Programming LaTeX — A survey of documentation and packages

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Abstract

A survey of programming-related documentation for LaTeX. Included are references to printed and electronic books and manuals, symbol lists, FAQs, the LaTeX source code, CTAN and distributions, programming-related packages, users groups and online communities, and information on creating packages and documentation.

Contents

Introduction

Reinventing the wheel may be useful if you think that you can do it better. Worse, though, is not even being aware that the wheel has already been invented in the first place, which can be an embarrassing waste of time. Such can be the case both for a new LaTeX programmer who isn't aware of the many ways things may be done, but also for someone, this author included, who learned LaTeX many years ago but may have missed some of the recent advancements in package code and documentation.

A wealth of information is available, not only in print and online, but also directly embedded in the typical LaTeX distribution. The following is meant to be a broad overview of some of today's resources for LaTeX programmers.

(The latest version of this document is available in the docsurvey package.)

Printed books

Even in an electronic/online era, printed books still have the advantage of being able to be opened for reference without taking up space on the screen. Printed books also provide extended discussion of useful topics, have extensive human-edited indexes which are more useful than a simple document-wide search function, and some are also available in electronic format.

LaTeX: A Document Preparation System:
The classic introduction to LaTeX, in continuous reprint for decades. [1]

Guide to LaTeX:
An introduction and more advanced material, including an extensive reference guide. Fourth edition: 2004. [2]

More Math into LaTeX:
Updated to a fifth edition in 2016. [3]

LaTeX Beginner's Guide:
An overview with numerous examples. [4]

LaTeX Cookbook:
More examples. [5]

The LaTeX Companion:
Provides extended discussion and examples of the inner workings of LaTeX and numerous useful packages. Second edition: 2004. [6]

Additional books:
Listed at the TeX FAQ. [20] (`https://texfaq.org/`)

Electronic books and documentation

Most of these are provided with the TeX distribution, and may be updated with each release. Access the embedded documentation from a command line using the `texdoc` program.

TeX

TeX by Topic, A TeXnician's Reference:
A reference for TeX. This may be useful for understanding the source code of LaTeX packages, many of which are quite old and written in low-level TeX. [7] (`texdoc texbytopic`)

LaTeX

Getting something out of LaTeX:
Create your first document in LaTeX. [8] (https://ctan.org/pkg/first-latex-doc)

The very short guide to typesetting with LaTeX:
A four-page introduction. [9] (https://ctan.org/pkg/latex-veryshortguide)

Formatting Information:
A beginner's introduction to typesetting with LaTeX. [10] (https://ctan.org/pkg/beginlatex)

LaTeX for Complete Novices:
An extensive introduction for a non-technical person. [11] (texdoc dickimaw-novices)

Using LaTeX to Write a PhD Thesis:
A followup to *LaTeX for Complete Novices*, including extensive discussion about bibliographies, indexes, and glossaries. [12] (texdoc dickimaw-thesis)

Writing Scientific Documents Using LaTeX:
An introduction to typesetting scientific documents. [13]
(https://ctan.org/pkg/intro-scientific)

The Not So Short Introduction to LaTeX 2$_\varepsilon$:
Covers introductory material, customizations, and a simple package. Available in many languages [14] (texdoc -l lshort)
(https://ctan.org/pkg/lshort)

LaTeX 2$_\varepsilon$: An unofficial reference manual:
A thorough but concise reference manual for LaTeX 2$_\varepsilon$, available in several languages. [15]
(texdoc -l latex2e-help)
(https://latexref.xyz)

LaTeX WikiBook:
An online book, includes information about creating LaTeX packages and classes.
(https://en.wikibooks.org/wiki/LaTeX)

LuaLaTeX

A guide to LuaLaTeX:
An introduction. (texdoc lualatex-doc)

LuaTeX Reference:
The full manual. (texdoc luatex.pdf)

XeLaTeX

The XeTeX reference guide:
A summary of additional features. (texdoc xetex-reference)

Font-change-xetex:
Macros for using fonts. (texdoc font-change-xetex)

LaTeX3 and expl3

The LaTeX3 Interfaces:
Reference documentation for the expl3 programming environment. (texdoc interface3)

Symbol references

These are lists of the LaTeX commands which produce symbols.

