

The ‘fancyvrb’ package

Fancy Verbatims in L^AT_EX

Timothy Van Zandt
Princeton University
Princeton – USA

Packaging and documentation by

Denis Girou (CNRS/IDRIS – France),
Sebastian Rahtz† (Elsevier – GB)
and
Herbert Voß (FU Berlin – DE)

November 24, 2021

Abstract

This package provides very sophisticated facilities for reading and writing verbatim T_EX code. Users can perform common tasks like changing font family and size, numbering lines, framing code examples, colouring text and conditionally processing text.

Report bugs to hvoss@tug.org

Thanks to Claudio Beccari, Jean-François Burnol, Philippe Esperet, Michael Friendly, Mario Hassler, Ohad Kammar, Mikhail Kolodin, Andreas Matthias, Frank Mittelbach, Rolf Niepraschk, Will Robertson, Ulrich M. Schwarz, Thomas Siegel, Clemens Steinke, and Vladimir Volovich.

Contents

I Package fancyvrb	4
1 Introduction	4
2 Verbatim material in footnotes	4
3 Improved verbatim commands	5
4 Verbatim environments	5
4.1 Customization of verbatim environments	5
4.1.1 Comments	5
4.1.2 Initial characters to suppress	6
4.1.3 Customization of formatting	6
4.1.4 Changing individual line formatting	7
4.1.5 Fonts	7
4.1.6 Types and characteristics of frames	8
4.1.7 Label for the environment	9
4.1.8 Line numbering	11
4.1.9 Selection of lines to print	13
4.1.10 Spaces and tab characters	14
4.1.11 Space between lines	15
4.1.12 Escape characters for inserting commands	15
4.1.13 Margins	15
4.1.14 Overfull box messages	16
4.1.15 Page breaks	16
4.1.16 Catcode characters	16
4.1.17 Active characters	17
4.1.18 Reference label	17
4.2 Different kinds of verbatim environments	17
4.2.1 Verbatim environment	17
4.2.2 BVerbatim environment	17
4.2.3 LVerbatim environment	18
4.2.4 Personalized environments	18
5 Saving and restoring verbatim text and environments	19
6 Writing and reading verbatim files	21

7 Automatic pretty printing	22
8 Known problems	22
9 Conclusion	22
II Package fancyvrb-ex	23
10 Example environment	23
11 CenterExample environment	24
12 SideBySideExample environment	24

Part I

Package fancyvrb

1 Introduction

‘fancyvrb’ is the development of the *verbatim* macros of the ‘fancybox’ package, Section 11 of [1]. It offers six kinds of extended functionality, compared to the standard \LaTeX *verbatim* environment:

1. *verbatim* commands can be used in footnotes,
2. several *verbatim* commands are enhanced,
3. a variety of *verbatim* environments are provided, with many parameters to change the way the contents are printed; it is also possible to define new customized *verbatim* environments,
4. a way is provided to save and restore *verbatim* text and environments,
5. there are macros to write and read files in *verbatim* mode, with the usual versatility,
6. you can build *example* environments (showing both result and *verbatim* text), with the same versatility as normal *verbatim*.

The package works by scanning a line at a time from an environment or a file. This allows it to pre-process each line, rejecting it, removing spaces, numbering it, etc, before going on to execute the body of the line with the appropriate catcodes set.

2 Verbatim material in footnotes

After a `\VerbatimFootnotes` macro declaration (to use after the preamble), it is possible to put *verbatim* commands and environments (the \LaTeX or ‘fancyvrb’ ones) in footnotes, unlike in standard \LaTeX :

```
1 \VerbatimFootnotes
2 We can put verbatim\footnote{\verb+_Yes!_+} text in footnotes.
```

We can put *verbatim*¹ text in footnotes.

¹_Yes!_

3 Improved verbatim commands

The `\DefineShortVerb` macro allows us to define a special character as an abbreviation to enclose verbatim text and the `\UndefineShortVerb` macro suppresses the special meaning of the specified character (the same functionalities are provided in the L^AT_EX ‘shortvrb’ package):

We can simply write `_verbatim_` material using a single `_delimiter_`. And we can `_change_` the character.

```

1 \DefineShortVerb{\|}
2 We can simply write \Verb+_verbatim_+
3 material using a single |_delimiter_|
4 \UndefineShortVerb{\|}
5 \DefineShortVerb{\+}
6 And we can +_change_+ the character.
```

To make matters more versatile, we can nominate *escape* characters in verbatim text (using the `\Verb` macro or with a ‘shortverb’ character defined), to perform formatting or similar tasks, using the `commandchars` parameter as shown for environments in paragraph 4.1.12.

4 Verbatim environments

Several verbatim environments are available, each with a lot of parameters to customize them. In the following examples we use the `Verbatim` environment, which is the equivalent of the standard `verbatim`. The parameters can be set globally using the `\fvset` macro or in an optional argument after the start of the environment^{2,3}.

