

The `setouterhbox` package

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Abstract

If math stuff is set in an `\hbox`, then TeX performs some optimization and omits the implicate penalties `\binoppenalty` and `\relpenalty`. This packages tries to put stuff into an `\hbox` without getting lost of those penalties.

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1 Documentation

1.1 Introduction

There is a situation in `hyperref`'s driver for `dvips` where the user wants to have links that can be broken across lines. However `dvips` doesn't support the feature. With option `breaklinks` `hyperref` sets the links as usual, put them in a box and write the link data with box dimensions into the appropriate `\specials`. Then, however, it does not set the complete unbreakable box, but it unwrappes the material inside to allow line breaks. Of course line breaking and glue setting will falsify the link dimensions, but line breaking was more important for the user.

1.2 Acknowledgement

Jonathan Fine, Donald Arsenau and me discussed the problem in the newsgroup `comp.text.tex` where Damian Menscher has started the thread, see [1].

The discussion was productive and generated many ideas and code examples. In order to have a more permanent result I wrote this package and tried to implement most of the ideas, a kind of summary of the discussion. Thus I want and have to thank Jonathan Fine and Donald Arsenau very much.

Two weeks later David Kastrup (posting in `comp.text.tex`, [2]) remembered an old article of Michael Downes ([3]) in TUGboat, where Michael Downes already presented the method we discuss here. Nowadays we have ε -TeX that extends the tool set of a TeX macro programmer. Especially useful ε -TeX was in this package for detecting and dealing with errorneous situations.

However also nowadays a perfect solution for the problem is still missing at macro level. Probably someone has to go deep in the internals of the TeX compiler to implement a switch that let penalties stay where otherwise TeX would remove them for optimization reasons.

1.3 Usage

Package loading. L^ATeX: as usually:

```
\usepackage{setouterhbox}
```

The package can also be included directly, thus plain-TeX users write:

```
\input setouterhbox.sty
```

Register allocation. The material will be put into a box, thus we need to know these box number. If you need to allocate a new box register:

L^ATeX: `\newsavebox{\langle name \rangle}`

plain-TeX: `\newbox\langle name \rangle`

Then `\langle name \rangle` is a command that held the box number.

Box wrapping. L^ATeX users put the material in the box with an environment similar to `lrbox`. The environment `setouterhbox` uses the same syntax and offers the same features, such as verbatim stuff inside:

```
\begin{setouterhbox}\langle box number \rangle...\end{setouterhbox}
```

Users with plain-TeX do not have environments, they use instead:

```
setouterhbox\langle box number \rangle...\endsetouterhbox
```

In both cases the material is put into an `\hbox` and assigned to the given box, denoted by `\langle box number \rangle`. Note the assignment is local, the same way `lrbox` behaves.

Unwrapping. The box material is ready for unwrapping:

```
\unhbox\<box number>
```

1.4 Option hyperref

Package `url` uses math mode for typesetting urls. Break points are inserted by `\binoppenalty` and `\relpenalty`. Unhappily these break points are removed, if `hyperref` is used with option `breaklinks` and drivers that depend on `pdfmark`: `dvips`, `vtexpdfmark`, `textures`, and `dvipsone`. Thus the option `hyperref` enables the method of this package to avoid the removal of `\relpenalty` and `\binoppenalty`. Thus you get more break points. However, the link areas are still wrong for these drivers, because they are not supporting broken links.

Note, you need version 2006/08/16 v6.75c of package `hyperref`, because starting with this version the necessary hook is provided that package `setouterhbox` uses.

```
\usepackage[...]{hyperref}[2006/08/16]
\usepackage[hyperref]{setouterhbox}
```

Package order does not matter.

