LaTeX Notes

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Contents

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1 Introduction

This is a collection of LaTeX solutions that the author had found repeatedly useful. Some are problem fixes, but others simply represent the author's preferences. Many involve one or more of the huge collection of LaTeX packages. All of these examples work with pdfLaTeX (project page [36] and manual [37]), which is the author's preferred tool.

Tables are not covered in this report. However, a discussion of various ways to layout and format tables can be found in *LaTeX Table Notes* [25].

2 Printing Dates

The following uses the `datetime2`[1] package. This an do much more than is described here. For more information consult the package documentation [33]. The datetime2 package can also be use to help with PDF metadata dates, and §16 discusses this.

2.1 Formatting Dates

The default format for the report date and the `\today` macro give a date that looks like 'June 15, 2018'. The format can be changed with the following that formats dates as '15th June 2018'.

```
\usepackage[en-GB]{datetime2}
\DTMlangsetup[en-GB]{ord=raise}
```

The `en-GB` option also gives time in 12 hour format. The `datetime2` package has a number of style options like `en-GB`. The English versions are described in [34].

An arbitrary date can be printed with the `\DTMdate` macro. So formatting the report date could be done with:

```
\date{\DTMdate{2017-05-12}}
```

Dates can be stored and reused as in the following example, which formats the title page date:

```
\DTMsavedate{reportdate}{2017-05-12}
\title{ ... }
\author{ ... }
\date{\DTMusedate{reportdate}}
\maketitle
```

2.2 A Date and Filename Tag

A tag with file name, date and time can be put in the bottom margin of the last page, with the help of the `textpos` [9] package, like this:

```
\usepackage[en-GB]{datetime2}
\DTMlangsetup[en-GB]{ord=raise}
\usepackage{textpos}
...
\vfill
\begin{textblock}{5}(6,1)
\hfill\tiny\textsf{APR, \jobname.tex, \today, \DTMcurrenttime}
\end{textblock}
\end{document}
```

This will print something like APR, latexNotes.tex, 25th June 2018, 7:09pm at the end of a report.

An alternative placement puts the tag in the page footer, but only on the last page. This needs the `fancyhdr` package [20]. In the document preamble we put

[1] The `datetime2` package replaces `datetime`, which is now obsolete.

```
\usepackage{fancyhdr}
\pagestyle{fancy}
\lhead{}
\rhead{}
\renewcommand{\headrulewidth}{0pt}
\rfoot{}
```

and at the end we have

```
\rfoot{\tiny\textsf{[APR, \jobname.tex, \today, \DTMcurrenttime]}}
\end{document}
```

3 Some Symbols

The best source of information about special characters and the packages that provide them is Scott Pakin's 'The Comprehensive LaTeX Symbol List' [21].

3.1 Euro

If the `textcomp` package is loaded, `\texteuro` can be used for the Euro symbol. However, the `eurosym` package (manual [39] and website [40]) gives the official symbol, and is more versatile. The command `\euro` generates the symbol; and `\EUR{x}` shows an amount with the symbol that has the correct unbreakable thin space in between. Thus the following:

```
\usepackage{eurosym}
\usepackage{textcomp}
...
The software costs \euro 10. \\
The software costs \EUR{10}. \\
The software costs \texteuro10.
```

produces: The software costs €10.
The software costs € 10.
The software costs €10.

The symbol show by `\texteuro` depends on the font, and the above example is Latin Modern (§12.1). If the `eurosym` package is loaded with its `gen` option, the Euro symbol is also printed in the current font style.

3.2 Ticks and Crosses

A useful selection of tick and cross symbols from the `pifont` [30] and `amsfonts` [11] packages are given in table 1. The pifont commands can be made a little more usable with

```
\newcommand{\tick}{\ding{51}}
\newcommand{\cross}{\ding{55}}
```

There are some more tick and crosses in the `bbding` package [10], but the pifont versions given above are better sized.

package	command	symbol
amsfonts	`\checkmark`	✓
pifont	`\ding{51}`	✓
pifont	`\ding{55}`	✗
pifont	`\ding{52}`	✔
pifont	`\ding{56}`	✘
pifont	`\ding{54}`	✖

Table 1: Ticks and Crosses

3.3 Backslash, Tilde and URLs

A backslash can be produced with the `\verb` command, and the sequence `x\verb|\|x` gives x\x. However, there are some places where verbatim is not allowed. In which case, a backslash can be made with the `\textbackslash` command, but the exact character depends on the font in play. Thus the sequence `x\textbackslash x` gives x\x, while `x{\tt\textbackslash}x` gives x\x just like the `\verb` command.

