate traditional BibTeX's cross-referencing mechanism. It enables inheritance by default, disables overwriting, and clears all other inheritance rules and mappings.

In a bibliography entry, you can give an option `'noinherit'` where the value is a datafield set defined with `\DeclareDatafieldSet` (§ 4.5.2). This will block inheritance of the fields in the set on a per-entry basis. For example:

```
\DeclareDatafieldSet{nobtitle}{
  \member[field=booktitle]
}
```

```
@INBOOK{s1,
  OPTIONS = {noinherit=nobtitle},
  TITLE   = {Subtitle},
  CROSSREF = {s2}
}

@BOOK{s2,
  TITLE = {Title}
}
```

Here, `s1` will not inherit the `TITLE` of `s2` as `BOOKTITLE` as this is blocked by the datafield set given as the value to the `noinherit` option. One important thing to note is that children will never inherit any dateparts of a given type if they already contain a datepart of that type. So, for example:

```
@INBOOK{b1,
  DATE      = {2004-03-03},
  ORIGDATE  = {2004-03},
  CROSSREF  = {b2}
}

@BOOK{b2,
  DATE      = {2004-03-03/2005-08-09},
  ORIGDATE  = {2004-03/2005-08},
  EVENTDATE = {2004-03/2005-08},
}
```

Here, `b1` will not inherit any of `endyear`, `endmonth`, `endday`, `origendyear` or `origendmonth` as this would make a mess of its own dates. It will, given the inheritance defaults, inherit all of the `event*` date parts.

## 4.6 Auxiliary Commands

The facilities in this section are intended for analyzing and saving bibliographic data rather than formatting and printing it.

### 4.6.1 Data Commands

The commands in this section grant low-level access to the unformatted bibliographic data. They are not intended for typesetting but rather for things like saving data to a temporary macro so that it may be used in a comparison later.

`\thefield{<field>}`

Expands to the unformatted *<field>*. If the *<field>* is undefined, this command expands to an empty string.

`\strfield{⟨field⟩}`

Similar to `\thefield`, except that the field is automatically sanitized such that its value may safely be used in the formation of a control sequence name.

`\csfield{⟨field⟩}`

Similar to `\thefield`, but prevents expansion.

`\usefield{⟨command⟩}{⟨field⟩}`

Executes `⟨command⟩` using the unformatted `⟨field⟩` as its argument.

`\thelist{⟨literal list⟩}`

Expands to the unformatted `⟨literal list⟩`. If the list is undefined, this command expands to an empty string. Note that this command will dump the `⟨literal list⟩` in the internal format used by this package. This format is not suitable for printing.

`\strlist{⟨literal list⟩}`

Similar to `\thelist`, except that the list internal representation is automatically sanitized such that its value may safely be used in the formation of a control sequence name.

`\thefirstlistitem{⟨literal list⟩}`

Expands to the unformatted first item in `⟨literal list⟩`. If the `⟨literal list⟩` is undefined, this command expands to an empty string.

`\strfirstlistitem{⟨literal list⟩}`

Similar to `\thefirstlistitem`, except that the item is automatically sanitized such that its value may safely be used in the formation of a control sequence name.

`\usefirstlistitem{⟨command⟩}{⟨literal list⟩}`

Executes `⟨command⟩` using the unformatted first item of `⟨literal list⟩` as its argument.

`\thename{⟨name list⟩}`

Expands to the unformatted `⟨name list⟩`. If the list is undefined, this command expands to an empty string. Note that this command will dump the `⟨name list⟩` in the internal format used by this package. This format is not suitable for printing.

`\strname{⟨name list⟩}`

Similar to `\thename`, except that the name internal representation is automatically sanitized such that its value may safely be used in the formation of a control sequence name.

`\savefield{⟨field⟩}{⟨macro⟩}`

`\savefield*{⟨field⟩}{⟨macro⟩}`

Copies an unformatted `⟨field⟩` to a `⟨macro⟩`. The regular variant of this command defines the `⟨macro⟩` globally, the starred one works locally.



```
\savelist{⟨literal list⟩}{⟨macro⟩}  
\savelist*{⟨literal list⟩}{⟨macro⟩}
```

Copies an unformatted *⟨literal list⟩* to a *⟨macro⟩*. The regular variant of this command defines the *⟨macro⟩* globally, the starred one works locally.

```
\savename{⟨name list⟩}{⟨macro⟩}  
\savename*{⟨name list⟩}{⟨macro⟩}
```

Copies an unformatted *⟨name list⟩* to a *⟨macro⟩*. The regular variant of this command defines the *⟨macro⟩* globally, the starred one works locally.

```
\savefieldcs{⟨field⟩}{⟨csname⟩}  
\savefieldcs*{⟨field⟩}{⟨csname⟩}
```

Similar to `\savefield`, but takes the control sequence name *⟨csname⟩* (without a leading backslash) as an argument, rather than a macro name.

```
\savelistcs{⟨literal list⟩}{⟨csname⟩}  
\savelistcs*{⟨literal list⟩}{⟨csname⟩}
```

Similar to `\savelist`, but takes the control sequence name *⟨csname⟩* (without a leading backslash) as an argument, rather than a macro name.

```
\savenamecs{⟨name list⟩}{⟨csname⟩}  
\savenamecs*{⟨name list⟩}{⟨csname⟩}
```

Similar to `\savename`, but takes the control sequence name *⟨csname⟩* (without a leading backslash) as an argument, rather than a macro name.

```
\restorefield{⟨field⟩}{⟨macro⟩}
```

Restores a *⟨field⟩* from a *⟨macro⟩* defined with `\savefield` before. The field is restored within a local scope.

```
\restorelist{⟨literal list⟩}{⟨macro⟩}
```

Restores a *⟨literal list⟩* from a *⟨macro⟩* defined with `\savelist` before. The list is restored within a local scope.

```
\restorename{⟨name list⟩}{⟨macro⟩}
```

Restores a *⟨name list⟩* from a *⟨macro⟩* defined with `\savename` before. The list is restored within a local scope.

```
\clearfield{⟨field⟩}
```

Clears the *⟨field⟩* within a local scope. A field cleared this way is treated as undefined by subsequent data commands.

```
\clearlist{⟨literal list⟩}
```

Clears the *⟨literal list⟩* within a local scope. A list cleared this way is treated as undefined by subsequent data commands.

`\clearname{⟨name list⟩}`

Clears the `⟨name list⟩` within a local scope. A list cleared this way is treated as undefined by subsequent data commands.

#### 4.6.2 Stand-alone Tests

The commands in this section are various kinds of stand-alone tests for use in bibliography and citation styles.

`\if<datatype>julian{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the date ‘datatype’date (date, urldate, eventdate etc.) Was converted to the Julian Calendar due to the settings of the `julianandgregorianstart` options.

`\ifdatejulian{⟨true⟩}{⟨false⟩}`

As `\if<datatype>julian` but for use in `\mkbibdate*` formatting commands (§ 4.10.2) inside which the appropriate `\if<datatype>julian` command is aliased to this command.

`\if<datatype>dateera{⟨era⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the date ‘datatype’date (date, urldate, eventdate etc.) has an era specification equal to `⟨era⟩` and `⟨false⟩` otherwise. The supported `⟨era⟩` strings which `biber` determines and passes in the `.bbl` are:

**bce** BCE/BC era

**ce** CE/AD era

This command is useful for determining whether to print the location strings in § 4.9.2.21.

`\ifdateera{⟨era⟩}{⟨true⟩}{⟨false⟩}`

As `\if<datatype>dateera` but for use in `\mkbibdate*` formatting commands (§ 4.10.2) inside which the appropriate `\if<datatype>dateera` command is aliased to this command.

`\if<datatype>datecirca{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the date ‘datatype’date (date, urldate, eventdate etc.) had a ‘circa’ marker in the source and `⟨false⟩` otherwise. See § 2.3.8. This command is useful for determining whether to print the location strings in § 4.9.2.21.

`\ifdatecirca{⟨true⟩}{⟨false⟩}`

As `\if<datatype>datecirca` but for use in `\mkbibdate*` formatting commands (§ 4.10.2) inside which the appropriate `\if<datatype>datecirca` command is aliased to this command.

`\if<datatype>dateuncertain{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the date ‘datatype’date (date, urldate, eventdate etc.) had an uncertainty marker in the source and `⟨false⟩` otherwise. See § 2.3.8. This command is useful for determining whether to print, for example, a question mark after a year.

`\ifdateuncertain{<true>}{<false>}`

As `\if<datatype>dateuncertain` but for use in `\mkbibdate*` formatting commands (§ 4.10.2) inside which the appropriate `\if<datatype>dateuncertain` command is aliased to this command.

`\ifenddateuncertain{<true>}{<false>}`

As `\ifend<datatype>dateuncertain` but for use in `\mkbibdate*` formatting commands (§ 4.10.2) inside which the appropriate `\ifend<datatype>dateuncertain` command is aliased to this command.

`\if<datatype>dateunknown{<true>}{<false>}`

Expands to `<true>` if the date ‘`datatype`’date (date, urldate, eventdate etc.) is marked as unknown (as opposed to open) in the source and `<false>` otherwise. See § 2.3.8.

`\ifdateunknown{<true>}{<false>}`

As `\if<datatype>dateunknown` but for use in `\mkbibdate*` formatting commands (§ 4.10.2) inside which the appropriate `\if<datatype>dateunknown` command is aliased to this command.

`\ifenddateunknown{<true>}{<false>}`

As `\ifend<datatype>dateunknown` but for use in `\mkbibdate*` formatting commands (§ 4.10.2) inside which the appropriate `\ifend<datatype>dateunknown` command is aliased to this command.

`\iflabeldateisdate{<true>}{<false>}`

Expands to `<true>` if `labeldate` is defined and was obtained from `date`, and to `<false>` otherwise.

`\ifdatehasyearonlyprecision{<datatype>}{<true>}{<false>}`

Expands to `<true>` if the `<datatype>`date is defined and would be shown with year precision `\print<datatype>date`, and to false otherwise.

`\ifdatehastime{<datatype>}{<true>}{<false>}`

Expands to `<true>` if the `<datatype>`date is defined, has a time component and `<datatype>dateusetime` is true, and to false otherwise.

`\ifdateshavedifferentprecision{<datatype1>}{<datatype2>}{<true>}{<false>}`

Expands to `<true>` if the two dates `<datatype1>` and `<datatype2>` would show in different precision when printed with `\print<datatype1>date` and `\print<datatype2>date` respectively, and to `<false>` otherwise.

`\ifdateyearsequal{<datatype1>}{<datatype2>}{<true>}{<false>}`

Expands to `<true>` if the two dates `<datatype1>` and `<datatype2>` have the same year and era. Since the sign of the date is saved in the era field, years should be compared using this command to avoid confusion when the two years have opposite signs

`\ifdatesequal{⟨datatype1⟩}{⟨datatype2⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the two dates `⟨datatype1⟩` and `⟨datatype2⟩` are the same. Here `⟨datatype2⟩` may be the ‘end’ bit of `⟨datatype1⟩` (or vice versa).

`\ifdaterangesequal{⟨datatype1⟩}{⟨datatype2⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the two date ranges—that is the start and the end date—`⟨datatype1⟩` and `⟨datatype2⟩` are the same.

`\ifcaselang[⟨language⟩]{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the optional `⟨language⟩` is one of those declared by `\DeclareCaseLangs` (see § 4.6.4) and to `⟨false⟩` otherwise. Without the optional argument, checks the current value of `\currentlang`.

`\ifsortingnamekeytemplatename{⟨string⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the `⟨string⟩` is equal to the current in scope sorting name key template name (see 4.5.6), and to `⟨false⟩` otherwise.

`\ifuniquenametemplatename{⟨string⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the `⟨string⟩` is equal to the current in scope uniqueness name key template name (see 4.5.6), and to `⟨false⟩` otherwise.

`\iflabelalphanametemplatename{⟨string⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the `⟨string⟩` is equal to the current in scope alphabetic label name template name (see 4.5.6), and to `⟨false⟩` otherwise.

`\iffieldundef{⟨field⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the `⟨field⟩` is undefined, and to `⟨false⟩` otherwise.

`\iflistundef{⟨literal list⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the `⟨literal list⟩` is undefined, and to `⟨false⟩` otherwise.

`\ifnameundef{⟨name list⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the `⟨name list⟩` is undefined, and to `⟨false⟩` otherwise.

`\iffieldsequal{⟨field 1⟩}{⟨field 2⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the values of `⟨field 1⟩` and `⟨field 2⟩` are equal, and to `⟨false⟩` otherwise.

`\iflistsequal{⟨literal list 1⟩}{⟨literal list 2⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the values of `⟨literal list 1⟩` and `⟨literal list 2⟩` are equal, and to `⟨false⟩` otherwise.

`\ifnamesequal{⟨name list 1⟩}{⟨name list 2⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the values of `⟨name list 1⟩` and `⟨name list 2⟩` are equal, and to `⟨false⟩` otherwise.

`\iffieldequals`{*<field>*}{*<macro>*}{*<true>*}{*<false>*}

Expands to *<true>* if the value of the *<field>* is equal to the definition of *<macro>*, and to *<false>* otherwise.

`\iflistequals`{*<literal list>*}{*<macro>*}{*<true>*}{*<false>*}

Expands to *<true>* if the value of the *<literal list>* is equal to the definition of *<macro>*, and to *<false>* otherwise.

`\ifnameequals`{*<name list>*}{*<macro>*}{*<true>*}{*<false>*}

Expands to *<true>* if the value of the *<name list>* is equal to the definition of *<macro>*, and to *<false>* otherwise.

`\iffieldequalcs`{*<field>*}{*<csname>*}{*<true>*}{*<false>*}

Similar to `\iffieldequals` but takes the control sequence name *<csname>* (without a leading backslash) as an argument, rather than a macro name.

`\iflistequalcs`{*<literal list>*}{*<csname>*}{*<true>*}{*<false>*}

Similar to `\iflistequals` but takes the control sequence name *<csname>* (without a leading backslash) as an argument, rather than a macro name.

`\ifnameequalcs`{*<name list>*}{*<csname>*}{*<true>*}{*<false>*}

Similar to `\ifnameequals` but takes the control sequence name *<csname>* (without a leading backslash) as an argument, rather than a macro name.

`\iffieldequalstr`{*<field>*}{*<string>*}{*<true>*}{*<false>*}

Executes *<true>* if the value of the *<field>* is equal to *<string>*, and *<false>* otherwise. This command is robust.

`\iffieldxref`{*<field>*}{*<true>*}{*<false>*}

If the `crossref/xref` field of an entry is defined, this command checks if the *<field>* is related to the cross-referenced parent entry. It executes *<true>* if the *<field>* of the child entry is equal to the corresponding *<field>* of the parent entry, and *<false>* otherwise. If the `crossref/xref` field is undefined, it always executes *<false>*. This command is robust. See the description of the `crossref` and `xref` fields in § 2.2.3 as well as § 2.4.1 for further information concerning cross-referencing.

`\iflistxref`{*<literal list>*}{*<true>*}{*<false>*}

Similar to `\iffieldxref` but checks if a *<literal list>* is related to the cross-referenced parent entry. See the description of the `crossref` and `xref` fields in § 2.2.3 as well as § 2.4.1 for further information concerning cross-referencing.

`\ifnamexref`{*<name list>*}{*<true>*}{*<false>*}

Similar to `\iffieldxref` but checks if a *<name list>* is related to the cross-referenced parent entry. See the description of the `crossref` and `xref` fields in § 2.2.3 as well as § 2.4.1 for further information concerning cross-referencing.

`\ifcurrentfield{⟨field⟩}{⟨true⟩}{⟨false⟩}`

Executes *⟨true⟩* if the current field is *⟨field⟩*, and *⟨false⟩* otherwise. This command is robust. It is intended for use in field formatting directives and always executes *⟨false⟩* when used in any other context.

`\ifcurrentlist{⟨literal list⟩}{⟨true⟩}{⟨false⟩}`

Executes *⟨true⟩* if the current list is *⟨literal list⟩*, and *⟨false⟩* otherwise. This command is robust. It is intended for use in list formatting directives and always executes *⟨false⟩* when used in any other context.

`\ifcurrentname{⟨name list⟩}{⟨true⟩}{⟨false⟩}`

Executes *⟨true⟩* if the current list is *⟨name list⟩*, and *⟨false⟩* otherwise. This command is robust. It is intended for use in list formatting directives and always executes *⟨false⟩* when used in any other context.

`\ifuseprefix{⟨true⟩}{⟨false⟩}`

Expands to *⟨true⟩* if the `useprefix` option is enabled (either globally or for the current entry), and *⟨false⟩* otherwise. See § 3.1.3 for details on this option.

`\ifuseauthor{⟨true⟩}{⟨false⟩}`

This is just a particular case of the `\ifuse<name>` macro below but is mentioned here as `author` is part of the default data model. Expands to *⟨true⟩* if the `useauthor` option is enabled (either globally or for the current entry), and *⟨false⟩* otherwise. See § 3.1.3 for details on this option.

`\ifuseeditor{⟨true⟩}{⟨false⟩}`

This is just a particular case of the `\ifuse<name>` macro below but is mentioned here as `editor` is part of the default data model. Expands to *⟨true⟩* if the `useeditor` option is enabled (either globally or for the current entry), and *⟨false⟩* otherwise. See § 3.1.3 for details on this option.

`\ifusetranslator{⟨true⟩}{⟨false⟩}`

This is just a particular case of the `\ifuse<name>` macro below but is mentioned here as `translator` is part of the default data model. Expands to *⟨true⟩* if the `usetranslator` option is enabled (either globally or for the current entry), and *⟨false⟩* otherwise. See § 3.1.3 for details on this option.

`\ifuse<name>{⟨true⟩}{⟨false⟩}`

Expands to *⟨true⟩* if the `use<name>` option is enabled (either globally or for the current entry), and *⟨false⟩* otherwise. See § 3.1.3 for details on this option.

`\ifcrossrefsource{⟨true⟩}{⟨false⟩}`

Expands to *⟨true⟩* if the entry was included in the `.bb1` due to being referenced more than `mincrossrefs` times and false otherwise. See § 3.1.2.1. Also expands to false if the entry was directly cited.

`\ifxrefsource{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the entry was included in the `.bbl` due to being referenced more than `minxrefs` times and `false` otherwise. See § 3.1.2.1. Also expands to `false` if the entry was directly cited.

`\ifsingletitle{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if there is only one work by the `labelname` name in the bibliography, and to `⟨false⟩` otherwise. If `labelname` is not set for an entry, this will always expand to `⟨false⟩`. Note that this feature needs to be enabled explicitly with the package option `singletitle`.

`\ifnocite{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the entry was *only* included in the `.bbl` via `\nocite`. That is, returns `⟨false⟩` if an entry was both `\nocite`'d and `\cite`'d.

`\ifuniquetitle{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if there is only one work with the title `labeltitle` and to `⟨false⟩` otherwise. If `labeltitle` is not set for an entry, this will always expand to `⟨false⟩`. Note that this feature needs to be enabled explicitly with the package option `uniquetitle`.

`\ifuniquebaretitle{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if `labelname` is empty and there is only one work with the title `labeltitle` and to `⟨false⟩` otherwise. If `labeltitle` is not set for an entry, this will always expand to `⟨false⟩`. Note that this feature needs to be enabled explicitly with the package option `uniquebaretitle`.

`\ifuniquework{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if there is only one work by the `labelname` name with the `labeltitle` title in the bibliography, and to `⟨false⟩` otherwise. If neither `labelname` nor `labeltitle` are set for an entry, this will always expand to `⟨false⟩`. Note that this feature needs to be enabled explicitly with the package option `uniquework`. If both `singletitle` and `uniquetitle` are `false` for the same entry, this could be because another entry has the same `labelname` and yet another, different, entry has the same `labeltitle`. `uniquework` would let you know that there is another entry that has *both* the same `labelname` *and* the same `labeltitle`. This could be helpful in cases where multiple people maintain bibliography datasources and there is a risk of adding the same work with different keys without other parties realising this. This test could help to find such duplicates.

`\ifuniqueprimaryauthor{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the primary (first) author name of `labelname` is unique in the bibliography list and to `⟨false⟩` otherwise. This effectively answers the question 'is there more than one author with the same base name'. The base name parts are defined by `\DeclareUniquenameTemplate` see § 4.11.4. This is required by some styles (e.g. APA) which mandates primary author disambiguation only and only if there are (different) primary authors with the same family name. If `labelname` is not set for an entry, this will always expand to `⟨false⟩`. Note that this feature needs to be enabled explicitly with the package option `uniqueprimaryauthor`.



`\ifandothers{⟨list⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the `⟨list⟩` is defined and has been truncated in the `bib` file with the keyword ‘and others’, and to `⟨false⟩` otherwise. The `⟨list⟩` may be a literal list or a name list.

`\ifmorenames{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the current name list has been or will be truncated, and to `⟨false⟩` otherwise. This command is intended for use in formatting directives for name lists. It will always expand to `⟨false⟩` when used elsewhere. This command performs the equivalent of an `\ifandothers` test for the current list. If this test is negative, it also checks if the `listtotal` counter is larger than `liststop`. This command may be used in a formatting directive to decide if a note such as “and others” or “et al.” is to be printed at the end of the list. Note that you still need to check whether you are in the middle or at the end of the list, i.e., whether `listcount` is smaller than or equal to `liststop`, see § 4.4.1 for details.

`\ifmoreitems{⟨true⟩}{⟨false⟩}`

This command is similar to `\ifmorenames` but checks the current literal list. It is intended for use in formatting directives for literal lists. It will always expand to `⟨false⟩` when used elsewhere.

`\if<namepart>inits{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` or `⟨false⟩`, depending on the state of the `<namepart>inits` package option (see § 3.1.2.3). This command is intended for use in formatting directives for name lists.

`\ifterseinits{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` or `⟨false⟩`, depending on the state of the `terseinits` package option (see § 3.1.2.3). This command is intended for use in formatting directives for name lists.

`\ifentrytype{⟨type⟩}{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the entry type of the entry currently being processed is `⟨type⟩`, and `⟨false⟩` otherwise.

`\ifkeyword{⟨keyword⟩}{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the `⟨keyword⟩` is found in the `keywords` field of the entry currently being processed, and `⟨false⟩` otherwise.

`\ifentrykeyword{⟨entrykey⟩}{⟨keyword⟩}{⟨true⟩}{⟨false⟩}`

A variant of `\ifkeyword` which takes an entry key as its first argument. This is useful for testing an entry other than the one currently processed. A user-facing version of this command is available for use in documents see § 3.11.

`\ifcategory{⟨category⟩}{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the entry currently being processed has been assigned to a `⟨category⟩` with `\addtcategory`, and `⟨false⟩` otherwise.



`\ifentrycategory{⟨entrykey⟩}{⟨category⟩}{⟨true⟩}{⟨false⟩}`

A variant of `\ifcategory` which takes an entry key as its first argument. This is useful for testing an entry other than the one currently processed. A user-facing version of this command is available for use in documents see § 3.11

`\ifciteseen{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the entry currently being processed has been cited before, and `⟨false⟩` otherwise. This command is robust and intended for use in citation styles. If there are any `refsection` environments in the document, the citation tracking is local to these environments. Note that the citation tracker needs to be enabled explicitly with the package option `citetracker`. The behavior of this test depends on the mode the citation tracker is operating in, see § 3.1.2.3 for details. If the citation tracker is disabled, the test always yields `⟨false⟩`. Also see the `\citetrackertrue` and `\citetrackerfalse` switches in § 4.6.4.

`\ifentryseen{⟨entrykey⟩}{⟨true⟩}{⟨false⟩}`

A variant of `\ifciteseen` which takes an entry key as its first argument. Since the `⟨entrykey⟩` is expanded prior to performing the test, it is possible to test for entry keys in a field such as `xref`:

```
\ifentryseen{\thefield{xref}}{true}{false}
```

Apart from the additional argument, `\ifentryseen` behaves like `\ifciteseen`. A user-facing version of this command is available for use in documents see § 3.11.

`\ifentryinbib{⟨entrykey⟩}{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the entry `⟨entrykey⟩` appears in the current bibliography, and `⟨false⟩` otherwise. A user-facing version of this command is available for use in documents see § 3.11.

`\iffirstcitekey{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if the entry currently being processed is the first one in the citation list, and `⟨false⟩` otherwise. This command relies on the `citecount`, `citetotal`, `multicitecount` and `multicitetotal` counters (§ 4.10.5) and thus is intended for use only in the `⟨loopcode⟩` of a citation command defined with `\DeclareCiteCommand`.

`\iflastcitekey{⟨true⟩}{⟨false⟩}`

Similar `\iffirstcitekey`, but executes `⟨true⟩` if the entry currently being processed is the last one in the citation list, and `⟨false⟩` otherwise.

`\ifciteibid{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the entry currently being processed is the same as the last one, and to `⟨false⟩` otherwise. This command is intended for use in citation styles. If there are any `refsection` environments in the document, the tracking is local to these environments. Note that the ‘ibidem’ tracker needs to be enabled explicitly with the package option `ibidtracker`. The behavior of this test depends on the mode the tracker is operating in, see § 3.1.2.3 for details. If the tracker is disabled, the test always yields `⟨false⟩`. Also see the `\citetrackertrue` and `\citetrackerfalse` switches in § 4.6.4.

`\ifcitemidem{⟨true⟩}{⟨false⟩}`

Expands to  $\langle true \rangle$  if the primary name (i. e., the author or editor) in the entry currently being processed is the same as the last one, and to  $\langle false \rangle$  otherwise. This command is intended for use in citation styles. If there are any `refsection` environments in the document, the tracking is local to these environments. Note that the ‘idem’ tracker needs to be enabled explicitly with the package option `idemtracker`. The behavior of this test depends on the mode the tracker is operating in, see § 3.1.2.3 for details. If the tracker is disabled, the test always yields  $\langle false \rangle$ . Also see `\citetrackertrue` and `\citetrackerfalse` in § 4.6.4.

`\ifopcit{⟨true⟩}{⟨false⟩}`

This command is similar to `\ifcitembid` except that it expands to  $\langle true \rangle$  if the entry currently being processed is the same as the last one *by this author or editor*. Note that the ‘opcit’ tracker needs to be enabled explicitly with the package option `opcittracker`. The behavior of this test depends on the mode the tracker is operating in, see § 3.1.2.3 for details. If the tracker is disabled, the test always yields  $\langle false \rangle$ . Also see the `\citetrackertrue` and `\citetrackerfalse` switches in § 4.6.4.

`\ifloccit{⟨true⟩}{⟨false⟩}`

This command is similar to `\ifopcit` except that it also compares the  $\langle postnote \rangle$  arguments and expands to  $\langle true \rangle$  only if they match and are numerical (in the sense of `\ifnumerals` from § 4.6.2), i. e., `\ifloccit` will yield `true` if the citation refers to the same page cited before. Note that the ‘loccit’ tracker needs to be enabled explicitly with the package option `loccittracker`. The behavior of this test depends on the mode the tracker is operating in, see § 3.1.2.3 for details. If the tracker is disabled, the test always yields  $\langle false \rangle$ . Also see the `\citetrackertrue` and `\citetrackerfalse` switches in § 4.6.4.

`\iffirstonpage{⟨true⟩}{⟨false⟩}`

The behavior of this command is responsive to the package option `pagetracker`. If the option is set to `page`, it expands to  $\langle true \rangle$  if the current item is the first one on the page, and to  $\langle false \rangle$  otherwise. If the option is set to `spread`, it expands to  $\langle true \rangle$  if the current item is the first one on the double-page spread, and to  $\langle false \rangle$  otherwise. If the page tracker is disabled, this test always yields  $\langle false \rangle$ . Depending on the context, the ‘item’ may be a citation or an entry in the bibliography or a bibliography list. Note that this test distinguishes between body text and footnotes. For example, if used in the first footnote on a page, it will expand to  $\langle true \rangle$  even if there is a citation in the body text prior to the footnote. Also see the `\pagetrackertrue` and `\pagetrackerfalse` switches in § 4.6.4.

`\ifsamepage{⟨instance 1⟩}{⟨instance 2⟩}{⟨true⟩}{⟨false⟩}`

This command expands to  $\langle true \rangle$  if two instances of a reference are located on the same page or double-page spread, and to  $\langle false \rangle$  otherwise. An instance of a reference may be a citation or an entry in the bibliography or a bibliography list. These instances are identified by the value of the `instcount` counter, see § 4.10.5. The behavior of this command is responsive to the package option `pagetracker`. If this option is set to `spread`, `\ifsamepage` is in fact an ‘if same spread’ test. If the page tracker is disabled, this test always yields  $\langle false \rangle$ . The arguments  $\langle instance 1 \rangle$  and  $\langle instance 2 \rangle$  are treated as integer expressions in the sense of e-TeX’s `\numexpr`.

This implies that it is possible to make calculations within these arguments, for example:

```
\ifsamepage{\value{instcount}}{\value{instcount}-1}{  
  ↪ true}{false}
```

Note that `\value` is not prefixed by `\the` and that the subtraction is included in the second argument in the above example. If  $\langle instance\ 1 \rangle$  or  $\langle instance\ 2 \rangle$  is an invalid number (for example, a negative one), the test yields  $\langle false \rangle$ . Also note that this test does not distinguish between body text and footnotes. Also see the `\pagetrackertrue` and `\pagetrackerfalse` switches in § 4.6.4.

`\ifinteger` $\{\langle string \rangle\}\{\langle true \rangle\}\{\langle false \rangle\}$

Executes  $\langle true \rangle$  if the  $\langle string \rangle$  is a positive integer, and  $\langle false \rangle$  otherwise. This command is robust.

`\hascomputableequivalent` $\{\langle string \rangle\}\{\langle true \rangle\}\{\langle false \rangle\}$

Executes  $\langle true \rangle$  if the  $\langle string \rangle$  can be transformed into a LaTeX-computable integer consisting only of US-ASCII characters via `\getcomputableequivalent` and  $\langle false \rangle$  otherwise. The mapping from non-US-ASCII to US-ASCII numerals will usually be given in the `lbnx` file.

`\ifiscomputable` $\{\langle string \rangle\}\{\langle true \rangle\}\{\langle false \rangle\}$

Returns  $\langle true \rangle$  if `\ifinteger` or `\hascomputableequivalent` returns  $\langle true \rangle$  on  $\langle string \rangle$  and  $\langle false \rangle$  otherwise.

`\getcomputableequivalent` $\{\langle string \rangle\}\{\langle macro \rangle\}$

Saves the US-ASCII representation of the number given as  $\langle string \rangle$  in  $\langle macro \rangle$ .

`\ifnumeral` $\{\langle string \rangle\}\{\langle true \rangle\}\{\langle false \rangle\}$

Executes  $\langle true \rangle$  if the  $\langle string \rangle$  is an Arabic or Roman numeral, and  $\langle false \rangle$  otherwise. This command is robust. See also `\DeclareNumChars` and `\NumCheckSetup` in § 4.6.4.

`\ifnumerals` $\{\langle string \rangle\}\{\langle true \rangle\}\{\langle false \rangle\}$

Executes  $\langle true \rangle$  if the  $\langle string \rangle$  is a range or a list of Arabic or Roman numerals, and  $\langle false \rangle$  otherwise. This command is robust. In contrast to `\ifnumeral`, it will also execute  $\langle true \rangle$  with arguments like “52–58”, “14/15”, “1, 3, 5”, and so on. See also `\DeclareNumChars`, `\DeclareRangeChars`, `\DeclareRangeCommands`, `\NumCheckSetup`, and `\NumsCheckSetup` in § 4.6.4.