1.5 Example

```
1 <*example>
2 \documentclass[a5paper]{article}
3 \usepackage{url}[2005/06/27]
4 \usepackage{setouterhbox}
5
6 \newsavebox{\testbox}
7
8 \setlength{\parindent}{0pt}
9 \setlength{\parskip}{2em}
10
11 \begin{document}
12 \raggedright
13
14 \url{http://this.is.a.very.long.host.name/followed/%
15 by/a/very_long_long_long_path.html}%
16
17 \sbox\testbox{%
18   \url{http://this.is.a.very.long.host.name/followed/%
19   by/a/very_long_long_long_path.html}%
20 }%
21 \unhbox\testbox
22
23 \begin{setouterhbox}{\testbox}%
24   \url{http://this.is.a.very.long.host.name/followed/%
25   by/a/very_long_long_long_path.html}%
26 \end{setouterhbox}
27 \unhbox\testbox
28
29 \end{document}
30 </example>
```

2 Implementation

Internal macros are prefixed by `\setouterhbox`, `@` is not used inside names, thus we do not need to care of its catcode if we are not using it as L^AT_EX package.

2.1 Package start stuff

```
31 <*package>
```

Prevent reloading more than one, necessary for plain- \TeX : Reload check, especially if the package is not used with \LaTeX .

```

32 \begingroup
33   \catcode44 12 % ,
34   \catcode45 12 % -
35   \catcode46 12 % .
36   \catcode58 12 % :
37   \catcode64 11 % @
38   \expandafter\let\expandafter\x\csname ver@setouterhbox.sty\endcsname
39   \ifcase 0%
40     \ifx\x\relax % plain
41       \else
42         \ifx\x\empty % LaTeX
43           \else
44             1%
45           \fi
46         \fi
47       \else
48         \catcode35 6 % #
49         \catcode123 1 % {
50         \catcode125 2 % }
51         \expandafter\ifx\csname PackageInfo\endcsname\relax
52           \def\x#1#2{%
53             \immediate\write-1{Package #1 Info: #2.}%
54           }%
55         \else
56           \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
57         \fi
58         \x{setouterhbox}{The package is already loaded}%
59       \endgroup
60     \expandafter\endinput
61   \fi
62 \endgroup

```

Package identification:

```

63 \begingroup
64   \catcode35 6 % #
65   \catcode40 12 % (
66   \catcode41 12 % )
67   \catcode44 12 % ,
68   \catcode45 12 % -
69   \catcode46 12 % .
70   \catcode47 12 % /
71   \catcode58 12 % :
72   \catcode64 11 % @
73   \catcode123 1 % {
74   \catcode125 2 % }
75   \expandafter\ifx\csname ProvidesPackage\endcsname\relax
76     \def\x#1#2#3[#4]{\endgroup
77       \immediate\write-1{Package: #3 #4}%
78       \xdef#1{#4}%
79     }%
80   \else
81     \def\x#1#2[#3]{\endgroup
82       #2[#3]}%
83     \ifx#1\relax
84       \xdef#1{#3}%
85     \fi
86   }%
87 \fi
88 \expandafter\x\csname ver@setouterhbox.sty\endcsname
89 \ProvidesPackage{setouterhbox}%
90 [2007/09/09 v1.7 Set hbox in outer horizontal mode (H0)]

```

```

91 \begingroup
92   \catcode123 1 % {
93   \catcode125 2 % }
94   \def\x{\endgroup
95     \expandafter\edef\csname setouterhboxAtEnd\endcsname{%
96       \catcode35 \the\catcode35\relax
97       \catcode64 \the\catcode64\relax
98       \catcode123 \the\catcode123\relax
99       \catcode125 \the\catcode125\relax
100     }%
101   }%
102 \x
103 \catcode35 6 % #
104 \catcode64 11 % @
105 \catcode123 1 % {
106 \catcode125 2 % }
107 \def\TMP@EnsureCode#1#2{%
108   \edef\setouterhboxAtEnd{%
109     \setouterhboxAtEnd
110     \catcode#1 \the\catcode#1\relax
111   }%
112   \catcode#1 #2\relax
113 }
114 \TMP@EnsureCode{40}{12}% (
115 \TMP@EnsureCode{41}{12}% )
116 \TMP@EnsureCode{44}{12}% ,
117 \TMP@EnsureCode{45}{12}% -
118 \TMP@EnsureCode{46}{12}% .
119 \TMP@EnsureCode{47}{12}% /
120 \TMP@EnsureCode{58}{12}% :
121 \TMP@EnsureCode{60}{12}% <
122 \TMP@EnsureCode{61}{12}% =
123 \TMP@EnsureCode{62}{12}% >
124 \TMP@EnsureCode{96}{12}% ‘

