

The footnote* package

Mark Wooding

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1 User guide

This package provides some commands for handling footnotes slightly better than L^AT_EX usually does; there are several commands and environments (notably `\parbox`, `minipage` and `tabular`¹) which ‘trap’ footnotes so that they can’t escape and appear at the bottom of the page.

`savenotes` The `savenotes` environment saves up any footnotes encountered within it, and performs them all at the end.

`\savenotes` If you’re defining a command or environment, you can use the `\savenotes` command to start saving up footnotes, and the `\spewnotes` command to execute them all at the end. Note that `\savenotes` and `\spewnotes` enclose a group, so watch out. You can safely nest the commands and environments – they work out if they’re already working and behave appropriately.

`minipage*` To help things along a bit, the package provides a `*`-version of the `minipage` environment, which doesn’t trap footnotes for itself (and in fact sends any footnotes it contains to the bottom of the page, where they belong).

`\makesavenoteenv` The new `minipage*` environment was created with a magic command called `\makesavenoteenv`. It has a fairly simple syntax:

$$\langle \textit{make-save-note-env-cmd} \rangle ::= \overbrace{\text{\texttt{\textbackslash makesavenoteenv}} \overbrace{\{ - \langle \textit{env-name} \rangle - \}}^{\text{\texttt{[- \langle \textit{new-env-name} \rangle -]}}}}$$

*The footnote package is currently at version 1.13, dated 28 January 1997.

¹The `mdwtab` package, provided in this distribution, handles footnotes correctly anyway; it uses an internal version of this package to do so.

Without the optional argument, it redefines the named environment so that it handles footnotes correctly. With the optional argument, it makes the new environment named by `<new-env-name>` into a footnote-friendly version of the `<env-name>` environment.

`\parbox` The package also redefines the `\parbox` command so that it works properly with footnotes.

`footnote` The other problem which people tend to experience with footnotes is that you can't put verbatim text (with the `\verb` command or the `verbatim` environment) into the `\footnote` command's argument. This package provides a `footnote environment`, which *does* allow verbatim things. You use the environment just like you do the command. It's really easy. It even has an optional argument, which works the same way.

`footnotetext` To go with the `footnote` environment, there's a `footnotetext` environment, which just puts the text in the bottom of the page, like `\footnotetext` does.

There's a snag with these environments, though. Some other nonstandard environments, like `tabularx`, try to handle footnotes their own way, because they won't work otherwise. The way they do this is not compatible with the way that the `footnote` and `footnotetext` environments work, and you will get strange results if you try (there'll be odd vertical spacing, and the footnote text may well be incorrect).²

2 Implementation

Most implementations of footnote-saving (in particular, that used in the `tabularx` and `longtable` packages) use a token list register to store the footnote text, and then expand it when whatever was preventing footnotes (usually a vbox) stops. This is no good at all if the footnotes contain things which might not be there by the time the expansion occurs. For example, references to things in temporary boxes won't work.

This implementation therefore stores the footnotes up in a box register. This must be just as valid as using tokens, because all I'm going to do at the end is unbox the box).

```
1 \*macro | package>
2 \ifx\fn@notes\@undefined%
3   \newbox\fn@notes%
4 \fi
```

I'll need a length to tell me how wide the footnotes should be at the moment.

```
5 \newdimen\fn@width
```

Of course, I can't set this up until I actually start saving footnotes. Until then I'll use `\columnwidth` (which works in `multicol` even though it doesn't have any right to).

```
6 \let\fn@colwidth\columnwidth
```

And now a switch to remember if we're already handling footnotes,

```
7 \newif\if@savingnotes
```

²The solution to this problem is to send mail to David Carlisle persuading him to use this package to handle footnotes, rather than doing it his way.

2.1 Building footnote text

I need to emulate L^AT_EX's footnote handling when I'm putting the notes into my box; this is also useful in the verbatim-in-footnotes stuff.

`\fn@startnote` Here's how a footnote gets started. Most of the code here is stolen from `\@footnotetext`.

```
8 \def\fn@startnote{%
9   \hsize\fn@colwidth%
10  \interlinepenalty\interfootnotelinepenalty%
11  \reset@font\footnotesize%
12  \floatingpenalty\@MM% Is this right???
13  \@parboxrestore%
14  \protected@edef\@currentlabel{\csname p@\@mpfn\endcsname\@thefnmark}%
15  \color@begingroup%
16 }
```

`\fn@endnote` Footnotes are finished off by this macro. This is the easy bit.

```
17 \let\fn@endnote\color@endgroup
```

2.2 Footnote saving

`\fn@fntext` Now to define how to actually do footnotes. I'll just add the notes to the bottom of the footnote box I'm building.