1
2

```

First verbatim line.
Second verbatim line.
```

```

1 \begin{Verbatim}
2   First verbatim line.
3   Second verbatim line.
4 \end{Verbatim}
```

4.1 Customization of verbatim environments

The appearance of verbatim environments can be changed in many and varied ways; here we list the keys that can be set.

4.1.1 Comments

`commentchar (character)` : character to define comments in the verbatim code, so that lines starting with this character will not be printed (*Default: empty*).

²For clarification in this paper, note that we generally indent each verbatim line with two spaces.

³This mechanism uses the ‘keyval’ package from the standard L^AT_EX graphics distribution, written by David CARLISLE.

4.1 Customization of verbatim environments

1 A comment 2 Verbatim line.	1 \begin{Verbatim}[commentchar=!] 2 A comment 3 Verbatim line. 4 ! A comment that you will not see 5 \end{Verbatim}
---------------------------------	---

Take care to a special effect if the comment character is not the first non blank one: it is because this character is in fact managed as the T_EX comment one, that is to say that it gobble the newline character too. So, in this case, the current line will be joined with the next one and, more, the last one will be lost if it contain a comment, as 'fancyvrb' print a line only after finding it end character, which will never occurred in this case...

1 First line. Second.	1 \begin{Verbatim}[commentchar=%] 2 First line. % First line 3 Second. 4 Third line. % Third line lost... 5 \end{Verbatim}
-----------------------	--

4.1.2 Initial characters to suppress

`gobble` (integer) : number of characters to suppress at the beginning of each line (up to a maximum of 9), mainly useful when environments are indented (*Default: empty* – no character suppressed).

1 Verbatim line.	1 \begin{Verbatim} 2 Verbatim line. 3 \end{Verbatim}
1 Verbatim line.	5 \begin{Verbatim}[gobble=2] 6 Verbatim line. 7 \end{Verbatim}
1 atim line.	9 \begin{Verbatim}[gobble=8] 10 Verbatim line. 11 \end{Verbatim}

4.1.3 Customization of formatting

`formatcom` (command) : command to execute before printing verbatim text (*Default: empty*).

1 First verbatim line. 2 Second verbatim line.	1 \begin{Verbatim}[formatcom=\color{red}] 2 First verbatim line. 3 Second verbatim line. 4 \end{Verbatim}
---	--

4.1.4 Changing individual line formatting

The macro `\FancyVerbFormatLine` defines the way each line is formatted. Its default value is `\def\FancyVerbFormatLine#1{#1}`, but we can redefine it at our convenience (`FancyVerbLine` is the name of the line counter):

<pre>1 ⇒ First verbatim line. 2 ⇒ Second verbatim line. 3 ⇒ Third verbatim line.</pre>	<pre>1 \renewcommand{\FancyVerbFormatLine}[1]{% 2 \makebox[0cm][l]{\Rightarrow\$}#1} 3 \begin{Verbatim} 4 First verbatim line. 5 Second verbatim line. 6 Third verbatim line. 7 \end{Verbatim}</pre>
<pre>1 FIRST VERBATIM LINE. 2 Second verbatim line. 3 THIRD VERBATIM LINE.</pre>	<pre>1 \renewcommand{\FancyVerbFormatLine}[1]{% 2 \ifodd\value{FancyVerbLine}% 3 \MakeUppercase{#1}\else#1\fi} 4 \begin{Verbatim} 5 First verbatim line. 6 Second verbatim line. 7 Third verbatim line. 8 \end{Verbatim}</pre>

4.1.5 Fonts

`fontfamily (family name)` : font family to use. `tt`, `courier` and `helvetica` are pre-defined (*Default: tt*).

We can guess that PostScript fonts are available

<pre>1 Verbatim line.</pre>	<pre>1 \begin{Verbatim}[fontfamily=helvetica] 2 Verbatim line. 3 \end{Verbatim}</pre>
-----------------------------	---

`fontsize (font size)` : size of the font to use (*Default: auto* – the same as the current font). If you use the ‘`resize`’ package too, you can require a change of the size proportional to the current one (for instance: `fontsize=\resize{-2}`).

We can guess that PostScript fonts are available

<pre>1 Verbatim line.</pre>	<pre>1 \begin{Verbatim}[fontsize=\small] 2 Verbatim line. 3 \end{Verbatim}</pre>
<pre>1 Verbatim line.</pre>	<pre>4 \begin{Verbatim}[fontfamily=courier, 5 fontsize=\large] 6 Verbatim line. 7 \end{Verbatim}</pre>

4.1 Customization of verbatim environments

fontshape (font shape) : font shape to use (*Default: auto* – the same as the current font).

We can guess that PostScript fonts are available

1 Verbatim line.	1 \begin{Verbatim}[fontfamily=courier, 2 fontshape=it] 3 Verbatim line. 4 \end{Verbatim}
------------------	---

fontseries (series name) : \LaTeX font ‘series’ to use (*Default: auto* – the same as the current font).