`\ifpages` $\{\langle string \rangle\}\{\langle true \rangle\}\{\langle false \rangle\}$

Similar to `\ifnumerals`, but also considers `\DeclarePageCommands` and `\PagesCheckSetup` from § 4.6.4.

`\iffieldint` $\{\langle field \rangle\}\{\langle true \rangle\}\{\langle false \rangle\}$

Similar to `\ifinteger`, but uses the value of a  $\langle field \rangle$  rather than a literal string in the test. If the  $\langle field \rangle$  is undefined, it executes  $\langle false \rangle$ .

`\fieldhascomptableequivalent{⟨field⟩}{⟨true⟩}{⟨false⟩}`

Similar to `\hascomptableequivalent`, but uses the value of a `⟨field⟩` rather than a literal string in the test. If the `⟨field⟩` is undefined, it executes `⟨false⟩`.

`\iffielddiscomptable{⟨field⟩}{⟨true⟩}{⟨false⟩}`

Similar to `\ifiscomptable`, but uses the value of a `⟨field⟩` rather than a literal string in the test. If the `⟨field⟩` is undefined, it executes `⟨false⟩`.

`\iffieldnum{⟨field⟩}{⟨true⟩}{⟨false⟩}`

Similar to `\ifnumeral`, but uses the value of a `⟨field⟩` rather than a literal string in the test. If the `⟨field⟩` is undefined, it executes `⟨false⟩`.

`\iffieldnums{⟨field⟩}{⟨true⟩}{⟨false⟩}`

Similar to `\ifnumerals`, but uses the value of a `⟨field⟩` rather than a literal string in the test. If the `⟨field⟩` is undefined, it executes `⟨false⟩`.

`\iffieldpages{⟨field⟩}{⟨true⟩}{⟨false⟩}`

Similar to `\ifpages`, but uses the value of a `⟨field⟩` rather than a literal string in the test. If the `⟨field⟩` is undefined, it executes `⟨false⟩`.

`\ifbibstring{⟨string⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if the `⟨string⟩` is a known localisation key, and to `⟨false⟩` otherwise. The localisation keys defined by default are listed in § 4.9.2. New ones may be defined with `\NewBibliographyString`.

`\ifbibxstring{⟨string⟩}{⟨true⟩}{⟨false⟩}`

Similar to `\ifbibstring`, but the `⟨string⟩` is expanded.

`\iffieldbibstring{⟨field⟩}{⟨true⟩}{⟨false⟩}`

Similar to `\ifbibstring`, but uses the value of a `⟨field⟩` rather than a literal string in the test. If the `⟨field⟩` is undefined, it expands to `⟨false⟩`.

`\iffieldplusstringbibstring{⟨field⟩}{⟨string⟩}{⟨true⟩}{⟨false⟩}`

Similar to `\iffieldbibstring`, but appends `⟨string⟩` to the value of `⟨field⟩` and checks if the resulting string is a known localisation key. Expands to `⟨false⟩` if `⟨field⟩` is undefined.

`\ifdriver{⟨entrytype⟩}{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` if a driver for the `⟨entrytype⟩` is available, and to `⟨false⟩` otherwise.

`\ifcapital{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if `biblatex`'s punctuation tracker would capitalize a localisation string at the current location, and `⟨false⟩` otherwise. This command is robust. It may be useful for conditional capitalization of certain parts of a name in a formatting directive.

`\ifcitation{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` when located in a citation, and to `⟨false⟩` otherwise. Note that this command is responsive to the outermost context in which it is used. For example, if a citation command defined with `\DeclareCiteCommand` executes a driver defined with `\DeclareBibliographyDriver`, any `\ifcitation` tests in the driver code will yield `⟨true⟩`. See § 4.11.6 for a practical example.

`\ifvolcite{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` when located in `\volcite` or a related citation command (§ 3.9.6), and to `⟨false⟩` otherwise.

`\ifbibliography{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` when located in a bibliography, and to `⟨false⟩` otherwise. Note that this command is responsive to the outermost context in which it is used. For example, if a driver defined with `\DeclareBibliographyDriver` executes a citation command defined with `\DeclareCiteCommand`, any `\ifbibliography` tests in the citation code will yield `⟨true⟩`. See § 4.11.6 for a practical example.

`\ifnatbibmode{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` or `⟨false⟩` depending on the `natbib` option from § 3.1.1.

`\ifciteindex{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` or `⟨false⟩` depending on the `indexing` option from § 3.1.2.1.

`\ifbibindex{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` or `⟨false⟩` depending on the `indexing` option from § 3.1.2.1.

`\iffootnote{⟨true⟩}{⟨false⟩}`

Expands to `⟨true⟩` when located in a footnote, and to `⟨false⟩` otherwise. Note that footnotes in `minipage` environments are considered to be part of the body text. This command will only expand to `⟨true⟩` in footnotes at the bottom of the page and in endnotes as provided by the `endnotes` package.

**`citecounter`** This counter indicates how many times the entry currently being processed is cited in the current reference section. Note that this feature needs to be enabled explicitly with the package option `citecounter`. If the option is set to `context`, citations in the body text and in footnotes are counted separately. In this case, `citecounter` will hold the value of the context it is used in.

**`maxcitecounter`** This counter holds the maximum value of `citecounter` across all entries in the current reference section. Like `citecounter` it is only available if the `citecounter` option is enabled and tracks footnotes and text separately if the option is set to `context`.

**uniquename** This counter refers to the `labelname` list. It is set on a per-name basis. Its value is 0 if the base parts of the name (by default just the ‘family’ part of the name) are unique, 1 if adding the other non-base parts of the name (as specified in the `uniquename` template defined by `\DeclareUniquenameTemplate`) as initials will make it unique, and 2 if adding the full form of the non-base parts of the name are required to disambiguate the name. This information is required by author-year and author-title citation schemes which add additional parts of the name when citing different authors with the same family name. For example, (given the default `\DeclareUniquenameTemplate` definition) if there is one ‘John Doe’ and one ‘Edward Doe’ in the list of references, this counter will be set to 1. If there is one ‘John Doe’ and one ‘Jane Doe’, the value of the counter will be 2. If the option is set to `init/allinit/mininit`, the counter will be limited to 1. This is useful for citations styles which use initials to disambiguate names but never print the full name in citations. If adding the initials is not sufficient to disambiguate the name, `uniquename` will also be set to 0 for that name. This feature needs to be enabled explicitly with the package option `uniquename`. Note that the `uniquename` counter is local to `\printnames` and that it is only set for the `labelname` list and for the name list that `labelname` has been derived from (typically author or editor). Its value is zero in any other context, i.e., it must be evaluated in the name formatting directives handling name lists. See § 4.11.4 for further details and practical examples. This counter can be overridden on a per-namepart basis by consulting the `\namepart ‘namepart’ un` macros during name formatting, see § 4.2.3.

**uniquelist** This counter refers to the `labelname` list. It is set on a per-field basis. Its value indicates the number of names required to disambiguate the name list if automatic `maxnames/minnames` truncation would lead to ambiguous citations. For example, if there is one work by ‘Doe/Smith/Johnson’ and another one by ‘Doe/Edwards/Williams’, setting `maxnames=1` would lead to ‘Doe et al.’ in both cases. In this case, `uniquelist` would be set to 2 on the `labelname` lists of both entries because at least the first two names are required to disambiguate them. Note that the `uniquelist` counter is local to `\printnames` and that it is only set for the `labelname` list and to the name list `labelname` has been derived from (typically author or editor). Its value is zero in any other context. If available, the `uniquelist` value will be used automatically by `\printnames` when processing the name list, i.e., it will automatically override `maxnames/minnames`. This feature needs to be enabled explicitly with the package option `uniquelist`. See § 4.11.4 for further details and practical examples.

**parenlevel** The current nesting level of parentheses and/or brackets. This information is only available if the `parenttracker` from § 3.1.2.3 is enabled.

### 4.6.3 Tests with `\ifboolexpr` and `\ifthenelse`

The tests introduced in § 4.6.2 may also be used with the `\ifboolexpr` command provided by the `etoolbox` package and the `\ifthenelse` command provided by the `ifthen` package. The syntax of the tests is slightly different in this case: the `<true>` and `<false>` arguments are omitted from the test itself and passed to the `\ifboolexpr` or `\ifthenelse` command instead. Note that the use of these commands implies some processing overhead. If you do not need any boolean operators, it is more efficient to use the stand-alone tests from § 4.6.2.

`\ifboolexpr{<expression>}{<true>}{<false>}`

etoolbox command which allows for complex tests with boolean operators and grouping:

```
\ifboolexpr{ (
    test {\ifnameundef{editor}}
    and
    not test {\iflistundef{location}}
)
or test {\iffieldundef{year}}
}
{...}
{...}
```

`\ifthenelse{<tests>}{<true>}{<false>}`

ifthen command which allows for complex tests with boolean operators and grouping:

```
\ifthenelse{ \ (
    \ifnameundef{editor}
    \and
    \not \iflistundef{location}
)
\or \iffieldundef{year}
}
{...}
{...}
```

The additional tests provided by biblatex are only available when `\ifboolexpr` or `\ifthenelse` are used in citation commands and in the bibliography.

#### 4.6.4 Miscellaneous Commands

The section introduced miscellaneous commands and little helpers for use in bibliography and citation styles.

`\newbibmacro{<name>} [ <arguments> ] [ <optional> ] { <definition> }`

`\newbibmacro*{<name>} [ <arguments> ] [ <optional> ] { <definition> }`

Defines a macro to be executed via `\usebibmacro` later. The syntax of this command is very similar to `\newcommand` except that `<name>` may contain characters such as numbers and punctuation marks and does not start with a backslash. The optional argument `<arguments>` is an integer specifying the number of arguments taken by the macro. If `<optional>` is given, it specifies a default value for the first argument of the macro, which automatically becomes an optional argument. In contrast to `\newcommand`, `\newbibmacro` issues a warning message if the macro is already defined, and automatically falls back to `\renewbibmacro`. As with `\newcommand`, the regular variant of this command uses the `\long` prefix in the definition while the starred one does not. If a macro has been declared to be long, it may take arguments containing `\par` tokens. `\newbibmacro` and



`\renewbibmacro` are provided for convenience. Style authors are free to use `\newcommand` or `\def` instead. However, note that most shared definitions found in `biblatex.def` are defined with `\newbibmacro`, hence they must be used and modified accordingly.

```
\renewbibmacro{⟨name⟩}[⟨arguments⟩][⟨optional⟩]{⟨definition⟩}  
\renewbibmacro*{⟨name⟩}[⟨arguments⟩][⟨optional⟩]{⟨definition⟩}
```

Similar to `\newbibmacro` but redefines `⟨name⟩`. In contrast to `\renewcommand`, `\renewbibmacro` issues a warning message if the macro is undefined, and automatically falls back to `\newbibmacro`.

```
\providebibmacro{⟨name⟩}[⟨arguments⟩][⟨optional⟩]{⟨definition⟩}  
\providebibmacro*{⟨name⟩}[⟨arguments⟩][⟨optional⟩]{⟨definition⟩}
```

Similar to `\newbibmacro` but only defines `⟨name⟩` if it is undefined. This command is similar in concept to `\providecommand`.

```
\letbibmacro{⟨alias⟩}{⟨name⟩}  
\letbibmacro*{⟨alias⟩}{⟨name⟩}
```

This command defines the macro `⟨alias⟩` to be an alias of the macro `⟨name⟩`. The definition is performed by `\csletcs`. An error is issued if `⟨name⟩` is undefined. The regular variant of this command sanitizes `⟨name⟩` while the starred variant does not.

```
\usebibmacro{⟨name⟩}  
\usebibmacro*{⟨name⟩}
```

This command executes the macro `⟨name⟩`, as defined with `\newbibmacro`. If the macro takes any arguments, they are simply appended after `⟨name⟩`. The regular variant of this command sanitizes `⟨name⟩` while the starred variant does not.

```
\savecommand{⟨command⟩}  
\restorecommand{⟨command⟩}
```

These commands save and restore any `⟨command⟩`, which must be a command name starting with a backslash. Both commands work within a local scope. They are mainly provided for use in localisation files.

```
\savebibmacro{⟨name⟩}  
\restorebibmacro{⟨name⟩}
```

These commands save and restore the macro `⟨name⟩`, where `⟨name⟩` is the identifier of a macro defined with `\newbibmacro`. Both commands work within a local scope. They are mainly provided for use in localisation files.

```
\savefieldformat[⟨entry type⟩]{⟨format⟩}  
\restorefieldformat[⟨entry type⟩]{⟨format⟩}
```

These commands save and restore the formatting directive `⟨format⟩`, as defined with `\DeclareFieldFormat`. Both commands work within a local scope. They are mainly provided for use in localisation files.

```
\savelistformat[⟨entry type⟩]{⟨format⟩}
\restorelistformat[⟨entry type⟩]{⟨format⟩}
```

These commands save and restore the formatting directive *⟨format⟩*, as defined with `\DeclareListFormat`. Both commands work within a local scope. They are mainly provided for use in localisation files.

```
\savenameformat[⟨entry type⟩]{⟨format⟩}
\restorenameformat[⟨entry type⟩]{⟨format⟩}
```

These commands save and restore the formatting directive *⟨format⟩*, as defined with `\DeclareNameFormat`. Both commands work within a local scope. They are mainly provided for use in localisation files.

```
\savelistwrapperformat[⟨entry type⟩]{⟨format⟩}
\restorelistwrapperformat[⟨entry type⟩]{⟨format⟩}
```

These commands save and restore the formatting directive *⟨format⟩*, as defined with `\DeclareListWrapperFormat`. Both commands work within a local scope. They are mainly provided for use in localisation files.

```
\savenamewrapperformat[⟨entry type⟩]{⟨format⟩}
\restorenamewrapperformat[⟨entry type⟩]{⟨format⟩}
```

These commands save and restore the formatting directive *⟨format⟩*, as defined with `\DeclareNameWrapperFormat`. Both commands work within a local scope. They are mainly provided for use in localisation files.

```
\ifbibmacroundef{⟨name⟩}{⟨true⟩}{⟨false⟩}
```

Expands to *⟨true⟩* if the bibliography macro *⟨name⟩* is undefined, and to *⟨false⟩* otherwise.

This bibliography macro can be used in the following idiom to make a bibliography macro more type specific.

```
\letbibmacro{cite:∗}{cite}
\newbibmacro{cite:patent}{%
  \printtext{\color{red}%
    Some citation format specific to patents}}

\renewbibmacro∗{cite}{%
  \ifbibmacroundef{cite:\thefield{entrytype}}
  {\usebibmacro{cite:∗}}
  {\usebibmacro∗{cite:\thefield{entrytype}}}%
}
```

```

\iffielddformatundef[⟨entry type⟩]{⟨name⟩}{⟨true⟩}{⟨false⟩}
\iflistformatundef[⟨entry type⟩]{⟨name⟩}{⟨true⟩}{⟨false⟩}
\ifnameformatundef[⟨entry type⟩]{⟨name⟩}{⟨true⟩}{⟨false⟩}
\iflistwrapperformatundef[⟨entry type⟩]{⟨name⟩}{⟨true⟩}{⟨false⟩}
\ifnamewrapperformatundef[⟨entry type⟩]{⟨name⟩}{⟨true⟩}{⟨false⟩}

```

Expands to `⟨true⟩` if the formatting directive `⟨format⟩` is undefined, and to `⟨false⟩` otherwise.

```
\usedriver{⟨code⟩}{⟨entrytype⟩}
```

Executes the bibliography driver for an `⟨entrytype⟩`. Calling this command in the `⟨loopcode⟩` of a citation command defined with `\DeclareCiteCommand` is a simple way to print full citations similar to a bibliography entry. Commands such as `\newblock`, which are not applicable in a citation, are disabled automatically by default. The global initialization can be changed with `\AtUsedriver`, see § 4.10.6. Additional local initialization commands may be passed as the `⟨code⟩` argument. This argument is executed inside the group in which `\usedriver` runs the respective driver. Note that it is mandatory in terms of the syntax but may be left empty. Also note that this command will automatically switch languages if the `autolang` package option is enabled.

```
\bibhypertarget{⟨name⟩}{⟨text⟩}
```

A wrapper for `hyperref`'s `\hypertarget` command. The `⟨name⟩` is the name of the anchor, the `⟨text⟩` is arbitrary printable text or code which serves as an anchor. If there are any `refsection` environments in the document, the `⟨name⟩` is local to the current environment. If the `hyperref` package option is disabled or the `hyperref` package has not been loaded, this command will simply pass on its `⟨text⟩` argument. See also the formatting directive `bibhypertarget` in § 4.10.4.

```
\bibhyperlink{⟨name⟩}{⟨text⟩}
```

A wrapper for `hyperref`'s `\hyperlink` command. The `⟨name⟩` is the name of an anchor defined with `\bibhypertarget`, the `⟨text⟩` is arbitrary printable text or code to be transformed into a link. If there are any `refsection` environments in the document, the `⟨name⟩` is local to the current environment. If the `hyperref` package option is disabled or the `hyperref` package has not been loaded, this command will simply pass on its `⟨text⟩` argument. See also the formatting directive `bibhyperlink` in § 4.10.4.

```
\bibhyperref[⟨entrykey⟩]{⟨text⟩}
```

Transforms `⟨text⟩` into an internal link pointing to `⟨entrykey⟩` in the bibliography. If `⟨entrykey⟩` is omitted, this command uses the key of the entry currently being processed. This command is employed to transform citations into clickable links pointing to the corresponding entry in the bibliography. The link target is marked automatically by `biblatex`. If there are multiple bibliographies in a document, the target will be the first occurrence of `⟨entrykey⟩` in one of the bibliographies. If there are `refsection` environments, the links are local to the environment. See also the formatting directive `bibhyperref` in § 4.10.4.

```
\ifhyperref{⟨true⟩}{⟨false⟩}
```

Expands to `⟨true⟩` if the `hyperref` package option is enabled (which implies that the `hyperref` package has been loaded), and to `⟨false⟩` otherwise.

`\docsvfield{⟨field⟩}`

Similar to the `\docsvlist` command from the `etoolbox` package, except that it takes a field name as its argument. The value of this field is parsed as a comma-separated list. If the `⟨field⟩` is undefined, this command expands to an empty string.

`\forcsvfield{⟨handler⟩}{⟨field⟩}`

Similar to the `\forcsvlist` command from the `etoolbox` package, except that it takes a field name as its argument. The value of this field is parsed as a comma-separated list. If the `⟨field⟩` is undefined, this command expands to an empty string.

`\MakeCapital{⟨text⟩}`

Similar to `\MakeUppercase` but only converts the first printable character in `⟨text⟩` to uppercase. Note that the restrictions that apply to `\MakeUppercase` also apply to this command. Namely, all commands in `⟨text⟩` must either be robust or prefixed with `\protect` since the `⟨text⟩` is expanded during capitalization. Apart from US-ASCII characters and the standard accent commands, this command also handles the active characters of the `inputenc` package as well as the shorthands of the `babel` package. If the `⟨text⟩` starts with a control sequence, nothing is capitalized. This command is robust.

`\MakeSentenceCase{⟨text⟩}`

`\MakeSentenceCase*{⟨text⟩}`

Converts its `⟨text⟩` argument to sentence case, i. e., the first word is capitalized and the remainder of the string is converted to lowercase. This command is robust. The starred variant differs from the regular version in that it considers the language of the entry, as specified in the `langid` field. If the `langid` field is defined and holds a language declared with `\DeclareCaseLangs` (see below)<sup>38</sup>, then the sentence case conversion is performed. If the `langid` field is undefined, then the language list declared with `\DeclareCaseLangs` is checked for the presence of the main document language derived from the `language` option. If found, sentence case conversion is performed, if not, the `⟨text⟩` is not altered in any way. It is recommended to use `\MakeSentenceCase*` rather than the regular variant in formatting directives.

Depending on the option `casechanger` `\MakeCaseChange` and `\MakeCaseChange*` are either implemented using the `expl3` module `l3text` or original `LaTeXε` code.

Both variants support the traditional BibTeX convention for `bib` files that anything wrapped in a pair of curly braces is not modified when changing the case. For example:

```
\MakeSentenceCase{an Introduction to LaTeX}
\MakeSentenceCase{an Introduction to {LaTeX}}
```

would yield:

---

<sup>38</sup>By default, converting to sentence case is enabled for the following language identifiers: `american`, `british`, `canadian`, `english`, `australian`, `newzealand` as well as the aliases `USenglish` and `UKenglish`. Use `\DeclareCaseLangs` to extend or change this list.

```
An introduction to latex
An introduction to LaTeX
```

In `bib` files designed with traditional BibTeX in mind, it has been fairly common to only wrap single letters in braces to prevent case-changing:

```
title = {An Introduction to {L}a{T}e{X}}
```

The problem with this convention is that the braces will suppress the kerning on both sides of the enclosed letter. It is preferable to wrap the entire word in braces as shown in the first example. Macros in titles must also be protected with braces

```
title = {The {\TeX book}},
```

The behaviour of `\MakeSentenceCase` differs slightly between the `latex2e` and `expl3` implementation. Generally speaking, the `expl3` code is closer to the BibTeX behaviour of `change.case$`. It is also better equipped to deal with non-US-ASCII input and macros than the `latex2e` implementation. `\MakeSentenceCase` behaves as follows.

- The first letter of its argument is capitalised with `\MakeUppercase`. This is different from BibTeX's `change.case$`, which does not touch the first letter of its argument.

Note that with the `latex2e` code a pair of braces that starts with a control sequence will be treated as a single character for capitalisation purposes. This means that the entire argument of a command protected with a single pair of braces is capitalised.

- With the `latex2e` code expandable commands are expanded before the case change, which means that the case change applies to the replacement text. Unexpandable commands are not touched.

BibTeX does not interpret macros and therefore passes commands through unchanged (this does not necessarily apply to the *arguments* of those commands). The `expl3` implementation also does not expand commands and only applies case change to the arguments.

- Text wrapped in one or more pairs of braces is protected from case change *unless* it starts with a control sequence. This is the same behaviour as with BibTeX. Note that the braces could either be explicit groups or argument delimiters.
- Text in a single pair of braces that starts with a control sequence is not protected and will be subject to case changes. Note that this need not apply to braces that are argument delimiters, in fact the `latex2e` implementation of `\MakeSentenceCase` may in some cases produce an error or otherwise undesirable output if the argument of a command starts with a control sequence. BibTeX's case change function does not differentiate between argument delimiters and brace groups and always subjects text at brace level 1 to case change if it starts with a control sequence.

For most intents and purposes the following rules should give a sensible result.

- Protect all words whose case should not be changed by wrapping them in one pair of braces.

- If words are already in the braced argument of a command such as `\mkbibquote` or `\emph`, they are automatically protected.
  - To *undo* this protection wrap the command in braces again.
  - It is not possible to selectively re-apply protection if it has been undone with an additional pair of braces. If a more fine-grained control is needed, work-arounds like splitting the argument could be tried.
- While it is possible to protect words from case change at the beginning of a field with a pair of braces, it is not possible to undo the case protection that a command automatically implies by wrapping it in braces in that position. In that case work-arounds are necessary.

```
title = {The Story of {HMS} \emph{Erebus}
        in {\emph{Really}} Strong Wind},
```

would be converted to sentence case by `\MakeSentenceCase` as

The story of HMS *Erebus* in *really* strong wind

If the `expl3` implementation of the case changing functions is selected, the BibTeX case protection behaviour can be exchanged for a slightly simpler version. When `bibtexcaseprotection` set to `false`, braces no longer automatically imply case protection. Instead words can be protected from case change with `\NoCaseChange`. The examples from above would then read

```
title = {An Introduction to \NoCaseChange{LaTeX}},
title = {The Story of \NoCaseChange{HMS \emph{Erebus}}
        in \emph{Really} Strong Wind},
```

Generally, this option should allow for a saner case protection input, because curly braces are no longer overloaded with different levels of meaning, but it is a big departure from the standard case protection input that has been with the LaTeX world for a long time.

Due to its complex implementation `\MakeSentenceCase` can not accept arbitrary input, it only safely operates on raw text or field data. In the standard styles the `title` and other `title`-like field formats do not work together with `\MakeSentenceCase` because of their argument structure, so the standard styles offer a dedicated `titlecase` field format to apply this command. To enable sentence casing in standard styles for languages that support it you would use:

```
\DeclareFieldFormat{titlecase}{\MakeSentenceCase*{#1}}
```

Sentence casing can then be disabled by resetting that field format to

```
\DeclareFieldFormat{titlecase}{#1}
```

Custom styles may follow a different approach, but style authors are encouraged to apply the same general ideas to their styles.

`\mkpageprefix`[ $\langle$ pagination $\rangle$ ][ $\langle$ postpro $\rangle$ ]{ $\langle$ text $\rangle$ }

This command is intended for use in field formatting directives which format the page numbers in the  $\langle$ postnote $\rangle$  argument of citation commands and the pages field of bibliography entries. It will parse its  $\langle$ text $\rangle$  argument and prefix it with ‘p.’ or ‘pp.’ by default. The optional  $\langle$ pagination $\rangle$  argument holds the name of a field indicating the pagination type. This may be either `pagination` or `bookpagination`, with `pagination` being the default. The spacing between the prefix and the  $\langle$ text $\rangle$  may be modified by redefining `\ppspace`. The default is an unbreakable interword space. See §§ 2.3.12 and 3.15.3 for further details. See also `\DeclareNumChars`, `\DeclareRangeChars`, `\DeclareRangeCommands`, and `\NumCheckSetup`. The optional  $\langle$ postpro $\rangle$  argument specifies a macro to be used for post-processing the  $\langle$ text $\rangle$ . If only one optional argument is given, it is taken as  $\langle$ pagination $\rangle$ . Here are two typical examples:

```
\DeclareFieldFormat{postnote}{\mkpageprefix[pagination
↪ ][\mknormrange]{#1}}
\DeclareFieldFormat{pages}{\mkpageprefix[bookpagination
↪ ]{#1}}
```

`\mkpagetotal`[ $\langle$ pagination $\rangle$ ][ $\langle$ postpro $\rangle$ ]{ $\langle$ text $\rangle$ }

This command is similar to `\mkpageprefix` except that it is intended for the `pagetotal` field of bibliography entries, i. e., it will print “123 pages” rather than “page 123”. The optional  $\langle$ pagination $\rangle$  argument defaults to `bookpagination`. The spacing inserted between the pagination suffix and the  $\langle$ text $\rangle$  may be modified by redefining the macro `\ppspace`. The optional  $\langle$ postpro $\rangle$  argument specifies a macro to be used for post-processing the  $\langle$ text $\rangle$ . If only one optional argument is given, it is taken as  $\langle$ pagination $\rangle$ . Here is a typical example:

```
\DeclareFieldFormat{pagetotal}{\mkpagetotal[
↪ bookpagination]{#1}}
```

The optional argument `bookpagination` is omissible in this case. The pagination strings are taken from `<pagination>total` and `<pagination>totals`.

`\mkcomprange`[ $\langle$ postpro $\rangle$ ][ $\langle$ itempostpro $\rangle$ ]{ $\langle$ text $\rangle$ }

`\mkcomprange*`[ $\langle$ postpro $\rangle$ ][ $\langle$ itempostpro $\rangle$ ]{ $\langle$ text $\rangle$ }

This command, which is intended for use in field formatting directives, will parse its  $\langle$ text $\rangle$  argument for page ranges and compress them. For example, “125–129” may be formatted as “125–9”. You may configure the behavior of `\mkcomprange` by adjusting the LaTeX counters `mincomprange`, `maxcomprange`, and `mincompwidth`, as illustrated in table 12. The default settings are 10, 100000, and 1, respectively. This means that the command tries to compress as much as possible by default. Use `\setcounter` to adjust the parameters. The scanner recognises `\bibrangedash` and hyphens as range dashes. It will normalize the dash by replacing any number of consecutive hyphens with `\bibrangedash`. Lists of ranges delimited with `\bibrangesep` are also supported. The scanner will normalise any comma or semicolons surrounded by optional space by replacing them with `\bibrangesep`. If you want to hide a character from the list/range scanner for



Table 12: \mkcomprange setup

Input	Output		
	mincomprange=10	mincomprange=100	mincomprange=1000
11--15	11-5	11-15	11-15
111--115	111-5	111-5	111-115
1111--1115	1111-5	1111-5	1111-5
	maxcomprange=1000	maxcomprange=100	maxcomprange=10
	1111-5	1111-5	1111-5
	1111--1155	1111-55	1111-1155
	1111--1555	1111-555	1111-1555
	mincompwidth=1	mincompwidth=10	mincompwidth=100
	1111-5	1111-15	1111-115
	1111--1155	1111-55	1111-155
	1111--1555	1111-555	1111-555

some reason, wrap the character or the entire string in curly braces. The optional  $\langle postpro \rangle$  argument specifies a macro to be used for post-processing the  $\langle text \rangle$ . This is important if you want to combine `\mkcomprange` with other formatting macros which also need to parse their  $\langle text \rangle$  argument, such as `\mkpageprefix`. Simply nesting these commands will not work as expected. Use the  $\langle postpro \rangle$  argument to set up the processing chain as follows:

```
\DeclareFieldFormat{postnote}{\mkcomprange[ {
  ↪ \mkpageprefix[pagination] } ]{#1}}
```

Note that `\mkcomprange` is executed first, using `\mkpageprefix` as post-processor. Also note that the  $\langle postpro \rangle$  argument is wrapped in an additional pair of braces. This is only required in this particular case to prevent LaTeX's optional argument scanner from getting confused by the nested brackets. The starred version of this command differs from the regular one in the way the  $\langle postpro \rangle$  argument is applied to a list of values. For example:

```
\mkcomprange[\mkpageprefix]{5, 123-129, 423-439}
\mkcomprange*[\mkpageprefix]{5, 123-129, 423-439}
```

will output:

```
pp. 5, 123-9, 423-39
p. 5, pp. 123-9, pp. 423-39
```

The second optional argument  $\langle itempostpro \rangle$  is used to post-process each individual number item in the formatted list. It can be used to convert numbers from cardinals to ordinals. If only one optional argument is present, it is treated as  $\langle postpro \rangle$ .

```
\mknormrange[ $\langle postpro \rangle$ ][ $\langle itempostpro \rangle$ ]{ $\langle text \rangle$ }
\mknormrange* $\langle postpro \rangle$ [ $\langle itempostpro \rangle$ ]{ $\langle text \rangle$ }
```

This command, which is intended for use in field formatting directives, will parse its  $\langle text \rangle$  argument for page ranges and will normalise them. The command is similar to

`\mkcomprange` except that the page ranges will not be compressed. The scanner recognises `\bibrangedash` and hyphens as range dashes. It will normalize the dash by replacing any number of consecutive hyphens with `\bibrangedash`. Lists of ranges delimited with `\bibrangessep` are also supported. The scanner will normalise any comma or semicolons surrounded by optional space by replacing them with `\bibrangessep`. If you want to hide a character from the list/range scanner for some reason, wrap the character or the entire string in curly braces. The optional `<postpro>` argument specifies a macro to be used for post-processing the `<text>`. See `\mkcomprange` on how to use this argument. The starred version of this command differs from the regular one in the way the `<postpro>` argument is applied to a list of values. The second optional argument `<itempostpro>` is used to post-process each individual number item in the formatted list. It can be used to convert numbers from cardinals to ordinals. If only one optional argument is present, it is treated as `<postpro>`.

```
\mkfirstpage[<postpro>][<itempostpro>]{<text>}
\mkfirstpage*[<postpro>][<itempostpro>]{<text>}
```

This command, which is intended for use in field formatting directives, will parse its `<text>` argument for page ranges and print the start page of the range only. The scanner recognizes `\bibrangedash` and hyphens as range dashes. Lists of ranges delimited with `\bibrangessep` are also supported. If you want to hide a character from the list/range scanner for some reason, wrap the character or the entire string in curly braces. The optional `<postpro>` argument specifies a macro to be used for post-processing the `<text>`. See `\mkcomprange` on how to use this argument. The starred version of this command differs from the regular one in the way the `<postpro>` argument is applied to a list of values. The second optional argument `<itempostpro>` is used to post-process each individual number item in the formatted list. It can be used to convert numbers from cardinals to ordinals. If only one optional argument is present, it is treated as `<postpro>`. For example:

```
\mkfirstpage[\mkpageprefix]{5, 123-129, 423-439}
\mkfirstpage*[\mkpageprefix]{5, 123-129, 423-439}
```

will output:

```
pp. 5, 123, 423
p. 5, p. 123, p. 423
```

`\rangelen{<rangefield>}`

Takes the name of a bibfield declared as a range field in the data model and returns the length of the range. This is calculated by `biber` and can handle many special cases. It will return `-1` for open ended ranges. Specifically `\rangelen` can:

- Calculate the total of multiple ranges in the same field such as ‘1-10, 20-30’
- Handle implicit ranges such as ‘22-4’ and ‘130-33’
- Handle roman numeral ranges in upper and lower case and consisting of both US-ASCII and Unicode roman numeral representations.