There's some hacking added here to handle the case that a footnote is in an `\intertext` command within a broken `amsmath` alignment environment – otherwise the footnotes get duplicated due to the way that that package measures equations.³

```
18 \long\def\fn@fntext#1{%
19   \ifx\ifmeasuring@\@undefined%
20     \expandafter\@secondoftwo\else\expandafter\@iden%
21     \fi%
22   {\ifmeasuring@\expandafter\@gobble\else\expandafter\@iden\fi}%
23   {%
24     \global\setbox\fn@notes\vbox{%
25       \unvbox\fn@notes%
26       \fn@startnote%
27       \@makefntext{%
28         \rule{\z@}{\footnotesep}%
29         \ignorespaces%
30         #1%
31         \@finalstrut\strutbox%
32       }%
33       \fn@endnote%
34     }%
35   }%
36 }
```

³The correct solution of course is to implement aligning environments in a sensible way, by building the table and leaving penalties describing the intended format, and then pick that apart in a postprocessing phase. If I get the time, I'll start working on this again. I have a design worked out and the beginnings of an implementation, but it's going to be a long time coming.

`\savenotes` The `\savenotes` declaration starts saving footnotes, to be spewed at a later date. We'll also remember which counter we're meant to use, and redefine the footnotes used by `minipages`.

The idea here is that we'll gather up footnotes within the environment, and output them in whatever format they were being typeset outside the environment.

I'll take this a bit at a time. The start is easy: we need a group in which to keep our local definitions.

```
37 \def\savenotes{%
38   \begingroup%
```

Now, if I'm already saving footnotes away, I won't bother doing anything here. Otherwise I need to start hacking, and set the switch.

```
39   \if@savingnotes\else%
40     \@savingnotestruetrue%
```

I redefine the `\@footnotetext` command, which is responsible for adding a footnote to the appropriate insert. I'll redefine both the current version, and `minipage`'s specific version, in case there's a nested `minipage`.

```
41   \let\@footnotetext\fn@fntext%
42   \let\@mpfootnotetext\fn@fntext%
```

I'd better make sure my box is empty before I start, and I must set up the column width so that later changes (e.g., in `minipage`) don't upset things too much.

```
43   \fn@width\columnwidth%
44   \let\fn@colwidth\fn@width%
45   \global\setbox\fn@notes\box\voidb@x%
```

Now for some yuckiness. I want to ensure that `minipage` doesn't change how footnotes are handled once I've taken charge. I'll store the current values of `\thempfn` (which typesets a footnote marker) and `\@mpfn` (which contains the name of the current footnote counter).

```
46   \let\fn@thempfn\thempfn%
47   \let\fn@mpfn\@mpfn%
```

The `minipage` environment provides a hook, called `\@minipagerestore`. Initially it's set to `\relax`, which is unfortunately unexpandable, so if I want to add code to it, I must check this possibility. I'll make it `\@empty` (which expands to nothing) if it's still `\relax`. Then I'll add my code to the hook, to override `\thempfn` and `\@mpfn` set up by `minipage`.

Note that I can't just force the `mpfootnote` counter to be equal to the `footnote` one, because `minipage` clears `\c@mpfootnote` to zero when it starts. This method will ensure that even so, the current counter works OK.

```
48   \ifx\@minipagerestore\relax\let\@minipagerestore\@empty\fi%
49   \expandafter\def\expandafter\@minipagerestore\expandafter{%
50     \@minipagerestore%
51     \let\thempfn\fn@thempfn%
52     \let\@mpfn\fn@mpfn%
53   }%
54   \fi%
55 }
```

`\spewnotes` Now I can spew out the notes we saved. This is a bit messy, actually. Since the standard `\@footnotetext` implementation tries to insert funny struts and things, I must be a bit careful. I'll disable all this bits which start paragraphs prematurely.

```

56 \def\spewnotes{%
57   \endgroup%
58   \if@savingnotes\else\ifvoid\fn@notes\else\beginingroup%
59     \let\@makefnstext\@empty%
60     \let\@finalstrut\@gobble%
61     \let\rule\@gobbletwo%
62     \@footnotetext{\unvbox\fn@notes}%
63   \endgroup\fi\fi%
64 }
```

Now make an environment, for users.

```

65 \let\endsavenotes\spewnotes
```

That's all that needs to be in the shared code section.

```

66 \</macro | package>
67 \<*package>
```

2.3 The footnote environment

Since `\footnote` is a command with an argument, things like `verbatim` are unwelcome in it. Every so often someone on `comp.text.tex` moans about it and I post a nasty hack to make it work. However, as a more permanent and 'official' solution, here's an environment which does the job rather better. Lots of this is based on code from my latest attempt on the newsgroup.

