

The **newfile** package^{*}

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Abstract

The **newfile** package provides convenient user level commands for reading and writing new files during a LaTeX run.

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1 Introduction

TeX has a maximum of 16 input and 16 output *streams* for reading and writing files. The **newfile** package provides means of associating several different files with a particular stream.

The **newfile** package requires the **verbatim** package [SRR99], which is one of the required packages in a LaTeX distribution.

This manual is typeset according to the conventions of the **LATEX** DOCUMENTSTRIP utility which enables the automatic extraction of the **LATEX** macro source files [GMS94].

Section 2 describes the usage of the package. Commented source code for the package is in Section 4.

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2 The newfile package

\newoutputstream
\newinputstream

The command `\newoutputstream{<stream>}` creates a new stream called *<stream>* for writing out text and commands. The *<stream>* should be just alphabetic characters with no spaces; for example `myout`. The command `\newinputstream{<stream>}` creates a new stream for reading from a file. The *<stream>* names must be unique — you cannot use the same name for both an input and an output stream.

If you try and create too many streams, TeX will tell you via an error message.

These two commands also attempt to create two other new commands, called respectively `\atstreamopen<stream>` and `\atstreamclose<stream>`. If these commands already exist then they are left untouched, otherwise they are created (like using `\providecommand{\atstreamopen<stream>}{}`). For example if if you have used `mystr` as the name of a stream (either input or output), then the macros `\atstreamopenmystr` and `\atstreamclosemystr` are defined; by default they do nothing, but you can `\renewcommand` them to do something.

\openoutputfile

The macro `\openoutputfile{<filename>}{<stream>}` opens the file called *<filename>* and the output stream *<stream>*. It then attaches the file to the stream for writing and calls the macro `\atstreamopen<stream>`. Any pre-existing contents of *<filename>* are deleted.

\closeoutputstream

The macro `\closeoutputstream{<stream>}` calls the macro `\atstreamclose<stream>`, closes the output stream *<stream>* and closes whatever file is currently attached to *<stream>*. It then detaches the file from the stream.

writeverbatim

The `writeverbatim` environment takes one argument, the name of an output stream, which must be open. The contents of the environment are written out verbatim to the file currently attached to the stream.

\addtostream

The command `\addtostream{<stream>}{<text>}` writes *<text>* to the file currently attached to the output stream *<stream>*, which must be open. Any commands within *<text>* will be processed before being written. To prevent this, put `\protect` before any command that you do not want expanding.

\openinputfile

The macro `\openinputfile{<filename>}{<stream>}` opens the file called *<filename>* and the input stream *<stream>*. It then attaches the file to the stream for reading and calls the macro `\atstreamopen<stream>`. It is an error if *<filename>* can not be found.

\closeinputstream

The macro `\closeinputstream{<stream>}` calls the macro `\atstreamclose<stream>`, closes the input stream *<stream>* and closes whatever file is currently attached to *<stream>*. It then detaches the file from the stream.

\readstream

The macro `\readstream{<stream>}` reads the contents of the file that is currently associated with the input stream *<stream>*. This provides the same functionality as `\input{<filename>}` does.

\readaline

The macro `\readaline{<stream>}` reads what TeX considers to be one line from the file that is currently associated with the input stream *<stream>*. Multiple lines can be read by calling `\readaline` multiple times. A warning is issued if there are no more lines to be read (i.e., the end of the file has been reached).

\readverbatim

The macro `\readverbatim{<stream>}` reads the contents of the file that is currently associated with the input stream *<stream>* as `verbatim` text. This provides

```

\streamfont
\numbervstream
\marginnumbervstream
\streamvnumfont
\plainvstream
comment

```

the same functionality as the `verbatim` package's `\verb+atiminput{<filename>}` command does.

Text read in `verbatim` is typeset using the font specified by `\streamfont{}`. The default is `\streamfont{\normalfont\ttfamily}`. To typeset in a smaller font, try for example, `\streamfont{\small\ttfamily}`.

The declaration `\numbervstream` causes `\readverbatim` to number each line it reads. The declaration `\marginnumbervstream` is similar to `\numbervstream` except it puts the numbers in the margin. The `streamline` counter is used for the line numbering. Both the numbering declarations (re)set it to zero. The numbers are typeset in the font specified by `\streamvnumfont{}`. The default is `\streamvnumfont{\footnotesize}`.