We can guess that PostScript fonts are available

1 Verbatim line.	1 \begin{Verbatim}[fontfamily=courier, 2 fontseries=b] 3 Verbatim line. 4 \end{Verbatim}
------------------	---

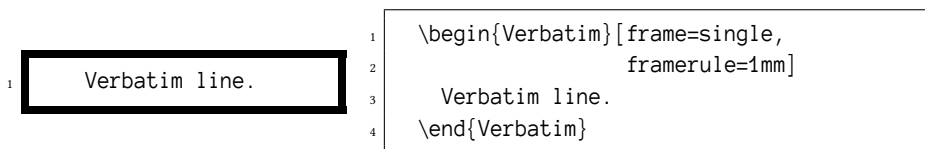
4.1.6 Types and characteristics of frames

frame (none|leftline|topline|bottomline|lines|single) : type of frame around the verbatim environment (*Default: none* – no frame). With leftline and single modes, a space of a length given by the \LaTeX `\fboxsep` macro is added between the left vertical line and the text.

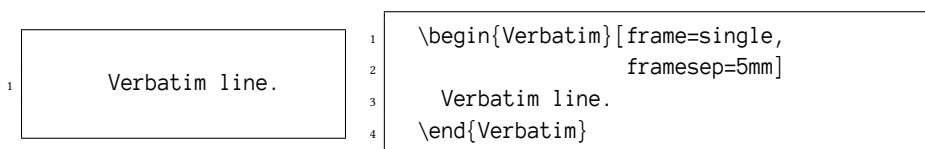
Problem at the top of a page...

1 Verbatim line.	1 \begin{Verbatim}[frame=leftline] 2 Verbatim line. 3 \end{Verbatim}
1 Verbatim line.	4 5 \begin{Verbatim}[frame=topline] 6 Verbatim line. 7 \end{Verbatim}
1 Verbatim line.	8 9 \begin{Verbatim}[frame=bottomline] 10 Verbatim line. 11 \end{Verbatim}
1 Verbatim line.	12 13 \begin{Verbatim}[frame=lines] 14 Verbatim line. 15 \end{Verbatim}
1 Verbatim line.	16 17 \begin{Verbatim}[frame=single] 18 Verbatim line. 19 \end{Verbatim}

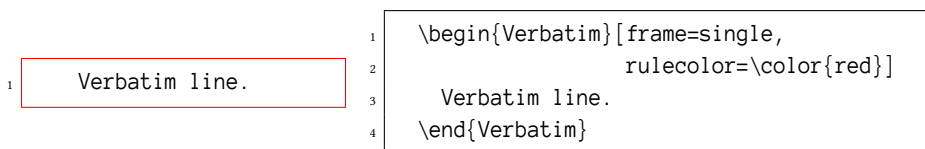
`framerule` (dimension) : width of the rule of the frame (*Default: 0.4pt if framing specified*).



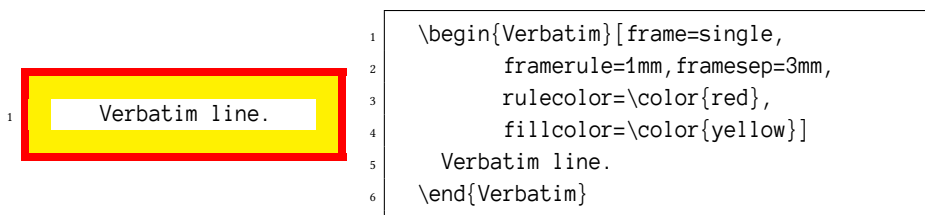
`framesep` (dimension) : width of the gap between the frame and the text (*Default: \fboxsep*).



`rulecolor` (color command) : color of the frame rule, expressed in the standard \LaTeX way (*Default: black*).



`fillcolor` (color command) : color used to fill the space between the frame and the text (its thickness is given by `framesep`) (*Default: none* – no color).



4.1.7 Label for the environment

`label` (`{[string]string}`) : label(s) to print on top, bottom or both frame lines of the environment to describe its content (*Default: empty* – no label). If the label(s) contains special characters, as a comma or an equal sign, it must be put inside a group. If only one string is given, it will be used for both top and bottom lines (if the two are printed), but if an optional first label is given too, this one will be used for the top line and the second one for the bottom line. Note also that, if another value than `topline`, `bottomline`, `lines` or `single` is used for the frame parameter, the label(s) will not be printed.

4.1 Customization of verbatim environments

Problem at the top of a page...

1 2	My text First verbatim line. Second verbatim line.
1 2	The code First verbatim line. Second verbatim line.

```
1 \fvset{gobble=2}
2 \begin{Verbatim}[frame=single,
3     label=My text]
4     First verbatim line.
5     Second verbatim line.
6 \end{Verbatim}
7
8 \begin{Verbatim}[frame=topline,
9     framesep=4mm,
10    label=\fbox{\Large\emph{The code}}]
11    First verbatim line.
12    Second verbatim line.
13 \end{Verbatim}
```

labelposition (none|topline|bottomline|all) : position where to print the label if one is defined, which must be coherent with the kind of frame chosen (*Default: none if the label is empty, topline if one label is defined and all if two are defined*). Of course, some incompatible options (like frame=topline,labelposition=bottomline) will not print the label.