Here are some examples:

pages = '10'	\rangelen{pages} returns '1'
pages = '10-15'	\rangelen{pages} returns '6'
pages = '10-15,47-53'	\rangelen{pages} returns '13'
pages = '10-'	\rangelen{pages} returns '-1'
pages = '-10'	\rangelen{pages} returns '-1'
pages = '48-9'	\rangelen{pages} returns '2'
pages = '172-77'	\rangelen{pages} returns '6'
pages = 'i-vi'	\rangelen{pages} returns '6'
pages = 'X-XX'	\rangelen{pages} returns '11'
pages = 'VII-xii'	\rangelen{pages} returns '6'
pages = 'VII-xii, 145-7, 135-39'	\rangelen{pages} returns '14'

The \rangelen command can be used in tests:

```
\ifnumcomp{\rangelen{pages}}{=}{1}{add 'f'}{do nothing}
```

```
\DeclareNumChars{<characters>}  
\DeclareNumChars*{<characters>}
```

This command configures the \ifnumeral, \ifnumerals, and \ifpages tests from § 4.6.2. The setup will also affect \iffieldnum, \iffieldnums, \iffieldpages as well as \mkpageprefix and \mkpagetotal. The <characters> argument is an undelimited list of characters which are to be considered as being part of a number. The regular version of this command replaces the current setting, the starred version appends its argument to the current list. The default setting is:

```
\DeclareNumChars{.}
```

This means that a (section or other) number like '3.4.5' will be considered as a number. Note that Arabic and Roman numerals are detected by default, there is no need to declare them explicitly.

```
\DeclareRangeChars{<characters>}  
\DeclareRangeChars*{<characters>}
```

This command configures the \ifnumerals and \ifpages tests from § 4.6.2. The setup will also affect \iffieldnums and \iffieldpages as well as \mkpageprefix and \mkpagetotal. The <characters> argument is an undelimited list of characters which are to be considered as range indicators. The regular version of this command replaces the current setting, the starred version appends its argument to the current list. The default setting is:

```
\DeclareRangeChars{~,; -+ /}
```

For engines that fully support Unicode these defaults are extended with

```
\DeclareRangeChars*{--}
```

This means that strings like ‘3–5’, ‘35+’, ‘8/9’ and so on will be considered as a range by `\ifnumerals` and `\ifpages`. Non-range characters in such strings are recognized as numbers. So strings like ‘3a–5a’ and ‘35b+’ are not deemed to be ranges by default. See also §§ 2.3.12 and 3.15.3 for further details.

```
\DeclareRangeCommands{⟨commands⟩}
\DeclareRangeCommands*{⟨commands⟩}
```

This command is similar to `\DeclareRangeChars`, except that the `⟨commands⟩` argument is an undelimited list of commands which are to be considered as range indicators. The regular version of this command replaces the current setting, the starred version appends its argument to the current list. The default list is rather long and should cover all common cases; here is a shorter example:

```
\DeclareRangeCommands{\&
  ↪ \bibrangedash\textendash\textemdash\psq\psqq}
```

See also §§ 2.3.12 and 3.15.3 for further details.

```
\DeclarePageCommands{⟨commands⟩}
\DeclarePageCommands*{⟨commands⟩}
```

This command is similar to `\DeclareRangeCommands`, except that it only affects the `\ifpages` and `\iffieldpages` tests but not `\ifnumerals` and `\iffieldnums`. The default setting is:

```
\DeclarePageCommands{\pno\ppno}
```

```
\NumCheckSetup{⟨code⟩}
```

Use this command to temporarily redefine any commands which interfere with the tests performed by `\ifnumeral`, `\ifnumerals`, and `\ifpages` from § 4.6.2. The setup will also affect `\iffieldnum`, `\iffieldnums`, `\iffieldpages` as well as `\mkpageprefix` and `\mkpagetotal`. The `⟨code⟩` will be executed in a group by these commands. Since the above mentioned commands will expand the string to be analyzed, it is possible to remove commands to be ignored by the tests by making them expand to an empty string. See also §§ 2.3.12 and 3.15.3 for further details.

```
\NumsCheckSetup{⟨code⟩}
```

Like `\NumCheckSetup` but only applies to `\ifnumerals` and `\ifpages` from § 4.6.2 and their derivative tests.

```
\PagesCheckSetup{⟨code⟩}
```

Like `\NumCheckSetup` but only applies to `\ifpages` from § 4.6.2 and its derivative tests. The default setting is makes `\pnfmt` transparent to the test:

```
\PagesCheckSetup{\let\pnfmt\@firstofone}
```

`\DeclareBabelToExplLanguageMapping{⟨babel language⟩}{⟨expl language⟩}`

This command is only available if the `expl3` case changing code is used.

Use `⟨expl language⟩` as `⟨language⟩` argument for the `l3text` case changing functions when `babel language` is active. This command is only required if `⟨babel language⟩` should correspond to a language for which `l3text` has special rules set up. The default invocations of this command are

```
\DeclareBabelToExplLanguageMapping{dutch}{nl}  
\DeclareBabelToExplLanguageMapping{greek}{el}  
\DeclareBabelToExplLanguageMapping{turkish}{tr}
```

`\UndeclareBabelToExplLanguageMapping{⟨babel language⟩}`

This command is only available if the `expl3` case changing code is used.

Removes the `babel`-to-`expl3` language mapping for `⟨babel language⟩`. If the argument is an asterisk `*`, all language mappings are removed.

`\DeclareCaseLangs{⟨languages⟩}`

`\DeclareCaseLangs*{⟨languages⟩}`

Defines the list of languages which are considered by the `\MakeSentenceCase*` command as it converts a string to sentence case. The `⟨languages⟩` argument is a comma-separated list of `babel/polyglossia` language identifiers. The regular version of this command replaces the current setting, the starred version appends its argument to the current list. The default setting is:

```
\DeclareCaseLangs{%  
  american,british,canadian,english,australian,  
  ↪ newzealand,USenglish,UKenglish}
```

See the `babel/polyglossia` manuals and table 2 for a list of languages identifiers.

`\BibliographyWarning{⟨message⟩}`

This command is similar to `\PackageWarning` but prints the entry key of the entry currently being processed in addition to the input line number. It may be used in the bibliography as well as in citation commands. If the `⟨message⟩` is fairly long, use `\MessageBreak` to include line breaks. Note that the standard `\PackageWarning` command does not provide a meaningful clue when used in the bibliography since the input line number is the line on which the `\printbibliography` command was given.

`\pagetrackertrue`

`\pagetrackerfalse`

These commands activate or deactivate the citation tracker locally (this will affect the `\iffirstonpage` and `\ifsamepage` test from § 4.6.2). They are intended for use in the definition of citation commands or anywhere in the document body. If a citation command is to be excluded from page tracking, use `\pagetrackerfalse` in the `⟨precode⟩` argument of `\DeclareCiteCommand`. See § 4.3.1 for details. Note that these commands have no effect if page tracking has been disabled globally.

`\citetrackertrue`  
`\citetrackerfalse`

These commands activate or deactivate all citation trackers locally (this will affect the `\ifciteseen`, `\ifentryseen`, `\ifciteibid`, and `\ifciteidem` tests from § 4.6.2). They are intended for use in the definition of citation commands or anywhere in the document body. If a citation command is to be excluded from tracking, use `\citetrackerfalse` in the *⟨precode⟩* argument of `\DeclareCiteCommand`. See § 4.3.1 for details. Note that these commands have no effect if tracking has been disabled globally.

`\backtrackertrue`  
`\backtrackerfalse`

These commands activate or deactivate the `backref` tracker locally. They are intended for use in the definition of citation commands or anywhere in the document body. If a citation command is to be excluded from backtracking, use `\backtrackerfalse` in the *⟨precode⟩* argument of `\DeclareCiteCommand`. Note that these commands have no effect if the `backref` option has been not been set globally.

## 4.7 Punctuation and Spacing

The `biblatex` package provides elaborate facilities designed to manage and track punctuation and spacing in the bibliography and in citations. These facilities work on two levels. The high-level commands discussed in § 4.7.1 deal with punctuation and whitespace inserted by the bibliography style between the individual segments of a bibliography entry. The commands in §§ 4.7.2, 4.7.3, 4.7.4 work at a lower level. They use TeX's space factor and modified space factor codes to track punctuation in a robust and efficient way. This way it is possible to detect trailing punctuation marks within fields, not only those explicitly inserted between fields. The same technique is also used for automatic capitalization of localisation strings, see `\DeclareCapitalPunctuation` in § 4.7.5 as well as § 4.8 for details. Note that these facilities are only made available locally in citations and bibliographies. They will not affect any other part of a document.

### 4.7.1 Block and Unit Punctuation

The major segments of a bibliography entry are ‘blocks’ and ‘units’. A block is the larger segment of the two, a unit is shorter or at most equal in length. For example, the values of fields such as `title` or `note` usually form a unit which is separated from subsequent data by a period or a comma. A block may comprise several fields which are treated as separate units, for example `publisher`, `location`, and `year`. The segmentation of an entry into blocks and units is at the discretion of the bibliography style. An entry is segmented by inserting `\newblock` and `\newunit` commands at suitable places and `\finentry` at the very end (see § 4.2.3 for an example). See also § 4.11.7 for some practical hints.

`\newblock` Records the end of a block. This command does not print anything, it merely marks the end of the block. The block delimiter `\newblockpunct` will be inserted by a subsequent `\printtext`, `\printfield`, `\printlist`, `\printnames`, or `\bibstring` command. You may use `\newblock` at suitable places without having to worry about spurious blocks. A new block will only be started by the next `\printfield` (or similar) command if this command prints anything. See § 4.11.7 for further details.

`\newunit` Records the end of a unit and puts the default delimiter `\newunitpunct` in the punctuation buffer. This command does not print anything, it merely marks the end of the unit. The punctuation buffer will be inserted by the next `\printtext`, `\printfield`, `\printlist`, `\printnames`, or `\bibstring` command. You may use `\newunit` after commands like `\printfield` without having to worry about spurious punctuation and whitespace. The buffer will only be inserted by the next `\printfield` or similar command if *both* fields are non-empty. This also applies to `\printtext`, `\printlist`, `\printnames`, and `\bibstring`. See § 4.11.7 for further details.

`\finentry` Inserts `\finentrypunct`. This command should be used at the very end of every bibliography entry.

```
\setunit{⟨punctuation⟩}  
\setunit*{⟨punctuation⟩}
```

The `\setunit` command is similar to `\newunit` except that it uses `⟨punctuation⟩` instead of `\newunitpunct`. The starred variant differs from the regular version in that it checks if the last `\printtext`, `\printfield`, `\printlist`, `\printnames`, or `\bibstring` command did actually print anything. If not, it does nothing.

```
\printunit{⟨punctuation⟩}  
\printunit*{⟨punctuation⟩}
```

The `\printunit` command is similar to `\setunit` except that `⟨punctuation⟩` persists in the buffer. This ensures that `⟨punctuation⟩` is inserted before the next non-empty field printed by the `\printtext`, `\printfield`, `\printlist`, `\printnames`, or `\bibstring` commands—regardless of any intermediate calls to `\newunit` or `\setunit`.

```
\setpunctfont{⟨command⟩}
```

This command, which is intended for use in field formatting directives, provides an alternative way of dealing with unit punctuation after a field printed in a different font (for example, a title printed in italics). The standard LaTeX way of dealing with this is adding a small amount of space, the so-called italic correction. This command allows adapting the punctuation to the font of the preceding field. The `⟨command⟩` should be a text font command which takes one argument, such as `\emph` or `\textbf`. This command will only affect punctuation marks inserted by one of the commands from § 4.7.3. The font adaption is applied to the next punctuation mark only and will be reset automatically thereafter. If you want to reset it manually before it takes effect, issue `\resetpunctfont`. If the `punctfont` package option is disabled, this command does nothing. Note that the `\mkbibemph`, `\mkbibitalic` and `\mkbibbold` wrappers from § 4.10.4 incorporate this feature by default.

`\resetpunctfont` This command resets the unit punctuation font defined with `\setpunctfont` before it takes effect. If the `punctfont` package option is disabled, this command does nothing.

#### 4.7.2 Punctuation Tests

The following commands may be used to test for preceding punctuation marks at any point in citations and the bibliography.



`\ifpunct{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if preceded by any punctuation mark except for an abbreviation dot, and `⟨false⟩` otherwise.

`\ifterm{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if preceded by a terminal punctuation mark, and `⟨false⟩` otherwise. A terminal punctuation mark is any punctuation mark which has been registered for automatic capitalization, either with `\DeclareCapitalPunctuation` or by default, see § 4.7.5 for details. By default, this applies to periods, exclamation marks, and question marks.

`\ifpunctmark{⟨character⟩}{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if preceded by the punctuation mark `⟨character⟩`, and `⟨false⟩` otherwise. The `⟨character⟩` may be a comma, a semicolon, a colon, a period, an exclamation mark, a question mark, or an asterisk. Note that a period denotes an end-of-sentence period. Use the asterisk to test for the dot after an abbreviation. If this command is used in a formatting directive for name lists, i. e., in the argument to `\DeclareNameFormat`, the `⟨character⟩` may also be an apostrophe.

`\ifprefchar{⟨true⟩}{⟨false⟩}`

Executes `⟨true⟩` if preceded by any prefix character declared by `\DeclarePrefChars`.

### 4.7.3 Adding Punctuation

The following commands are designed to prevent double punctuation marks. Bibliography and citation styles should always use these commands instead of literal punctuation marks. All `\add. . .` commands in this section automatically remove preceding whitespace with `\unspace` (see § 4.7.4). Note that the behavior of all `\add. . .` commands discussed below is the package default, which is restored whenever `biblatex` switches languages. This behavior may be adjusted with `\DeclarePunctuationPairs` from § 4.7.5.

`\adddot` Adds a period unless it is preceded by any punctuation mark. The purpose of this command is inserting the dot after an abbreviation. Any dot inserted this way is recognized as such by the other punctuation commands. This command may also be used to turn a previously inserted literal period into an abbreviation dot.

`\addcomma` Adds a comma unless it is preceded by another comma, a semicolon, a colon, or a period.

`\addsemicolon` Adds a semicolon unless it is preceded by a comma, another semicolon, a colon, or a period.

`\addcolon` Adds a colon unless it is preceded by a comma, a semicolon, another colon, or a period.

`\addperiod` Adds a period unless it is preceded by an abbreviation dot or any other punctuation mark. This command may also be used to turn a previously inserted abbreviation dot into a period, for example at the end of a sentence.

`\addexclam` Adds an exclamation mark unless it is preceded by any punctuation mark except for an abbreviation dot.

- `\addquestion` Adds a question mark unless it is preceded by any punctuation mark except for an abbreviation dot.
- `\isdot` Turns a previously inserted literal period into an abbreviation dot. In contrast to `\adddot`, nothing is inserted if this command is not preceded by a period.
- `\nopunct` Adds an internal marker which will cause the next punctuation command to print nothing.

#### 4.7.4 Adding Whitespace

The following commands are designed to prevent spurious whitespace. Bibliography and citation styles should always use these commands instead of literal whitespace. In contrast to the commands in §§ 4.7.2 and 4.7.3, they are not restricted to citations and the bibliography but available globally.

- `\unspace` Removes preceding whitespace, i. e., removes all skips and penalties from the end of the current horizontal list. This command is implicitly executed by all of the following commands.
- `\addspace` Adds a breakable interword space.
- `\adnbspace` Adds a non-breakable interword space.
- `\addthinspace` Adds a *breakable* thin space.
- `\adnbnthinspace` Adds a non-breakable thin space. This is similar to `\,` and `\thinspace`.
- `\addlowpenspace` Adds a space penalized by the value of the `lownamepenalty` counter, see §§ 3.12.4 and 4.10.3 for details.
- `\addhighpenspace` Adds a space penalized by the value of the `highnamepenalty` counter, see §§ 3.12.4 and 4.10.3 for details.
- `\addlpthinspace` Similar to `\addlowpenspace` but adds a breakable thin space.
- `\addhpthinspace` Similar to `\addhighpenspace` but adds a breakable thin space.
- `\addabbrvspace` Adds a space penalized by the value of the `abbrvpenalty` counter, see §§ 3.12.4 and 4.10.3 for details.
- `\addabthinspace` Similar to `\addabbrvspace` but using a thin space.
- `\adddotSPACE` Executes `\adddot` and adds a space penalized by the value of the `abbrvpenalty` counter, see §§ 3.12.4 and 4.10.3 for details.
- `\addslash` Adds a breakable slash. This command differs from the `\slash` command in the LaTeX kernel in that a linebreak after the slash is not penalized at all.

Note that the commands in this section implicitly execute `\unspace` to remove spurious whitespace, hence they may be used to override each other. For example, you may use `\adnbspace` to transform a previously inserted interword space into a non-breakable one and `\addspace` to turn a non-breakable space into a breakable one.

### 4.7.5 Configuring Punctuation and Capitalization

The following commands configure various features related to punctuation and automatic capitalization.

```
\DeclarePrefChars{⟨characters⟩}  
\DeclarePrefChars*{⟨characters⟩}
```

This command declares characters that are to be treated specially when testing to see if `\bibnamedelimc` is to be inserted between a name prefix and a family name. If a character is in the list of `⟨characters⟩`, `\bibnamedelimc` is not inserted. It is used to allow abbreviated name prefixes like ‘d’Argent’ where no space should be inserted after the apostrophe. The starred version appends its argument to the list of prefix characters, the unstarred version replaces the current setting. The default setting is:

```
\DeclarePrefChars{'-}
```

For engines that fully support Unicode these defaults are extended with

```
\DeclarePrefChars*{' }
```

```
\DeclareAutoPunctuation{⟨characters⟩}
```

This command defines the punctuation marks to be considered by the citation commands as they scan ahead for punctuation. Note that `⟨characters⟩` is an undelimited list of characters. Valid `⟨characters⟩` are period, comma, semicolon, colon, exclamation and question mark. The default setting is:

```
\DeclareAutoPunctuation{.,;:!?}
```

This definition is restored automatically whenever the `autopunct` package option is set to `true`. Executing `\DeclareAutoPunctuation{}` is equivalent to setting `autopunct=false`, i.e., it disables this feature.

```
\DeclareCapitalPunctuation{⟨characters⟩}
```

When `biblatex` inserts localisation strings, i.e., key terms such as ‘edition’ or ‘volume’, it automatically capitalizes them after terminal punctuation marks. This command defines the punctuation marks which will cause localisation strings to be capitalized if one of them precedes a string. Note that `⟨characters⟩` is an undelimited list of characters. Valid `⟨characters⟩` are period, comma, semicolon, colon, exclamation and question mark. The package default is:

```
\DeclareCapitalPunctuation{.!?}
```

Using `\DeclareCapitalPunctuation` with an empty argument is equivalent to disabling automatic capitalization. Since this feature is language specific, this command must be used in the argument to `\DefineBibliographyExtras` (when used in the preamble) or `\DeclareBibliographyExtras` (when used

in a localisation module). See §§ 3.10 and 4.9 for details. By default, strings are capitalized after periods, exclamation marks, and question marks. All strings are generally capitalized at the beginning of a paragraph (in fact whenever TeX is in vertical mode).

`\DeclarePunctuationPairs{⟨identifier⟩}{⟨characters⟩}`

Use this command to declare valid pairs of punctuation marks. This will affect the punctuation commands discussed in § 4.7.3. For example, the description of `\addcomma` states that this command adds a comma unless it is preceded by another comma, a semicolon, a colon, or a period. In other words, commas after abbreviation dots, exclamation marks, and question marks are permitted. These valid pairs are declared as follows:

```
\DeclarePunctuationPairs{comma}{*!?
```

The `⟨identifier⟩` selects the command to be configured. The identifiers correspond to the names of the punctuation commands from § 4.7.3 without the `\add` prefix, i. e., valid `⟨identifier⟩` strings are `dot`, `comma`, `semicolon`, `colon`, `period`, `exclam`, `question`. The `⟨characters⟩` argument is an undelimited list of punctuation marks. Valid `⟨characters⟩` are `comma`, `semicolon`, `colon`, `period`, `exclamation mark`, `question mark`, and `asterisk`. A period in the `⟨characters⟩` argument denotes an end-of-sentence period, an asterisk the dot after an abbreviation. This is the default setup, which is automatically restored whenever `biblatex` switches languages and corresponds to the behavior described in § 4.7.3:

```
\DeclarePunctuationPairs{dot}{}
\DeclarePunctuationPairs{comma}{*!?!}
\DeclarePunctuationPairs{semicolon}{*!?!}
\DeclarePunctuationPairs{colon}{*!?!}
\DeclarePunctuationPairs{period}{}
\DeclarePunctuationPairs{exclam}{*}
\DeclarePunctuationPairs{question}{*}
```

Since this feature is language specific, `\DeclarePunctuationPairs` must be used in the argument to `\DefineBibliographyExtras` (when used in the preamble) or `\DeclareBibliographyExtras` (when used in a localisation module). See §§ 3.10 and 4.9 for details. Note that some localisation modules may use a setup which is different from the package default.<sup>39</sup>

`\DeclareQuotePunctuation{⟨characters⟩}`

This command controls ‘American-style’ punctuation. The `\mkbibquote` wrapper from § 4.10.4 can interact with the punctuation facilities discussed in §§ 4.7.1, 4.7.3, 4.7.4. Punctuation marks after `\mkbibquote` will be moved inside the quotes if they have been registered with `\DeclareQuotePunctuation`. Note that `⟨characters⟩` is an undelimited list of characters. Valid `⟨characters⟩` are `period`, `comma`, `semicolon`, `colon`, `exclamation` and `question mark`. Here is an example:

```
\DeclareQuotePunctuation{., }
```

<sup>39</sup>As of this writing, the `american` module uses different settings for ‘American-style’ punctuation.

Executing `\DeclareQuotePunctuation{}` is equivalent to disabling this feature. This is the package default. Since this feature is language specific, this command must be used in the argument to `\DefineBibliographyExtras` (when used in the preamble) or `\DeclareBibliographyExtras` (when used in a localisation module). See §§ 3.10 and 4.9 for details. See also § 3.13.1.

`\uspunctuation` A shorthand using the lower-level commands `\DeclareQuotePunctuation` and `\DeclarePunctuationPairs` to activate ‘American-style’ punctuation. See § 3.13.1 for details. This shorthand is provided for convenience only. The effective settings are applied by the lower-level commands.

`\stdpunctuation` Undoes the settings applied by `\uspunctuation`, restoring standard punctuation. As standard punctuation is the default setting, you only need this command to override a previously executed `\uspunctuation` command. See § 3.13.1 for details.

#### 4.7.6 Correcting Punctuation Tracking

The facilities for punctuation tracking and automatic capitalization are very reliable under normal circumstances, but there are always marginal cases which may require manual intervention. Typical cases are localisation strings printed as the first word in a footnote (which is usually treated as the beginning of a paragraph as far as capitalization is concerned, but TeX is not in vertical mode at this point) or punctuation after periods which are not really end-of-sentence periods (for example, after an ellipsis like “[...]” a command such as `\addperiod` would do nothing since parentheses and brackets are transparent to the punctuation tracker). In such cases, use the following commands in bibliography and citation styles to mark the beginning or middle of a sentence if and where required:

`\bibsentence` This command marks the beginning of a sentence. A localisation string immediately after this command will be capitalized and the punctuation tracker is reset, i. e., this command hides all preceding punctuation marks from the punctuation tracker and enforces capitalization.

`\midsentence` This command marks the middle of a sentence. A localisation string immediately after this command will not be capitalized and the punctuation tracker is reset, i. e., this command hides all preceding punctuation marks from the punctuation tracker and suppresses capitalization.

`\midsentence*` The starred variant of `\midsentence` differs from the regular one in that a preceding abbreviation dot is not hidden from the punctuation tracker, i. e., any code after `\midsentence*` will see a preceding abbreviation dot. All other punctuation marks are hidden from the punctuation tracker and capitalization is suppressed.

### 4.8 Localization Strings

Localization strings are key terms such as ‘edition’ or ‘volume’ which are automatically translated by `biblatex`’s localisation modules. See § 4.9 for an overview and § 4.9.2 for a list of all strings supported by default. The commands in this section are used to print the localised term.

`\bibstring[⟨wrapper⟩]{⟨key⟩}`

Prints the localisation string `⟨key⟩`, where `⟨key⟩` is an identifier in lowercase letters (see § 4.9.2). The string will be capitalized as required, see § 4.7.5 for details. Depending on the `abbreviate` package option from § 3.1.2.1, `\bibstring` prints

the short or the long version of the string. If localisation strings are nested, i. e., if `\bibstring` is used in another string, it will behave like `\bibxstring`. If the `\wrapper` argument is given, the string is passed to the `\wrapper` for formatting. This is intended for font commands such as `\emph`.

`\biblstring[\wrapper]{\key}`

Similar to `\bibstring` but always prints the long string, ignoring the `abbreviate` option.

`\bibsstring[\wrapper]{\key}`

Similar to `\bibstring` but always prints the short string, ignoring the `abbreviate` option.

`\bibncpstring[\wrapper]{\key}`

Similar to `\bibstring` but the term is never capitalized.

`\bibncplstring[\wrapper]{\key}`

Similar to `\biblstring` but the term is never capitalized.

`\bibncpsstring[\wrapper]{\key}`

Similar to `\bibsstring` but the term is never capitalized.

`\bibcpstring[\wrapper]{\key}`

Similar to `\bibstring` but the term is always capitalized.

`\bibcplstring[\wrapper]{\key}`

Similar to `\biblstring` but the term is always capitalized.

`\bibcpsstring[\wrapper]{\key}`

Similar to `\bibsstring` but the term is always capitalized.

`\bibucstring[\wrapper]{\key}`

Similar to `\bibstring` but the whole term is uppercased.

`\bibuclstring[\wrapper]{\key}`

Similar to `\biblstring` but the whole term is uppercased.

`\bibucsstring[\wrapper]{\key}`

Similar to `\bibsstring` but the whole term is uppercased.

`\biblcstring[\wrapper]{\key}`

Similar to `\bibstring` but the whole term is lowercased.

`\biblclstring[\wrapper]{\key}`

Similar to `\biblstring` but the whole term is lowercased.

`\biblcsstring[\wrapper]{\key}`

Similar to `\bibsstring` but the whole term is lowercased.

`\bibxstring{⟨key⟩}`

A simplified but expandable version of `\bibstring`. Note that this variant does not capitalize automatically, nor does it hook into the punctuation tracker. It is intended for special cases in which strings are nested or an expanded localisation string is required in a test.

`\bibxlstring[⟨wrapper⟩]{⟨key⟩}`

Similar to `\bibxstring` but always uses the long string, ignoring the `abbreviate` option.

`\bibxsstring[⟨wrapper⟩]{⟨key⟩}`

Similar to `\bibxstring` but always uses the short string, ignoring the `abbreviate` option.

`\mainlang`

Deprecated

Switches from the current language to the main document language. This command is deprecated. Use the text-macro `\textmainlang` instead. With `babel` this command will need to be wrapped into *two* groups to have purely local effect.

`\textmainlang{⟨text⟩}`

Locally switches from the current language to the main document language to typeset `⟨text⟩`. This can be used the `⟨wrapper⟩` argument in the localisation string commands above.

`\texouterlang{⟨text⟩}`

Locally switches from the current language to the surrounding language (which was not selected by `biblatex`) to typeset `⟨text⟩`. This can be used the `⟨wrapper⟩` argument in the localisation string commands above.

It is possible to add bibliography strings to a bibliography string set to apply additional formatting.

`\DeclareBibstringSet{⟨setname⟩}{⟨key,...⟩}`

This commands assigns all `⟨key⟩`s to the bibliography string set `⟨setname⟩`.

`\UndeclareBibstringSet{⟨setname⟩}`

Remove the bibliography string set `⟨setname⟩`. Any formatting definitions will also be cleared.

`\UndeclareBibstringSets`

Remove all existing bibliography string sets with `\UndeclareBibstringSet`.

`\DeclareBibstringSetFormat{⟨setname⟩}{⟨code⟩}`

Defines the bibliography string format for `⟨setname⟩`. The format works exactly like an additional `⟨wrapper⟩` format for `\bibstring`. `⟨code⟩` is executed whenever a bibliography string of `⟨setname⟩` is printed. The text of the bibliography string is passed to `⟨code⟩` as first and only argument.



`\UnecclareBibstringSetFormat{⟨setname⟩}`

Remove any bibliography string set format defined for `⟨setname⟩`.

Bibliography string sets can be useful to apply additional formatting to a number of bibliography strings at the same time. These commands are intended for use in language modules. For example in French typography it is customary to italicise Latin terms. The French language module can define a new bibliography string set called `latin` for all Latin strings and apply additional formatting only to these strings. It is not recommended to apply the formatting directly in the bibliography string definitions, since that can interfere with the capitalisation function. Assuming that the French language `.lbx` file only defines two Latin strings, `andothers` and `andothers`, the `.lbx` file would contain.

```
\DeclareBibliographyExtras{%  
  ...  
  \DeclareBibstringSet{latin}{andothers,ibidem}%  
  \DeclareBibstringSetFormat{latin}{\mkbibemph{#1}}%  
  ...  
}  
  
\UndeclareBibliographyExtras{%  
  ...  
  \UndeclareBibstringSet{latin}%  
  ...  
}
```

Note that the defined sets should be undeclared after use to avoid side effects for other languages.

## 4.9 Localization Modules

A localisation module provides translations for key terms such as ‘edition’ or ‘volume’ as well as definitions for language specific features such as the date format and ordinals. These definitions are provided in files with the suffix `lbx`. The base name of the file must be a language name known to the `babel/polyglossia` packages. The `lbx` files may also be used to map `babel/polyglossia` language names to the backend modules of the `biblatex` package. All localisation modules are loaded on demand in the document body. Note that the contents of the file are processed in a group and that the category code of the character `@` is temporarily set to ‘letter’.

### 4.9.1 Localization Commands

The user-level versions of the localisation commands were already introduced in § 3.10. When used in `lbx` files, however, the syntax of localisation commands is different from the user syntax in the preamble and the configuration file. When used in localisation files, there is no need to specify the `⟨language⟩` because the mapping of strings to a language is already provided by the name of the `lbx` file.