```

2.2 Interface macros

`\setouterhboxBox` The method requires a global box assignment. To be on the safe side, a new box register is allocated for this global box assignment.

```
125 \newbox\setouterhboxBox
```

`\setouterhboxFailure` Error message for both plain-TeX and L^AT_EX

```

126 \begingroup\expandafter\expandafter\expandafter\endgroup
127 \expandafter\ifx\csname RequirePackage\endcsname\relax
128   \input infwarerr.sty\relax
129 \else
130   \RequirePackage{infwarerr}[2007/09/09]%
131 \fi
132 \edef\setouterhboxFailure#1#2{%
133   \expandafter\noexpand\csname @PackageError\endcsname
134     {setouterhbox}{#1}{#2}%
135 }

```

2.3 Main part

eTeX provides much better means for checking error conditions. Thus lines marked by "E" are executed if eTeX is available, otherwise the lines marked by "T" are used.

```

136 \begingroup\expandafter\expandafter\expandafter\endgroup
137 \expandafter\ifx\csname lastnodetype\endcsname\relax
138   \catcode'T=9 % ignore
139   \catcode'E=14 % comment

```

```

140 \else
141   \catcode'T=14 % comment
142   \catcode'E=9 % ignore
143 \fi

\setouterhboxRemove Remove all kern, glue, and penalty nodes; poor man's version, if  $\varepsilon$ -TeX is not
available
144 \def\setouterhboxRemove{%
145 E \ifnum\lastnodetype<11 %
146 E   \else
147 E   \ifnum\lastnodetype>13 %
148 E   \else
149     \unskip\unkern\unpenalty
150 E   \expandafter\expandafter\expandafter\setouterhboxRemove
151 E   \fi
152 E \fi
153 }%

\setouterhbox Passing the box contents by macro parameter would prevent catcode changes in
the box contents like by \verb. Also \bgroup and \egroup does not work, be-
cause stuff has to be added at the begin and end of the box, thus the syntax
\setouterhbox{<box number>}\endsetouterhbox is used. Also we automati-
cally get an environment setouterhbox if LATEX is used.
154 \def\setouterhbox#1{%
155   \begingroup
156   \def\setouterhboxNum{#1}%
157   \setbox0\vbox\bgroup
158 T   \kern.123pt\relax % marker
159 T   \kern0pt\relax % removed by \setouterhboxRemove
160   \begingroup
161   \everypar{}%
162   \noindent
163 }

\endsetouterhbox Most of the work is done in the end part, thus the heart of the method follows:
164 \def\endsetouterhbox{%
165   \endgroup

Omit the first pass to get the penalties of the second pass.
166   \pretolerance-1 %

We don't want a third pass with \emergencystretch.
167   \tolerance10000 %
168   \hsize\maxdimen

Line is not underfull:
169   \parfillskip 0pt plus 1filll\relax
170   \leftskip0pt\relax

Suppress underful \hbox warnings, is explicit line breaks are used.
171   \rightskip0pt plus 1fil\relax
172   \everypar{}%

Ensure that there is a paragraph and prevents \endgraph from eating terminal
glue:
173   \kern0pt%
174   \endgraf
175   \setouterhboxRemove
176 E   \ifnum\lastnodetype=1 %
177 E   \global\setbox\setouterhboxBox\lastbox
178 E   \loop
179 E     \setouterhboxRemove
180 E   \ifnum\lastnodetype=1 %

```

```

181 E      \setbox0=\lastbox
182 E      \global\setbox\setouterhboxBox=\hbox{%
183 E      \unhbox0 %

```

Remove \rightskip, a penalty with -10000 is part of the previous line.

```

184 E      \unskip
185 E      \unhbox\setouterhboxBox
186 E      }%
187 E      \repeat
188 E      \else
189 E      \setouterhboxFailure{%
190 E      Something is wrong%
191 E      }{%
192 E      Could not find expected line.%
193 E      \MessageBreak
194 E      (\string\lastnodetype: \number\lastnodetype, expected: 1)%
195 E      }%
196 E      \fi
197 E      \setouterhboxRemove
198 T      \global\setbox\setouterhboxBox\lastbox
199 T      \loop
200 T      \setouterhboxRemove
201 T      \setbox0=\lastbox
202 T      \ifcase\ifvoid0 1\else0\fi
203 T      \global\setbox\setouterhboxBox=\hbox{%
204 T      \unhbox0 %