Problem at the top of a page...

1 2	Text First verbatim line. Second verbatim line. Text
1 2	Text First verbatim line. Second verbatim line.

```
1 \fvset{gobble=2}
2 \begin{Verbatim}[frame=single,
3     framesep=2mm,
4     label=Text,labelposition=all]
5     First verbatim line.
6     Second verbatim line.
7 \end{Verbatim}
8
9 \begin{Verbatim}[frame=lines,
10    label=Text,labelposition=topline]
11    First verbatim line.
12    Second verbatim line.
13 \end{Verbatim}
```

<pre> 1 First verbatim line. 2 Second verbatim line. _____ Code included _____ _____ Beginning of code _____ 1 First verbatim line. 2 Second verbatim line. _____ End of code _____ </pre>	<pre> 1 \begin{Verbatim}[frame=bottomline, 2 framesep=3mm, 3 label=\textit{Code included}, 4 labelposition=bottomline] 5 First verbatim line. 6 Second verbatim line. 7 \end{Verbatim} 8 9 \begin{Verbatim}[frame=lines, 10 framesep=3mm, 11 label={ [Beginning of code]End of code}] 12 First verbatim line. 13 Second verbatim line. 14 \end{Verbatim} </pre>
---	--

4.1.8 Line numbering

numbers (none|left|right) : numbering of the verbatim lines (*Default: none* — no numbering). If requested, this numbering is done *outside* the verbatim environment.

<pre> 1 First verbatim line. 2 Second verbatim line. </pre>	<pre> 1 \begin{Verbatim}[gobble=2,numbers=left] 2 First verbatim line. 3 Second verbatim line. 4 \end{Verbatim} </pre>
<pre> 1 First verbatim line. 2 Second verbatim line. </pre>	<pre> 6 \begin{Verbatim}[gobble=2, 7 numbers=right,numbersep=0pt] 8 First verbatim line. 9 Second verbatim line. 10 \end{Verbatim} </pre>

numbersep (dimension) : gap between numbers and verbatim lines (*Default: 12pt*).

<pre> 1 First verbatim line. 2 Second verbatim line. </pre>	<pre> 1 \begin{Verbatim}[gobble=2, 2 numbers=left,numbersep=2pt] 3 First verbatim line. 4 Second verbatim line. 5 \end{Verbatim} </pre>
---	---

firstnumber (auto|last|integer) : number of the first line (*Default: auto* — numbering starts from 1). last means that the numbering is continued from the previous verbatim environment. If an integer is given, its value will be used to start the numbering.

4.1 Customization of verbatim environments

1	Verbatim line.	1	<code>\fvset{gobble=2,</code>
		2	<code>numbers=left,numbersep=3pt}</code>
		3	<code>\begin{Verbatim}</code>
		4	<code>Verbatim line.</code>
		5	<code>\end{Verbatim}</code>
		6	<code></code>
2	Verbatim line.	7	<code>\begin{Verbatim}[firstnumber=last]</code>
		8	<code>Verbatim line.</code>
		9	<code>\end{Verbatim}</code>
100	Verbatim line.	10	<code></code>
		11	<code>\begin{Verbatim}[firstnumber=100]</code>
		12	<code>Verbatim line.</code>
		13	<code>\end{Verbatim}</code>

stepnumber (integer) : interval at which line numbers are printed (*Default: 1* – all lines are numbered).

2	First verbatim line. Second verbatim line. Third verbatim line.	1	<code>\begin{Verbatim}[gobble=2,numbers=left,</code>
		2	<code>numbersep=3pt,stepnumber=2]</code>
		3	<code>First verbatim line.</code>
		4	<code>Second verbatim line.</code>
		5	<code>Third verbatim line.</code>
		6	<code>\end{Verbatim}</code>

The macro `\theFancyVerbLine` defines the typesetting style of the numbering, and the counter used is `FancyVerbLine`:

8.a	First verbatim line.	1	<code>\renewcommand{\theFancyVerbLine}{%</code>
8.b	Second verbatim line.	2	<code>\textcolor{red}{\small</code>
8.c	Third verbatim line.	3	<code>8.\alph{FancyVerbLine}}}</code>
		4	<code>\begin{Verbatim}[gobble=2,</code>
		5	<code>numbers=left,numbersep=2pt]</code>
		6	<code>First verbatim line.</code>
		7	<code>Second verbatim line.</code>
		8	<code>Third verbatim line.</code>
		9	<code>\end{Verbatim}</code>

numberblanklines (boolean) : to number or not the empty lines (really empty or containing blank characters only) (*Default: true* – all lines are numbered).

1	First verbatim line.	1	<code>\begin{Verbatim}[gobble=2,numbers=left,</code>
2	Second verbatim line.	2	<code> numbersep=3pt,</code>
		3	<code> numberblanklines=false]</code>
		4	<code> First verbatim line.</code>
		5	<code> </code>
		6	<code> Second verbatim line.</code>
		7	<code> </code>
		8	<code>\end{Verbatim}</code>

4.1.9 Selection of lines to print

`firstline` (integer) : first line to print (*Default: empty* – all lines from the first are printed).