`\DeclareBibliographyStrings{⟨definitions⟩}`

This command is only available in `lbx` files. It is used to define localisation strings. The `⟨definitions⟩` consist of `⟨key⟩=⟨value⟩` pairs which assign an expression to an

identifier. A complete list of all keys supported by default is given in § 4.9.2. Note that the syntax of the value is different in `lbx` files. The value assigned to a key consists of two expressions, each of which is wrapped in an additional pair of brackets. This is best shown by example:

```
\DeclareBibliographyStrings{%
  bibliography = {{Bibliography}{Bibliography}},
  shorthands   = {{List of Abbreviations}{
    ↪ Abbreviations}},
  editor       = {{editor}{ed.}},
  editors      = {{editors}{eds.}},
}
```

The first value is the long, written out expression, the second one is an abbreviated or short form. Both strings must always be given even though they may be identical if an expression is always (or never) abbreviated. Depending on the setting of the `abbreviate` package option (see § 3.1.2.1), `biblatex` selects one expression when loading the `lbx` file. There is also a special key named `inherit` which copies the strings from a different language. This is intended for languages which only differ in a few expressions, such as German and Austrian or American and British English. For example, here are the complete definitions for Austrian:

```
\DeclareBibliographyStrings{%
  inherit      = {german},
  january      = {{J\"anner}{J\"an.}},
}
```

The above examples are slightly simplified. Real localisation files should use the punctuation and formatting commands discussed in §§ 4.7.3 and 3.12 instead of literal punctuation. Here is an excerpt from a real localisation file:

```
bibliography      = {{Bibliography}{Bibliography}},
shorthands        = {{List of Abbreviations}{
  ↪ Abbreviations}},
editor            = {{editor}{ed\adddot}},
editors           = {{editors}{eds\adddot}},
byeditor          = {{edited by}{ed\adddotsspace by}},
mathesis          = {{Master's thesis}{
  ↪ MA\addabbrvspace thesis}},
```

Note the handling of abbreviation dots, the spacing in abbreviated expressions, and the capitalization in the example above. All expressions should be capitalized as they usually are when used in the middle of a sentence. The `biblatex` package will automatically capitalize the first word when required at the beginning of a sentence, see `\DeclareCapitalPunctuation` in § 4.7.5 for details. Expressions intended for use in headings are special. They should be capitalized in a way that is suitable for titling and should not be abbreviated (but they may have a short form).

`\InheritBibliographyStrings{⟨language⟩}`

This command is only available in `lbx` files. It copies the localisation strings for `⟨language⟩` to the current language, as specified by the name of the `lbx` file.

`\DeclareBibliographyExtras{⟨code⟩}`

This command is only available in `lbx` files. It is used to adapt language specific features such as the date format and ordinals. The `⟨code⟩`, which may be arbitrary LaTeX code, will usually consist of redefinitions of the formatting commands from § 4.10.2.

`\UndeclareBibliographyExtras{⟨code⟩}`

This command is only available in `lbx` files. It is used to restore any formatting commands modified with `\DeclareBibliographyExtras`. If a redefined command is included in § 4.10.2, there is no need to restore its previous definition since these commands are localised by all language modules anyway.

`\InheritBibliographyExtras{⟨language⟩}`

This command is only available in `lbx` files. It copies the bibliography extras for `⟨language⟩` to the current language, as specified by the name of the `lbx` file.

`\DeclareHyphenationExceptions{⟨text⟩}`

This command corresponds to `\DefineHyphenationExceptions` from § 3.10. The difference is that it is only available in `lbx` files and that the `⟨language⟩` argument is omitted. The hyphenation exceptions will affect the language of the `lbx` file currently being processed.

`\DeclareRedundantLanguages{⟨language, language, ...⟩}{⟨langid, langid, ...⟩}`

This command provides the language mappings required by the `clearlang` option from § 3.1.2.1. The `⟨language⟩` is the string given in the language field (without the optional `lang` prefix); `⟨langid⟩` is `babel/polyglossia`'s language identifier, as given in the optional argument of `\usepackage` when loading `babel` or the argument of `\setdefaultlanguage` or `\setotherlanguages` when using `polyglossia`. This command may be used in `lbx` files or in the document preamble. Here are some examples:

```
\DeclareRedundantLanguages{french}{french}
\DeclareRedundantLanguages{german}{german,ngerman,
  ↪ austrian,naustrian,
    nswissgerman,swissgerman}
\DeclareRedundantLanguages{english,american}{english,
  ↪ american,british,
    canadian,australian,newzealand,USenglish,
  ↪ UKenglish}
```

Note that this feature needs to be enabled globally with the `clearlang` option from § 3.1.2.1. If it is disabled, all mappings will be ignored. If the `⟨langid⟩` parameter is blank, `biblatex` will clear the mappings for the corresponding `⟨language⟩`, i. e., the feature will be disabled for this `⟨language⟩` only.

`\DeclareLanguageMapping{⟨language⟩}{⟨file⟩}`

This command maps a babel/polyglossia language identifier to an l<sup>b</sup>x file. The *⟨language⟩* must be a language name known to the babel/polyglossia package, i. e., one of the identifiers listed in table 2. The *⟨file⟩* argument is the name of an alternative l<sup>b</sup>x file without the .l<sup>b</sup>x suffix. Declaring the same mapping more than once is possible. Subsequent declarations will simply overwrite any previous ones. This command may only be used in the preamble. See § 4.11.8 for further details.

`\DeclareLanguageMappingSuffix{⟨suffix⟩}`

This command defines a language file suffix which will be added when looking for .l<sup>b</sup>x language string definition files. This is intended for styles which provide their own .l<sup>b</sup>x files so that they will be used automatically. For example, the APA style defines:

```
\DeclareLanguageMappingSuffix{-apa}
```

When the document language is ‘german’, bibl<sup>a</sup>tex will look for the file german-apa.l<sup>b</sup>x which defines some APA specific strings and in turn loads german.l<sup>b</sup>x. If `\DeclareLanguageMapping` is defined for a language, this overrides `\DeclareLanguageMappingSuffix`.

The suffix will be applied to other language files loaded recursively by the loading of a language file. For example, given the suffix defined above, when loading ‘ngerman’, bibl<sup>a</sup>tex will look for the file ngerman-apa.l<sup>b</sup>x and if this recursively loads ‘german’, then bibl<sup>a</sup>tex will look for german-apa.l<sup>b</sup>x. Infinite recursion is of course avoided.

`\NewBibliographyString{⟨key⟩}`

This command, which may be used in the preamble (including cbx and bbx files) as well as in l<sup>b</sup>x files, declares new localisation strings, i. e., it initializes a new *⟨key⟩* to be used in the *⟨definitions⟩* of `\DefineBibliographyStrings` or `\DeclareBibliographyStrings`. The *⟨key⟩* argument may also be a comma-separated list of key names. When used in an l<sup>b</sup>x, the *⟨key⟩* is initialized only for the language specified by the name of the l<sup>b</sup>x file. The keys listed in § 4.9.2 are defined by default.

## 4.9.2 Localization Keys

The localisation keys in this section are defined by default and covered by the localisation files which come with bibl<sup>a</sup>tex. Note that these strings are only available in citations, the bibliography and bibliography lists. All expressions should be capitalized as they usually are when used in the middle of a sentence. bibl<sup>a</sup>tex will capitalize them automatically at the beginning of a sentence. The only exceptions to these rules are the three strings intended for use in headings.

### 4.9.2.1 Headings

The following strings are special because they are intended for use in headings and made available globally via macros. For this reason, they should be capitalized for use in headings and they must not include any local commands which are part of bibl<sup>a</sup>tex’s author interface.

<b>bibliography</b>	The term ‘bibliography’, also available as <code>\bibname</code> .
<b>references</b>	The term ‘references’, also available as <code>\refname</code> .
<b>shorthands</b>	The term ‘list of shorthands’ or ‘list of abbreviations’, also available as <code>\biblistname</code> .

#### 4.9.2.2 Roles, Expressed as Functions

The following keys refer to roles which are expressed as a function (‘editor’, ‘translator’) rather than as an action (‘edited by’, ‘translated by’).

<b>editor</b>	The term ‘editor’, referring to the main editor. This is the most generic editorial role.
<b>editors</b>	The plural form of <code>editor</code> .
<b>compiler</b>	The term ‘compiler’, referring to an editor whose task is to compile a work.
<b>compilers</b>	The plural form of <code>compiler</code> .
<b>founder</b>	The term ‘founder’, referring to a founding editor.
<b>founders</b>	The plural form of <code>founder</code> .
<b>continuator</b>	An expression like ‘continuator’, ‘continuation’, or ‘continued’, referring to a past editor who continued the work of the founding editor but was subsequently replaced by the current editor.
<b>continuators</b>	The plural form of <code>continuator</code> .
<b>redactor</b>	The term ‘redactor’, referring to a secondary editor.
<b>redactors</b>	The plural form of <code>redactor</code> .
<b>reviser</b>	The term ‘reviser’, referring to a secondary editor.
<b>revisers</b>	The plural form of <code>reviser</code> .
<b>collaborator</b>	A term like ‘collaborator’, ‘collaboration’, ‘cooperator’, or ‘cooperation’, referring to a secondary editor.
<b>collaborators</b>	The plural form of <code>collaborator</code> .
<b>translator</b>	The term ‘translator’.
<b>translators</b>	The plural form of <code>translator</code> .
<b>commentator</b>	The term ‘commentator’, referring to the author of a commentary to a work.
<b>commentators</b>	The plural form of <code>commentators</code> .
<b>annotator</b>	The term ‘annotator’, referring to the author of annotations to a work.
<b>annotators</b>	The plural form of <code>annotators</code> .
<b>organizer</b>	The term ‘organizer’, referring to the organizer of an event or work.
<b>organizers</b>	The plural form of <code>organizer</code> .

#### 4.9.2.3 Concatenated Editor Roles, Expressed as Functions

The following keys are similar in function to `editor`, `translator`, etc. They are used to indicate additional roles of the editor, e. g., ‘editor and translator’, ‘editor and foreword’.

<b>editortr</b>	Used if <code>editor</code> / <code>translator</code> are identical.
<b>editorstr</b>	The plural form of <code>editortr</code> .

`editorco` Used if editor/commentator are identical.  
`editorsco` The plural form of `editorco`.  
`editoran` Used if editor/annotator are identical.  
`editorsan` The plural form of `editoran`.  
`editorin` Used if editor/introduction are identical.  
`editorsin` The plural form of `editorin`.  
`editorfo` Used if editor/foreword are identical.  
`editorsfo` The plural form of `editorfo`.  
`editoraf` Used if editor/aftword are identical.  
`editorsaf` The plural form of `editoraf`.

Keys for editor/translator/⟨*role*⟩ combinations:

`editortrco` Used if editor/translator/commentator are identical.  
`editorstrco` The plural form of `editortrco`.  
`editortran` Used if editor/translator/annotator are identical.  
`editorstran` The plural form of `editortran`.  
`editortrin` Used if editor/translator/introduction are identical.  
`editorstrin` The plural form of `editortrin`.  
`editortrfo` Used if editor/translator/foreword are identical.  
`editorstrfo` The plural form of `editortrfo`.  
`editortraf` Used if editor/translator/aftword are identical.  
`editorstraf` The plural form of `editortraf`.

Keys for editor/commentator/⟨*role*⟩ combinations:

`editorcoin` Used if editor/commentator/introduction are identical.  
`editorscoin` The plural form of `editorcoin`.  
`editorcofo` Used if editor/commentator/foreword are identical.  
`editorscofo` The plural form of `editorcofo`.  
`editorcoaf` Used if editor/commentator/aftword are identical.  
`editorscoaf` The plural form of `editorcoaf`.

Keys for editor/annotator/⟨*role*⟩ combinations:

`editoranin` Used if editor/annotator/introduction are identical.  
`editorsanin` The plural form of `editoranin`.  
`editoranfo` Used if editor/annotator/foreword are identical.  
`editorsanfo` The plural form of `editoranfo`.  
`editoranaf` Used if editor/annotator/aftword are identical.  
`editorsanaf` The plural form of `editoranaf`.

Keys for editor/translator/commentator/⟨*role*⟩ combinations:

<code>editortrcoin</code>	Used if editor/translator/commentator/introduction are identical.
<code>editorstrcoin</code>	The plural form of <code>editortrcoin</code> .
<code>editortrcofo</code>	Used if editor/translator/commentator/foreword are identical.
<code>editorstrcofo</code>	The plural form of <code>editortrcofo</code> .
<code>editortrcoaf</code>	Used if editor/translator/commentator/aftword are identical.
<code>editorstrcoaf</code>	The plural form of <code>editortrcoaf</code> .

Keys for editor/annotator/commentator/⟨*role*⟩ combinations:

<code>editortranin</code>	Used if editor/annotator/commentator/introduction are identical.
<code>editorstranin</code>	The plural form of <code>editortranin</code> .
<code>editortranfo</code>	Used if editor/annotator/commentator/foreword are identical.
<code>editorstranfo</code>	The plural form of <code>editortranfo</code> .
<code>editortranaf</code>	Used if editor/annotator/commentator/aftword are identical.
<code>editorstranaf</code>	The plural form of <code>editortranaf</code> .

#### 4.9.2.4 Concatenated Translator Roles, Expressed as Functions

The following keys are similar in function to `translator`. They are used to indicate additional roles of the translator, e. g., ‘translator and commentator’, ‘translator and introduction’.

<code>translatorco</code>	Used if translator/commentator are identical.
<code>translatorsco</code>	The plural form of <code>translatorco</code> .
<code>translatorsan</code>	Used if translator/annotator are identical.
<code>translatorsan</code>	The plural form of <code>translatorsan</code> .
<code>translatorin</code>	Used if translator/introduction are identical.
<code>translatorsin</code>	The plural form of <code>translatorin</code> .
<code>translatorfo</code>	Used if translator/foreword are identical.
<code>translatorsfo</code>	The plural form of <code>translatorfo</code> .
<code>translatorsaf</code>	Used if translator/aftword are identical.
<code>translatorsaf</code>	The plural form of <code>translatorsaf</code> .

Keys for translator/commentator/⟨*role*⟩ combinations:

<code>translatorcoin</code>	Used if translator/commentator/introduction are identical.
<code>translatorscoin</code>	The plural form of <code>translatorcoin</code> .
<code>translatorcofo</code>	Used if translator/commentator/foreword are identical.
<code>translatorscofo</code>	The plural form of <code>translatorcofo</code> .
<code>translatorcoaf</code>	Used if translator/commentator/aftword are identical.
<code>translatorscoaf</code>	The plural form of <code>translatorcoaf</code> .

Keys for translator/annotator/⟨*role*⟩ combinations:

<code>translatorsanin</code>	Used if translator/annotator/introduction are identical.
------------------------------	--



<code>translatorsanin</code>	The plural form of <code>translatoranin</code> .
<code>translatoranfo</code>	Used if <code>translator/annotator/foreword</code> are identical.
<code>translatorsanfo</code>	The plural form of <code>translatoranfo</code> .
<code>translatoranaf</code>	Used if <code>translator/annotator/aftword</code> are identical.
<code>translatorsanaf</code>	The plural form of <code>translatoranaf</code> .

#### 4.9.2.5 Roles, Expressed as Actions

The following keys refer to roles which are expressed as an action ('edited by', 'translated by') rather than as a function ('editor', 'translator').

<code>byauthor</code>	The expression '[created] by <i>&lt;name&gt;</i> '.
<code>byeditor</code>	The expression 'edited by <i>&lt;name&gt;</i> '.
<code>bycompiler</code>	The expression 'compiled by <i>&lt;name&gt;</i> '.
<code>byfounder</code>	The expression 'founded by <i>&lt;name&gt;</i> '.
<code>bycontinuator</code>	The expression 'continued by <i>&lt;name&gt;</i> '.
<code>byredactor</code>	The expression 'redacted by <i>&lt;name&gt;</i> '.
<code>byreviser</code>	The expression 'revised by <i>&lt;name&gt;</i> '.
<code>byreviewer</code>	The expression 'reviewed by <i>&lt;name&gt;</i> '.
<code>bycollaborator</code>	An expression like 'in collaboration with <i>&lt;name&gt;</i> ' or 'in cooperation with <i>&lt;name&gt;</i> '.
<code>bytranslator</code>	The expression 'translated by <i>&lt;name&gt;</i> ' or 'translated from <i>&lt;language&gt;</i> by <i>&lt;name&gt;</i> '.
<code>bycommentator</code>	The expression 'commented by <i>&lt;name&gt;</i> '.
<code>byannotator</code>	The expression 'annotated by <i>&lt;name&gt;</i> '.
<code>byorganizer</code>	The expression '[organized] by <i>&lt;name&gt;</i> '.

#### 4.9.2.6 Concatenated Editor Roles, Expressed as Actions

The following keys are similar in function to `byeditor`, `bytranslator`, etc. They are used to indicate additional roles of the editor, e. g., 'edited and translated by', 'edited and furnished with an introduction by', 'edited, with a foreword, by'.

<code>byeditortr</code>	Used if <code>editor/translator</code> are identical.
<code>byeditorco</code>	Used if <code>editor/commentator</code> are identical.
<code>byeditoran</code>	Used if <code>editor/annotator</code> are identical.
<code>byeditorin</code>	Used if <code>editor/introduction</code> are identical.
<code>byeditorfo</code>	Used if <code>editor/foreword</code> are identical.
<code>byeditoraf</code>	Used if <code>editor/aftword</code> are identical.

Keys for `editor/translator/role` combinations:

<code>byeditortrco</code>	Used if <code>editor/translator/commentator</code> are identical.
<code>byeditortran</code>	Used if <code>editor/translator/annotator</code> are identical.
<code>byeditortrin</code>	Used if <code>editor/translator/introduction</code> are identical.
<code>byeditortrfo</code>	Used if <code>editor/translator/foreword</code> are identical.
<code>byeditortraf</code>	Used if <code>editor/translator/aftword</code> are identical.

Keys for editor/commentator/⟨*role*⟩ combinations:

- `byeditorcoin` Used if editor/commentator/introduction are identical.
- `byeditorcofo` Used if editor/commentator/foreword are identical.
- `byeditorcoaf` Used if editor/commentator/aftword are identical.

Keys for editor/annotator/⟨*role*⟩ combinations:

- `byeditoranin` Used if editor/annotator/introduction are identical.
- `byeditoranfo` Used if editor/annotator/foreword are identical.
- `byeditoranaf` Used if editor/annotator/aftword are identical.

Keys for editor/translator/commentator/⟨*role*⟩ combinations:

- `byeditortrcoin` Used if editor/translator/commentator/introduction are identical.
- `byeditortrcofo` Used if editor/translator/commentator/foreword are identical.
- `byeditortrcoaf` Used if editor/translator/commentator/aftword are identical.

Keys for editor/translator/annotator/⟨*role*⟩ combinations:

- `byeditortranin` Used if editor/annotator/commentator/introduction are identical.
- `byeditortranfo` Used if editor/annotator/commentator/foreword are identical.
- `byeditortranaf` Used if editor/annotator/commentator/aftword are identical.

#### 4.9.2.7 Concatenated Translator Roles, Expressed as Actions

The following keys are similar in function to `bytranslator`. They are used to indicate additional roles of the translator, e. g., ‘translated and commented by’, ‘translated and furnished with an introduction by’, ‘translated, with a foreword, by’.

- `bytranslatorco` Used if translator/commentator are identical.
- `bytranslatorsa` Used if translator/annotator are identical.
- `bytranslatorin` Used if translator/introduction are identical.
- `bytranslatorsfo` Used if translator/foreword are identical.
- `bytranslatorsaf` Used if translator/aftword are identical.

Keys for translator/commentator/⟨*role*⟩ combinations:

- `bytranslatorcoin` Used if translator/commentator/introduction are identical.
- `bytranslatorcofo` Used if translator/commentator/foreword are identical.
- `bytranslatorcoaf` Used if translator/commentator/aftword are identical.

Keys for translator/annotator/⟨*role*⟩ combinations:

- `bytranslatorsanin` Used if translator/annotator/introduction are identical.
- `bytranslatorsanfo` Used if translator/annotator/foreword are identical.
- `bytranslatorsanaf` Used if translator/annotator/aftword are identical.

#### 4.9.2.8 Roles, Expressed as Objects

Roles which are related to supplementary material may also be expressed as objects ('with a commentary by') rather than as functions ('commentator') or as actions ('commented by').

withcommentator	The expression 'with a commentary by <i>&lt;name&gt;</i> '.
withannotator	The expression 'with annotations by <i>&lt;name&gt;</i> '.
withintroduction	The expression 'with an introduction by <i>&lt;name&gt;</i> '.
withforeword	The expression 'with a foreword by <i>&lt;name&gt;</i> '.
withafterword	The expression 'with an afterword by <i>&lt;name&gt;</i> '.

#### 4.9.2.9 Supplementary Material

commentary	The term 'commentary'.
annotations	The term 'annotations'.
introduction	The term 'introduction'.
foreword	The term 'foreword'.
afterword	The term 'afterword'.

#### 4.9.2.10 Publication Details

volume	The term 'volume', referring to a book.
volumes	The plural form of <code>volume</code> .
involumes	The term 'in', as used in expressions like 'in <i>&lt;number of volumes&gt;</i> volumes'.
journal	The term 'volume', referring to a journal.
jourser	The term 'series', referring to a journal.
book	The term 'book', referring to a document division.
part	The term 'part', referring to a part of a book or a periodical.
issue	The term 'issue', referring to a periodical.
newseries	The expression 'new series', referring to a journal.
oldseries	The expression 'old series', referring to a journal.
edition	The term 'edition'.
in	The term 'in', referring to the title of a work published as part of another one, e. g., ' <i>&lt;title of article&gt;</i> in <i>&lt;title of journal&gt;</i> '.
inseries	The term 'in', as used in expressions like 'volume <i>&lt;number&gt;</i> in <i>&lt;name of series&gt;</i> '.
ofseries	The term 'of', as used in expressions like 'volume <i>&lt;number&gt;</i> of <i>&lt;name of series&gt;</i> '.
number	The term 'number', referring to an issue of a journal.
chapter	The term 'chapter', referring to a chapter in a book.
version	The term 'version', referring to a revision number.
reprint	The term 'reprint'.
reprintof	The expression 'reprint of <i>&lt;title&gt;</i> '.
reprintas	The expression 'reprinted as <i>&lt;title&gt;</i> '.
reprintfrom	The expression 'reprinted from <i>&lt;title&gt;</i> '.

translationof	The expression ‘translation of <i>&lt;title&gt;</i> ’.
translationas	The expression ‘translated as <i>&lt;title&gt;</i> ’.
translationfrom	The expression ‘translated from [the] <i>&lt;language&gt;</i> ’.
reviewof	The expression ‘review of <i>&lt;title&gt;</i> ’.
origpubas	The expression ‘originally published as <i>&lt;title&gt;</i> ’.
origpubin	The expression ‘originally published in <i>&lt;year&gt;</i> ’.
astitle	The term ‘as’, as used in expressions like ‘published by <i>&lt;publisher&gt;</i> as <i>&lt;title&gt;</i> ’.
bypublisher	The term ‘by’, as used in expressions like ‘published by <i>&lt;publisher&gt;</i> ’.

#### 4.9.2.11 Publication State

inpreparation	The expression ‘in preparation’ (the manuscript is being prepared for publication).
submitted	The expression ‘submitted’ (the manuscript has been submitted to a journal or conference).
forthcoming	The expression ‘forthcoming’ (the manuscript has been accepted by a press or journal).
inpress	The expression ‘in press’ (the manuscript is fully copyedited and out of the author’s hands; it is in the final stages of the production process).
prepublished	The expression ‘pre-published’ (the manuscript is published in a preliminary form or location, such as online version in advance of print publication).

#### 4.9.2.12 Pagination

page	The term ‘page’.
pages	The plural form of page.
column	The term ‘column’, referring to a column on a page.
columns	The plural form of column.
section	The term ‘section’, referring to a document division (usually abbreviated as §).
sections	The plural form of section (usually abbreviated as §§).
paragraph	The term ‘paragraph’ (i. e., a block of text, not to be confused with section).
paragraphs	The plural form of paragraph.
verse	The term ‘verse’ as used when referring to a work which is cited by verse numbers.
verses	The plural form of verse.
line	The term ‘line’ as used when referring to a work which is cited by line numbers.
lines	The plural form of line.
pagetotal	The term ‘page’ as used in \mkpageprefix.
pagetotals	The plural form of pagetotal.
columntotal	The term ‘column’, referring to a column on a page, as used in \mkpageprefix.
columntotals	The plural form of columntotal.
sectiontotal	The term ‘section’, referring to a document division (usually abbreviated as §), as used in \mkpageprefix.
sectiontotals	The plural form of sectiontotal (usually abbreviated as §§).

<code>paragraphtotal</code>	The term ‘paragraph’ (i. e., a block of text, not to be confused with <code>section</code> ) as used in <code>\mkpageprefix</code> .
<code>paragraphtotals</code>	The plural form of <code>paragraphtotal</code> .
<code>versetotal</code>	The term ‘verse’ as used when referring to a work which is cited by verse numbers when used in <code>\mkpageprefix</code> .
<code>versetotals</code>	The plural form of <code>versetotal</code> .
<code>linetotal</code>	The term ‘line’ as used when referring to a work which is cited by line numbers when used in <code>\mkpageprefix</code> .
<code>linetotals</code>	The plural form of <code>linetotal</code> .

#### 4.9.2.13 Types

The following keys are typically used in the `type` field of `@thesis`, `@report`, `@misc`, and other entries:

<code>bathesis</code>	An expression equivalent to the term ‘Bachelor’s thesis’.
<code>mathesis</code>	An expression equivalent to the term ‘Master’s thesis’.
<code>phdthesis</code>	The term ‘PhD thesis’, ‘PhD dissertation’, ‘doctoral thesis’, etc.
<code>candthesis</code>	An expression equivalent to the term ‘Candidate thesis’. Used for ‘Candidate’ degrees that have no clear equivalent to the Master’s or doctoral level.
<code>techreport</code>	The term ‘technical report’.
<code>resreport</code>	The term ‘research report’.
<code>software</code>	The term ‘computer software’.
<code>datacd</code>	The term ‘data CD’ or ‘CD-ROM’.
<code>audiocd</code>	The term ‘audio CD’.

#### 4.9.2.14 Miscellaneous

<code>nodate</code>	The term to use in place of a date when there is no date for an entry e. g., ‘n.d.’
<code>and</code>	The term ‘and’, as used in a list of authors or editors, for example.
<code>andothers</code>	The expression ‘and others’ or ‘et alii’, used to mark the truncation of a name list.
<code>andmore</code>	Like <code>andothers</code> but used to mark the truncation of a literal list.

#### 4.9.2.15 Labels

The following strings are intended for use as labels, e. g., ‘Address: *<url>*’ or ‘Abstract: *<abstract>*’.

<code>url</code>	The term ‘address’ in the sense of an internet address.
<code>urlfrom</code>	An expression like ‘available from <i>&lt;url&gt;</i> ’ or ‘available at <i>&lt;url&gt;</i> ’.
<code>urlseen</code>	An expression like ‘accessed on <i>&lt;date&gt;</i> ’, ‘retrieved on <i>&lt;date&gt;</i> ’, ‘visited on <i>&lt;date&gt;</i> ’, referring to the access date of an online resource.
<code>file</code>	The term ‘file’.
<code>library</code>	The term ‘library’.
<code>abstract</code>	The term ‘abstract’.
<code>annotation</code>	The term ‘annotations’.

#### 4.9.2.16 Citations

Traditional scholarly expressions used in citations:

<code>idem</code>	The term equivalent to the Latin ‘idem’ (‘the same [person]’).
<code>idemsf</code>	The feminine singular form of <code>idem</code> .
<code>idems</code>	The masculine singular form of <code>idem</code> .
<code>idemsn</code>	The neuter singular form of <code>idem</code> .
<code>idempf</code>	The feminine plural form of <code>idem</code> .
<code>idempm</code>	The masculine plural form of <code>idem</code> .
<code>idempr</code>	The neuter plural form of <code>idem</code> .
<code>idempp</code>	The plural form of <code>idem</code> suitable for a mixed gender list of names.
<code>ibidem</code>	The term equivalent to the Latin ‘ibidem’ (‘in the same place’).
<code>opcit</code>	The term equivalent to the Latin term ‘opere citato’ (‘[in] the work [already] cited’).
<code>loccit</code>	The term equivalent to the Latin term ‘loco citato’ (‘[at] the place [already] cited’).
<code>confer</code>	The term equivalent to the Latin ‘confer’ (‘compare’).
<code>sequens</code>	The term equivalent to the Latin ‘sequens’ (‘[and] the following [page]’), as used to indicate a range of two pages when only the starting page is provided (e. g., ‘25 sq.’ or ‘25 f.’ instead of ‘25–26’).
<code>sequentes</code>	The term equivalent to the Latin ‘sequentes’ (‘[and] the following [pages]’), as used to indicate an open-ended range of pages when only the starting page is provided (e. g., ‘25 sqq.’ or ‘25 ff.’).
<code>passim</code>	The term equivalent to the Latin ‘passim’ (‘throughout’, ‘here and there’, ‘scatteredly’).

Other expressions frequently used in citations:

<code>see</code>	The term ‘see’.
<code>seealso</code>	The expression ‘see also’.
<code>seenote</code>	An expression like ‘see note <i>&lt;footnote&gt;</i> ’ or ‘as in <i>&lt;footnote&gt;</i> ’, used to refer to a previous footnote in a citation.
<code>backrefpage</code>	An expression like ‘see page <i>&lt;page&gt;</i> ’ or ‘cited on page <i>&lt;page&gt;</i> ’, used to introduce back references in the bibliography.
<code>backrefpages</code>	The plural form of <code>backrefpage</code> , e. g., ‘see pages <i>&lt;pages&gt;</i> ’ or ‘cited on pages <i>&lt;pages&gt;</i> ’.
<code>quotedin</code>	An expression like ‘quoted in <i>&lt;citation&gt;</i> ’, used when quoting a passage which was already a quotation in the cited work.
<code>citedas</code>	An expression like ‘henceforth cited as <i>&lt;shorthand&gt;</i> ’, used to introduce a shorthand in a citation.
<code>thiscite</code>	The expression used in some verbose citation styles to differentiate between the page range of the cited item (typically an article in a journal, collection, or conference proceedings) and the page number the citation refers to. For example: “Author, Title, in: Book, pp. 45–61, <code>thiscite</code> p. 52.”

#### 4.9.2.17 Month Names

january	The name 'January'.
february	The name 'February'.
march	The name 'March'.
april	The name 'April'.
may	The name 'May'.
june	The name 'June'.
july	The name 'July'.
august	The name 'August'.
september	The name 'September'.
october	The name 'October'.
november	The name 'November'.
december	The name 'December'.

#### 4.9.2.18 Language Names

langamerican	The language 'American' or 'American English'.
langbasque	The language 'Basque'.
langbrazilian	The language 'Brazilian' or 'Brazilian Portuguese'.
langbulgarian	The language 'Bulgarian'.
langcatalan	The language 'Catalan'.
langcroatian	The language 'Croatian'.
langczech	The language 'Czech'.
langdanish	The language 'Danish'.
langdutch	The language 'Dutch'.
langenglish	The language 'English'.
langestonian	The language 'Estonian'.
langfinnish	The language 'Finnish'.
langfrench	The language 'French'.
langgerman	The language 'German'.
langgreek	The language 'Greek'.
langhungarian	The language 'Hungarian'.
langitalian	The language 'Italian'.
langjapanese	The language 'Japanese'.
langlatin	The language 'Latin'.
langlatvian	The language 'Latvian'.
langlithuanian	The language 'Lithuanian'.
langmarathi	The language 'Marathi'.
langnorwegian	The language 'Norwegian'.
langpolish	The language 'Polish'.



langportuguese	The language ‘Portuguese’.
langromanian	The language ‘Romanian’.
langrussian	The language ‘Russian’.
langserbian	The language ‘Serbian’.
langslovak	The language ‘Slovak’.
langslovene	The language ‘Slovene’.
langspanish	The language ‘Spanish’.
langswedish	The language ‘Swedish’.
langturkish	The language ‘Turkish’.
langukrainian	The language ‘Ukrainian’.