```

Remove \rightskip, a penalty with -10000 is part of the previous line.

```

205 T      \unskip
206 T      \unhbox\setouterhboxBox
207 T      }%
208 T      \repeat
209 T      \ifdim.123pt=\lastkern
210 T      \else
211 T      \setouterhboxFailure{%
212 T      Something is wrong%
213 T      }{%
214 T      Unexpected stuff was detected before the line.%
215 T      }%
216 T      \fi
217 T      \egroup
218 T      \ifcase \ifnum\wd0=0 \else 1\fi
219 T      \ifdim\ht0=.123pt \else 1\fi
220 T      \ifnum\dp0=0 \else 1\fi
221 T      0 %
222 E      \ifnum\lastnodetype=-1 %

```

There was just one line that we have caught.

```

223      \else
224      \setouterhboxFailure{%
225      Something is wrong%
226      }{%
227      After fetching the line there is more unexpected stuff.%
228 E      \MessageBreak
229 E      (\string\lastnodetype: \number\lastnodetype, expected: -1)%
230      }%
231      \fi
232 E      \egroup
233 \expandafter\endgroup
234 \expandafter\setouterhboxFinish\expandafter{%
235 \number\setouterhboxNum
236 }%
237 }

```

2.4 Environment support

Check `\@currenvir` for the case that `\setouterhbox` was called as environment. Then the box assignment must be put after the `\endgroup` of `\end{...}`.

```
238 \def\setouterhboxCurr{\setouterhbox}
239 \def\setouterhboxLast#1{%
240   \setbox#1\hbox{%
241     \unhbox\setouterhboxBox
242     \unskip % remove \rightskip glue
243     \unskip % remove \parfillskip glue
244     \unpenalty % remove paragraph ending \penalty 10000
245     \unkern % remove explicit kern inserted above
246   }%
247 }
```

`\setouterhboxFinish` #1 is an explicit number.

```
248 \def\setouterhboxFinish#1{%
249   \begingroup\expandafter\expandafter\expandafter\endgroup
250   \expandafter\ifx\csname @currenvir\endcsname\setouterhboxCurr
251     \aftergroup\setouterhboxLast
252     \aftergroup{%
253       \setouterhboxAfter #1\NIL
254     \aftergroup}%
255   \else
256     \setouterhboxLast{#1}%
257   \fi
258 }
```

`\setouterhboxAfter` #1 is an explicit number.

```
259 \def\setouterhboxAfter#1#2\NIL{%
260   \aftergroup#1%
261   \ifx\#2\%
262     \else
263       \setouterhboxReturnAfterFi{%
264         \setouterhboxAfter#2\NIL
265       }%
266     \fi
267 }
```

`\setouterhboxReturnAfterFi` A utility macro to get tail recursion.

```
268 \long\def\setouterhboxReturnAfterFi#1\fi{\fi#1}
```

Restore catcodes we have need to distinguish between the implementation with and without ε -TeX.

```
269 \catcode69=11\relax % E
270 \catcode84=11\relax % T
```

2.5 Option hyperref

```
271 \begingroup
272   \def\x{LaTeX2e}%
273   \expandafter\endgroup
274   \ifx\x\fmtname
275     \else
276       \setouterhboxAtEnd
277       \expandafter\endinput
278   \fi
```

`\Hy@setouterhbox` `\Hy@setouterhbox` is the internal hook that `hyperref` uses since 2006/02/12 v6.75a.

```
279 \DeclareOption{hyperref}{%
280   \long\def\Hy@setouterhbox#1#2{%
281     \setouterhbox{#1}#2\endsetouterhbox
```



```

282 }%
283 }

284 \ProcessOptions\relax
285 \setouterhboxAtEnd
286 \</package>