`lastline` (integer) : last line to print (*Default: empty* – all lines until the last one are printed).

1	First verbatim line.	1	<code>\begin{Verbatim}[gobble=2,firstline,lastline,</code>
2	Second verbatim line.	2	<code> numbers=left,numbersep=2pt]</code>
3	Third verbatim line.	3	<code> First verbatim line.</code>
		4	<code> Second verbatim line.</code>
		5	<code> Third verbatim line.</code>
		6	<code>\end{Verbatim}</code>

2	Second verbatim line.	1	<code>\begin{Verbatim}[gobble=2,firstline=2,</code>
3	Third verbatim line.	2	<code> numbers=left,numbersep=2pt]</code>
		3	<code> First verbatim line.</code>
		4	<code> Second verbatim line.</code>
		5	<code> Third verbatim line.</code>
		6	<code>\end{Verbatim}</code>

1	First verbatim line.	1	<code>\begin{Verbatim}[gobble=2,lastline=1,</code>
		2	<code> numbers=left,numbersep=2pt]</code>
		3	<code> First verbatim line.</code>
		4	<code> Second verbatim line.</code>
		5	<code> Third verbatim line.</code>
		6	<code>\end{Verbatim}</code>

Instead of specifying a `firstline` at which to start printing a range of lines, you can define a start string; the start of the range is the first line that exactly equals the string. (The comparison is made before any characters are gobbled off the front of the line.) Similarly for a stop string. You can mix line-numbers and strings, e.g. start at `firstline`, and end at a stop string. Specifying the strings is a bit klunky. Initially you must define the strings with `\newcommand*` as in:

4.1 Customization of verbatim environments

3	Second verbatim line.
1	<code>\newcommand*\FancyVerbStartString{FROM}</code>
2	<code>\newcommand*\FancyVerbStopString{TO}</code>
3	<code>\begin{Verbatim}</code>
4	First verbatim line.
5	FROM
6	Second verbatim line.
7	TO
8	Third verbatim line.
9	<code>\end{Verbatim}</code>

To redefine the strings, you must use `\renewcommand*`.

With the setting `lastline=` or `lastline=0` nothing will be printed.

1	foo
2	<code>\begin{Verbatim}[frame=none,lastline=]</code>
3	First verbatim line.
4	Second verbatim line.
5	Third verbatim line.
6	<code>\end{Verbatim}</code>
7	bar

foo

bar

4.1.10 Spaces and tab characters

`showspaces` (boolean) : print a special character representing each space (*Default: false* – spaces not shown).

1	<code>Verbatim line.</code>
1	<code>\begin{Verbatim}[showspaces=true]</code>
2	Verbatim line.
3	<code>\end{Verbatim}</code>

In practice, all verbatim environments have a `*` variant, which sets `showspaces=true`:

1	<code>Verbatim line.</code>
1	<code>\begin{Verbatim*}</code>
2	Verbatim line.
3	<code>\end{Verbatim*}</code>

There are also some parameters to determine the way tab characters are interpreted (using tabs is in fact a rather old-fashioned style of coding):

`showtabs` (boolean) : explicitly show tab characters (*Default: false* – tab characters not shown).

`obeytabs` (boolean) : position characters according to the tabs (*Default: false* – tab characters are added to the current position).

`tabsize` (integer) : number of spaces given by a tab character (*Default: 8*).

4.1.11 Space between lines

`baselinestretch` (auto|dimension) : value to give to the usual ‘`baselinestretch`’ \LaTeX parameter (*Default: auto* — its current value just before the verbatim command).

1	First verbatim line.	1	<code>\begin{Verbatim}[baselinestretch=2]</code>
		2	<code>First verbatim line.</code>
2	Second verbatim line.	3	<code>Second verbatim line.</code>
		4	<code>\end{Verbatim}</code>

4.1.12 Escape characters for inserting commands

`commandchars` (three characters) : characters which define the character which starts a macro and marks the beginning and end of a group; thus lets us introduce *escape* sequences in verbatim code. Of course, it is better to choose special characters which are not used in the verbatim text! (*Default: empty*).

1	This is a comment	1	<code>\begin{Verbatim}[commandchars=\\\{\}]</code>
2	First verbatim line.	2	<code>\textit{This is a comment}</code>
3	Second verbatim line.	3	<code>First verbatim line.</code>
4	Third verbatim line.	4	<code>\fbox{Second} verbatim line.</code>
		5	<code>\textcolor{red}{Third} verbatim line.</code>
		6	<code>\end{Verbatim}</code>
1	<code>\textbf{Verbatim} line.</code>	7	<code>\begin{Verbatim}[commandchars=+\{\}]</code>
		8	<code>+textit[\textbf{Verbatim} line].</code>
		9	<code>\end{Verbatim}</code>
		10	<code>\end{Verbatim}</code>

Using this way, it is also possible to put labels to be able, later, to make reference to some lines of the verbatim environments:

1	First verbatim line.	1	<code>\begin{Verbatim}[commandchars=\\\{\},</code>
2	Second line.	2	<code>numbers=left,numbersep=2pt]</code>
3	Third verbatim line.	3	<code>First verbatim line.</code>
		4	<code>Second line.\label{vrb:Important}</code>
		5	<code>Third verbatim line.</code>
		6	<code>\end{Verbatim}</code>
		7	<code></code>
		8	<code>As I previously shown</code>
		9	<code>line~\ref{vrb:Important}, it is...</code>

As I previously shown line 2, it is...