I'll work on this in a funny order, although I think it's easier to understand. First, I'll do some macros for reading the optional argument of footnote-related commands.

`\fn@getmark` Saying `\fn@getmark{<default-code>}{<cont-code>}` will read an optional argument giving a value for the footnote counter; if the argument isn't there, the `<default-code>` is executed, and it's expected to set up the appropriate counter to the current value. The footnote marker text is stored in the macro `\@thefnmark`, as is conventional for L^AT_EX's footnote handling macros. Once this is done properly, the `<cont-code>` is called to continue handling things.

Since the handling of the optional argument plays with the footnote counter locally, I'll start a group right now to save some code. Then I'll decide what to do based on the presence of the argument.

```

68 \def\fn@getmark#1#2{%
69   \beginingroup%
70   \@ifnextchar[%
71     {\fn@getmark@i{#1}}%
72     {#1\fn@getmark@ii{#2}}%
73 }
```

There's an optional argument, so I need to read it and assign it to the footnote counter.

```

74 \def\fn@getmark@i#1[#2]{%
75   \csname c@\mpfn\endcsname#2%
```

```

76 \fn@getmark@ii%
77 }

```

Finally, set up the macro properly, and end the group.

```

78 \def\fn@getmark@ii#1{%
79 \unrestored@protected@xdef\@thefnmark{\thempfn}%
80 \endgroup%
81 #1%
82 }

```

From argument reading, I'll move on to footnote typesetting.

\fn@startfntext The **\fn@startfntext** macro sets everything up for building the footnote in a box register, ready for unboxing into the footnotes insert. The **\fn@prefntext** macro is a style hook I'll set up later.

```

83 \def\fn@startfntext{%
84 \setbox\z@\vbox\bgroup%
85 \fn@startnote%
86 \fn@prefntext%
87 \rule\z@\footnotesep%
88 \ignorespaces%
89 }

```

\fn@endfntext Now I'll end the vbox, and add it to the footnote insertion. Again, I must be careful to prevent **\@footnotetext** from adding horizontal mode things in bad places.

```

90 \def\fn@endfntext{%
91 \@finalstrut\strutbox%
92 \fn@postfntext%
93 \egroup%
94 \beginingroup%
95 \let\@makefntext\@empty%
96 \let\@finalstrut\@gobble%
97 \let\rule\@gobbletwo%
98 \@footnotetext{\unvbox\z@}%
99 \endgroup%
100 }

```

footnote I can now start on the environment proper. First I'll look for an optional argument.

```
\def\footnote{%
```

Oh. I've already come up against the first problem: that name's already used. I'd better save the original version.

```
101 \let\fn@latex@@footnote\footnote
```

The best way I can think of for seeing if I'm in an environment is to look at **\@currenvir**. I'll need something to compare with, then.

```
102 \def\fn@footnote{footnote}
```

Now to start properly. ;-)

```

103 \def\footnote{%
104 \ifx\@currenvir\fn@footnote%

```

```

105     \expandafter\@firstoftwo%
106     \else%
107     \expandafter\@secondoftwo%
108     \fi%
109     {\fn@getmark{\stepcounter\@mpfn}%
110      {\leavevmode\unskip\@footnotemark\fn@startfntext}}}%
111     {\fn@latex@@footnote}}%
112 }

```

Ending the environment is simple.

```

113 \let\endfootnote\fn@endfntext

```

`footnotetext` I'll do the same magic as before for `\footnotetext`.

```

114 \def\fn@footnotetext{footnotetext}
115 \let\fn@latex@@footnotetext\footnotetext
116 \def\footnotetext{%
117     \ifx\@currenvir\fn@footnotetext%
118     \expandafter\@firstoftwo%
119     \else%
120     \expandafter\@secondoftwo%
121     \fi%
122     {\fn@getmark{}\fn@startfntext}}%
123     {\fn@latex@@footnotetext}}%
124 }
125 \let\endfootnotetext\endfootnote