Comprehensive LaTeX Symbol List:
More than 14,000 symbols and LaTeX commands. [16] (texdoc symbols-letter) (texdoc symbols-a4)

Every symbol (most symbols) defined by unicode-math:
Unicode math symbols. [17] (texdoc unimath-symbols)

Source code

The source code for LaTeX 2$_\varepsilon$ itself is also included in the distribution.

The LaTeX 2$_\varepsilon$ sources:
Occasionally useful for figuring out how something really works. [18] (texdoc source2e)

List of internal LaTeX 2$_\varepsilon$ macros useful to package authors:
A list of the core LaTeX macros, each of which is linked to the source code. [19] (texdoc macros2e)

FAQs

TeX FAQ:
A wide-ranging list of frequently-asked questions. (formerly the UK TUG FAQ) [20] (texdoc letterfaq) (texdoc newfaq)

Visual LaTeX FAQ:
Click on a visual element to learn how it is programmed. [21] (texdoc visualFAQ)

Non-English

Initiation à LATEX:
A French guide on LaTeX— for beginners or advanced users. [22] (https://ctan.org/pkg/guide-latex-fr)

LaTeX 2$_\varepsilon$ Via Exemplos:
A study course in Brazilian Portuguese. [23] (https://ctan.org/pkg/latex-via-exemplos)

The Not So Short Introduction to LaTeX 2$_\varepsilon$:
Covers introductory material, customizations, and a simple package. Available in many languages [14] (texdoc -l lshort) (https://ctan.org/pkg/lshort)

LaTeX 2$_\varepsilon$: An unofficial reference manual:
A thorough but concise reference manual for LaTeX 2$_\varepsilon$, available in several languages. [15] (texdoc -l latex2e-help) (https://latexref.xyz)

Ebook Foundation — Free Programming Books:
A variety of TeX-related and other programming books and documents, in a number of languages. [24] (https://github.com/EbookFoundation/free-programming-books)

General typeseting theory

Discussion about general typesetting theory, presented by various TeX-related authors.

A Few Notes on Book Design:
Discussion about book design and typography. 100+ pages. [25] (texdoc memdesign)

KOMA-Script — The Guide — Calculating the Page Layout with typearea:
Discussion about the page layout of a book. [26] (texdoc typearea)

A TUFTE-STYLE BOOK — The Design of Tufte's Books:
Emulating ideas from the books of Edward R. Tufte. [27] (texdoc tufte-latex)

The Octavo Package:
Design principles and guidelines emulating books from the Renaissance. [28] (texdoc octavo)

Package canoniclayout:
Ideas regarding text-block proportions. [29] (texdoc canoniclayout)

Publication-quality tables in LaTeX:
Improved design of tabular layouts. [30] (texdoc booktabs)

The Ti*k*Z and PGF Packages — Guidelines on Graphics:
"General guidelines and principles concerning the creation of graphics for scientific presentations, papers, and books". [31] (texdoc pgfmanual)

Accessing embedded information

texdoc

A large amount of documentation is included in a TeX distribution. Most can be accessed with the `texdoc` program. Enter "`texdoc -l <name>`" to search for matching package, file, or program names. In some cases the same document is available in both letter or A4 paper sizes, or in several languages. `texdoc` is also available online [32], with popular packages sorted by category. (texdoc.net)

kpsewhich

The program `kpsewhich` may be used to find out where a file is located. `kpsewhich filename` searches for and returns the path to the given filename.

`kpsewhich` can also return directories, such as:

```
kpsewhich -var-value TEXMFROOT
kpsewhich -var-value TEXMFDIST
kpsewhich -var-value TEXMFLOCAL
```

Some package authors choose not to include the source code in the package documentation. To view the source code:

1. To locate and read a package's `.sty` file:

   ```
   kpsewhich package.sty
   ```

   Usually these files have their comments removed, so it is better to use the `.dtx` file instead.

2. The `.dtx` file is usually available, and will have the package's source code.

   ```
   kpsewhich package.dtx
   ```

   If it is not installed on your local system, it will be necessary to download the `.dtx` file from CTAN (see the next section).

   The comments are not yet typeset and so will not be as easily read.

3. To typeset the documentation with the source code, copy the `.dtx` file and any associated image files somewhere local and then look for `\OnlyDescription` in the source. This command tells the ltxdoc package not to print the source code.