4.1.13 Margins

`xleftmargin` (dimension) : indentation to add at the start of each line (*Default: 0pt* — no left margin).

4.1 Customization of verbatim environments

1 Verbatim line.

```
1 \begin{Verbatim}[frame=single,  
2 xleftmargin=5mm]  
3 Verbatim line.  
4 \end{Verbatim}
```

`xrightmargin` (dimension) : right margin to add after each line (*Default: 0pt* – no right margin).

1 Verbatim line.

```
1 \begin{Verbatim}[frame=single,  
2 xrightmargin=1cm]  
3 Verbatim line.  
4 \end{Verbatim}
```

`resetmargins` (boolean) : reset the left margin, which is useful if we are inside other indented environments (*Default: false* – no reset of the margin).

- First item

1 Verbatim line.

- Second item

1 Verbatim line.

```
1 \begin{itemize}  
2 \item First item  
3 \begin{Verbatim}[frame=single]  
4 Verbatim line.  
5 \end{Verbatim}  
6 \item Second item  
7 \begin{Verbatim}[frame=single,  
8 resetmargins=true]  
9 Verbatim line.  
10 \end{Verbatim}  
11 \end{itemize}
```

4.1.14 Overfull box messages

`hfuzz` (dimension) : value to give to the $\text{T}_{\text{E}}\text{X}$ `\hfuzz` dimension for text to format. This can be used to avoid seeing some unimportant *Overfull box* messages (*Default: 2pt*).

4.1.15 Page breaks

`samepage` (boolean) : in very special circumstances, we may want to make sure that a verbatim environment is not broken, even if it does not fit on the current page. To avoid a page break, we can set the `samepage` parameter to *true* (*Default: false*).

4.1.16 Catcode characters

`codes` (macro) : to specify *catcode* changes (*Default: empty*).

For instance, this allows us to include formatted mathematics in verbatim text:

1	$x=1/\sqrt{z**2} ! \frac{1}{\sqrt{z^2}}$	1	<pre>\begin{Verbatim}[commandchars=\\\{\}, 2 codes={\catcode`\\$=3\catcode`\^=7}] 3 x=1/\sqrt{z**2} ! \$\frac{1}{\sqrt{z^2}}\$ 4 \end{Verbatim}</pre>
---	--	---	---

4.1.17 Active characters

`defineactive (macro)` : to define the effect of *active* characters (*Default: empty*).

This allows us to do some devious tricks: see the example in Section 6 on page 21.

4.1.18 Reference label

`relabel (<label>)` : A label for use of `\pageref`.

1	First verbatim line.	1	<pre>\begin{Verbatim}[relabel=verb0] 2 First verbatim line. 3 Second verbatim line. 4 \end{Verbatim} 5 See the verbatim on 6 page~\pageref{verb0}.</pre>
---	----------------------	---	--

4.2 Different kinds of verbatim environments

4.2.1 Verbatim environment

This is the ‘normal’ verbatim environment which we have been using up to now.

4.2.2 BVerbatim environment

This environment puts the verbatim material in a \TeX box. Some parameters do not work inside this environment (notably the framing ones), but two new ones are available:

`boxwidth (auto|dimension)` : size of the box used (*Default: auto* – the width of the longest line is used).

`baseline (b|c|t)` : position of the baseline (on the baseline, the center or the top of the box) (*Default: b*).

4.2 Different kinds of verbatim environments

First
Second

First
Second

```
1 \fvset{gobble=2}
2 \begin{BVerbatim}
3   First
4   Second
5 \end{BVerbatim}
6 \begin{BVerbatim}[baseline=c]
7   First
8   Second
9 \end{BVerbatim}
```

First
Second

First
Second

```
1 \begin{BVerbatim}[boxwidth=2cm]
2   First
3   Second
4 \end{BVerbatim}
5 \begin{BVerbatim}[boxwidth=2cm,
6                   baseline=t]
7   First
8   Second
9 \end{BVerbatim}
```

4.2.3 LVerbatim environment

This environment puts verbatim material into \LaTeX ‘LR’ mode (the so-called *left-to-right* mode, which in fact is the same thing that \TeX itself calls *restricted horizontal mode*).