The declaration `\plainvstream` stops any numbering. The default is `\plainvstream`.

The `comment` environment, which is part of the `verbatim` package, throws away everything inside the environment.

The `verbatim` package [SRR99] provides some other facilities, apart from the `comment` environment, and its documentation explains them.

3 Examples

3.1 Output stream

This example is inspired by the `endfloat` package [MG95] which provides a more sophisticated approach than shown below. The example demonstrates the use of an output stream.

Suppose that in an `article` class document you want all the figures to be collected at the end, but to specify them at the appropriate places in the body of the text.

```

1 <*ex>
2 \documentclass[article]
3 \usepackage{newfile}
4 ...

```

Create a new output stream called `figs` and open it to write to file `figures.tex`.

```

5 \newoutputstream{figs}
6 \openoutputfile{figures.out}{figs}
7 ...

```

Write out verbatim the first `figure` environment to the `figs` stream.

```

8 \begin{writeverbatim}{figs}
9 \begin{figure}
10 ...
11 \end{figure}
12 \end{writeverbatim}
13 ...

```

After the last `figure` is written to `figs`, close the `figs` output stream, which also closes the `figures.out` file.

```

14 \begin{writeverbatim}{figs}

```

```

15 \begin{figure}
16 ...
17 \end{figure}
18 \end{writeverbatim}
19 \closeoutputstream{figs}
20 ...
At the end \input figures.out to typeset the figures.
21 \input{figures.out}
22 \end{document}

```

3.2 An output and input stream

This example is the kind of thing that the `answers` package [Pif96] does rather better. The example illustrates the use of an output and an input stream.

Suppose you are writing a document that includes questions and answers and you want all the answers at the end. It is most convenient if you can write the answer to each question as it is posed, and then only print them at the end.

```

1 \documentclass{article}
2 \usepackage{newfile}
3 ...

```

Create new output and input streams called `ans` and `ansin`. Just to demonstrate the use of the `\atstreamopen...` command, redefine `\atstreamopenansin` so that it will start a section called ‘Answers to all the questions’. Then open the `ans` stream to write to a file called `answers.all`.

```

4 \newoutputstream{ans}
5 \newinputstream{ansin}
6 \renewcommand{\atstreamopenansin}{\section{Answers to all the questions}}
7 \openoutputfile{answers.all}{ans}
8 ...

```

For each question, write out the answer verbatim to the `ans` stream.

```

9 This is a question.
10 \begin{writeverbatim}{ans}
11 This is the answer to a question.
12 \end{writeverbatim}
13 ...

```

At the end, close the `ans` stream and open the `ansin` stream to read from the file `answers.all`. Opening the stream will also start the new ‘Answers to all the questions’ section (from `\atstreamopenansin`). Then read from the `ansin` stream.

```

14 \closeoutputstream{ans}
15 \openinputfile{answers.all}{ansin}
16 \readstream{ansin}

```

Finally, close the `ansin` stream, and we are done.

```

17 \closeinputstream{ansin}
18 \end{document}

```

If desired, instead of inserting the answers at the end of the question document, `answers.all` could have been `\input` into a separate answer document.

Along the same lines as above, perhaps the original document is a `book` class, with questions (and answers) at the end of each chapter. A separate answer file could be produced for each chapter, like:

```
1 ...
2 \newoutputstream{ansout}
3 \newinputstream{ansin}
4 ...
5 \chapter{First chapter} % chapter 1
6 \openoutputfile{\jobname\thechapter.ans}{ansout}
```

The `\jobname` is the name of the main LaTeX document file, without the `.tex` extension, so if the name of the LaTeX source file is `mybook.tex` the above line creates a file called `mybook1.ans`.

```
7 ...
8 \begin{writeverbatim}{ansout}
9 An answer
10 \end{writeverbatim}
11 ...
12 \closeoutputstream{ansout}
13 \chapter{Another chapter} % chapter N
14 \openoutputfile{\jobname\thechapter.ans}{ansout}
15 ...
16 \closeoutputstream{ansout}
17
18 \chapter{Answers}
19
20 \section{Chapter 1}
21 \openinputstream{\jobname1.ans}{ansin}
22 \readstream{ansin}
23 \closestream{ansin}
24 ...
25 \section{Chapter N}
26 \openinputstream{\jobnameN.ans}{ansin}
27 \readstream{ansin}
28 \closestream{ansin}
29 ...
```

The above example shows how you can associate different files with a single stream.