```

`\fn@prefntext` Now for one final problem. The style hook for footnotes is the command
`\fn@postfntext` `\@makefntext`, which takes the footnote text as its argument. Clearly this is utterly unsuitable, so I need to split it into two bits, where the argument is. This is very tricky, and doesn't deserve to work, although it appears to be a good deal more effective than it has any right to be.

```

126 \long\def\@tempa#1\@@#2\@@@{\def\fn@prefntext{#1}\def\fn@postfntext{#2}}
127 \expandafter\@tempa\@makefntext\@@\@@@

```

2.4 Hacking existing environments

Some existing L^AT_EX environments ought to have footnote handling but don't. Now's our chance.

`\makesavenoteenv` The `\makesavenoteenv` command makes an environment save footnotes around itself.

It would also be nice to make `\parbox` work with footnotes. I'll do this later.

```

128 \def\makesavenoteenv{\@ifnextchar[\fn@msne@ii\fn@msne@i}

```

We're meant to redefine the environment. We'll copy it (using `\let`) to a magic name, and then pass it on to stage 2.

```

129 \def\fn@msne@i#1{%
130     \expandafter\let\csname msne$#1\expandafter\endcsname%
131     \csname #1\endcsname%
132     \expandafter\let\csname endmsne$#1\expandafter\endcsname%
133     \csname end#1\endcsname%
134     \fn@msne@ii[#1]{msne$#1}%
135 }

```

Now we'll define the new environment. The start is really easy, since we just need to insert a `\savenotes`. The end is more complex, since we need to preserve the `\if@endpe` flag so that `\end` can pick it up. I reckon that proper hooks should be added to `\begin` and `\end` so that environments can define things to be done outside the main group as well as within it; still, we can't all have what we want, can we?

```

136 \def\fn@msne@ii[#1]#2{%
137   \expandafter\edef\csname#1\endcsname{%
138     \noexpand\savenotes%
139     \expandafter\noexpand\csname#2\endcsname%
140   }%
141   \expandafter\edef\csname end#1\endcsname{%
142     \expandafter\noexpand\csname end#2\endcsname%
143     \noexpand\expandafter%
144     \noexpand\spewnotes%
145     \noexpand\if@endpe\noexpand\@endpetrue\noexpand\fi%
146   }%
147 }
```

`minipage*` Let's define a `minipage*` environment which handles footnotes nicely. Really easy:

```

148 \makesavenoteenv[minipage*]{minipage}
```

`\parbox` Now to alter `\parbox` slightly, so that it handles footnotes properly. I'm going to do this fairly inefficiently, because I'm going to try and change it as little as possible.

First, I'll save the old `\parbox` command. If I don't find a '*', I'll just call this command.

```

149 \let\fn@parbox\parbox
```

This is the clever bit: I don't know how many optional arguments Mr Mittelbach and his chums will add to `\parbox`, so I'll handle any number. I'll store them all up in my first argument and call myself every time I find a new one. If I run out of optional arguments, I'll call the original `\parbox` command, surrounding it with `\savenotes` and `\spewnotes`.

```

150 \def\parbox{\@ifnextchar[{\fn@parbox@i{}}{\fn@parbox@ii{}}}
151 \def\fn@parbox@i#1[#2]{%
152   \@ifnextchar[{\fn@parbox@i{#1[#2]}}{\fn@parbox@ii{#1[#2]}}}%
153 }
154 \long\def\fn@parbox@ii#1#2#3{\savenotes\fn@parbox#1{#2}{#3}\spewnotes}
```

Done!

```

155 \</package>
```

Mark Wooding, 28 January 1997

Appendix

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END OF TERMS AND CONDITIONS

Appendix: How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the “copyright” line and a pointer to where the full notice is found.

one line to give the program’s name and a brief idea of what it does.
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Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

Gnomovision version 69, Copyright (C) yyyy name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type ‘show w’.
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The hypothetical commands **show w** and **show c** should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than **show w** and **show c**; they could even be mouse-clicks or menu items—whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a “copyright disclaimer” for the program, if necessary. Here is a sample; alter the names:

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signature of Ty Coon, 1 April 1989
Ty Coon, President of Vice

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