4.2.4 Personalized environments

It is easy to define personal customized environments. You can redefine the existing ones using the `\RecustomVerbatimEnvironment` macro or create your own ones, using the `\DefineVerbatimEnvironment` macro⁴. In each case, you specify the name of the new environment, the type of environment on which it is based, and a set of initial option values. The options can be overridden with an optional argument in the normal way:

1 First verbatim line.
2 Second verbatim line.

```
1 \RecustomVerbatimEnvironment
2   {Verbatim}{Verbatim}
3   {gobble=2, frame=single}
4 \begin{Verbatim}
5   First verbatim line.
6   Second verbatim line.
7 \end{Verbatim}
```

⁴For verbatim commands, the `\CustomVerbatimCommand` and `\RecustomVerbatimCommand` macros also exist; for instance:

```
\RecustomVerbatimCommand{\VerbatimInput}{VerbatimInput}{frame=lines}
```

<pre> 1 First verbatim line. 2 Second verbatim line. </pre> <hr/> <pre> First verbatim line. Second verbatim line. </pre>	<pre> 1 \DefineVerbatimEnvironment% 2 {MyVerbatim}{Verbatim} 3 {gobble=2,numbers=left,numbersep=2mm, 4 frame=lines,framerule=0.8mm} 5 \begin{MyVerbatim} 6 First verbatim line. 7 Second verbatim line. 8 \end{MyVerbatim} 9 10 \begin{MyVerbatim}[numbers=none, 11 framerule=1pt] 12 First verbatim line. 13 Second verbatim line. 14 \end{MyVerbatim} </pre>
---	---

5 Saving and restoring verbatim text and environments

The `\SaveVerb` and `\UseVerb` macros allow us to save and restore verbatim material. `\UseVerb` itself is robust:

I have saved `_verbatim_` and reuse it later as many times as I want

Using `_verbatim_`
`_verbatim_`.

<pre> 1 2 3 4 5 6 </pre>	<pre> \DefineShortVerb{\ } \SaveVerb{Verb} _verbatim_ I have saved \UseVerb{Verb} and reuse it later as many times as I want \subsection*{Using \UseVerb{Verb}} \UseVerb{Verb}. </pre>
--------------------------	---

This also provides a solution to putting verbatim text inside \LaTeX commands which do not normally permit it:

<pre> 1 \DefineShortVerb{\ }\SaveVerb{Verb} _OK^ \marginpar{\UseVerb{Verb}} </pre>	<code>_OK^</code>
---	-------------------

There is a useful ability to use verbatim text as the item text in a description list (something not normally permitted in \LaTeX), using the `aftersave` parameter:

`aftersave` (macro) : macro to dynamically save some verbatim material (*Default: empty*).

<pre> \MyCommand : my command </pre>	<pre> 1 \newcommand{\Vitem}{% 2 \SaveVerb[aftersave=% 3 \item[\UseVerb{Vitem}]]{\Vitem}} 4 \DefineShortVerb{\ } 5 \begin{description} 6 \Vitem \MyCommand : my command 7 \end{description} </pre>
--------------------------------------	---

In the same way, we can use and restore (in normal, boxed and LR mode, using `\UseVerbatim`, `\BUseVerbatim` and `\LUseVerbatim` respectively) entire verbatim environments:

<pre>1 Verbatim line.</pre>	<pre>1 \begin{SaveVerbatim}{VerbEnv} 2 Verbatim line. 3 \end{SaveVerbatim} 4 \UseVerbatim{VerbEnv} 5 and \UseVerbatim{VerbEnv}</pre>
<p>and</p> <pre>1 Verbatim line.</pre>	
<pre>1st 1st econd and econd.</pre>	<pre>1 \begin{SaveVerbatim}[gobble=5]{VerbEnv} 2 First 3 Second 4 \end{SaveVerbatim} 5 6 \fbox{\BUseVerbatim{VerbEnv}} 7 and \BUseVerbatim{VerbEnv}. 8 9 \LUseVerbatim{VerbEnv} and 10 \LUseVerbatim{VerbEnv}</pre>
<pre>1 1st 2 econd</pre>	
<p>and</p> <pre>1 1st 2 econd</pre>	
<pre>1 This works. 2 I use Verbatim directly.</pre>	<pre>1 \begin{SaveVerbatim}{FOO} 2 However, if I define a 3 reusable Verbatim by 4 SaveVerbatim, 5 linenumbers works. 6 \end{SaveVerbatim} 7 8 \begin{Verbatim}[numbers=left] 9 This works. 10 I use Verbatim directly. 11 \end{Verbatim} 12 13 \UseVerbatim[numbers=left]{FOO}</pre>
<pre>1 However, if I define a 2 reusable Verbatim by 3 SaveVerbatim, 4 linenumbers works.</pre>	

6 Writing and reading verbatim files

The command `\VerbatimInput` (the variants `\BVerbatimInput` and `\LVerbatimInput` also exist) allows inclusion of the contents of a file with verbatim formatting. Of course, the various parameters which we have described for customizing can still be used:

```
1  ! A "hello" program
2
3  program hello
4    print *, "Hello world"
5  end program hello
```

```
1  ! A "hello" program
2
3  program hello
4    print *, "Hello world"
5  end program hello
```

```
3  program hello
4    print *, "Hello world"
5  end program hello
```

```
1  ! A "hello" program
2
3  program hello
4    print *, "Hello world"
5  end program hello
```

```
1  \fvset{fontsize=\small}
2  \VerbatimInput{hello.f90}
3
4  \fvset{frame=single,numbers=left,
5        numbersep=3pt}
6  \VerbatimInput{hello.f90}
7
8  \VerbatimInput[firstline=3,
9        rulecolor=\color{green}]
10 {hello.f90}
11
12 \VerbatimInput[frame=lines,
13        fontshape=sl,fontsize=\footnotesize]
14 {hello.f90}
```