4. Remove `\OnlyDescription`, then process the `.dtx` file with

   ```
   pdflatex package.dtx
   ```

   Barring unusual circumstances, this will create a new documentation `.pdf` file with the package source code included.

Obtaining packages — Comprehensive TeX Archive Network (CTAN)

The Comprehensive TeX Archive Network (CTAN) provides a master collection of packages. A search function is available, which is useful when you know the name of a package or its author, and a list of topics is also provided. There are so many topics, however, that finding the right topic can be a problem in itself. One useful method to find what you are looking for is to search for a related package you may already know about, then look at its description on CTAN to see what topics are shown for it. Selecting these topics then shows you related packages. [33]

Packages useful for programming LaTeX

A number of packages are especially useful for LaTeX programmers: (`texdoc <packagename>`)

xifthen: Conditionals.

etoolbox: A wide range of programming tools, often avoiding the need to resort to low-level TeX.

etextools: Adds to etoolbox. Strings, lists, and more.

xparse: Define macros and environments with flexible argument types.

environ: Process environment contents.

arrayjobx, fifo-stack, forarray, forloop, xfor: Programming arrays, stacks, and loops.

iftex: Detect TeX engine.

ifplatform: Detect operating system.

xstring: String manipulation.

keyval, xkeyval, kvsetkeys: Key/value arguments.

pgfkeys, pgfkeyx: Another form of key/value arguments.

kvoptions: Key/value package options.

expl3: LaTeX3 programming.

l3keys, l3keys2e: Key/value for LaTeX3.

chktex: Locates typographic errors.

CTAN topic macro-supp: An entire topic of useful programming macros.

Creating and documenting new packages

How-to

Documentation for those interested in creating their own package or class:

How to package your LaTeX package:
A tutorial. [34] (`texdoc dtxtut`)

LaTeX 2$_\varepsilon$ for class and package writers:
Programming a package or class. [35] (`texdoc clsguide`)

The doc and shortvrb packages:
Packages for documenting packages. [36] (`texdoc doc`)

The DocStrip program:
The program which processes `.dtx` and `.ins` files to generate documentation and `.sty` files. [37]
(`texdoc docstrip`)

Published articles about creating LaTeX packages

Related articles from *TUGboat*:

Rolling your own Document Class: Using LaTeX to keep away from the Dark Side:
An overview of the article class. [38]

Good things come in little packages: An introduction to writing `.ins` and `.dtx` files:
How and why to create your own `.dtx` and `.ins` files. [39]

How to develop your own document class — our experience:
A comparison of developing class vs. package files. [40]

Users groups

TeX Users Group: http://tug.org

List of international users groups: http://tug.org/usergroups.html

Online communities

English forums:

TeX — LaTeX Stack Exchange: http://tex.stackexchange.com
Almost any question has already been asked, and a quick web search will find answers, ranked by vote.

LaTeX Community: http://www.latex-community.org
A traditional forum with quick replies to your questions

German forums:

TeXwelt: http://texwelt.de/wissen/

goLaTeX: http://golatex.de

French forums:

TeXnique.fr: http://texnique.fr

Mailing lists: http://tug.org/mailman/listinfo
Several dozen, spanning a wide range of TeX-related topics.

Newsgroup: comp.text.tex

Distributions — LaTeX for various operating systems

TeXLive: http://tug.org/texlive — Unix and Windows

MiKTex: https://miktex.org — Windows and Mac

proTeXt: http://tug.org/protext/ — Windows

MacTex: http://tug.org/mactex/ — Mac

Change log

2017/03/06: Initial version.

2017/10/04: Added users groups, mailing lists, distributions, LuaTeX, XeTeX, chktex. Organization and formatting improvements.

2017/10/14: More information about accessing embedded documentation.

2018/01/18: Added texdoc.net.

2018/01/21: Added latex-veryshortguide, first-latex-doc, beginlatex, intro-scientific, guide-latex-fr.

2018/03/24: Added interface3, dickimaw-novices, dickimaw-thesis.

2018/04/01: Added TeXnique.fr.

2018/06/28: Added sections for non-English documents and general typesetting theory. Updated host and name for TeX FAQ. Added latex-via-exemplos and Ebook Foundation free programming books.

2018/10/18: Updated URL for *LaTeX 2ε: An unofficial reference manual*.

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