The following strings are intended for use in phrases like ‘translated from [the] English by *translator*’:

fromamerican	The expression ‘from [the] American’ or ‘from [the] American English’.
frombasque	The expression ‘from [the] Basque’.
frombrazilian	The expression ‘from [the] Brazilian’ or ‘from [the] Brazilian Portuguese’.
frombulgarian	The expression ‘from [the] Bulgarian’.
fromcatalan	The expression ‘from [the] Catalan’.
fromcroatian	The expression ‘from [the] Croatian’.
fromczech	The expression ‘from [the] Czech’.
fromdanish	The expression ‘from [the] Danish’.
fromdutch	The expression ‘from [the] Dutch’.
fromenglish	The expression ‘from [the] English’.
fromestonian	The expression ‘from [the] Estonian’.
fromfinnish	The expression ‘from [the] Finnish’.
fromfrench	The expression ‘from [the] French’.
fromgerman	The expression ‘from [the] German’.
fromgreek	The expression ‘from [the] Greek’.
fromhungarian	The language ‘from [the] Hungarian’.
fromitalian	The expression ‘from [the] Italian’.
fromjapanese	The expression ‘from [the] Japanese’.
fromlatin	The expression ‘from [the] Latin’.
fromlatvian	The expression ‘from [the] Latvian’.
fromlithuanian	The language ‘from [the] Lithuanian’.
frommarathi	The expression ‘from [the] Marathi’.
fromnorwegian	The expression ‘from [the] Norwegian’.
frompolish	The expression ‘from [the] Polish’.
fromportuguese	The expression ‘from [the] Portuguese’.
fromromanian	The expression ‘from [the] Romanian’.

<code>fromrussian</code>	The expression ‘from [the] Russian’.
<code>fromserbian</code>	The expression ‘from [the] Serbian’.
<code>fromslovak</code>	The expression ‘from [the] Slovak’.
<code>fromslovene</code>	The expression ‘from [the] Slovene’.
<code>fromspanish</code>	The expression ‘from [the] Spanish’.
<code>fromswedish</code>	The expression ‘from [the] Swedish’.
<code>fromturkish</code>	The expression ‘from [the] Turkish’.
<code>fromukrainian</code>	The expression ‘from [the] Ukrainian’.

#### 4.9.2.19 Country Names

Country names are localised by using the string `country` plus the iso-3166 country code as the key. The short version of the translation should be the iso-3166 country code. Note that only a small number of country names is defined by default, mainly to illustrate this scheme. These keys are used in the `location` list of `@patent` entries but they may be useful for other purposes as well.

<code>countryde</code>	The name ‘Germany’, abbreviated as DE.
<code>countryeu</code>	The name ‘European Union’, abbreviated as EU.
<code>countryep</code>	Similar to <code>countryeu</code> but abbreviated as EP. This is intended for patent entries.
<code>countryfr</code>	The name ‘France’, abbreviated as FR.
<code>countryuk</code>	The name ‘United Kingdom’, abbreviated (according to iso-3166) as GB.
<code>countryus</code>	The name ‘United States of America’, abbreviated as US.

#### 4.9.2.20 Patents and Patent Requests

Strings related to patents are localised by using the term `patent` plus the iso-3166 country code as the key. Note that only a small number of patent keys is defined by default, mainly to illustrate this scheme. These keys are used in the `type` field of `@patent` entries.

<code>patent</code>	The generic term ‘patent’.
<code>patentde</code>	The expression ‘German patent’.
<code>patenteu</code>	The expression ‘European patent’.
<code>patentfr</code>	The expression ‘French patent’.
<code>patentuk</code>	The expression ‘British patent’.
<code>patentus</code>	The expression ‘U.S. patent’.

Patent requests are handled in a similar way, using the string `patreq` as the base name of the key:

<code>patreq</code>	The generic term ‘patent request’.
<code>patreqde</code>	The expression ‘German patent request’.
<code>patreqeu</code>	The expression ‘European patent request’.
<code>patreqfr</code>	The expression ‘French patent request’.
<code>patrequk</code>	The expression ‘British patent request’.
<code>patrequs</code>	The expression ‘U.S. patent request’.

#### 4.9.2.21 Dates and Times

Abbreviation strings for standard eras. Both secular and Christian variants are supported.

<code>commonera</code>	The era 'CE'
<code>beforecommonera</code>	The era 'BCE'
<code>annodomini</code>	The era 'AD'
<code>beforechrist</code>	The era 'BC'

Abbreviation strings for 'circa' dates:

<code>circa</code>	The string 'circa'
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Abbreviation strings for year divisions parsed from ISO8601-2 Extended Format dates:

<code>spring</code>	The string 'spring'
<code>summer</code>	The string 'summer'
<code>autumn</code>	The string 'autumn'
<code>winter</code>	The string 'winter'
<code>springN</code>	The string 'spring (Northern Hemisphere)'
<code>summerN</code>	The string 'summer (Northern Hemisphere)'
<code>autumnN</code>	The string 'autumn (Northern Hemisphere)'
<code>winterN</code>	The string 'winter (Northern Hemisphere)'
<code>springS</code>	The string 'spring (Southern Hemisphere)'
<code>summerS</code>	The string 'summer (Southern Hemisphere)'
<code>autumnS</code>	The string 'autumn (Southern Hemisphere)'
<code>winterS</code>	The string 'winter (Southern Hemisphere)'
<code>Q1</code>	The string 'Quarter 1'
<code>Q2</code>	The string 'Quarter 2'
<code>Q3</code>	The string 'Quarter 3'
<code>Q4</code>	The string 'Quarter 3'
<code>QD1</code>	The string 'Quadrimester 1'
<code>QD2</code>	The string 'Quadrimester 2'
<code>QD3</code>	The string 'Quadrimester 3'
<code>S1</code>	The string 'Semestral 1'
<code>S2</code>	The string 'Semestral 2'

Abbreviation strings for AM/PM:

<code>am</code>	The string 'AM'
<code>pm</code>	The string 'PM'

## 4.10 Formatting Commands

This section corresponds to § 3.12 in the user part of this manual. Bibliography and citation styles should incorporate the commands and facilities discussed in this section in order to provide a certain degree of high-level configurability. Users should not be forced to write new styles if all they want to do is modify the spacing in the bibliography or the punctuation used in citations.

### 4.10.1 User-definable Commands and Hooks

This section corresponds to § 3.12.1 in the user part of the manual. The commands and hooks discussed here are meant to be redefined by users, but bibliography and citation styles may provide a default definition which is different from the package default. These commands are defined in `biblatex.def`. Note that all commands starting with `\mk...` take one mandatory argument.

- `\bibsetup` Arbitrary code to be executed at the beginning of the bibliography, intended for commands which affect the layout of the bibliography.
- `\bibfont` Arbitrary code setting the font used in the bibliography. This is very similar to `\bibsetup` but intended for switching fonts.
- `\citesetup` Arbitrary code to be executed at the beginning of each citation command.
- `\newblockpunct` The separator inserted between ‘blocks’ in the sense explained in § 4.7.1. The default definition is controlled by the package option `block` (see § 3.1.2.1).
- `\newunitpunct` The separator inserted between ‘units’ in the sense explained in § 4.7.1. This will usually be a period or a comma plus an interword space. The default definition is a period and a space.
- `\finentrypunct` The punctuation printed at the very end of every bibliography entry, usually a period. The default definition is a period.
- `\entrysetpunct` The punctuation printed between bibliography subentries of an entry set. The default definition is a semicolon and a space.
- `\bibnamedelima` This delimiter controls the spacing between the elements which make up a name part. It is inserted automatically by the backend after the first name element if the element is less than three characters long and before the last element. The default definition is `\addhighpenspace`, i.e., a space penalized by the value of the `highnamepenalty` counter (§ 3.12.4). Please refer to § 3.15.4 for further details.
- `\bibnamedelimb` This delimiter controls the spacing between the elements which make up a name part. It is inserted automatically by the backend between all name elements where `\bibnamedelima` does not apply. The default definition is `\addlowpenspace`, i.e., a space penalized by the value of the `lownamepenalty` counter (§ 3.12.4). Please refer to § 3.15.4 for further details.
- `\bibnamedelimc` This delimiter controls the spacing between name parts. The default name formats use it between the name prefix and the family name if `useprefix=true`. The default definition is `\addhighpenspace`, i.e., a space penalized by the value of the `highnamepenalty` counter (§ 3.12.4). Please refer to § 3.15.4 for further details.

- `\bibnamedelimd` This delimiter controls the spacing between name parts. The default name formats use it between all name parts where `\bibnamedelimc` does not apply. The default definition is `\addlowpenpace`, i.e., a space penalized by the value of the `lownamepenalty` counter (§ 3.12.4). Please refer to § 3.15.4 for further details.
- `\bibnamedelimi` This delimiter replaces `\bibnamedelima/b` after initials. Note that this only applies to initials given as such in the bib file, not to the initials automatically generated by biblatex which use their own set of delimiters.
- `\bibinitperiod` The punctuation inserted automatically by the backend after all initials unless `\bibinithyphendelim` applies. The default definition is a period (`\adddot`). Please refer to § 3.15.4 for further details.
- `\bibinitdelim` The spacing inserted automatically by the backend between multiple initials unless `\bibinithyphendelim` applies. The default definition is an unbreakable interword space. Please refer to § 3.15.4 for further details.
- `\bibinithyphendelim` The punctuation inserted automatically by the backend between the initials of hyphenated name parts, replacing `\bibinitperiod` and `\bibinitdelim`. The default definition is a period followed by an unbreakable hyphen. Please refer to § 3.15.4 for further details.
- `\bibindexnamedelima` Replaces `\bibnamedelima` in the index.
- `\bibindexnamedelimb` Replaces `\bibnamedelimb` in the index.
- `\bibindexnamedelimc` Replaces `\bibnamedelimc` in the index.
- `\bibindexnamedelimd` Replaces `\bibnamedelimd` in the index.
- `\bibindexnamedelimi` Replaces `\bibnamedelimi` in the index.
- `\bibindexinitperiod` Replaces `\bibinitperiod` in the index.
- `\bibindexinitdelim` Replaces `\bibinitdelim` in the index.
- `\bibindexinithyphendelim` Replaces `\bibinithyphendelim` in the index.
- `\revsdnamepunct` The punctuation to be printed between the given and family name parts when a name is reversed. The default is a comma. This command should be incorporated in formatting directives for name lists. Please refer to § 3.15.4 for further details.
- `\bibnamedash` The dash to be used as a replacement for recurrent authors or editors in the bibliography. The default is an ‘em’ or an ‘en’ dash, depending on the indentation of the list of references.
- `\labelnamepunct` A separator to be printed after the name used for alphabetizing in the bibliography (author or editor, if the author field is undefined) instead of `\newunitpunct`. The default is `\newunitpunct`, i.e., it is not handled differently from regular unit punctuation but permits convenient reconfiguration. This punctuation command is deprecated and has been superseded by the context-sensitive `\nametitledelim` (see § 3.12.2). For backwards compatibility reasons, however, `\nametitledelim` still defaults to `\labelnamepunct` in the bib and biblist contexts. Style authors may want to consider replacing `\labelnamepunct` with `\printdelim{nametitledelim}` and users may want to prefer modifying the context-sensitive `nametitledelim` with `\DeclareDelimFormat` over redefining `\labelnamepunct`, e.g.,

Deprecated

```
\DeclareDelimFormat[bib]{nametitledelim}{%
  \addcolon\space}
```

- `\subtitlepunct` The separator to be printed between the fields `title` and `subtitle`, `booktitle` and `booksubtitle`, as well as `maintitle` and `mainsubtitle`. Use this separator instead of `\newunitpunct` at this location. The default is `\newunitpunct`, i.e., it is not handled differently from regular unit punctuation but permits convenient reconfiguration.
- `\intitlepunct` The separator to be printed between the word “in” and the following title in entry types such as `@article`, `@inbook`, `@incollection`, etc. Use this separator instead of `\newunitpunct` at this location. The default definition is a colon plus an interword space.
- `\bibpagespunct` The separator to be printed before the `pages` field. Use this separator instead of `\newunitpunct` at this location. The default is a comma plus an interword space.
- `\bibpagerefpunct` The separator to be printed before the `pageref` field. Use this separator instead of `\newunitpunct` at this location. The default is an interword space.
- `\bibeidpunct` The separator printed before the `eid` field (similar to `\bibpagespunct`). The default is a comma plus an interword space.
- `\multinamedelim` The delimiter to be printed between multiple items in a name list like `author` or `editor` if there are more than two names in the list. If there are only two names in the list, use the `\finalnamedelim` instead. This command should be incorporated in all formatting directives for name lists. The default is a comma followed by an interword space. Context Sensitive
- `\finalnamedelim` Use this command instead of `\multinamedelim` before the final name in a name list. The default is the localised term ‘and’, separated by interword spaces. Context Sensitive
- `\revsdnamedelim` The extra delimiter to be printed after the first name in a name list consisting of two names (in addition to `\finalnamedelim`) if the first name is reversed. This command should be incorporated in all formatting directives for name lists. Context Sensitive
- `\andothersdelim` The delimiter to be printed before the localisation string ‘and others’ if a name list like `author` or `editor` is truncated. This command should be incorporated in all formatting directives for name lists. The default is an interword space. Context Sensitive
- `\multilistdelim` The delimiter to be printed between multiple items in a literal list like `publisher` or `location` if there are more than two names in the list. If there are only two items in the list, use the `\finallistdelim` instead. This command should be incorporated in all formatting directives for literal lists. The default is a comma plus an interword space. Context Sensitive
- `\finallistdelim` Use this command instead of `\multilistdelim` before the final item in a literal list. The default is the localised term ‘and’, separated by interword spaces. Context Sensitive
- `\andmoredelim` The delimiter to be printed before the localisation string ‘and more’ if a literal list like `publisher` or `location` is truncated. This command should be incorporated in all formatting directives for literal lists. The default is an interword space. Context Sensitive

- `\multicitedelim` The delimiter printed between citations if multiple entry keys are passed to a single citation command. This command should be incorporated in the definition of all citation commands, for example in the `<sepcode>` argument passed to `\DeclareCiteCommand`. See § 4.3.1 for details. The default is a semicolon plus an interword space.
- `\multiciterangedelim` The delimiter printed between two citations if they are compressed to a range. The default is `\bibrangedash`.
- `\multicitesubentrydelim` The delimiter printed between subentry citations of the same set. This delimiter is only used in citation styles that reduce citations of the same set to a more compact form (subentry of numeric-comp). The default is a comma.
- `\multicitesubentryrangedelim` The delimiter printed between two citations of the same set if they are compressed to a range. The default is `\multiciterangedelim`.
- `\supercitedelim` Similar to `\multinamedelim`, but intended for the `\supercite` command only. The default is a comma.
- `\superciterangedelim` Analogue of `\multiciterangedelim` for `\supercite`. The default is `\bibrangedash`.
- `\supercitesubentrydelim` Analogue of `\multicitesubentrydelim` for `\supercite`. The default is `\supercitedelim`.
- `\supercitesubentryrangedelim` Analogue of `\multicitesubentryrangedelim` for `\supercite`. The default is `\superciterangedelim`.
- `\compcitedelim` Similar to `\multicitedelim`, but intended for citation styles that ‘compress’ multiple citations, i. e., print the author only once if subsequent citations share the same author etc. The default definition is a comma plus an interword space.
- `\textcitedelim` Similar to `\multicitedelim`, but intended for `\textcite` and related commands (§ 3.9.2). The default is a comma plus an interword space. The standard styles modify this provisional definition to ensure that the delimiter before the final citation is the localised term ‘and’, separated by interword spaces.
- `\nametitledelim` The delimiter to be printed between the author/editor and the title. This command should be incorporated in the definition of all citation commands of author-title and some verbose citation styles and in the bibliography drivers—in author-year bibliographies `\nametitledelim` may be printed between the author/editor-year block and the title. The default definition inside bibliographies (i. e., in the `bib` and `biblist` contexts) is the now deprecated `\labelnamepunct` (for backwards compatibility reasons), in `textcite` context it is a space and it is a comma plus an interword space otherwise. Context Sensitive
- `\nameyear delim` The delimiter to be printed between the author/editor and the year. This command should be incorporated in the definition of all citation commands of author-year citation styles and in the bibliography drivers. The default definition is an interword space. For backwards compatibility reasons there are separate definitions in the `bib`, `biblist`, `textcite` and `global` context. Context Sensitive
- `\namelabeldelim` The delimiter printed between the name/title and the label. This command should be incorporated in the definition of all citation commands of alphabetic and numeric citation styles. The default definition is an interword space. Context Sensitive



<code>\nonameyear<del>delim</del></code>	The delimiter printed between the substitute for the <code>labelname</code> when it does not exist (usually the label or title in standard styles) and the year citation styles and the bibliography drivers. This command should be incorporated in the definition of all citation commands of author-year citation styles and in the bibliography drivers. The default definition is an interword space. For backwards compatibility reasons there are separate definitions in the <code>bib</code> , <code>biblist</code> , <code>textcite</code> and global context.	Context Sensitive
<code>\author<del>typedelim</del></code>	The delimiter printed between the author and the <code>authortype</code> . The default is a comma followed by a space.	Context Sensitive
<code>\editor<del>typedelim</del></code>	The delimiter printed between the editor and the <code>editor</code> or <code>editortype</code> string. The default is a comma followed by a space.	Context Sensitive
<code>\translator<del>typedelim</del></code>	The delimiter printed between the translator and the <code>translator</code> string. The default is a comma followed by a space.	Context Sensitive
<code>\labelalpha<del>others</del></code>	A string to be appended to the non-numeric portion of the <code>labelalpha</code> field (i. e., the field holding the citation label used by alphabetic citation styles) if the number of authors/editors exceeds the <code>maxalphanames threshold</code> or the author/editor list was truncated in the <code>bib</code> file with the keyword ‘and others’. This will typically be a single character such as a plus sign or an asterisk. The default is a plus sign. This command may also be redefined to an empty string to disable this feature. In any case, it must be redefined in the preamble.	
<code>\sortalpha<del>others</del></code>	Similar to <code>\labelalpha<del>others</del></code> but used in the sorting process. Setting it to a different value is advisable if the latter contains formatting commands. If <code>\sortalpha<del>others</del></code> is not redefined, it defaults to <code>\labelalpha<del>others</del></code> .	
<code>\vol<del>citedelim</del></code>	The delimiter to be printed between the volume portion and the page/text portion of <code>\volcite</code> and related commands (§ 3.9.6).	
<code>\pre<del>notedelim</del></code>	The delimiter to be printed after the <code>⟨prenote⟩</code> argument of a citation command. The default is an interword space.	Context Sensitive
<code>\post<del>notedelim</del></code>	The delimiter to be printed before the <code>⟨postnote⟩</code> argument of a citation command. The default is a comma plus an interword space.	Context Sensitive
<code>\ext<del>postnotedelim</del></code>	The delimiter printed between the citation and the parenthetical <code>⟨postnote⟩</code> argument of a citation command when the postnote occurs outside of the citation parentheses. In the standard styles, this occurs when the citation uses the shorthand field of the entry. The default is an interword space.	Context Sensitive
<code>\multi<del>prenotedelim</del></code>	The delimiter to be printed after the <code>⟨multiprenote⟩</code> argument of a citation command.	Context Sensitive
<code>\multi<del>postnotedelim</del></code>	The delimiter to be printed before the <code>⟨multipostnote⟩</code> argument of a citation command.	Context Sensitive
<code>\mk<del>bibName</del> ‘name<del>part</del>’ {⟨text⟩}</code>	Formatting hook for the name part ‘namepart’, to be used in all formatting directives for name lists. The default <code>datamodel</code> defines the name parts ‘family’, ‘given’, ‘prefix’ and ‘suffix’ and therefore the following macros are automatically defined:	

```
\mkbibNamefamily
\mkbibNamegiven
```

```
\mkbibnameprefix  
\mkbibnamesuffix
```

`\mkbibcompletename'formatorder'`  $\langle text \rangle$  Formatting hook for the complete name in format order 'formatorder'. The default styles use the name format orders 'family', 'family-given' and 'given-family', therefore the following macros are automatically defined:

```
\mkbibcompletenamefamily  
\mkbibcompletenamefamilygiven  
\mkbibcompletenamegivenfamily
```

These formatting hooks should enclose the complete name in the bibliography macro `\name:'formatorder'`. Initially all hooks expand to `\mkbibcompletename`.

`\mkbibcompletename`  $\langle text \rangle$  The initial value of all default formatting hooks `\mkbibcompletename'formatorder'`.

`\datecircadelim` When formatting dates with the global option `datecirca` enabled, the delimiter printed after any localised 'circa' term. Defaults to interword space. Context Sensitive

`\dateeradelim` When formatting dates with the global option `dateera` set, the delimiter printed before the localisation era term. Defaults to interword space. Context Sensitive

`\dateuncertainprint` Prints date uncertainty information when the global option `dateuncertain` is enabled and the `\ifdateuncertain` test is true. By default, prints the language specific `\bibdateuncertain` string (§ 3.12.3).

`\enddateuncertainprint` Prints date uncertainty information when the global option `dateuncertain` is enabled and the `\ifenddateuncertain` test is true. By default, prints the language specific `\bibdateuncertain` string (§ 3.12.3).

`\datecircaprint` Prints date circa information when the global option `datecirca` is enabled and the `\ifdatecirca` test is true. By default, prints the 'circa' localised term (§ 4.9.2.21) and the `datecircadelim` delimiter.

`\enddatecircaprint` Prints date circa information when the global option `datecirca` is enabled and the `\ifenddatecirca` test is true. By default, prints the 'circa' localised term (§ 4.9.2.21) and the `datecircadelim` delimiter.

`\datecircaprintiso` Prints iso8601-2 format date circa information when the global option `datecirca` is enabled and the `\ifdatecirca` test is true. Prints `\textasciitilde`.

`\enddatecircaprintiso` Prints iso8601-2 format date circa information when the global option `datecirca` is enabled and the `\ifenddatecirca` test is true. Prints `\textasciitilde`.

- `\dateeraprint` `yearfield` Prints date era information when the global option `dateera` is set to ‘secular’ or ‘christian’. By default, prints the `dateeradelim` delimiter and the appropriate localised era term (§ 4.9.2.21). If the `dateeraauto` option is set, then the passed `<yearfield>` (which is the name of a year field such as ‘year’, ‘origyear’, ‘endeventyear’ etc.) is tested to see if its value is earlier than the `dateeraauto` threshold and if so, then the BCE/CE localisation will be output too. The default setting for `dateeraauto` is 0 and so only BCE/BC localisation strings are candidates for output. Detects whether the start or end year era information is to be printed by looking at the `<yearfield>` name passed to it.
- `\dateeraprintpre` Prints date era information when the global option `dateera` is set to ‘astronomical’. By default, prints `bibdataeraprefix`. Detects whether the start or end year era information is to be printed by looking at the `<yearfield>` name passed to it.
- `\relatedpunct` The separator between the `relatedtype` bibliography localisation string and the data from the first related entry.
- `\relateddelim` The generic separator between the data of multiple related entries. The default definition is an optional dot plus linebreak.
- `\relateddelim<relatedtype>` The separator between the data of multiple related entries inside related entries of type ‘relatedtype’. There is no default, if such a type-specific delimiter does not exist, `\relateddelim` is used.
- `\begrelateddelim` The generic separator before the block of related entries. The default definition is `\newunitpunct`.
- `\begrelateddelim<relatedtype>` The separator between the block of related entries of type ‘relatedtype’. There is no default, if such a type-specific delimiter does not exist, `\relateddelim` is used.

#### 4.10.2 Language-specific Commands

This section corresponds to § 3.12.3 in the user part of the manual. The commands discussed here are usually handled by the localisation modules, but may also be redefined by users on a per-language basis. Note that all commands starting with `\mk...` take one or more mandatory arguments.

- `\bibrangedash` The language specific dash to be used for ranges of numbers. Defaults to `\textendash`.
- `\bibrangessep` The language specific separator to be used between multiple ranges. Defaults to a comma followed by a space.
- `\bibdatesep` The language specific separator used between date components in terse date formats. Defaults to `\hyphen`.
- `\bibdaterangesep` The language specific separator to be used for date ranges. Defaults to `\textendash` for all date formats apart from `ymd` which defaults to a `\slash`. The date format option `iso` is hard-coded to `\slash` since this is a standards compliant format.
- `\mkbibdatelong` Takes the names of three field as arguments which correspond to three date components (in the order year/month/day) and uses their values to print the date in the language specific long date format.

`\mkbibdateshort` Similar to `\mkbibdatelong` but using the language specific short date format.

`\mkbibtimezone` Modifies a timezone string passed in as the only argument. By default this changes ‘Z’ to the value of `\bibtimezone`.

`\bibdateuncertain` The language specific marker to be used after uncertain dates when the global option `dateuncertain` is enabled. Defaults to a space followed by a question mark.

`\bibdateeraprefix` The language specific marker which is printed as a prefix to beginning BCE/BC dates in a date range when the option `dateera` is set to ‘astronomical’. Defaults to `\textminus`, if defined and `\textendash` otherwise.

`\bibdateeraendprefix` The language specific marker which is printed as a prefix to end BCE/BC dates in a date range when the option `dateera` is set to ‘astronomical’. Defaults to a thin space followed by `\bibdateeraprefix` when `\bibdaterangesep` is set to a dash and to `\bibdateeraprefix` otherwise. This is a separate macro so that you may add extra space before a negative date marker which, for example follows a dash date range marker as this can look a little odd.

`\bibtimesep` The language specific marker which separates time components. Default to a colon.

`\bibutctimezone` The language specific string printed for the UTC timezone. Defaults to ‘Z’.

`\bibtimezonesep` The language specific marker which separates an optional time zone component from a time. Empty by default.

`\bibtzminsep` The language specific marker which separates hour and minute component of offset timezones. Defaults to a `\bibtimesep`.

`\bibdatetimesep` The language specific separator printed between date and time components when printing time components along with date components (see the `<datatype>dateusetime` option in § 3.1.2.1). Defaults to a space for non-ISO8601-2 output formats, and ‘T’ for ISO8601-2 output format.

`\finalandcomma` Prints the comma to be inserted before the final ‘and’ in an enumeration, if applicable in the respective language.

`\finalandsemicolon` Prints the semicolon to be inserted before the final ‘and’ in an enumeration, if applicable in the respective language.

`\mkbibordinal{<integer>}`

Takes an integer argument and prints it as an ordinal number.

`\mkbibmascord{<integer>}`

Similar to `\mkbibordinal`, but prints a masculine ordinal, if applicable in the respective language.

`\mkbibfemord{<integer>}`

Similar to `\mkbibordinal`, but prints a feminine ordinal, if applicable in the respective language.

`\mkbibneutord{<integer>}`

Similar to `\mkbibordinal`, but prints a neuter ordinal, if applicable in the respective language.

`\mkbibordedition{⟨integer⟩}`

Similar to `\mkbibordinal`, but intended for use with the term ‘edition’.

`\mkbibordseries{⟨integer⟩}`

Similar to `\mkbibordinal`, but intended for use with the term ‘series’.

#### 4.10.3 User-definable Lengths and Counters

This section corresponds to § 3.12.4 in the user part of the manual. The length registers and counters discussed here are meant to be altered by users. Bibliography and citation styles should incorporate them where applicable and may also provide a default setting which is different from the package default.

`\bibhang` The hanging indentation of the bibliography, if applicable. This length is initialized to `\parindent` at load-time. If `\parindent` is zero length for some reason, `\bibhang` will default to 1em.

`\biblabelsep` The horizontal space between entries and their corresponding labels. Bibliography styles which use `list` environments and print a label should set `\labelsep` to `\biblabelsep` in the definition of the respective environment. This length is initialized to twice the value of `\labelsep` at load-time.

`\bibitemsep` The vertical space between the individual entries in the bibliography. Bibliography styles using `list` environments should set `\itemsep` to `\bibitemsep` in the definition of the respective environment. This length is initialized to `\itemsep` at load-time.

`\bibnamesep` Vertical space to be inserted between two entries in the bibliography whenever an entry starts with a name which is different from the initial name of the previous entry. The default value is zero. Setting this length to a positive value greater than `\bibitemsep` will group the bibliography by author/editor name. Note that `\bibitemsep`, `\bibnamesep`, and `\bibinitsep` obey the rules for `\addvspace`, that is, when vertical space introduced by any of these commands immediately follows on from space introduced by another of them, the resulting total space is equal to the largest of them.

`\bibinitsep` Vertical space to be inserted between two entries in the bibliography whenever an entry starts with a letter which is different from the initial letter of the previous entry. The default value is zero. Setting this length to a positive value greater than `\bibitemsep` will group the bibliography alphabetically. Note that `\bibitemsep`, `\bibnamesep`, and `\bibinitsep` obey the rules for `\addvspace`, that is, when vertical space introduced by any of these commands immediately follows on from space introduced by another of them, the resulting total space is equal to the largest of them.

`\bibparsep` The vertical space between paragraphs within an entry in the bibliography. Bibliography styles using `list` environments should set `\parsep` to `\bibparsep` in the definition of the respective environment. The default value is zero.

`abbrvpenalty` The penalty used by `\addabbrvspace`, `\addabthinspace`, and `\adddotsspace`, see § 4.7.4 for details. This counter is initialized to `\hyphenpenalty` at load-time.

- `highnamepenalty` The penalty used by `\addhighpenspace` and `\addhpthinspace`, see § 4.7.4 for details. The counter is initialized to `\hyphenpenalty` at load-time.
- `lownamepenalty` The penalty used by `\addlowpenspace` and `\addlpthinspace`, see § 4.7.4 for details. The counter is initialized to half the `\hyphenpenalty` at load-time.
- `biburlbigbreakpenalty` The biblatex version of url’s `\UrlBigBreakPenalty`. The default value is 100.
- `biburlbreakpenalty` The biblatex version of url’s `\UrlBreakPenalty`. The default value is 200.
- `biburlnumpenalty` If this counter is set to a value greater than zero, biblatex will permit line-breaks after numbers in all strings formatted with the `\url` command from the url package. This will affect URLs and DOIs in the bibliography. The breakpoints will be penalized by the value of this counter. If URLs and/or DOIs in the bibliography run into the margin, try setting this counter to a value greater than zero but less than 10000 (you normally want to use a high value like 9000). Setting the counter to zero disables this feature. This is the default setting.
- `biburlucpenalty` Similar to `biburlnumpenalty`, except that it will add a breakpoint after all uppercase letters.
- `biburlllcpenalty` Similar to `biburlnumpenalty`, except that it will add a breakpoint after all lowercase letters.
- `\biburlbigskip` The biblatex version of `\Urlmuskip`. This length holds the additional (stretchable) space inserted around breakable characters in the `\url` command from the url package. The default value is `0mu plus 3mu`.
- `\biburlnumskip` The additional space inserted after numbers in strings formatted with the `\url` command from the url package. This will affect URLs and DOIs in the bibliography. If URLs and/or DOIs in the bibliography run into the margin, it may help to set this length to add some small stretchable space, for example `0mu plus 1mu`. The default setting is `0mu`. This value is only used if `biburlnumpenalty` is set to a value different from zero.
- `\biburlucskip` Similar to `biburlnumskip`, except that it will add space after all uppercase letters.
- `\biburlllcskip` Similar to `biburlnumskip`, except that it will add space after all lowercase letters.