3.3 Multiple streams

This is a more complex example, again inspired by the `endfloat` package. In a `book` class document you want all the figures and tables to be collected at the end, but to specify them at the appropriate places in the body of the text.

```
1 \documentclass{book}
2 \usepackage{newfile}
```

3 ...

Create and open two new output streams, one for figures (**figs**) and the other (**tabs**) for tables. For demonstration purposes, also create a new input stream called **figtab**.

```
4 \newoutputstream{figs}
5 \openoutputfile{figures.out}{figs}
6 \newoutputstream{tabs}
7 \openoutputfile{tables.out}{tabs}
8 \newinputstream{figtab}
9 ...
```

There is a slight difficulty with this example, as in the **book** class, figures and table numbers start anew with each chapter and the chapter number is prepended to the sequence number. We can make a start on solving this by creating a new pseudo chapter number and changing the default definitions of the figure and table numbers (which are `\renewcommand{\thefigure}{\thechapter.\arabic{figure}}` and similarly for tables).

```
10 \newcounter{pseudochapter}
11 \renewcommand{\thepseudochapter}{\arabic{pseudochapter}}
12 \renewcommand{\thefigure}{\thepseudochapter.\arabic{figure}}
13 \renewcommand{\thetable}{\thepseudochapter.\arabic{table}}
14 ...
```

Do the usual things at the start of the document.

```
15 \begin{document}
16 \maketitle
17 \tableofcontents
18 \listoffigures
19 ..
```

At the start of each chapter we need to set the **pseudochapter** counter to the chapter number, and write this to the output streams so that there is a record of which chapters the figures and tables came from. Normally, each chapter resets the figure and table numbers, but as these will now be at the end, we have to fake the start of chapters in the output files. We can do all of this by the **\addtostream** macro.

```
20 \chapter{First}
```

The next bit of code will result in

```
\setcounter{pseudochapter}{N}
```

where N is the number of this chapter, appearing in the output files.

```
21 \addtostream{figs}{\protect\setcounter{pseudochapter}{\thechapter}}
22 \addtostream{tabs}{\protect\setcounter{pseudochapter}{\thechapter}}
```

The next bit of code results in the following two lines in the output files:

```
\refstepcounter{chapter}
\addtocounter{chapter}{-1}
```

The first of these has the effect of resetting the figure and table counters by increasing the chapter counter by one. The second line resets the chapter counter back to its original value.

```

23 \addtostream{figs}{\protect\refstepcounter{chapter}}
24 \addtostream{figs}{\protect\addtocounter{chapter}{-1}}
25 \addtostream{tabs}{\protect\refstepcounter{chapter}}
26 \addtostream{tabs}{\protect\addtocounter{chapter}{-1}}

```

Write out verbatim each figure to the `figs` stream.

```

27 \begin{writeverbatim}{figs}
28 \begin{figure}
29 ...
30 \end{figure}
31 \end{writeverbatim}
32 ...

```

and write each table verbatim to the `tabs` stream.

```

33 \begin{writeverbatim}{tabs}
34 \begin{table}
35 ...
36 \end{table}
37 \end{writeverbatim}
38 ...

```

When we have done all the chapters, figures and tables, close the two output streams.

```

39 \closeoutputstream{figs}
40 \closeoutputstream{tabs}

```

Then if we want the figures to be typeset before the tables, open the `figtab` stream to read from `figures.out`, read the stream and close it.

```

41 \openinputfile{figures.out}{figtab}
42 \readstream{figtab}
43 \closestream{figtab}

```

We can use the same `figtab` stream for reading the tables.

```

44 \openinputfile{tables.out}{figtab}
45 \readstream{figtab}
46 \closestream{figtab}
47 \end{document}
48 
```

Note that the `endfloat` package [MG95] will produce the same effect as the previous example, but much simply.

4 The package code

This package can only be used with LaTeX2e, and requires the `verbatim` package [SRR99], which is one of the required packages for a LaTeX distribution.

```

1 <*outin>
2 \NeedsTeXFormat{LaTeX2e}[1996/06/01]
3 \ProvidesPackage{newfile}[2002/06/21 v1.0 Output and input files]
4 \RequirePackage{verbatim}

```

To try and avoid name clashes with other packages, each internal macro in this package includes the character string ‘`stre@m`’.