```

3 Test

3.1 Catcode checks for loading

```

287 <*test1>

288 \catcode'\{=1 %
289 \catcode'\}=2 %
290 \catcode'\#=6 %
291 \catcode'\@=11 %
292 \expandafter\ifx\csname count@\endcsname\relax
293   \countdef\count@=255 %
294 \fi
295 \expandafter\ifx\csname @gobble\endcsname\relax
296   \long\def\@gobble#1{}%
297 \fi
298 \expandafter\ifx\csname @firstofone\endcsname\relax
299   \long\def\@firstofone#1{#1}%
300 \fi
301 \expandafter\ifx\csname loop\endcsname\relax
302   \expandafter\@firstofone
303 \else
304   \expandafter\@gobble
305 \fi
306 {%
307   \def\loop#1\repeat{%
308     \def\body{#1}%
309     \iterate
310   }%
311   \def\iterate{%
312     \body
313     \let\next\iterate
314   \else
315     \let\next\relax
316   \fi
317   \next
318 }%
319 \let\repeat=\fi
320 }%
321 \def\RestoreCatcodes{}
322 \count@=0 %
323 \loop
324   \edef\RestoreCatcodes{%
325     \RestoreCatcodes
326     \catcode\the\count@=\the\catcode\count@\relax
327   }%
328 \ifnum\count@<255 %
329   \advance\count@ 1 %
330 \repeat
331
332 \def\RangeCatcodeInvalid#1#2{%
333   \count@=#1\relax
334   \loop
335     \catcode\count@=15 %
336   \ifnum\count@<#2\relax

```

```

337 \advance\count@ 1 %
338 \repeat
339 }
340 \expandafter\ifx\csname LoadCommand\endcsname\relax
341 \def\LoadCommand{\input setouterhbox.sty\relax}%
342 \fi
343 \def\Test{%
344 \RangeCatcodeInvalid{0}{47}%
345 \RangeCatcodeInvalid{58}{64}%
346 \RangeCatcodeInvalid{91}{96}%
347 \RangeCatcodeInvalid{123}{255}%
348 \catcode'\@=12 %
349 \catcode'\=0 %
350 \catcode'\{=1 %
351 \catcode'\}=2 %
352 \catcode'\#=6 %
353 \catcode'\[=12 %
354 \catcode'\]=12 %
355 \catcode'\%=14 %
356 \catcode'\ =10 %
357 \catcode13=5 %
358 \LoadCommand
359 \RestoreCatcodes
360 }
361 \Test
362 \csname @@end\endcsname
363 \end
364 </test1>

```

3.2 Test with package url

```

365 <*test2>
366 \nofiles
367 \documentclass[a5paper]{article}
368 \usepackage{url}[2005/06/27]
369 \usepackage{setouterhbox}
370
371 \newsavebox{\testbox}
372
373 \setlength{\parindent}{0pt}
374 \setlength{\parskip}{2em}
375
376 \begin{document}
377 \raggedright
378
379 \url{http://this.is.a.very.long.host.name/followed/%
380 by/a/very_long_long_long_path.html}%
381
382 \sbox\testbox{%
383 \url{http://this.is.a.very.long.host.name/followed/%
384 by/a/very_long_long_long_path.html}%
385 }%
386 \unhbox\testbox
387
388 \begin{setouterhbox}{\testbox}%
389 \url{http://this.is.a.very.long.host.name/followed/%
390 by/a/very_long_long_long_path.html}%
391 \end{setouterhbox}
392 \unhbox\testbox
393
394 \end{document}
395 </test2>

```

4 Installation

4.1 Download

Package. This package is available on CTAN¹:

[CTAN:macros/latex/contrib/oberdiek/setouterhbox.dtx](#) The source file.

[CTAN:macros/latex/contrib/oberdiek/setouterhbox.pdf](#) Documentation.

Bundle. All the packages of the bundle ‘oberdiek’ are also available in a TDS compliant ZIP archive. There the packages are already unpacked and the documentation files are generated. The files and directories obey the TDS standard.

[CTAN:install/macros/latex/contrib/oberdiek.tds.zip](#)

TDS refers to the standard “A Directory Structure for T_EX Files” ([CTAN:tds/tds.pdf](#)). Directories with `texmf` in their name are usually organized this way.