#### 4.10.4 Auxiliary Commands and Hooks

The auxiliary commands and facilities in this section serve a special purpose. Some of them are used by biblatex to communicate with bibliography and citation styles in some way or other.

`\mkbibemph{⟨text⟩}`

A generic command which prints its argument as emphasized text. This is a simple wrapper around the standard `\emph` command. Apart from that, it uses `\setpunctfont` from § 4.7.1 to adapt the font of the next punctuation mark following the text set in italics. If the `punctfont` package option is disabled, this command behaves like `\emph`.

`\mkbibitalic{⟨text⟩}`

Similar in concept to `\mkbibemph` but prints italicized text. This is a simple wrapper around the standard `\textit` command which incorporates `\setpunctfont`. If the `punctfont` package option is disabled, this command behaves like `\textit`.

`\mkbibbold{⟨text⟩}`

Similar in concept to `\mkbibemph` but prints bold text. This is a simple wrapper around the standard `\textbf` command which incorporates `\setpunctfont`. If the `punctfont` package option is disabled, this command behaves like `\textbf`.

`\mkbibquote{⟨text⟩}`

A generic command which wraps its argument in quotation marks. If the `csquotes` package is loaded, this command uses the language sensitive quotation marks provided by that package. `\mkbibquote` also supports ‘American-style’ punctuation, see `\DeclareQuotePunctuation` in § 4.7.5 for details.

`\mkbibparens{⟨text⟩}`

A generic command which wraps its argument in parentheses. This command is nestable. When nested, it will alternate between parentheses and brackets, depending on the nesting level.

`\mkbibbrackets{⟨text⟩}`

A generic command which wraps its argument in square brackets. This command is nestable. When nested, it will alternate between brackets and parentheses, depending on the nesting level.

`\bibopenparen⟨text⟩\bibcloseparen`

Alternative syntax for `\mkbibparens`. This will also work across groups. Note that `\bibopenparen` and `\bibcloseparen` must always be balanced.

`\bibopenbracket⟨text⟩\bibclosebracket`

Alternative syntax for `\mkbibbrackets`. This will also work across groups. Note that `\bibopenbracket` and `\bibclosebracket` must always be balanced.

`\mkbibfootnote{⟨text⟩}`

A generic command which prints its argument as a footnote. This is a wrapper around the standard LaTeX `\footnote` command which removes spurious white-space preceding the footnote mark and prevents nested footnotes. By default, `\mkbibfootnote` requests capitalization at the beginning of the note and automatically adds a period at the end. You may change this behavior by redefining the `\bibfootnotewrapper` macro introduced below.

`\mkbibfootnotetext{⟨text⟩}`

Similar to `\mkbibfootnote` but uses the `\footnotetext` command.



`\mkbibendnote{⟨text⟩}`

Similar in concept to `\mkbibfootnote` except that it prints its argument as an endnote. `\mkbibendnote` removes spurious whitespace preceding the endnote mark and prevents nested notes. It supports the `\endnote` command provided by the `endnotes` package as well as the `\pagenote` command provided by the `pagenote` package and the `memoir` class. If both commands are available, `\endnote` takes precedence. If no endnote support is available, `\mkbibendnote` issues an error and falls back to `\footnote`. By default, `\mkbibendnote` requests capitalization at the beginning of the note and automatically adds a period at the end. You may change this behavior by redefining the `\bibendnotewrapper` macro introduced below.

`\mkbibendnotetext{⟨text⟩}`

Similar to `\mkbibendnote` but uses the `\endnotetext` command. Please note that as of this writing, neither the `pagenote` package nor the `memoir` class provide a corresponding `\pagenotetext` command. In this case, `\mkbibendnote` will issue an error and fall back to `\footnotetext`.

`\bibfootnotewrapper{⟨text⟩}`

An inner wrapper which encloses the `⟨text⟩` argument of `\mkbibfootnote` and `\mkbibfootnotetext`. For example, `\mkbibfootnote` eventually boils down to this:

```
\footnote{\bibfootnotewrapper{text}}
```

The wrapper ensures capitalization at the beginning of the note and adds a period at the end. The default definition is:

```
\newcommand{\bibfootnotewrapper}[1]{\bibsentence #1  
↪ \addperiod}
```

If you don't want capitalization at the beginning or a period at the end of the note, do not modify `\mkbibfootnote` but redefine `\bibfootnotewrapper` instead.

`\bibendnotewrapper{⟨text⟩}`

Similar in concept to `\bibfootnotewrapper` but related to the `\mkbibendnote` and `\mkbibendnotetext` commands.

`\mkbibsuperscript{⟨text⟩}`

A generic command which prints its argument as superscripted text. This is a simple wrapper around the standard LaTeX `\textsuperscript` command which removes spurious whitespace and allows hyphenation of the preceding word.

`\mkbibmonth{⟨integer⟩}`

This command takes an integer argument and prints it as a month name. Even though the output of this command is language specific, its definition is not, hence it is normally not redefined in localisation modules.

`\mkbibyeardivision{⟨string⟩}`

Deprecated

This command takes a year division localisation string and prints the version of the string corresponding to the setting of the `dateabbrev` package option. Even though the output of this command is language specific, its definition is not, hence it is normally not redefined in localisation modules.

`\mkbibseason{⟨string⟩}`

Deprecated

This command takes a season localisation string and prints the version of the string corresponding to the setting of the `dateabbrev` package option. Even though the output of this command is language specific, its definition is not, hence it is normally not redefined in localisation modules.

`\mkyearzeros{⟨integer⟩}`

This command strips leading zeros from a year or enforces them, depending on the `datezeros` package option (§ 3.1.2.1). It is intended for use in the definition of date formatting macros. If zeros are enforced, this command calls `\forcezerosy` and thus expands its argument with `\protected@edef`.

`\mkmonthzeros{⟨integer⟩}`

This command strips leading zeros from a month or enforces them, depending on the `datezeros` package option (§ 3.1.2.1). It is intended for use in the definition of date formatting macros. If zeros are enforced, this command calls `\forcezerosmdt` and thus expands its argument with `\protected@edef`.

`\mkdayzeros{⟨integer⟩}`

This command strips leading zeros from a day or enforces them, depending on the `datezeros` package option (§ 3.1.2.1). It is intended for use in the definition of date formatting macros. If zeros are enforced, this command calls `\forcezerosmdt` and thus expands its argument with `\protected@edef`.

`\mktimezeros{⟨integer⟩}`

This command strips leading zeros from a number or preserves them, depending on the `timezeros` package option (§ 3.1.2.1). It is intended for use in the definition of time formatting macros. If zeros are enforced, this command calls `\forcezerosmdt` and thus expands its argument with `\protected@edef`.

`\forcezerosy{⟨integer⟩}`

This command adds zeros to a year (or any number supposed to be 4-digits). It is intended for date formatting and ordinals. The argument is expanded with `\protected@edef` before it is processed.

`\forcezerosmdt{⟨integer⟩}`

This command adds zeros to a month, day or time part (or any number supposed to be 2-digits). It is intended for date/time formatting and ordinals. The argument is expanded with `\protected@edef` before it is processed.

`\stripzeros{⟨integer⟩}`

This command strips leading zeros from a number. It is intended for date formatting and ordinals.

- `<labelfield>width` For every field marked as a ‘Label field’ in the data model, a formatting directive is created as per `shorthandwidth` above. Since `shorthand` is so marked in the default data model, this functionality is a superset of that described for `shorthandwidth`.
- `labelnumberwidth` Similar to `shorthandwidth`, but referring to the `labelnumber` field and the length register `\labelnumberwidth`. Numeric styles should adjust this directive such that it corresponds to the format used in the bibliography.
- `labelalphawidth` Similar to `shorthandwidth`, but referring to the `labelalpha` field and the length register `\labelalphawidth`. Alphabetic styles should adjust this directive such that it corresponds to the format used in the bibliography.
- `bibhyperref` A special formatting directive for use with `\printfield` and `\printtext`. This directive wraps its argument in a `\bibhyperref` command, see § 4.6.4 for details.
- `bibhyperlink` A special formatting directive for use with `\printfield` and `\printtext`. It wraps its argument in a `\bibhyperlink` command, see § 4.6.4 for details. The `<name>` argument passed to `\bibhyperlink` is the value of the `entrykey` field.
- `bibhypertarget` A special formatting directive for use with `\printfield` and `\printtext`. It wraps its argument in a `\bibhypertarget` command, see § 4.6.4 for details. The `<name>` argument passed to `\bibhypertarget` is the value of the `entrykey` field.
- `volcitepages` A special formatting directive which controls the format of the page/text portion in the argument of citation commands like `\volcite`.
- `volcitevolume` A special formatting directive which controls the format of the volume portion in the argument of citation commands like `\volcite`.
- `date` A special formatting directive which controls the format of `\printdate` (§ 4.4.1). Note that the date format (long/short etc.) is controlled by the package option `date` from § 3.1.2.1. This formatting directive only controls additional formatting such as fonts etc.
- `labeldate` As `date` but controls the format of `\printlabeldate`.
- `<datatype>date` As `date` but controls the format of `\print<datatype>date`.
- `time` A special formatting directive which controls the format of `\printtime` (§ 4.4.1). Note that the time format (24h/12h etc.) is controlled by the package option `time` from § 3.1.2.1. This formatting directive only controls additional formatting such as fonts etc.
- `labeltime` As `time` but controls the format of `\printlabeltime`.
- `<datatype>time` As `time` but controls the format of `\print<datatype>time`.

#### 4.10.5 Auxiliary Lengths, Counters, and Other Features

The length registers and counters discussed here are used by `biblatex` to pass information to bibliography and citation styles. Think of them as read-only registers. Note that all counters are LaTeX counters. Use `\value{counter}` to read out the current value.

`\<labelfield>width` For every field marked as a ‘label’ field in the data model, a length register is created as per `shorthandwidth` above. Since `shorthand` is so marked in the default data model, this functionality is a superset of that described for `shorthandwidth`.

`\labelnumberwidth` This length register indicates the width of the widest `labelnumber`. Numeric bibliography styles should incorporate this length in the definition of the bibliography environment.

`\labelalphawidth` This length register indicates the width of the widest `labelalpha`. Alphabetic bibliography styles should incorporate this length in the definition of the bibliography environment.

`maxextraalpha` This counter holds the highest number found in any `extraalpha` field.

`maxextradate` This counter holds the highest number found in any `extradate` field.

`maxextraname` This counter holds the highest number found in any `extraname` field.

`maxextratitle` This counter holds the highest number found in any `extratitle` field.

`maxextratitleyear` This counter holds the highest number found in any `extratitleyear` field.

`refsection` This counter indicates the current `refsection` environment. When queried in a bibliography heading, the counter returns the value of the `refsection` option passed to `\printbibliography`.

`refsegment` This counter indicates the current `refsegment` environment. When queried in a bibliography heading, this counter returns the value of the `refsegment` option passed to `\printbibliography`.

`maxnames` This counter holds the setting of the `maxnames` package option.

`minnames` This counter holds the setting of the `minnames` package option.

`maxitems` This counter holds the setting of the `maxitems` package option.

`minitems` This counter holds the setting of the `minitems` package option.

`instcount` This counter is incremented by `biblatex` for every citation as well as for every entry in the bibliography and bibliography lists. The value of this counter uniquely identifies a single instance of a reference in the document.

`citetotal` This counter, which is only available in the `<loopcode>` of a citation command defined with `\DeclareCiteCommand`, holds the total number of valid entry keys passed to the citation command.

`citecount` This counter, which is only available in the `<loopcode>` of a citation command defined with `\DeclareCiteCommand`, holds the number of the entry key currently being processed by the `<loopcode>`.

`multicitetotal` This counter is similar to `citetotal` but only available in `multicite` commands. It holds the total number of citations passed to the `multicite` command. Note that each of these citations may consist of more than one entry key. This information is provided by the `citetotal` counter.

- `multicitecount` This counter is similar to `citecount` but only available in multicite commands. It holds the number of the citation currently being processed. Note that this citation may consist of more than one entry key. This information is provided by the `citetotal` and `citecount` counters.
- `listtotal` This counter holds the total number of items in the current list. It is intended for use in list formatting directives and does not hold a meaningful value when used anywhere else. As an exception, it may also be used in the second optional argument to `\printnames` and `\printlist`, see § 4.4.1 for details. For every list, there is also a counter by the same name which holds the total number of items in the corresponding list. For example, the `author` counter holds the total number of items in the `author` list. This applies to both name lists and literal lists. These counters are similar to `listtotal` except that they may also be used independently of list formatting directives. For example, a bibliography style might check the `editor` counter to decide Whether or not to print the term “editor” or rather its plural form “editors” after the list of editors.
- `listcount` This counter holds the number of the list item currently being processed. It is intended for use in list formatting directives and does not hold a meaningful value when used anywhere else.
- `liststart` This counter holds the  $\langle start \rangle$  argument passed to `\printnames` or `\printlist`. It is intended for use in list formatting directives and does not hold a meaningful value when used anywhere else.
- `liststop` This counter holds the  $\langle stop \rangle$  argument passed to `\printnames` or `\printlist`. It is intended for use in list formatting directives and does not hold a meaningful value when used anywhere else.
- `\currentlang` The name of the currently active language for `biblatex`. Can be used anywhere and defaults to the main document language. This is automatically switched inside entries which define `langid`, given suitable settings of the `autolang` and `language` options. Note that this does not track all document language changes, only the current `biblatex` setting.
- `\currentfield` The name of the field currently being processed by `\printfield`. This information is only available locally in field formatting directives.
- `\currentlist` The name of the literal list currently being processed by `\printlist`. This information is only available locally in list formatting directives.
- `\currentname` The name of the name list currently being processed by `\printnames`. This information is only available locally in name formatting directives.

#### 4.10.6 General Purpose Hooks

`\AtBeginRefsection{ $\langle code \rangle$ }`

Appends the  $\langle code \rangle$  to an internal hook executed at the beginning of every reference section. The  $\langle code \rangle$  is executed just after setting the reference section number. This command may only be used in the preamble.

`\AtBeginBibliography{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed at the beginning of the bibliography. The `⟨code⟩` is executed at the beginning of the list of references, immediately after the `⟨begin code⟩` of `\defbibenvironment`. This command may only be used in the preamble.

`\AtBeginShorthands{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed at the beginning of the list of shorthands. The `⟨code⟩` is executed at the beginning of the list of shorthands, immediately after the `⟨begin code⟩` of `\defbibenvironment`. This command may only be used in the preamble.

This is just an alias for:

```
\AtBeginBiblist{shorthand}{code}
```

`\AtBeginBiblist{⟨biblistname⟩}{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed at the beginning of the bibliography list `⟨biblistname⟩`. The `⟨code⟩` is executed at the beginning of the bibliography list, immediately after the `⟨begin code⟩` of `\defbibenvironment`. This command may only be used in the preamble.

`\AtEveryBibitem{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed at the beginning of every item in the bibliography. The `⟨code⟩` is executed immediately after the `⟨item code⟩` of `\defbibenvironment`. The bibliographic data of the respective entry is available at this point. This command may only be used in the preamble.

`\AtEveryLositem{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed at the beginning of every item in the list of shorthands. The `⟨code⟩` is executed immediately after the `⟨item code⟩` of `\defbibenvironment`. The bibliographic data of the respective entry is available at this point. This command may only be used in the preamble.

This is just an alias for:

```
\AtEveryBiblistitem{shorthand}{code}
```

`\AtEveryBiblistitem{⟨biblistname⟩}{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed at the beginning of every item in the bibliography list named `⟨biblistname⟩`. The `⟨code⟩` is executed immediately after the `⟨item code⟩` of `\defbibenvironment`. The bibliographic data of the respective entry is available at this point. This command may only be used in the preamble.

`\AtNextBibliography{⟨code⟩}`

Similar to `\AtBeginBibliography` but only affecting the next `\printbibliography`. The internal hook is cleared after being executed once. This command may be used in the document body.

`\AtUsedriver{⟨code⟩}`  
`\AtUsedriver*{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed when initializing `\usedriver`. The starred variant of the command clears the initialisation hook, so the defaults can be overwritten. This command may only be used in the preamble. The default setting is:

```
\AtUsedriver{%  
  \delimcontext{bib}%  
  \let\finentry\blx@finentry@usedrv  
  \let\newblock\relax  
  \let\abx@macro@bibindex\@empty  
  \let\abx@macro@pageref\@empty}
```

`\AtEveryCite{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed at the beginning of every citation command. The `⟨code⟩` is executed immediately before the `⟨precode⟩` of the command (see § 4.3.1). No bibliographic data is available at this point. This command may only be used in the preamble.

`\AtEveryCitekey{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed once for every entry key passed to a citation command. The `⟨code⟩` is executed immediately before the `⟨loopcode⟩` of the command (see § 4.3.1). The bibliographic data of the respective entry is available at this point. This command may only be used in the preamble.

`\AtEveryMultiCite{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed at the beginning of every multicite command. The `⟨code⟩` is executed immediately before the `multiplenote` field (§ 4.3.2) is printed. No bibliographic data is available at this point. This command may only be used in the preamble.

`\AtNextCite{⟨code⟩}`

Similar to `\AtEveryCite` but only affecting the next citation command. The internal hook is cleared after being executed once. This command may be used in the document body.

`\AtEachCitekey{⟨code⟩}`

Similar to `\AtEveryCitekey` but only affecting the current citation command. This command may be used in the document body. The `⟨code⟩` is appended to the internal hook locally when located in a citation, as determined by `\ifcitation`.

`\AtNextCitekey{⟨code⟩}`

Similar to `\AtEveryCitekey` but only affecting the next entry key. The internal hook is cleared after being executed once. This command may be used in the document body.



`\AtNextMultiCite{⟨code⟩}`

Similar to `\AtEveryMultiCite` but only affecting the next multicite command. The internal hook is cleared after being executed once. This command may be used in the document body.

`\AtVolcite{⟨code⟩}`

`\AtVolcite*{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed when initializing `\volcite`. The starred variant of the command clears the initialisation hook, so the defaults can be overwritten. This command may only be used in the preamble. The default setting is:

```
\AtVolcite{%  
  \DeclareFieldAlias{postnote}{volcitenote}}
```

`\AtDataInput[⟨entrytype⟩]{⟨code⟩}`

Appends the `⟨code⟩` to an internal hook executed once for every entry as the bibliographic data is imported from the `bbl` file. The `⟨entrytype⟩` is the entry type the `⟨code⟩` applies to. If it applies to all entry types, omit the optional argument. The `⟨code⟩` is executed immediately after the entry has been imported. This command may only be used in the preamble. Note that `⟨code⟩` may be executed multiple times for an entry. This occurs when the same entry is cited in different `refsection` environments or the `sorting` option settings incorporate more than one sorting template. The `refsection` counter holds the number of the respective reference section while the data is imported.

`\UseBibitemHook`

Executes the internal hook corresponding to `\AtEveryBibitem`.

`\UseUsedriverHook`

Executes the internal hook corresponding to `\AtUsedriver`.

`\UseEveryCiteHook`

Executes the internal hook corresponding to `\AtEveryCite`.

`\UseEveryCitekeyHook`

Executes the internal hook corresponding to `\AtEveryCitekey`.

`\UseEveryMultiCiteHook`

Executes the internal hook corresponding to `\AtMultiEveryCite`.

`\UseNextCiteHook`

Executes and clears the internal hook corresponding to `\AtNextCite`.

`\UseNextCitekeyHook`

Executes and clears the internal hook corresponding to `\AtNextCitekey`.

`\UseNextMultiCiteHook`

Executes and clears the internal hook corresponding to `\AtNextMultiCite`.

`\UseVolciteHook`

Executes the internal hook corresponding to `\AtVolcite`.

`\DeferNextCitekeyHook`

Locally un-defines the internal hook specified by `\AtNextCitekey`. This essentially defers the hook to the next entry key in the citation list, when executed in the `<precode>` argument of `\DeclareCiteCommand` (§ 4.3.1).

`\AtEveryEntrykey{<code>}{<success>}{<failure>}`

Appends `<code>` to an internal hook executed every time an entrykey is processed for a citation command or `\nocite`. The `<code>` is passed one argument (#1), which contains the entrykey. If the code can be appended to the hook `<success>` is executed, otherwise `<failure>` is executed. Unlike `\AtEveryCitekey` the entry data of the current entrykey is not available when `<code>` is processed, indeed it is not even known whether or not there is any entry data at all.

#### 4.10.7 File hooks

`biblatex` has rudimentary support for injecting arbitrary code before and after a file is loaded via file hooks. For files that are loaded using `biblatex`'s file interface—that includes all bibliography and citation styles—the following three hooks are available

`\blx@filehook@preload@<filename with extension>`

If `<filename with extension>` is found, this hook is executed before it is loaded.

`\blx@filehook@postload@<filename with extension>`

If `<filename with extension>` is found, this hook is executed after it is loaded.

`\blx@filehook@failure@<filename with extension>`

This hook is executed if `<filename with extension>` can not be found.

`biblatex` generally only loads files once even if they were requested multiple times, so the hooks will only be executed once. Naturally, the file hooks need to be populated before the files are loaded, so the safest would be to populate them before `biblatex` is loaded. It is advisable to only append code to avoid overwriting previous hook contents. Since the name of the file hook include the dot and the file extension they will usually have to be defined with a command like `\csappto` from `etoolbox`.

The `.lbx` files are special and may have to be loaded several times in some situations. Their file hooks are

`\blx@lbxfilehook@once@preload@<filename with extension>`

If `<filename with extension>` is found, this hook is executed before it is loaded in a situation where the `.lbx` files are loaded only once.

`\blx@lbxfilehook@once@postload@<filename with extension>`

If `<filename with extension>` is found, this hook is executed after it is loaded in a situation where the `.lbx` files are loaded only once.

`\blx@lbxfilehook@once@failure@<filename with extension>`

This hook is executed if `<filename with extension>` can not be found in a situation where the `.lbx` files are loaded only once.

`\blx@lbxfilehook@simple@preload@<filename with extension>`

If `<filename with extension>` is found, this hook is executed before it is loaded in a situation where the `.lbx` files may be loaded multiple times.

`\blx@lbxfilehook@simple@postload@<filename with extension>`

If `<filename with extension>` is found, this hook is executed after it is loaded in a situation where the `.lbx` files may be loaded multiple times.

`\blx@lbxfilehook@simple@failure@<filename with extension>`

This hook is executed if `<filename with extension>` can not be found in a situation where the `.lbx` files may be loaded multiple times.

The following code sets up beamer to print the bibliography labels instead of its bibliography icons when `numeric.bbx` after is loaded

```
\csappto{blx@filehook@postload@numeric.bbx}{%  
  \mode<presentation>{%  
    \setbeamertemplate{bibliography item}{%  
      \insertbiblabel}}}
```

## 4.11 Hints and Caveats

This section provides some additional hints concerning the author interface of this package. It also addresses common problems and potential misconceptions.

### 4.11.1 Entry Sets

Entry sets have already been introduced in § 3.14.5. This section discusses how to process entry sets in a bibliography style. From the perspective of the driver, there is no difference between static and dynamic entry sets. Both types are handled in the same way. You will normally use the `\entryset` command from § 4.4.1 to loop over all set members (in the order in which they are listed in the `entryset` field of the `@set` entry, or in the order in which they were passed to `\defbibentryset`, respectively) and append `\finentry` at the end. That's it. The formatting is handled by the drivers for the entry types of the individual set members:

```
\DeclareBibliographyDriver{set}{%  
  \entryset{}{}%  
  \finentry}
```

You may have noticed that the `numeric` styles which come with this package support subdivided entry sets, i. e., the members of the set are marked with a letter or some other marker such that citations may either refer to the entire set or to a specific set member. The markers are generated as follows by the bibliography style:

```
\DeclareBibliographyDriver{set}{%
  \entryset
    {\printfield{entrysetcount}%
     \setunit*{\addnbspace}}
  {}%
  \finentry}
```

The `entrysetcount` field holds an integer indicating the position of a set member in the entry set. The conversion of this number to a letter or some other marker is handled by the formatting directive of the `entrysetcount` field. All the driver needs to do is print the field and add some white space (or start a new line). Printing the markers in citations works in a similar way. Where a numeric style normally says `\printfield{labelnumber}`, you simply append the `entrysetcount` field:

```
\printfield{labelnumber}\printfield{entrysetcount}
```

Since this field is only defined when processing citations referring to a set member, there is no need to add any additional tests.

Citing entry sets directly requires that a meaningful way of identifying sets is available in the style. This is obvious for styles based on numeric or alphabetic labels but not obvious (and rarely required) in styles which construct citations based on textual names/titles/dates etc. The default provided styles which do not construct citations based on labels (`authoryear`, `authortitle`, `verbose` etc.) therefore do not support citing sets directly as there is no obvious default identifier to use in such cases and such styles rarely, if ever, employ sets anyway. Custom styles may of course choose to define and print a citation identifier for directly cited sets.

#### 4.11.2 Electronic Publishing Information

The standard styles feature dedicated support for arXiv references. Support for other resources is easily added. The standard styles handle the `eprint` field as follows:

```
\iffieldundef{eprinttype}
  {\printfield{eprint}}
  {\printfield[eprint:\strfield{eprinttype}]{eprint}}
```

If an `eprinttype` field is available, the above code tries to use the field format `eprint:⟨eprinttype⟩`. If this format is undefined, `\printfield` automatically falls back to the field format `eprint`. There are two predefined field formats, the type-specific format `eprint:arxiv` and the fallback format `eprint`:

```
\DeclareFieldFormat{eprint}{...}
\DeclareFieldFormat{eprint:arxiv}{...}
```

In other words, adding support for additional resources is as easy as defining a field format named `eprint:⟨resource⟩` where `⟨resource⟩` is an identifier to be used in the `eprinttype` field.

#### 4.11.3 External Abstracts and Annotations

External abstracts and annotations have been discussed in § 3.14.8. This section provides some more background for style authors. The standard styles use the following macros (from `biblatex.def`) to handle abstracts and annotations:

```
\newbibmacro*{annotation}{%
  \iffieldundef{annotation}
    {\printfile[annotation]{
      ↪ \bibannotationprefix\thefield{entrykey}.tex}}%
    {\printfield{annotation}}}
\newcommand*{\bibannotationprefix}{bibannotation-}

\newbibmacro*{abstract}{%
  \iffieldundef{abstract}
    {\printfile[abstract]{\bibabstractprefix\thefield{
      ↪ entrykey}.tex}}%
    {\printfield{abstract}}}
\newcommand*{\bibabstractprefix}{bibabstract-}
```

If the `abstract/annotation` field is undefined, the above code tries to load the abstracts/annotations from an external file. The `\printfile` commands also incorporate file name prefixes which may be redefined by users. Note that you must enable `\printfile` explicitly by setting the `loadfiles` package option from § 3.1.2.1. This feature is disabled by default for performance reasons.

#### 4.11.4 Name Disambiguation

The `uniquename` and `uniquelist` options introduced in § 3.1.2.3 support various modes of operation. This section explains the differences between these modes by way of example. The `uniquename` option disambiguates individual names in the `labelname` list. The `uniquelist` option disambiguates the `labelname` list if it has become ambiguous after `maxnames/minnames` truncation. You can use either option stand-alone or combine both.

Name disambiguation works by taking a ‘base’ which is composed of one or more nameparts and then determining what needs to be added, if anything, to this ‘base’ to make the name unique in the current refsection. Name disambiguation is controlled by the `uniquename` template declared with the following command:

```
\DeclareUniquenameTemplate[⟨name⟩]{⟨specification⟩}
```

Defines the `uniquename` template `⟨name⟩`. The `⟨name⟩` is optional and defaults to `⟨global⟩`.

The `⟨specification⟩` is an ordered list of `\namepart` commands which define the nameparts to use in determining the `uniquename` information.

`\namepart[⟨options⟩]{⟨namepart⟩}`

⟨namepart⟩ is one of the datamodel nameparts defined with the `\DeclareDatamodelConstant` command (see § 4.2.3). The ⟨options⟩ are:

`use=true, false` default: false

Only use the ⟨namepart⟩ in constructing the uniqueusername information if there is a corresponding option use 'namepart' and that option is true.

`base=true, false` default: false

The ⟨namepart⟩ is part of the 'base' which is the main piece of namepart(s) information which is being disambiguated by uniqueness information. For example, a family name which may be disambiguated by further given names. 'base' ⟨namepart⟩s must occur before any non-'base' ⟨nameparts⟩. There *must* be at least one 'base' ⟨namepart⟩ and biber will report an error if this is not the case.

`disambiguation=none, init, initorfull, full`

The ⟨namepart⟩ will be disambiguated at most by information at the given value. If this option is not present then the default is inferred from the uniqueusername package option setting (see § 6). The 'disambiguation' option is ignored for ⟨namepart⟩s which have the 'base' option set to 'true' since it is these nameparts which are being disambiguated by the value of the non-base ⟨namepart⟩s and therefore 'disambiguation' does not apply.

**none** Do not use the ⟨namepart⟩ to perform any name disambiguation

**init** Use only the initials of the ⟨namepart⟩ to perform name disambiguation

**initorfull** Use initials and if necessary the full ⟨namepart⟩ to perform name disambiguation

**full** Use only the full ⟨namepart⟩ to perform name disambiguation even if initials would suffice

The default uniqueusername template is:

```
\DeclareUniquenameTemplate{
  \namepart[use=true, base=true]{prefix}
  \namepart[base=true]{family}
  \namepart{given}
}
```

This means that the 'base' to be disambiguated consists of the 'family' namepart, along with any prefix, if the useprefix option is true. The disambiguation is performed by adding anything up to the full namepart of any non 'base' nameparts in the specification, here just the 'given' namepart.

#### 4.11.4.1 Individual Names (uniqueusername)

Let's start off with some uniqueusername examples. Consider the following data:

```
John Doe    2008
Edward Doe  2008
John Smith  2008
Jane Smith  2008
```

Let's assume we're using an author-year style and set `uniquename=false`. In this case, we would get the following citations:

```
Doe 2008a
Doe 2008b
Smith 2008a
Smith 2008b
```

Since the family names are ambiguous and all works have been published in the same year, an extra letter is appended to the year to disambiguate the citations. Many style guides, however, mandate that the extra letter be used to disambiguate works by the same authors only, not works by different authors with the same family name. In order to disambiguate the author's family name, you are expected to add additional parts of the name, either as initials or in full. This requirement is addressed by the `uniquename` option. Here are the same citations with `uniquename=init`:

```
J. Doe 2008
E. Doe 2008
Smith 2008a
Smith 2008b
```

`uniquename=init` restricts name disambiguation to initials. Since 'J. Smith' would still be ambiguous, no additional name parts are added for the 'Smiths'. With `uniquename=full`, names are printed in full where required:

```
J. Doe 2008
E. Doe 2008
John Smith 2008
Jane Smith 2008
```

In order to illustrate the difference between `uniquename=init/full` and `allinit/allfull`, we need to introduce the notion of a 'visible' name. In the following, 'visible' names are all names at a position before the `maxnames/minnames/uniquelist` truncation point. For example, given this data:

```
William Jones/Edward Doe/Jane Smith
John Doe
John Smith
```

and `maxnames=1,minnames=1,uniquename=init/full`, we would get the following names in citations:

```
Jones et al.
Doe
Smith
```

When disambiguating names, `uniquename=init/full` only consider the visible names. Since all visible family names are distinct in this example, no further name parts are added. Let's compare that to the output of `uniquename=allinit`:

```
Jones et al.
J. Doe
Smith
```



`allinit` considers all names in all `labelname` lists, including those which are hidden and replaced by ‘et al.’ as the list is truncated. In this example, ‘John Doe’ is disambiguated from ‘Edward Doe’. Since the ambiguity of the two ‘Smiths’ can’t be resolved by adding initials, no initials are added in this case. Now let’s compare that to the output of `uniquename=allfull` which also disambiguates ‘John Smith’ from ‘Jane Smith’:

```
Jones et al.  
J. Doe  
John Smith
```

The options `uniquename=mininit/minfull` are similar to `init/full` in that they only consider visible names, but they perform minimal disambiguation. That is, they will disambiguate individual names only if they occur in identical lists of base nameparts (for the concept of ‘base’ nameparts, see `\DeclareUniquenameTemplate` in § 4.11.4). Consider the following data:

```
John Doe/William Jones  
Edward Doe/William Jones  
John Smith/William Edwards  
Edward Smith/Allan Johnson
```

With `uniquename=init/full`, we would get:

```
J. Doe and Jones  
E. Doe and Jones  
J. Smith and Edwards  
E. Smith and Johnson
```

With `uniquename=mininit/minfull`:

```
J. Doe and Jones  
E. Doe and Jones  
Smith and Edwards  
Smith and Johnson
```

The ‘Smiths’ are not disambiguated because the visible name lists are not ambiguous and the `mininit/minfull` options serve to disambiguate names occurring in identical base namepart lists only. Another way of looking at this is that they globally disambiguate base namepart lists. When it comes to ambiguous lists, note that a truncated list is considered to be distinct from an untruncated one even if the visible names are identical. For example, consider the following data:

```
John Doe/William Jones  
Edward Doe
```

With `maxnames=1, uniquename=init/full`, we would get:

```
J. Doe et al.  
E. Doe
```

With `uniqueusername=mininit/minfull`:

```
Doe et al.  
Doe
```

Because the lists differ in the 'et al.', the names are not disambiguated.