`\newoutputstream \newoutputstream{⟨stream⟩}` creates a new output stream called `⟨stream⟩`. Different files may be associated with the `⟨stream⟩`. Note that TeX permits no more than 16 output streams.

```

5 \newcommand{\newoutputstream}[1]{%
6   \@ifundefined{#1outstre@m}{%
7     {\expandafter\newwrite\csname #1outstre@m\endcsname
8      \csname newif\expandafter\endcsname
9        \csname ifstre@m#1open\endcsname
10       \global\csname stre@m#1openfalse\endcsname
11       \expandafter\ifx\csname atstreamopen#1\endcsname\relax
12         \global\@namedef{atstreamopen#1}{}%
13       \fi
14       \expandafter\ifx\csname atstreamclose#1\endcsname\relax
15         \global\@namedef{atstreamclose#1}{}%
16       \fi
17     }%
18     {\PackageError{newfile}{Output stream #1 is already defined}{\@ehc}}}
19

```

`\newinputstream \newinputstream{⟨stream⟩}` creates a new input stream called `⟨stream⟩`. Different files may be associated with the `⟨stream⟩`. Note that TeX permits no more than 16 input streams.

```

20 \newcommand{\newinputstream}[1]{%
21   \@ifundefined{#1instre@m}{%
22     {\expandafter\newread\csname #1instre@m\endcsname
23      \csname newif\expandafter\endcsname
24        \csname ifstre@m#1open\endcsname
25       \global\csname stre@m#1openfalse\endcsname
26       \expandafter\ifx\csname atstreamopen#1\endcsname\relax
27         \global\@namedef{atstreamopen#1}{}%
28       \fi
29       \expandafter\ifx\csname atstreamclose#1\endcsname\relax
30         \global\@namedef{atstreamclose#1}{}%
31       \fi
32     }%
33     {\PackageError{newfile}{Input stream #1 is already defined}{\@ehc}}}
34

```

Some checking macros will be useful as some of the checks occur in multiple places.

`\@ifstre@mopen \@ifstre@mopen{⟨stream⟩}{⟨TRUE code⟩}{⟨FALSE code⟩}` checks if stream `⟨stream⟩` is currently open.

```

35 \newcommand{\@ifstre@mopen}[3]{%
36   \csname ifstre@m#1open\endcsname#2\else#3\fi}

```

```

\instre@mandopen \instre@mandopen{\langle stream\rangle}{\langle TRUE code\rangle} checks if \langle stream\rangle is an input
stream and is open. If so, it executes \langle TRUE code\rangle.
37 \newcommand{\instre@mandopen}[2]{%
38   \@ifundefined{#1instre@m}{%
39     \PackageError{newfile}{#1\space is not an input stream}{\@ehc}}%
40   {\@ifstre@mopen{#1}{#2}{%
41     \PackageError{newfile}{Input stream #1\space is not open}{\@ehc}}}}
42

\instre@mandclosed \instre@mandclosed{\langle stream\rangle}{\langle TRUE code\rangle} checks if \langle stream\rangle is an input
stream and is closed (not open). If so, it executes \langle TRUE code\rangle.
43 \newcommand{\instre@mandclosed}[2]{%
44   \@ifundefined{#1instre@m}{%
45     \PackageError{newfile}{#1\space is not an input stream}{\@ehc}}%
46   {\@ifstre@mopen{#1}{#2}{%
47     \PackageError{newfile}{Input stream #1\space is open}{\@ehc}}{#2}}}
48

\outstre@mandopen \outstre@mandopen{\langle stream\rangle}{\langle TRUE code\rangle} checks if \langle stream\rangle is an output
stream and is open. If so, it executes \langle TRUE code\rangle.
49 \newcommand{\outstre@mandopen}[2]{%
50   \@ifundefined{#1outstre@m}{%
51     \PackageError{newfile}{#1\space is not an output stream}{\@ehc}}%
52   {\@ifstre@mopen{#1}{#2}{%
53     \PackageError{newfile}{Output stream #1\space is not open}{\@ehc}}}}
54

\outstre@mandclosed \outstre@mandclosed{\langle stream\rangle}{\langle TRUE code\rangle} checks if \langle stream\rangle is an output
stream and is closed (not open). If so, it executes \langle TRUE code\rangle.
55 \newcommand{\outstre@mandclosed}[2]{%
56   \@ifundefined{#1outstre@m}{%
57     \PackageError{newfile}{#1\space is not an output stream}{\@ehc}}%
58   {\@ifstre@mopen{#1}{%
59     \PackageError{newfile}{Output stream #1\space is open}{\@ehc}}{#2}}}
60

\openoutputfile \openoutputfile{\langle filename\rangle}{\langle stream\rangle} opens the file called \langle filename\rangle and at-
taches it to the stream \langle stream\rangle for writing. However, if the \nofiles command
has been given the file is not attached to the stream. No more than one file can
be attached to a stream at any given time.
61 \newcommand{\openoutputfile}[2]{%
62   \outstre@mandclosed{#2}{%
63     \global\@namedef{#1@filename}{#1}%
64     \if@filesw
65       \immediate\openout\@nameuse{#2outstre@m}=\@nameuse{#1@filename}%
66     \fi
67     \global\csname stre@m#2openttrue\endcsname%
68     \@nameuse{atstreamopen#2}%