We can make use of the ‘defineactive’ parameter to set the comment lines in the program text in a different style:

```
1  ! A "hello" program
2
3  program hello
4    print *, "Hello world"
5  end program hello
```

```
1  \def\ExclamationPoint{\char33}
2  \catcode\!=\active
3  \VerbatimInput%
4    [defineactive=%
5      \def!\{\color{cyan}\itshape
6        \ExclamationPoint}]
7  {hello.f90}
```

It is important to note that if the contents of the file does not fit on the page, it will be automatically broken across pages as needed (unless the `samepage` parameter has been set to true).

There is also a `VerbatimOut` environment to write verbatim text to an output file, in the same way:

1 2	I write that. And that too.
1 2 3 4 5 6 7	<pre>\begin{VerbatimOut}{file.txt} I write that. And that too. \end{VerbatimOut} \VerbatimInput[frame=single, numbers=left,numbersep=6pt]{file.txt}</pre>

7 Automatic pretty printing

Obviously, automatic *pretty printing* is outside the scope of this package. Nevertheless, this is specially interesting for verbatim inclusion of programming code files or fragments. In the \LaTeX world (not speaking of the *literate programming* way), there are software for some special languages, as the ‘C++2LaTeX’ package from Norbert KIESEL, but mainly two generic ones, which use completely different modes (an external preprocessor written in C and a \TeX based solution): the ‘LGrind’ [3] system, currently maintained by Michael PIEFEL, and the ‘listings’ [4] package from Carsten HEINZ.

Future versions of ‘fancyvrb’ and ‘listings’ packages are planned to cooperate, which will offer great advantages to both users of the two actual packages, and will allow ‘fancyvrb’ users to have automatic pretty printing of programming codes.

8 Known problems

- Vladimir VOLOVICH <vvv@vvv.vsu.ru> reported that the special character `\th`, available with T1 encoding, can’t be included as verbatim with ‘fancyvrb’. It can be true for other special characters too.

9 Conclusion

There are a few other possibilities that we have not described here. Note specially that it is possible to define a customization file (`fancyvrb.cfg`) loaded at the end of the package, to store definitions of your customized commands and environments and to redefine the attributes of existing ones.

Part II

Package fancyvrb-ex

This package defines some example environments which can write input code and output side by side or on top of each other. They are all used for this documentation of fancyvrb.

10 Example environment

```

1 \begin{Example}
2   First verbatim line.
3   Second verbatim line.
4   Third verbatim line.
5 \end{Example}

```

```

1   First verbatim line.
2   Second verbatim line.
3   Third verbatim line.

```

First verbatim line. Second verbatim line. Third verbatim line.

```

1 \begin{Example}[frame=lines,framerule=1mm,
2   numbers=left]
3   First verbatim line.
4   Second verbatim line.
5   Third verbatim line.
6 \end{Example}

```

```

1 First verbatim line.
2 Second verbatim line.
3 Third verbatim line.

```

First verbatim line. Second verbatim line. Third verbatim line.

11 CenterExample environment

```
1 \begin{CenterExample}[frame=single,  
2   numbers=right]  
3   First verbatim line.  
4   Second verbatim line.  
5   Third verbatim line.  
6 \end{CenterExample}
```

```
1 First verbatim line.  
2 Second verbatim line.  
3 Third verbatim line.
```

First verbatim line. Second verbatim line. Third verbatim line.

12 SideBySideExample environment

```
1 \begin{SideBySideExample}[xrightmargin=5cm,  
2   frame=lines, numbers=left]  
3   First verbatim line.  
4   Second verbatim line.  
5   Third verbatim line.  
6 \end{SideBySideExample}
```

```
1 First verbatim line. Second  
2 verbatim line. Third verbatim  
3 line.
```

```
1 First verbatim line.  
2 Second verbatim line.  
3 Third verbatim line.
```

References

- [1] Timothy VAN ZANDT, *Documentation for 'fancybox': Box tips and tricks for L^AT_EX*. Available from CTAN:macros/latex/contrib/supported/fancybox, 1993.
- [2] Timothy VAN ZANDT, *'fancyvrb': Fancy Verbatims in L^AT_EX*. Available from CTAN:macros/latex/contrib/supported/fancyvrb, 1998.
- [3] Various authors (current maintainer: Michael PIEFEL), *The 'LGrind' package*. Available from CTAN:support/lgrind, 1998.
- [4] Carsten HEINZ, *The 'Listings' package*. Available from CTAN:macros/latex/contrib/supported/listings, 1996-1997.