#### 4.11.4.2 Lists of Names (`uniquelist`)

Ambiguity is also an issue with name lists. If the `labelname` list is truncated by the `maxnames/minnames` options, it may become ambiguous. This type of ambiguity is addressed by the `uniquelist` option. Consider the following data:

```
Doe/Jones/Smith    2005  
Smith/Johnson/Doe 2005  
Smith/Doe/Edwards 2005  
Smith/Doe/Jones    2005
```

Many author-year styles truncate long author/editor lists in citations. For example, with `maxnames=1` we would get:

```
Doe et al. 2005  
Smith et al. 2005a  
Smith et al. 2005b  
Smith et al. 2005c
```

Since the authors are ambiguous after truncation, the extra letter is added to the year to ensure unique citations. Here again, many style guides mandate that the extra letter be used to disambiguate works by the same authors only. In order to disambiguate author lists, you are usually required to add more names, exceeding the `maxnames/minnames` truncation point. The `uniquelist` feature addresses this requirement. With `uniquelist=true`, we would get:

```
Doe et al. 2005  
Smith, Johnson et al. 2005  
Smith, Doe and Edwards 2005  
Smith, Doe and Jones 2005
```

The `uniquelist` option overrides `maxnames/minnames` on a per-entry basis. Essentially, what happens is that the 'et al.' part of the citation is expanded to the point of no ambiguity—but no further than that. `uniquelist` may also be combined with `uniqueusername`. Consider the following data:

```
John Doe/Allan Johnson/William Jones 2009  
John Doe/Edward Johnson/William Jones 2009  
John Doe/Jane Smith/William Jones    2009  
John Doe/John Smith/William Jones    2009  
John Doe/John Edwards/William Jones   2009  
John Doe/John Edwards/Jack Johnson    2009
```

With `maxnames=1`:

```
Doe et al. 2009a
Doe et al. 2009b
Doe et al. 2009c
Doe et al. 2009d
Doe et al. 2009e
Doe et al. 2009f
```

With `maxnames=1, uniquename=full, uniquelist=true`:

```
Doe, A. Johnson et al. 2009
Doe, E. Johnson et al. 2009
Doe, Jane Smith et al. 2009
Doe, John Smith et al. 2009
Doe, Edwards and Jones 2009
Doe, Edwards and Johnson 2009
```

With `uniquelist=minyear`, list disambiguation only happens if the visible list is identical to another visible list with the same `labelyear`. This is useful for author-year styles which only require that the citation as a whole be unique, but do not guarantee unambiguous authorship information in citations. This mode is conceptually related to `uniquename=mininit/minfull`. Consider this example:

```
Smith/Jones 2000
Smith/Johnson 2001
```

With `maxnames=1` and `uniquelist=true`, we would get:

```
Smith and Jones 2000
Smith and Johnson 2001
```

With `uniquelist=minyear`:

```
Smith et al. 2000
Smith et al. 2001
```

With `uniquelist=minyear`, it is not clear that the authors are different for the two works but the citations as a whole are still unambiguous since the year is different. In contrast to that, `uniquelist=true` disambiguates the authorship even if this information is not required to uniquely locate the works in the bibliography. Let's consider another example:

```
Vogel/Beast/Garble/Rook 2000
Vogel/Beast/Tremble/Bite 2000
Vogel/Beast/Acid/Squeeze 2001
```

With `maxnames=3, minnames=1, uniquelist=true`, we would get:

```
Vogel, Beast, Garble et al. 2000
Vogel, Beast, Tremble et al. 2000
Vogel, Beast, Acid et al. 2001
```

With `uniquelist=minyear`:

```
Vogel, Beast, Garble et al. 2000
Vogel, Beast, Tremble et al. 2000
Vogel et al. 2001
```

In the last citation, `uniquelist=minyear` does not override `maxnames/minnames` as the citation does not need disambiguating from the other two because the year is different.

#### 4.11.5 Trackers in Floats and TOC/LOT/LOF

If a citation is given in a float (typically in the caption of a figure or table), scholarly back references like ‘ibidem’ or back references based on the page tracker get ambiguous because floats are objects which are (physically and logically) placed outside the flow of text, hence the logic of such references applies poorly to them. To avoid any such ambiguities, the citation and page trackers are temporarily disabled in all floats unless explicitly requested with `trackfloats`. In addition to that, these trackers plus the back reference tracker (`backref`) are temporarily disabled in the table of contents, the list of figures, and the list of tables.

#### 4.11.6 Mixing Programming Interfaces

The `biblatex` package provides two main programming interfaces for style authors. The `\DeclareBibliographyDriver` command, which defines a handler for an entry type, is typically used in `bbx` files. `\DeclareCiteCommand`, which defines a new citation command, is typically used in `cbx` files. However, in some cases it is convenient to mix these two interfaces. For example, the `\fullcite` command prints a verbose citation similar to the full bibliography entry. It is essentially defined as follows:

```
\DeclareCiteCommand{\fullcite}
{...}
{\usedriver{...}{\thefield{entrytype}}}
{...}
{...}
```

As you can see, the core code which prints the citations simply executes the bibliography driver defined with `\DeclareBibliographyDriver` for the type of the current entry. When writing a citation style for a verbose citation scheme, it is often convenient to use the following structure:

```
\ProvidesFile{example.cbx}[2007/06/09 v1.0 biblatex
↪ citation style]

\DeclareCiteCommand{\cite}
{...}
{\usedriver{...}{cite:\thefield{entrytype}}}
{...}
{...}
```

```

\DeclareBibliographyDriver{cite:article}{...}
\DeclareBibliographyDriver{cite:book}{...}
\DeclareBibliographyDriver{cite:inbook}{...}
...

```

Another case in which mixing interfaces is helpful are styles using cross-references within the bibliography. For example, when printing an `@incollection` entry, the data inherited from the `@collection` parent entry would be replaced by a short pointer to the respective parent entry:

[1] Audrey Author: *Title of article*. In: [2], pp. 134–165.

[2] Edward Editor, ed.: *Title of collection*. Publisher: Location, 1995.

One way to implement such cross-references within the bibliography is to think of them as citations which use the value of the `xref` or `crossref` field as the entry key. Here is an example:

```

\ProvidesFile{example.bbx}[2007/06/09 v1.0 biblatex
  ↪ bibliography style]

\DeclareCiteCommand{\bbx@xref}
{
  {}
  {...}% code for cross-references
  {}
  {}
}

\DeclareBibliographyDriver{incollection}{%
  ...
  \iffieldundef{xref}
  {...}% code if no cross-reference
  {\bbx@xref{\thefield{xref}}}%
  ...
}

```

When defining `\bbx@xref`, the `<precode>`, `<postcode>`, and `<sepcode>` arguments of `\DeclareCiteCommand` are left empty in the above example because they will not be used anyway. The cross-reference is printed by the `<loopcode>` of `\bbx@xref`. For further details on the `xref` field, refer to § 2.2.3 and to the hints in § 2.4.1. Also see the `\iffieldxref`, `\iflistxref`, and `\ifnamexref` tests in § 4.6.2. The above could also be implemented using the `\entrydata` command from § 4.4.1:

```

\ProvidesFile{example.bbx}[2007/06/09 v1.0 biblatex
  ↪ bibliography style]

\DeclareBibliographyDriver{incollection}{%
  ...
  \iffieldundef{xref}
  {...}% code if no cross-reference
  {\entrydata{\thefield{xref}}}%
  % code for cross-references
}

```

```

    ...
  }}%
  ...
}

```

## 4.11.7 Using the Punctuation Tracker

### 4.11.7.1 The Basics

There is one fundamental principle style authors should keep in mind when designing a bibliography driver: block and unit punctuation is handled asynchronously. This is best explained by way of example. Consider the following code snippet:

```

\printfield{title}%
\newunit
\printfield{edition}%
\newunit
\printfield{note}%

```

If there is no `edition` field, this piece of code will not print:

```
Title. . Note
```

but rather:

```
Title. Note
```

because the unit punctuation tracker works asynchronously. `\newunit` will not print the unit punctuation immediately. It merely records a unit boundary and puts `\newunitpunct` on the punctuation buffer. This buffer will be handled by *subsequent* `\printfield`, `\printlist`, or similar commands but only if the respective field or list is defined. Commands like `\printfield` will consider three factors prior to inserting any block or unit punctuation:

- Has a new unit/block been requested at all?  
= Is there any preceding `\newunit` or `\newblock` command?
- Did the preceding commands print anything?  
= Is there any preceding `\printfield` or similar command?  
= Did this command actually print anything?
- Are we about to print anything now?  
= Is the field/list to be processed now defined?

Block and unit punctuation will only be inserted if *all* of these conditions apply. Let's reconsider the above example:

```

\printfield{title}%
\newunit
\printfield{edition}%
\newunit
\printfield{note}%

```

Here's what happens if the `edition` field is undefined. The first `\printfield` command prints the title and sets an internal 'new text' flag. The first `\newunit` sets an internal 'new unit' flag. No punctuation has been printed at this point. The second `\printfield` does nothing because the `edition` field is undefined. The next `\newunit` command sets the internal flag 'new unit' again. Still no punctuation has been printed. The third `\printfield` checks if the `note` field is defined. If so, it looks at the 'new text' and 'new unit' flags. If both are set, it inserts the punctuation buffer before printing the note. It then clears the 'new unit' flag and sets the 'new text' flag again.

This may all sound more complicated than it is. In practice, it means that it is possible to write large parts of a bibliography driver in a sequential way. The advantage of this approach becomes obvious when trying to write the above code without using the punctuation tracker. Such an attempt will lead to a rather convoluted set of `\iffielddundef` tests required to check for all possible field combinations (note that the code below handles three fields; a typical driver may need to cater for some two dozen fields):

```
\iffielddundef{title}%
  {\iffielddundef{edition}
    {\printfield{note}}
    {\printfield{edition}%
      \iffielddundef{note}%
        {}
        {. \printfield{note}}}}
  {\printfield{title}%
    \iffielddundef{edition}
      {}
      {. \printfield{edition}}%
    \iffielddundef{note}
      {}
      {. \printfield{note}}}%
```

#### 4.11.7.2 Common Mistakes

It is a fairly common misconception to think of the unit punctuation as something that is handled synchronously. This typically causes problems if the driver includes any literal text. Consider this erroneous code snippet which will generate misplaced unit punctuation:

```
\printfield{title}%
\newunit
(\printfield{series} \printfield{number})%
```

This code will yield the following result:

```
Title (. Series Number)
```

Here's what happens. The first `\printfield` prints the title. Then `\newunit` marks a unit boundary but does not print anything. The unit punctuation is printed by the *next* `\printfield` command. That's the asynchronous part mentioned



before. However, the opening parenthesis is printed immediately before the next `\printfield` inserts the unit punctuation, leading to a misplaced period. When inserting *any* literal text such as parentheses (including those printed by commands such as `\bibopenparen` and `\mkbibparens`), always wrap the text in a `\printtext` command. For the punctuation tracker to work as expected, it needs to know about all literal text inserted by a driver. This is what `\printtext` is all about. `\printtext` interfaces with the punctuation tracker and ensures that the punctuation buffer is inserted before the literal text gets printed. It also sets the internal ‘new text’ flag. Note there is in fact a third piece of literal text in this example: the space after `\printfield{series}`. In the corrected example, we will use the punctuation tracker to handle that space.

```
\printfield{title}%
\newunit
\printtext{()%
\printfield{series}%
\setunit*{\addspace}%
\printfield{number}%
\printtext{)}%
```

While the above code will work as expected, the recommended way to handle parentheses, quotes, and other things which enclose more than one field, is to define a field format:

```
\DeclareFieldFormat{parens}{\mkbibparens{#1}}
```

Field formats may be used with both `\printfield` and `\printtext`, hence we can use them to enclose several fields in a single pair of parentheses:

```
\printtext[parens]{%
\printfield{series}%
\setunit*{\addspace}%
\printfield{number}%
}%
```

We still need to handle cases in which there is no series information at all, so let’s improve the code some more:

```
\iffieldundef{series}
{}
{\printtext[parens]{%
\printfield{series}%
\setunit*{\addspace}%
\printfield{number}}}%
```

One final hint: localisation strings are not literal text as far as the punctuation tracker is concerned. Since `\bibstring` and similar commands interface with the punctuation tracker, there is no need to wrap them in a `\printtext` command.

#### 4.11.7.3 Advanced Usage

The punctuation tracker may also be used to handle more complex scenarios. For example, suppose that we want the fields `location`, `publisher`, and `year` to be rendered in one of the following formats, depending on the available data:

```
...text. Location: Publisher, Year. Text...
...text. Location: Publisher. Text...
...text. Location: Year. Text...
...text. Publisher, Year. Text...
...text. Location. Text...
...text. Publisher. Text...
...text. Year. Text...
```

This problem can be solved with a rather convoluted set of `\iflistundef` and `\iffieldundef` tests which check for all possible field combinations:

```
\iflistundef{location}
  {\iflistundef{publisher}
    {\printfield{year}}
    {\printlist{publisher}%
     \iffieldundef{year}
     {}
     {, \printfield{year}}}}
{\printlist{location}%
 \iflistundef{publisher}%
  {\iffieldundef{year}
   {}
   {: \printfield{year}}}
  {: \printlist{publisher}%
   \iffieldundef{year}
   {}
   {, \printfield{year}}}}%
```

The above could be written in a somewhat more readable way by employing `\ifthenelse` and the boolean operators discussed in § 4.6.3. The approach would still be essentially the same. However, it may also be written sequentially:

```
\newunit
\printlist{location}%
\setunit*{\addcolon\space}%
\printlist{publisher}%
\setunit*{\addcomma\space}%
\printfield{year}%
\newunit
```

In practice, you will often use a combination of explicit tests and the implicit tests performed by the punctuation tracker. For example, consider the following format (note the punctuation after the location if there is no publisher):

```

...text. Location: Publisher, Year. Text...
...text. Location: Publisher. Text...
...text. Location, Year. Text...
...text. Publisher, Year. Text...
...text. Location. Text...
...text. Publisher. Text...
...text. Year. Text...

```

This can be handled by the following code:

```

\newunit
\printlist{location}%
\iflistundef{publisher}
  {\setunit*{\addcomma\space}}
  {\setunit*{\addcolon\space}}%
\printlist{publisher}%
\setunit*{\addcomma\space}%
\printfield{year}%
\newunit

```

Since the punctuation after the location is special if there is no publisher, we need one `\iflistundef` test to catch this case. Everything else is handled by the punctuation tracker.

#### 4.11.8 Custom Localization Modules

Style guides may include provisions as to how strings like ‘edition’ should be abbreviated or they may mandate certain fixed expressions. For example, the MLA style guide requires authors to use the term ‘Works Cited’ rather than ‘Bibliography’ or ‘References’ in the heading of the bibliography. Localization commands such as `\DefineBibliographyStrings` from § 3.10 may indeed be used in `cbx` and `bbx` files to handle such cases. However, overloading style files with translations is rather inconvenient. This is where `\DeclareLanguageMapping` from § 4.9.1 comes into play. This command maps an `lbx` file with alternative translations to a `babel/polyglossia` language. For example, you could create a file named `french-humanities.lbx` which provides French translations adapted for use in the humanities and map it to the `babel/polyglossia` language `french` in the preamble or in the configuration file:

```

\DeclareLanguageMapping{french}{french-humanities}

```

If the document language is set to `french`, `french-humanities.lbx` will replace `french.lbx`. Coming back to the MLA example mentioned above, an MLA style may come with an `american-mla.lbx` file to provide strings which comply with the MLA style guide. It would declare the following mapping in the `cbx` and/or `bbx` file:

```

\DeclareLanguageMapping{american}{american-mla}

```

Use `\DeclareLanguageMappingSuffix` (see § 4.9.1) to define such a mapping for all languages.

Since the alternative `ltx` file can inherit strings from the standard `american.ltx` module, `american-mla.ltx` may be as short as this:

```
\ProvidesFile{american-mla.ltx}[2008/10/01 v1.0
  ↳ biblatex localization]
\InheritBibliographyExtras{american}
\DeclareBibliographyStrings{%
  inherit      = {american},
  bibliography = {{Works Cited}{Works Cited}},
  references    = {{Works Cited}{Works Cited}},
}
\endinput
```

Alternative `ltx` files must ensure that the localisation module is complete. They should do so by inheriting data from the corresponding standard module. If the language `american` is mapped to `american-mla.ltx`, `biblatex` will not load `american.ltx` unless this module is requested explicitly. In the above example, inheriting ‘strings’ and ‘extras’ will cause `biblatex` to load `american.ltx` before applying the modifications in `american-mla.ltx`.

Note that `\DeclareLanguageMapping` is not intended to handle language variants (e.g., American English vs. British English) or `babel/polyglossia` language aliases (e.g., `USenglish` vs. `american`). For example, `babel/polyglossia` offers the `USenglish` option which is similar to `american`. Therefore, `biblatex` comes with an `USenglish.ltx` file which simply inherits all data from `american.ltx` (which in turn gets the ‘strings’ from `english.ltx`). In other words, the mapping of language variants and `babel/polyglossia` language aliases happens on the file level, the point being that `biblatex`’s language support can be extended simply by adding additional `ltx` files. There is no need for centralized mapping. If you need support for, say, Portuguese (`babel/polyglossia: portuges`), you create a file named `portuges.ltx`. If `babel/polyglossia` offered an alias named `brasil`, you would create `brasil.ltx` and inherit the data from `portuges.ltx`. In contrast to that, the point of `\DeclareLanguageMapping` is handling *stylistic* variants like ‘humanities vs. natural sciences’ or ‘MLA vs. APA’ etc. which will typically be built on top of existing `ltx` files.

#### 4.11.9 Grouping

In a citation or bibliography style, you may need to set flags or store certain values for later use. In this case, it is crucial to understand the basic grouping structure imposed by this package. As a rule of thumb, you are working in a large group whenever author commands such as those discussed in § 4.6 are available because the author interface of this package is only enabled locally. If any bibliographic data is available, there is at least one additional group. Here are some general rules:

- The entire list of references printed by `\printbibliography` and similar commands is processed in a group. Each entry in the list is processed in an additional group which encloses the *⟨item code⟩* of `\defbibenvironment` as well as all driver code.
- The entire bibliography list printed by `\printbiblist` is processed in a group. Each entry in the list is processed in an additional group which encloses the *⟨item code⟩* of `\defbibenvironment` as well as all driver code.

- All citation commands defined with `\DeclareCiteCommand` are processed in a group holding the complete citation code consisting of the `\precode`, `\sepcode`, `\loopcode`, and `\postcode` arguments. The `\loopcode` is enclosed in an additional group every time it is executed. If any `\wrapper` code has been specified, the entire unit consisting of the wrapper code and the citation code is wrapped in an additional group.
- In addition to the grouping imposed by all backend commands defined with `\DeclareCiteCommand`, all ‘autocite’ and ‘multicite’ definitions imply an additional group.
- `\printfile`, `\printtext`, `\printfield`, `\printlist`, and `\printnames` form groups. This implies that all formatting directives will be processed within a group of their own.
- All `lbx` files are loaded and processed in a group. If an `lbx` file contains any code which is not part of `\DeclareBibliographyExtras`, the definitions must be global.

Note that using `\aftergroup` in citation and bibliography styles is unreliable because the precise number of groups employed in a certain context may change in future versions of this package. If the above list states that something is processed in a group, this means that there is *at least one* group. There may also be several nested ones.

#### 4.11.10 Namespaces

In order to minimize the risk of name clashes, LaTeX packages typically prefix the names of internal macros with a short string specific to the package. For example, if the `foobar` package requires a macro for internal use, it would typically be called `\FB@macro` or `\foo@macro` rather than `\macro` or `\@macro`. Here is a list of the prefixes used or recommended by `biblatex`:

- `blx` All macros with names like `\blx@name` are strictly reserved for internal use. This also applies to counter names, length registers, boolean switches, and so on. These macros may be altered in backwards-incompatible ways, they may be renamed or even removed at any time without further notice. Such changes will not even be mentioned in the revision history or the release notes. In short: never use any macros with the string `blx` in their name in any styles.
- `abx` Macros prefixed with `abx` are also internal macros but they are fairly stable. It is always preferable to use the facilities provided by the official author interface, but there may be cases in which using an `abx` macro is convenient.
- `bbx` This is the recommended prefix for internal macros defined in bibliography styles.
- `cbx` This is the recommended prefix for internal macros defined in citation styles.
- `lbx` This is the recommended base prefix for internal macros defined in localisation modules. The localisation module should add a second prefix to specify the language. For example, an internal macro defined by the Spanish localisation module would be named `\lbx@es@macro`.

## Appendix

### A Default Driver Source Mappings

These are the driver default source mappings.

#### A.1 bibtex

The bibtex driver is of course the most comprehensive and mature of the biblatex/biber supported data formats. These source mapping defaults are how the aliases from sections § 2.1.2 and § 2.2.5 are implemented.

```
\DeclareDriverSourcemap[datatype=bibtex]{
  \map{
    \step[typesource=conference, typetarget=
    ↪ inproceedings]
    \step[typesource=electronic, typetarget=online]
    \step[typesource=www,          typetarget=online]
  }
  \map{
    \step[typesource=mastersthesis, typetarget=thesis,
    ↪ final]
    \step[fieldset=type,          fieldvalue=mathesis
    ↪ ]
  }
  \map{
    \step[typesource=phdthesis, typetarget=thesis,
    ↪ final]
    \step[fieldset=type,          fieldvalue=phdthesis]
  }
  \map{
    \step[typesource=techreport, typetarget=report,
    ↪ final]
    \step[fieldset=type,          fieldvalue=techreport]
  }
  \map{
    \step[fieldsource=address,      fieldtarget=
    ↪ location]
    \step[fieldsource=school,       fieldtarget=
    ↪ institution]
    \step[fieldsource=annote,       fieldtarget=
    ↪ annotation]
    \step[fieldsource=archiveprefix, fieldtarget=
    ↪ eprinttype]
    \step[fieldsource=journal,      fieldtarget=
    ↪ journaltitle]
    \step[fieldsource=primaryclass, fieldtarget=
    ↪ eprintclass]
    \step[fieldsource=key,          fieldtarget=
    ↪ sortkey]
    \step[fieldsource=pdf,          fieldtarget=file]
```

```
}
}
```

## B Default Inheritance Setup

The following table shows the `biber` cross-referencing rules defined by default. Please refer to §§ 2.4.1 and 4.5.12 for explanation.

Types		Fields	
Source	Target	Source	Target
*	*	ids	-
		crossref	-
		xref	-
		entryset	-
		entrysubtype	-
		execute	-
		label	-
		options	-
		presort	-
		related	-
		relatedoptions	-
		relatedstring	-
		relatedtype	-
		shorthand	-
		shorthandintro	-
		sortkey	-
mvbook, book	inbook, bookinbook, suppbook	author	author
		author	bookauthor
mvbook	book, inbook, bookinbook, suppbook	title	maintitle
		subtitle	mainsubtitle
		titleaddon	maintitleaddon
		shorttitle	-
		sorttitle	-
		indextitle	-
		indexsorttitle	-
mvcollection, mvreference	collection, reference, incollection, inreference, suppcollection	title	maintitle
		subtitle	mainsubtitle
		titleaddon	maintitleaddon
		shorttitle	-
		sorttitle	-
		indextitle	-
		indexsorttitle	-
mvproceedings	proceedings, inproceedings	title	maintitle
		subtitle	mainsubtitle
		titleaddon	maintitleaddon
		shorttitle	-
		sorttitle	-
		indextitle	-
		indexsorttitle	-
book	inbook, bookinbook, suppbook	title	booktitle
		subtitle	booksubtitle
		titleaddon	booktitleaddon
		shorttitle	-
		sorttitle	-
		indextitle	-
		indexsorttitle	-





## C.2 Alphabetic Templates 2

The following table shows the alphabetic sorting templates for alphabetic styles defined by default. Please refer to § 3.6 for explanation.

Option	Template name
anyt	<pre> presort→labelalpha→sortname →sortyear→sorttitle→volume ↪mm ↪author ↪year ↪title ↪editor ↪translator ↪sorttitle ↪title </pre>
anyvt	<pre> presort→labelalpha→sortname →sortyear→volume →sorttitle ↪mm ↪author ↪year ↪title ↪editor ↪translator ↪sorttitle ↪title </pre>
all	<pre> presort→labelalpha→sortkey ↪mm </pre>

## C.3 Chronological Templates

The following table shows the chronological sorting templates defined by default. Please refer to § 3.6 for explanation.

Option	Template name
ynt	<pre> presort→sortyear →sortname →sorttitle ↪mm ↪year ↪author ↪title ↪9999 ↪editor ↪translator ↪sorttitle ↪title </pre>
ydnt	<pre> presort→sortyear (desc.) →sortname →sorttitle ↪mm ↪year (desc.) ↪author ↪title ↪9999 ↪editor ↪translator ↪sorttitle ↪title </pre>
all	<pre> presort→sortkey ↪mm </pre>

## D biblatexml

The biblatexml XML datasource format is designed to be an extensible and modern data source format for biblatex users. There are limitations with BibTeX format .bib files, in particular one might mention UTF-8 support and name formats. biber goes some way to addressing the UTF-8 limitations by using a modified version of the btparse C library but the rather archaic name parsing rules for BibTeX are hard-coded and specific to simple Western names.

biblatexml is an XML format for bibliographic data. When biber either reads or writes biblatexml format datasources, it automatically writes a RelaxNG XML schema for the datasources which is dynamically generated from the active biblatex datamodel. There is no static schema for biblatexml datasources because the allowable fields etc. depend on the data model. The format of

`biblatexml` datasources is relatively self-explanatory—it is usually only necessary to generate a `biblatexml` datasource from existing BibTeX format datasources (using `biber`'s 'tool' mode) in order to understand the format. `biber` also allows users to validate `biblatexml` datasources against the data model generated schema.

Since the `biblatexml` format is XML and depends on the data model and the data model is extensible by the user (see § 4.5.4), the `biblatexml` format can deal with extensions that BibTeX format data sources cannot, e.g. new nameparts, options at sub-entry scope. Since it is an XML format, it is relatively easy to transform it into other XML formats or HTML using standard XML processing libraries and tools.

Here is an explanation of the format with examples. By convention, `biblatexml` files have a `.bltxml` extension and `kpsewhich` understands this file extension.

## D.1 Header

`biblatexml` files begin with the standard XML header:

```
<?xml version="1.0" encoding="UTF-8"?>
```

The schema model, type and schema type namespace are given in the following line:

```
<?xml-model href="biblatexml.rng"
            type="application/xml"
            schematypens="http://relaxng.org/ns/
            ↳ structure/1.0"?>
```

When `biber` generates `biblatexml` data sources, it automatically adds this line and points the schema model (`href`) attribute at the automatically generated RelaxNG XML schema for ease of validation.