```

```

69   }%
70 }
71

\closeoutputstream \closeoutputstream{\langle stream\rangle} closes the stream \langle stream\rangle.
72 \newcommand{\closeoutputstream}[1]{%
73   \outstre@m{#1}{%
74     \nameuse{atstreamclose#1}%
75     \immediate\closeout\nameuse{#1outstre@m}%
76     \global\csname stre@m#1openfalse\endcsname}%
77 }
78

\openinputfile \openinputfile{\langle filename\rangle}{\langle stream\rangle} opens the file called \langle filename\rangle and attaches it to the stream \langle stream\rangle for reading. The file is added to the list of files. No more than one file can be attached to a stream at any given time.
79 \newcommand{\openinputfile}[2]{%
80   \IfFileExists{#1}{%                                file exists
81     \instre@m{#2}{%
82       \addtofilelist{#1}%
83       \global\@namedef{#1@filename}{#1}%
84       \immediate\openin\nameuse{#2instre@m}=\nameuse{#1@filename}%
85       \global\csname stre@m#2opentru\endcsname%
86       \nameuse{atstreamopen#2}}}%                file not found
87   {%
88     \PackageError{newfile}{Can't find file #1}{\@ehc}%
89   }%
90 }
91

\closeinputstream \closeinputstream{\langle stream\rangle} closes the stream \langle stream\rangle.
92 \newcommand{\closeinputstream}[1]{%
93   \instre@m{#1}{%
94     \nameuse{atstreamclose#1}%
95     \immediate\closein\nameuse{#1instre@m}%
96     \global\csname stre@m#1openfalse\endcsname}%
97 }
98

\writeverbatim \begin{writeverbatim}{\langle stream\rangle} writes the contents of the environment as verbatim text to the given \langle stream\rangle.
99 \def\writeverbatim#1{%
100   \bsphack
101   \let\do\makeother\dospecials
102   \catcode`\^\active
103   \verbatim@startline
104   \verbatim@addtoline
105   \verbatim@finish
106   \def\verbatim@processline{%