4.2 Bundle installation

Unpacking. Unpack the `oberdiek.tds.zip` in the TDS tree (also known as `texmf` tree) of your choice. Example (linux):

```
unzip oberdiek.tds.zip -d ~/texmf
```

Script installation. Check the directory `TDS:scripts/oberdiek/` for scripts that need further installation steps. Package `attachfile2` comes with the Perl script `pdfatfi.pl` that should be installed in such a way that it can be called as `pdfatfi`. Example (linux):

```
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

4.3 Package installation

Unpacking. The `.dtx` file is a self-extracting `docstrip` archive. The files are extracted by running the `.dtx` through plain-T_EX:

```
tex setouterhbox.dtx
```

TDS. Now the different files must be moved into the different directories in your installation TDS tree (also known as `texmf` tree):

| | |
|--|---|
| <code>setouterhbox.sty</code> | → <code>tex/generic/oberdiek/setouterhbox.sty</code> |
| <code>setouterhbox.pdf</code> | → <code>doc/latex/oberdiek/setouterhbox.pdf</code> |
| <code>setouterhbox-example.tex</code> | → <code>doc/latex/oberdiek/setouterhbox-example.tex</code> |
| <code>test/setouterhbox-test1.tex</code> | → <code>doc/latex/oberdiek/test/setouterhbox-test1.tex</code> |
| <code>test/setouterhbox-test2.tex</code> | → <code>doc/latex/oberdiek/test/setouterhbox-test2.tex</code> |
| <code>setouterhbox.dtx</code> | → <code>source/latex/oberdiek/setouterhbox.dtx</code> |

If you have a `docstrip.cfg` that configures and enables `docstrip`’s TDS installing feature, then some files can already be in the right place, see the documentation of `docstrip`.

4.4 Refresh file name databases

If your T_EX distribution (teT_EX, miK_TE_X, ...) relies on file name databases, you must refresh these. For example, teT_EX users run `texhash` or `mktextlsr`.

¹<http://ftp.ctan.org/tex-archive/>

4.5 Some details for the interested

Attached source. The PDF documentation on CTAN also includes the `.dtx` source file. It can be extracted by AcrobatReader 6 or higher. Another option is `pdftk`, e.g. unpack the file into the current directory:

```
pdftk setouterhbox.pdf unpack_files output .
```

Unpacking with \LaTeX . The `.dtx` chooses its action depending on the format:

plain- \TeX : Run `docstrip` and extract the files.

\LaTeX : Generate the documentation.

If you insist on using \LaTeX for `docstrip` (really, `docstrip` does not need \LaTeX), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{setouterhbox.dtx}
```

Do not forget to quote the argument according to the demands of your shell.

Generating the documentation. You can use both the `.dtx` or the `.drv` to generate the documentation. The process can be configured by the configuration file `ltxdoc.cfg`. For instance, put this line into this file, if you want to have A4 as paper format:

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with `pdf \LaTeX` :

```
pdflatex setouterhbox.dtx
makeindex -s gind.ist setouterhbox.idx
pdflatex setouterhbox.dtx
makeindex -s gind.ist setouterhbox.idx
pdflatex setouterhbox.dtx
```

5 References

- [1] Damian Menscher, [news:comp.text.tex](http://groups.google.com/group/comp.text.tex/msg/79648d4cf1f8bc13), *overlong lines in List of Figures*, `<dh058tqbd1@news.ks.uiuc.edu>`, 23rd September 2005. <http://groups.google.com/group/comp.text.tex/msg/79648d4cf1f8bc13>
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6 History

[2005/10/05 v1.0]

- First version.

[2005/10/07 v1.1]

- Option `hyperref` added.

[2005/10/18 v1.2]

- Support for explicit line breaks added.

[2006/02/12 v1.3]

- DTX format.
- Documentation extended.

[2006/08/26 v1.4]

- Date of hyperref updated.

[2007/04/26 v1.5]

- Use of package infwarerr.

[2007/05/17 v1.6]

- Standard header part for generic files.

[2007/09/09 v1.7]

- Catcode section added.

7 Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in *roman* refer to the code lines where the entry is used.

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