## D.2 Body

The body of a `biblatexml` data source looks like:

```
<bltx:entries
  xmlns:bltx="http://biblatex-biber.sourceforge.net/
  ↳ biblatexml">

  <bltx:entry id="" entrytype="">
  </bltx:entry>

  .
  .
  .

  <bltx:entry id="" entrytype="">
  </bltx:entry>

</bltx:entries>
```

The body is one or more `entry` elements inside the top-level `entries` element and everything is in the `bltx` namespace. An entry has an `id` attribute corresponding to a BibTeX entry key and a `entrytype` attribute corresponding to a BibTeX entrytype. For example, the `biblatexml`

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-model href="biblatexml.rng"
            type="application/xml"
            schematypens="http://relaxng.org/ns/
            ↪ structure/1.0"?>
<bltx:entries
  xmlns:bltx="http://biblatex-biber.sourceforge.net/
  ↪ biblatexml">
  <bltx:entry id="key1" entrytype="book">
  </bltx:entry>
</bltx:entries>
```

Corresponds to the BibTeX .bib

```
@book{key1,
}
```

In general, the XML elements in a biblatexml format datasource file have names corresponding to the fields in the datamodel, just like BibTeX format datasources. So for example, the BibTeX format source

```
@book{key1,
  TITLE = {...},
  ISSUE = {...},
  NOTE = {...}
}
```

would be, in biblatexml

```
<bltx:entry id="key1" entrytype="book">
  <bltx:title>...</bltx:title>
  <bltx:issue>...</bltx:issue>
  <bltx:note>...</bltx:note>
</bltx:entry>
```

The following exceptions to this simple mapping are to be noted

### D.2.1 Key aliases

Citation key aliases are specified like this:

```
<bltx:ids>
  <bltx:key>alias1</bltx:key>
  <bltx:key>alias2</bltx:key>
</bltx:ids>
```

this corresponds to the BibTeX format

```
@book{key1,
  IDS = {alias1, alias2}
}
```

### D.2.2 Names

Name specifications in `biblatex` are somewhat more complex in order to generalise the name handling abilities of `bibtex`. The user has to be more explicit about the name parts and this allows a much greater scope for the handling of different types of names and name parts. A name in `biblatex` format looks like this

```
<bltx:names type="author" morenames="1" useprefix="
→ true">
  <bltx:name gender="sm">
    <bltx:namepart type="given">
      <bltx:namepart initial="J">John</bltx:namepart
→ >
      <bltx:namepart initial="A">Arthur</
→ bltx:namepart>
    </bltx:namepart>
    <bltx:namepart type="family">Smith</
→ bltx:namepart>
    <bltx:namepart type="prefix" initial="v">von</
→ bltx:namepart>
  </bltx:name>
  <bltx:name useprefix="false">
    <bltx:namepart type="given">
      <bltx:namepart>Raymond</bltx:namepart>
    </bltx:namepart>
    <bltx:namepart type="family">Brown</
→ bltx:namepart>
  </bltx:name>
</bltx:names>
```

A name list field is contained in the `names` element with the mandatory `type` attribute giving the name of the name list. Things to note:

- The optional `morenames` attribute performs the same task as the BibTeX datasource format ‘and others’ string at the end of a name.
- Note that optional `useprefix` option can be specified at the level of a name list or an individual name in the name list. This is impossible with BibTeX datasources.
- Individual names may have an optional `gender` attribute which must be one of those defined in the datamodel ‘gender’ constant list. This is currently not used by standard styles but is available in `biblatex` name formats if necessary.
- A name list is composed of one or more name elements.
- Each name is composed of name parts of a `type` defined by the data model ‘nameparts’ constant.
- Each name part may have an option `initial` attribute which makes explicit the initial of the name part. If this is not present, `biber` attempts to automatically determine the initial from the name part.

- Name parts may have name parts so that compound names can be handled.

Ignoring the `biblatexml`-only features, a corresponding BibTeX format datasource would look like this:

```
AUTHOR = {von Smith, John Arthur and Brown, Raymond
  ↪ and others}
```

### D.2.3 Lists

Datasource list fields (see § 2.2.1) can be represented in two ways, depending on whether there is more than one element in the list:

```
<bltx:publisher>London</bltx:publisher>
<bltx:location>
  <bltx:item>London</bltx:item>
  <bltx:item>Moscow</bltx:item>
</bltx:location>
```

### D.2.4 Ranges

Datasource range fields (see § 2.2.1) are represented like this:

```
<bltx:pages>
  <bltx:item>
    <bltx:start>1</bltx:start>
    <bltx:end>10</bltx:end>
  </bltx:item>
  <bltx:item>
    <bltx:start>30</bltx:start>
    <bltx:end>34</bltx:end>
  </bltx:item>
</bltx:pages>
```

A range field is a list of ranges, each with its own `item`. A range item has a `start` element and an optional `end` element, since ranges can be open-ended.

### D.2.5 Dates

Datasource date fields (see § 2.2.1) can be represented in two ways, depending on whether they constitute a date range:

```
<bltx:date>1985-04-02</bltx:date>
<bltx:date type="event">
  <bltx:start>1990-05-16</bltx:start>
  <bltx:end>1990-05-17</bltx:end>
</bltx:date>
```

The `type` attribute on a date element corresponds to a particular type of date defined in the data model.

### D.2.6 Related Entries

Related entries are specified as follows:

```
<bltx:related>
  <bltx:item type="reprint"
             ids="rel1,rel2"
             string="Somestring"
             options="skipbiblist"/>
</bltx:related>
```

This corresponds to the BibTeX format:

```
@book{key1,
  RELATED          = {rel2,rel2},
  RELATEDTYPE      = {reprint},
  RELATEDSTRING    = {Somestring},
  RELATEDOPTIONS   = {skipbiblist}
}
```

As per § 4.5.1, the string and options attributes are optional.

## E Option Scope

The following table provides an overview of the scope of various options.

Per-entry, per-namelist and per-name options are set in the datasource, for example, in a .bibfile. See the `biber` documentation for details but here are a few examples. Per-entry:

```
@BOOK{key,
  OPTIONS = {sortingnamekeytemplatename=templatel},
}
```

Per-namelist and per-name options require either the `biblatexml` datasource format or the extend BibTeX name format supported by `biber` (see the `biber` documentation for details). Per-namelist:

```
@BOOK{key,
  AUTHOR = {sortingnamekeytemplatename=templatel and
    ↪ Arthur Smith and Bill Brown},
}
```

Per-name:

```
@BOOK{key,
  AUTHOR = {sortingnamekeytemplatename=templatel, family
    ↪ =Smith, given=Arthur and Bill Brown},
}
```

Option	Scope						
	Load-time	Global	Per-refcontext	Per-type	Per-entry	Per-namelist	Per-name
abbreviate	•	•	–	•	•	–	–
alldates	•	•	–	–	–	–	–
alldatesusetime	•	•	–	–	–	–	–
alltimes	•	•	–	–	–	–	–
arxiv	•	•	–	–	–	–	–
autocite	•	•	–	–	–	–	–
autopunct	•	•	–	–	–	–	–
autolang	•	•	–	–	–	–	–
backend	•	–	–	–	–	–	–
backref	•	•	–	–	–	–	–
backrefsetstyle	•	•	–	–	–	–	–
backrefstyle	•	•	–	–	–	–	–
bibencoding	•	•	–	–	–	–	–
bibstyle	•	–	–	–	–	–	–
bibtexcaseprotection	•	•	–	•	•	–	–
bibwarn	•	•	–	–	–	–	–
block	•	•	–	–	–	–	–
casechanger	•	–	–	–	–	–	–
citecounter	•	•	–	–	–	–	–
citereset	•	•	–	–	–	–	–
citestyle	•	–	–	–	–	–	–
citetracker	•	•	–	•	•	–	–
clearlang	•	•	–	•	•	–	–
datamodel	•	–	–	–	–	–	–
dataonly	•	•	–	•	•	–	–
date	•	•	–	–	–	–	–
labeldate	•	•	–	–	–	–	–
<datatype>date	•	•	–	–	–	–	–
dateabbrev	•	•	–	•	•	–	–
datecirca	•	•	–	–	–	–	–
dateera	•	•	–	–	–	–	–
dateerauto	•	•	–	–	–	–	–
dateuncertain	•	•	–	–	–	–	–
datezeros	•	•	–	–	–	–	–
defernumbers	•	•	–	–	–	–	–
doi	•	•	–	•	•	–	–
eprint	•	•	–	•	•	–	–
<namepart>inits	•	•	–	•	•	•	•
gregorianstart	•	•	–	–	–	–	–
hyperref	•	•	–	–	–	–	–
ibidtracker	•	•	–	•	•	–	–
idemtracker	•	•	–	•	•	–	–
indexing	•	•	–	•	•	–	–
isbn	•	•	–	•	•	–	–
julian	•	•	–	–	–	–	–
labelalpha	•	•	–	•	•	–	–
labelalphanametemplatename	–	–	•	–	•	•	•
labelnamefield	–	–	–	–	•	–	–
labelnumber	•	•	–	•	•	–	–
labeltitle	•	•	–	•	•	–	–
labeltitlefield	–	–	–	–	•	–	–
labeltitleyear	•	•	–	•	•	–	–
labeldateparts	•	•	–	•	•	–	–
labeltime	•	•	–	–	–	–	–
labeldateusetime	•	•	–	–	–	–	–
labelprefix	–	–	•	–	–	–	–
<datatype>time	•	•	–	–	–	–	–
<datatype>dateusetime	•	•	–	–	–	–	–
language	•	•	–	–	–	–	–
loadfiles	•	•	–	–	–	–	–



Option	Scope						
	Load-time	Global	Per-refcontext	Per-type	Per-entry	Per-namelist	Per-name
loccittracker	•	•	–	•	•	–	–
maxalphanames	•	•	–	•	•	–	–
maxbibnames	•	•	–	•	•	–	–
maxcitenames	•	•	–	•	•	–	–
maxsortnames	•	•	–	•	•	–	–
maxitems	•	•	–	•	•	–	–
maxnames	•	•	–	•	•	–	–
maxparents	•	•	–	–	–	–	–
mcite	•	–	–	–	–	–	–
minalphanames	•	•	–	•	•	–	–
minbibnames	•	•	–	•	•	–	–
mincitenames	•	•	–	•	•	–	–
minsortnames	•	•	–	•	•	–	–
mincrossrefs	•	•	–	–	–	–	–
minxrefs	•	•	–	–	–	–	–
minitems	•	•	–	•	•	–	–
minnames	•	•	–	•	•	–	–
nametemplates	–	–	•	–	•	•	•
natbib	•	–	–	–	–	–	–
nohashothers	•	•	–	•	•	•	–
nosorttothers	•	•	–	•	•	•	–
noinherit	–	–	–	–	•	–	–
notetype	•	•	–	–	–	–	–
opcittracker	•	•	–	•	•	–	–
openbib	•	•	–	–	–	–	–
pagetracker	•	•	–	–	–	–	–
parenttracker	•	•	–	–	–	–	–
punctfont	•	•	–	–	–	–	–
refsection	•	•	–	–	–	–	–
refsegment	•	•	–	–	–	–	–
related	•	•	–	•	•	–	–
safeinputenc	•	•	–	–	–	–	–
seconds	•	•	–	–	–	–	–
singletitle	•	•	–	•	•	–	–
skipbib	•	•	–	•	•	–	–
skipbiblist	•	•	–	•	•	–	–
skiplab	•	•	–	•	•	–	–
sortcase	•	•	–	–	–	–	–
sortcites	•	•	–	–	–	–	–
sorting	•	•	–	–	–	–	–
sortingnamekeytemplatename	–	–	•	–	•	•	•
sortlocale	•	•	–	–	–	–	–
sortlos	•	•	–	–	–	–	–
sortupper	•	•	–	–	–	–	–
style	•	–	–	–	–	–	–
terseinits	•	•	–	•	•	•	•
texencoding	•	•	–	–	–	–	–
timezeros	•	•	–	–	–	–	–
timezones	•	•	–	–	–	–	–
uniquelist	•	•	–	•	•	•	–
uniqueiname	•	•	–	•	•	•	•
uniqueinametemplatename	–	–	•	–	•	•	•
uniquetitle	•	•	–	•	•	–	–
uniquebaretitle	•	•	–	•	•	–	–
uniquework	•	•	–	•	•	–	–
uniqueprimaryauthor	•	•	–	•	•	–	–
url	•	•	–	•	•	–	–
useprefix	•	•	–	•	•	•	•
use<name>	•	•	–	•	•	–	–

## F Revision History

This revision history is a list of changes relevant to users of this package. Changes of a more technical nature which do not affect the user interface or the behavior of the package are not included in the list. More technical details are to be found in the `CHANGES.md` file. The numbers on the right indicate the relevant section of this manual.

### 3.18 2022-06-22

Added sorting option <code>\intciteorder</code> . . . . .	4.5.6
Added global option <code>pluralothers</code> . . . . .	3.1.2.1
Added <code>\localrefcontext</code> . . . . .	3.8.10
Added <code>\visibility</code> option to <code>\DeclareSortingNamekeyTemplate</code> 4.5.6	
Added <code>\GenRefcontextData</code> . . . . .	3.8.10
Added <code>\AtBeginRefsection</code> . . . . .	4.10.6

### 3.17 2022-01-25

Changed behaviour of index-less granular XDATA references . . . . .	3.14.6
Added <code>\DeclareNonamestring</code> . . . . .	4.5.10
Added new <code>\citecount</code> sort option and associated default sorting scheme and . . . . .	4.5.6 3.1.2.1
Added new <code>sourcemap</code> verbs <code>matches</code> and <code>matchesi</code> . . . . .	4.5.3
Deprecated <code>season</code> fields and macros in favour of generalised year divisions	4.2.4.3
Added <code>\textouterlang</code> . . . . .	4.8
Added <code>\UndeclareDelimcontextAlias</code> . . . . .	3.12.2
Added <code>\DeclareBibstringSet</code> , <code>\DeclareBibstringSetFormat</code> etc. 4.8	
Added Marathi localisation (निरंजन)	
Added Romanian localisation (Patrick Danilevici)	
Added some support for calculating with non-US-ASCII numerals . . . . .	4.6.2
Removed list support for <code>&lt;name&gt;</code> argument of <code>\DeclareDelimFormat</code>	3.12.2

### 3.16 2020-12-31

Added named <code>refcontext</code> support to <code>\assignrefcontext*</code> . . . . .	3.8.10
Fixed infinite loop with <code>volcitemapages</code> field format	
Added Extended Name Format documentation . . . . .	3.4
Added <code>label</code> option to <code>\printbibliography</code> . . . . .	3.8.2
Deprecate <code>\mainlang</code> in favour of <code>\textmainlang</code> . . . . .	4.8
Added Basque localisation (Ander Zarketa-Astigarraga)	

### 3.15a 2020-08-23

Fixed bug with long arguments in <code>\DeclareFieldFormat</code> and friends	
---	--

### 3.15 2020-08-16

Added starnocited option to sourcemaps . . . . .	4.5.3
Added the glob option to \addbibresource . . . . .	3.8.1
Added eid to more entry types . . . . .	2.1.1
Added \bibeidpunct . . . . .	3.12.1
Added issuetitleaddon and journaltitleaddon . . . . .	2.2.2
numeric-comp compresses subentry set references now . . . . .	3.1.2.2
Added subentrycomp to numeric-comp style . . . . .	3.1.2.2
Added \multiciterangedelim, \multicitesubentrydelim, \multicitesubentryrangedelim, \superciterangedelim, \supercitesubentrydelim, \supercitesubentryrangedelim 3.12.1	
Implemented expl3 case changing functions . . . . .	4.6.4
Added casechanger option . . . . .	3.1.1
Added bibtexcaseprotection option . . . . .	3.1.2.1
Added \mautocite and \Mautocite . . . . .	3.9.10
Added trackfloats and backreffloats . . . . .	3.1.2.1
Added block option to \printbibliography and friends . . . . .	3.8.2
Added \NumsCheckSetup and \PagesCheckSetup . . . . .	4.6.4
Added \AtEveryEntrykey . . . . .	4.10.6
Added \ifdateequal and \ifdaterangeequal . . . . .	4.6.2
Clarified \ifuniqueprimaryauthor semantics . . . . .	4.6.2
Added \bibncpstring, \bibncplstring and \bibncpsstring	4.8
Added Lithuanian localisation (Valdemaras Klumbys)	
Added Serbian localisation (Andrej Radović)	
Added Turkish localisation (Abdulkerim Gok)	
Added file hooks . . . . .	4.10.7
Deprecated \ifkomabibtoc and \ifkomabibtocnumbered	3.15.1

### 3.14 2019-12-01

Added new mapping verbs for citation sources . . . . .	4.5.3
Added documentation for new biber granular @xdata functionality . .	3.14.6
Enhanced polyglossia support	

### 3.13a 2019-08-31

Bugfix release

### 3.13 2019-08-17

Added new @dataset entry type . . . . .	2.1.1
Promoted @software to regular entry type . . . . .	2.1.1
Added entrykey alias for entry keys in labels . . . . .	4.5.5
Added appendstrict sourcemapping option . . . . .	4.5.3

Added nohashothers and nosortothers . . . . .	3.1.2.3
Enhanced \addbibresource with globbing . . . . .	3.8.1
Added \DeclareBiblatexOption . . . . .	4.2.1
Expanded scope possibilities for several options . . . . .	E
Added \ifvolcite test . . . . .	4.6.2
Added special fields volcitevolume and volcitepages . . . . .	4.3.2
Added \AtVolcite hook . . . . .	4.10.6
Added \pnfmt . . . . .	3.9.8
Added \mkbibcompletename and \mkbibcompletename'formatorder' . . . . .	3.12.1
Made \postnotedelim and friends context sensitive . . . . .	3.12.1
Added \multipostnotedelim and \multiprenotedelim . . . . .	3.12.1
Added \thefirstlistitem and friends . . . . .	4.6.1
Added <i>&lt;itempostpro&gt;</i> argument to \mkcomprange, \mknormrange and \mkfirstpage . . . . .	4.6.4
Added \biburlbigskip and friends . . . . .	3.12.4
Added biburlbigbreakpenalty and biburlbreakpenalty and friends 3.12.4	
Added \DeclarePrintBibliographyDefaults . . . . .	3.8.2
Added doi to @online . . . . .	2.1.1
<b>3.12 2018-10-30</b>	
Added literal and named annotation functionality . . . . .	3.7
Added \ifnocite . . . . .	4.6.2
Added case-insensitive versions of matching operators . . . . .	4.5.3
Added langids optional argument to \DeclareSortTranslit . . . . .	4.5.6
Added noroman option . . . . .	3.1.2.3
Changed sortyear to an integer field . . . . .	2.2.3
Added extraname . . . . .	4.2.4.2
Added bibencoding option to \addbibresource . . . . .	3.8.1
Changed type of number from integer to literal . . . . .	2.2.2
Removed noerrortexttools option . . . . .	1.5.5
Added maxsortnames and minsortnames . . . . .	3.1.2.1
Added \DeprecateFieldFormatWithReplacement and friends . . . . .	4.4.2
Added list and name wrappers . . . . .	4.4.2
Added \ifdateyearsequal . . . . .	4.6.2
Added 'and higher' sectioning values for citereset, refsection and refsegment options . . . . .	3.1.2.1
Added Hungarian localisation . . . . .	3.13.4
Added \DeclareCitePunctuationPosition . . . . .	4.3.1

### 3.11 2018-02-20

Added entrynocite option to sourcemapping . . . . .	4.5.3
Added driver and biblistfilter options to \printbiblist . .	3.8.3
Added \mknormrange . . . . .	4.6.4
Added \ifdateannotation . . . . .	3.7
Extended \iffieldannotation and friends . . . . .	3.7
Changed \DeclareSourcemap so that it can be used multiple times .	4.5.3
Added Latvian localisation (Rihards Skuja)	
Added locallabelwidth option . . . . .	3.1.2.1

### 3.10 2017-12-19

Changed edtf to iso . . . . .	3.1.2.1
Added noerroretextools option . . . . .	1.5.5

### 3.9 2017-11-21

Added \iffieldplusstringbibstring . . . . .	4.6.2
Fixed \mkpagetotal . . . . .	4.6.4

### 3.8 2017-11-04

Added hyperref=manual option . . . . .	3.1.2.1
Added field extradatescope . . . . .	4.2.4.2
Added \DeclareExtradata . . . . .	4.5.11
Added \DeprecateFieldWithReplacement, \DeprecateListWithReplacement and \DeprecateNameWithReplacement . . . . .	4.4.1
Added \letbibmacro . . . . .	4.6.4
Renamed extrayear to extradate . . . . .	4.2.4.2
Added sortsets global option . . . . .	3.1.2.1
Added \iflabelalphanameemplatename and \uniquenameemplatename . . . . .	4.6.2
Renamed \ifsortingnamescheme to \ifsortingnamekeyemplatename . . . . .	4.6.2
Renamed sortingnamekeyscheme to sortingnamekeytemplate	3.8.10
Renamed \DeclareSortingNamekeyScheme to \DeclareSortingNamekeyTemplate . . . . .	4.5.6
Renamed \DeclareSortingScheme to \DeclareSortingTemplate	4.5.6
Changes to \DeclareUniquenameTemplate and \DeclareLabelalphaNameTemplate scopes . .	4.11.4 and 4.5.5
Added new disambiguation option to \DeclareUniquenameTemplate	4.11.4
Added new user-facing versions of some entry-querying commands . . .	3.11
Changed origlanguage to a list in line with language . . . . .	2.2.2

Deprecated <code>childentrykey</code> and <code>childentrytype</code> . . . . .	4.2.4.1
Added <code>bibnamehash</code> and name list specific variants . . . . .	4.2.4.1
Added ALA-LC Russian romanisation transliteration support . . . . .	4.5.6
Added <code>urlraw</code> . . . . .	4.2.4.1
Added <code>\AtUsedriver</code> . . . . .	4.10.6
Added Bulgarian localisation (Kaloyan Ganev)	
<code>sortyear</code> is now a literal, not an integer . . . . .	2.2.3
Added <code>\DeclareLanguageMappingSuffix</code> . . . . .	4.9.1
Changed default for <code>\DeclarePrefChars</code> . . . . .	4.7.5
Added <code>\authortypedelim</code> , <code>\editortypedelim</code> and <code>\translatortypedelim</code> . . . . .	3.12.1
Added <code>\DeclareDelimAlias</code> . . . . .	3.12.2
Added slovenian as alias for slovene due to Polyglossia name for the language . . . . .	2.2.3
Added Ukrainian localisation (Sergiy M. Ponomarenko)	
<b>3.7 2016-12-08</b>	
Corrected default for <code>\bibdateeraprefix</code> . . . . .	4.10.2
Added <code>\DeclareSortInclusion</code> . . . . .	4.5.6
Added <code>\relateddelim&lt;relatedtype&gt;</code> . . . . .	3.12.1
<b>3.6 2016-09-15</b>	
Corrected some documentation and fixed a bug with <code>labeldate</code> localisation strings.	
<b>3.5 2016-09-10</b>	
Added <code>\ifuniquebaretitle test</code> . . . . .	4.6.2
Documented <code>\labelnamesource</code> and <code>\labeltitlesource</code> . . . .	4.2.4.1
Added <code>\bibdaterangesep</code> . . . . .	3.12.3
Added <code>refsection</code> option to <code>\DeclareSourcemap</code> . . . . .	4.5.3
Added <code>suppress</code> option to inheritance specifications . . . . .	4.5.12
Added <code>\ifuniquework</code> . . . . .	4.6.2
Changed <code>\DeclareStyleSourcemap</code> so that it can be used multiple times 4.5.3	
Added <code>\forcezerosy</code> and <code>\forcezerosmdt</code> . . . . .	4.10.4
Changed <code>\mkdatezeros</code> to <code>\mkyearzeros</code> , <code>\mkmonthszeros</code> and <code>\mkdayzeros</code> . . . . .	4.10.4
Added <code>namehash</code> and <code>fullhash</code> for all name list fields . . . . .	4.2.4.1
Generalised <code>giveninits</code> option to all nameparts . . . . .	3.1.2.3
Added <code>inits</code> option to <code>\DeclareSortingNamekeyScheme</code> . . . .	4.5.6
Removed option <code>sortgiveninits</code> . Use the option <code>inits</code> to <code>\DeclareSortingNamekeyScheme</code> instead	
Added <code>\DeclareLabelalphaNameTemplate</code> . . . . .	4.5.5

Added full EDTF Levels 0 and 1 compliance for parsing and printing times	2.3.8
Changed dates to be fully EDTF Levels 0 and 1 compliant. Associated tests and localisation strings	2.3.8
Added <code>timezeros</code>	3.1.2.1
Added <code>mktimezeros</code>	4.10.4
Changed <code>iso8601</code> to <code>edtf</code>	3.1.2.1
Added <code>\DeclareUniquenameTemplate</code>	4.11.4
Removed experimental RIS support	
<code>sortnamekeyscheme</code> and <code>useprefix</code> can be now be set per-namelist and per-name for BibTeX datasources	4.5.6
Added <code>\DeclareDelimcontextAlias</code>	3.12.2
Added Estonian localisation (Benson Muite)	
Reference contexts may now be named	3.8.10
Added <code>notfield</code> step in <code>Sourcemap</code> s	4.5.3
<b>3.4 2016-05-10</b>	
Added <code>\ifcrossrefsource</code> and <code>\ifxrefsource</code>	4.6.2
Added data annotation feature	3.7
Added package option <code>minxrefs</code>	3.1.2.1
Added <code>\ifuniqueprimaryauthor</code> and associated global option	4.6.2
Added <code>\DeprecateField</code> , <code>\DeprecateList</code> and <code>\DeprecateName</code>	4.4.1
Added <code>\ifcaselang</code>	4.6.2
Added <code>\DeclareSortTranslit</code>	4.5.6
Added <code>uniquetitle test</code>	4.6.2
Added <code>\namelabeldelim</code>	3.12.1
New starred variants of the <code>\assignrefcontext*</code> macros	3.8.10
New context-sensitive delimiter interface	3.12.2
Moved <code>prefixnumbers</code> option to <code>\newrefcontext</code> and renamed to <code>labelprefix</code>	3.8.10
Added <code>\DeclareDatafieldSet</code>	4.5.2
<b>3.3 2016-03-01</b>	
New macros for auto-assignment of <code>refcontexts</code>	3.8.10
Schema documentation for <code>biblatexml</code>	D
Sourcemaping documentation and examples for <code>biblatexml</code>	4.5.3
Changes for name formats to generalise available name parts	4.4.2
<code>useprefix</code> can now be specified per-namelist and per-name in <code>biblatexml</code> datasources	
New sourcemaping options for creating new entries dynamically and looping over map steps	4.5.3

Added <code>noalphaothers</code> and enhanced name range selection in <code>\DeclareLabelalphaTemplate</code> . . . . .	4.5.5
Added <code>\DeclareDatamodelConstant</code> . . . . .	4.5.4
Renamed <code>firstinits</code> to <code>giveninits</code> and <code>sortfirstinits</code> to <code>sortgiveninits</code> . . . . .	3.1.2.3
Added <code>\DeclareSortingNamekeyScheme</code> . . . . .	4.5.6
Removed messy experimental <code>endnote</code> and <code>zoterordf</code> support for <code>biber</code>	
Added <code>\nonameyeardelim</code> . . . . .	3.12.1
Added <code>\extpostnotedelim</code> . . . . .	3.12.1
<b>3.2 2015-12-28</b>	
Added <code>pstrwidth</code> and <code>pcompound</code> to <code>\DeclareLabelalphaTemplate</code> 4.5.5	
Added <code>\AtEachCitekey</code> . . . . .	4.10.6
<b>3.1 2015-09</b>	
Added <code>\DeclareNolabel</code> . . . . .	4.5.5
Added <code>\DeclareNolabelwidthcount</code> . . . . .	4.5.5
<b>3.0 2015-04-20</b>	
Improved Danish (Jonas Nyrup) and Spanish (Iudenticus) translations <code>labelname</code> and <code>labeltitle</code> are now resolved by <code>biblatex</code> instead of <code>biber</code> for more flexibility and future extensibility	
New <code>\entryclone</code> <code>sourcemap</code> verb for cloning entries during <code>sourcemap</code> ing 4.5.3	
New <code>\pernottype</code> negated per-type <code>sourcemap</code> verb . . . . .	4.5.3
New range calculation command <code>\frangelen</code> . . . . .	4.6.4
New bibliography context functionality . . . . .	3.8.10
Name lists in the data model now automatically create internals for <code>\ifuse&lt;name&gt; tests</code> and <code>booleans</code> . . . . . 3.1.3.1 and . . . . .	4.6.2
<b>2.9a 2014-06-25</b>	
<code>resetnumbers</code> now allows passing a number to reset to . . . . .	3.8.2
<b>2.9 2014-02-25</b>	
Generalised shorthands facility . . . . .	3.8.3
Sorting locales can now be defined as part of a sorting scheme . . . . .	4.5.6
Added <code>sortinithash</code> . . . . .	4.2.4.1
Added Slovene localisation (Tea Tušar and Bogdan Filipič)	
Added <code>\mkbibitalic</code> . . . . .	4.10.4
Recommend <code>begentry</code> and <code>finentry</code> bibliography macros . . . . .	4.2.3
<b>2.8a 2013-11-25</b>	
Split option <code>language=auto</code> into <code>language=autocite</code> and <code>language=autobib</code> . . . . .	3.1.2.1



## 2.8 2013-10-21

New langidopts . . . . .	2.2.3
hyphenation field renamed to langid . . . . .	2.2.3
polyglossia support	
Renamed babel option to autolang . . . . .	3.1.2.1
Corrected Dutch localisation	
Added datelabel=year option . . . . .	3.1.2.1
Added datelabelsource field . . . . .	4.2.4.1

## 2.7a 2013-07-14

Bugfix - respect maxnames and uniquelist in \finalandsemicolon  
Corrected French localisation

## 2.7 2013-07-07

Added field eventtitleaddon to default datamodel and styles . . . .	2.2.2
Added \ifentryinbib, \iffirstcitekey and \iflastcitekey	4.6.2
Added postpunct special field, documented multiprenote and multipostnote special fields . . . . .	4.3.2
Added \UseBibitemHook, \AtEveryMultiCite, \AtNextMultiCite, \UseEveryCiteHook, \UseEveryCitekeyHook, \UseEveryMultiCiteHook, \UseNextCiteHook, \UseNextCitekeyHook, \UseNextMultiCiteHook, \DeferNextCitekeyHook . . . . .	4.10.6
Fixed \textcite and related commands in the numeric and verbose styles	3.9.2
Added multicite variants of \volcite and related commands . . . . .	3.9.6
Added \finalandsemicolon . . . . .	3.12.3
Added citation delimiter \textcitedelim for \textcite and related commands to styles . . . . .	4.10.1
Updated Russian localisation (Oleg Domanov)	
Fixed Brazilian and Finnish localisation	

## 2.6 2013-04-30

Added \printunit . . . . .	4.7.1
Added field clonesourcekey . . . . .	4.2.4.1
New options for \DeclareLabelalphaTemplate . . . . .	4.5.5
Added \DeclareLabeldate and retired \DeclareLabelyear . .	4.5.11
Added nodate localisation string . . . . .	4.9.2.14
Added \rangelen . . . . .	4.6.4
Added starred variants of \citeauthor and \Citeauthor . . . . .	3.9.5
Restored original url format. Added urlfrom localisation key . . . . .	4.9.2.15
Added \AtNextBibliography . . . . .	4.10.6
Fixed related entry processing to allow nested and cyclic related entries	

Added Croatian localisation (Ivo Pletikosić)  
 Added Polish localisation (Anastasia Kandulina, Yuriy Chernyshov)  
 Fixed Catalan localisation  
 Added smart “of” for titles to Catalan and French localisation  
 Misc bug fixes

## 2.5 2013-01-10

Made `url` work as a localisation string, defaulting to previously hard-coded value ‘URL’.  
 Changed some `biber` option names to cohere with `biber` 1.5.  
 New sourcemap step for conditionally removing entire entries . . . . . 4.5.3  
 Updated Catalan localisation (Sebastià Vila-Marta)

## 2.4 2012-11-28

Added `relatedoptions` field . . . . . 4.5.1  
 Added `\DeclareStyleSourcemap` . . . . . 4.5.3  
 Renamed `\DeclareDefaultSourcemap` to `\DeclareDriverSourcemap`  
 4.5.3  
 Documented `\DeclareFieldInputHandler`,  
`\DeclareListInputHandler` and `\DeclareNameInputHandler`.  
 Added Czech localisation (Michal Hoftich)  
 Updated Catalan localisation (Sebastià Vila-Marta)

## 2.3 2012-11-01

Better detection of situations which require a `biber` or  $\LaTeX$  re-run  
 New append mode for `\DeclareSourcemap` so that fields can be combined  
 4.5.3  
 Extended auxiliary indexing macros  
 Added support for plural localisation strings with `relatedtype` . . . . 4.5.1  
 Added `\csfield` and `\usefield` . . . . . 4.6.1  
 Added starred variant of `\usebibmacro` . . . . . 4.6.4  
 Added `\ifbibmacroundef`, `\iffieldformatundef`,  
`\iflistformatundef` and `\ifnameformatundef` . . . . . 4.6.4  
 Added Catalan localisation (Sebastià Vila-Marta)  
 Misc bug fixes

## 2.2 2012-08-17

Misc bug fixes  
 Added `\revsdnamepunct` . . . . . 3.12.1  
 Added `\ifterseinits` . . . . . 4.6.2

## 2.1 2012-08-01

Misc bug fixes  
 Updated Norwegian localisation (Håkon Malmedal)  
 Increased data model auto-loading possibilities . . . . . 4.5.4

## 2.0 2012-07-01

### Misc bug fixes

Generalised singletitle test a little . . . . .	4.6.2
Added new special field extratitleyear . . . . .	4.2.4
Customisable data model . . . . .	4.5.4
Added \DeclareDefaultSourcemap . . . . .	4.5.3
Added labeltitle option . . . . .	3.1.2.3
Added new special field extratitle . . . . .	4.2.4
Made special field labeltitle customisable . . . . .	4.2.4
Removed field reprinttitle . . . . .	3.5
Added related entry feature . . . . .	3.5
Added \DeclareNoinit . . . . .	4.5.8
Added \DeclareNosort . . . . .	4.5.9
Added sorting option for \printbibliography and \printshorthands . . . . .	3.8.2
Added ids field for citekey aliasing . . . . .	2.2
Added sortfirstinits option . . . . .	3.1.2.3
Added data stream modification feature . . . . .	4.5.3
Added customisable labels feature . . . . .	4.5.5
Added \citeyear* and \citedate* . . . . .	3.9.5