```

```

107      \immediate\write\@nameuse{\#1outstre@m}{\the\verbatim@line}%
108  \verbatim@start}
109 \def\endwriteverbatim{\@esphack}
110

\addtostream \addtostream{\langle stream\rangle}{\langle text\rangle} writes \langle text\rangle to the given \langle stream\rangle.
111 \newcommand{\addtostream}[2]{%
112   \@bsphack
113   \outstre@m{\open{\#1}{\%}
114     {\let\protect\string
115       \immediate\write\@nameuse{\#1outstre@m}{\#2}%
116     }{\%}
117   }\@esphack
118 }
119

\ifstre@mnoteof \checkstre@mnoteof{\langle stream\rangle} sets \ifstre@mnoteof to TRUE if \langle stream\rangle is
\checkstre@mnoteof not at the end of the file (i.e., it is the opposite of \ifeof).
120 \newif\ifstre@mnoteof
121 \newcommand{\checkstre@meof}[1]{%
122   \stre@mnoteoftrue\ifeof\@nameuse{\#1instre@m}\stre@mnoteoffalse\fi}
123

\readstream \readstream{\langle stream\rangle} reads the contents of the given \langle stream\rangle as \input text.
124 \def\readstream#1{%
125   \instre@m{\open{\#1}{\%
126     \loop \checkstre@meof{\#1} \ifstre@mnoteof
127       \read\@nameuse{\#1instre@m} to\temptokstre@m
128       \temptokstre@m
129     \repeat
130   }{\%
131 }
132

\readaline \readaline{\langle stream\rangle} reads what TeX considers to be one line from the given
\readaline \langle stream\rangle as \input text.
133 \def\readaline#1{%
134   \instre@m{\open{\#1}{\%
135     \ifeof\@nameuse{\#1instre@m}
136       \PackageWarning{newfile}{No more to read from stream #1}
137     \else
138       \read\@nameuse{\#1instre@m} to\temptokstre@m
139       \temptokstre@m
140     \fi
141   }{\%
142 }
143

\readverbatim \readverbatim{\langle stream\rangle} reads the contents of the given \langle stream\rangle as verbatim
\stre@mverbatim@\input text.
\verbatim@readstre@m

```

The read verbatim code is a slight variation on code from the `verbatim` package. Most of the setup is done by the macros `\stre@mverbatim@input{<setup>}{<stream>}` and `\verbatim@readstre@m{<stream>}`. Finally, `\verbatim@read@file` is a `verbatim` package macro.

```

144 \def\readverbatim{\begingroup
145   \@ifstar{\stre@mverbatim@input\relax}%
146     {\stre@mverbatim@input{\frenchspacing\obeyspaces}}}
147
148 \def\stre@mverbatim@input#1#2{%
149   \ifstre@mopen{#2}%
150     {\@verbatim #1\relax
151      \def\verbatim@in@stream{\nameuse{#2instre@m}}
152      \verbatim@readstre@m{#2}\endtrivlist\endgroup\doendpe}%
153     {\PackageError{newfile}{Stream #2 is not open}{\ehc}\endgroup}%
154 }
155
156 \def\verbatim@readstre@m#1{%
157   \verbatim@startline
158   \expandafter\endlinechar\expandafter\m@ne
159   \expandafter\verbatim@read@file
160   \expandafter\endlinechar\the\endlinechar\relax
161   \verbatim@finish
162 }
163

```

`\plainvstream` A macro that sets `\verbatim@processline` to its default definition.

```

164 \newcommand{\plainvstream}{%
165   \def\verbatim@processline{\the\verbatim@line\par}%
166 }
167

```

`\streamvnumfont` We need a counter for numbering lines read in verbatim.

`\stre@mvnfont` `\streamvnumfont{}` defines `\stre@mvnfont` to be ``.

```

168 \newcounter{streamvline}
169 \newcommand{\streamvnumfont}[1]{\def\stre@mvnfont{#1}}
170 \streamvnumfont{\footnotesize}
171

```

`\streamvfont` `\streamvfont{}` defines `\verbatim@font` to use ``.

`\verbatim@font` `\newcommand{\verbatim@font}[1]{%`

```

172   \def\verbatim@font{#1}%
173   \hyphenchar\font\m@ne
174   \let\do\do@noligs
175   \verbatim@nolig@list}%
176 \verbatim@font{\normalfont\ttfamily}
177
178

```

`\numbervstream` `\numbervstream` puts numbers at the start of each line read verbatim.

```

179 \newcommand{\numbervstream}{%
180   \setcounter{streamvline}{0}%
181   \def\verbatim@processline{%
182     \addtocounter{streamvline}{1}%
183     \leavevmode
184     {\stref@mvnfont \thestreamvline}\space
185     \the\verbatim@line\par}%
186 }
187
\marginnumbervstream \marginnumbervstream puts numbers in the margin at the start of each line read
verbatim.
188 \newcommand{\marginnumbervstream}{%
189   \setcounter{streamvline}{0}%
190   \def\verbatim@processline{%
191     \addtocounter{streamvline}{1}%
192     \leavevmode
193     \llap{\stref@mvnfont \thestreamvline} \hskip\@totalleftmargin
194     \the\verbatim@line\par}%
195 }
196
The end of the newfile package.

197 ⟨/outin⟩

```

References

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