The tilde character is generated by the `\textasciitilde` command, but its vertical alignment depends on the font family begin used. The default Computer Modern font puts tilde at the top of the line rather like this ˜. Alternatively, the Latin Modern font puts tilde in the middle of the line thus ~. To use Latin Modern for the whole document put the following in the preamble:

```
\usepackage[T1]{fontenc}
\usepackage{lmodern}
```

Backslashes and tildes are often used in URLs and in this context the `url` package [1] can be used. It behaves like `\verb` but with sensible line breaking of names. For example `\url{somewhere/users/~adrian}` gives somewhere/users/~adrian.

3.4 Temperature Degrees

Nicely spaced degrees Celsius and Fahrenheit symbols for use in text mode can be defined like this:

```
\def\degC{$^\circ\kern-0.06em\rm{C}$}
\def\degF{$^\circ\kern-0.06em\rm{F}$}
```

So `10\degC{}` gives 10°C, and `50\degF{}` gives 50°F. The `{}` can be omitted if the commands are followed by punctuation.

Similar commands can be defined for use in maths mode by simply removing the `$` characters:

```
\def\degCm{^\circ\kern-0.06em\rm{C}}
\def\degFm{^\circ\kern-0.06em\rm{F}}
```

With these, `$10\degCm=50\degFm$` produces $10^\circ\mathrm{C} = 50^\circ\mathrm{F}$.

3.5 The Smiley

There are a few ways of printing a smiley. The traditional smiley `:-)` can be produced with `{\tt :-)}`. Alternatively, the character sequence `$\ddot\smile$` gives ⌣̈, and the `wasysym` package [13] has the symbols `\smiley` and `\frownie`, which look like ☺ and ☹.

3.6 Icons as Symbols

The available fonts provide many icon like symbols such as the smiley and frownie described above. However, if the required symbol is not available, an icon graphic can be pressed into service.

Assuming that we have a file called `slrCamera.png` that is a suitable small graphic icon, it can use it like this:

```
\usepackage{graphicx}
...
\newcommand{\camera}
  {\raise-0.6px\hbox{\includegraphics[scale=0.07,]{slrCamera}}}
...
... camera icon \camera\ that ...
```

This produces a camera icon 📷 that is embedded in a text line.

The `\raise` command and `scale` parameter are used to adjust the icon to a correct fit and position in the line.

4 References

4.1 Referencing Section Names

The ability to reference numbered items is built into LaTeX. So

```
\subsection{Programming in Java}\label{sec:java}
...
... \S\ref{sec:java} ...
```

gives a reference to the section's number, which might be '§5.1' for example. To get a reference to the section's name we can use the `nameref` package [23]. This is part of the `hyperref` package (§4.2), but it can be used on its own like this:

```
\usepackage{nameref}
...
...  \nameref{sec:java} ...
```

This will print the section command's text, which is 'Programming in Java.'

4.2 Hypertext

References, contents entries, index entries, citations and URLs, given using the `\url` command [1], can be hypertexted in pdfTeX with the `hyperref` package (manual [24], package options [22] and article [18]). This includes the `nameref` package (§4.1).

The `\href` command, provided for textual links, can be used sometimes to modify how a URL link is displayed:

```
\href{http://www.ctan.org/beamer/doc/beameruserguide.pdf}
     {\tt www.ctan.org/beamer/\\doc/beameruserguide.pdf}
```

The package's default options surrounds each link with a coloured box, which is not shown when the PDF file is physically printed:

```
\usepackage{hyperref}
```

Sometimes, the default hypertext boxes can make a document rather ugly, particularly if there is a contents list. So instead links can be shown as coloured text without any boxes:

```
\usepackage[colorlinks]{hyperref}
```

This appears to be the method used for the `hyperref` manual. Unfortunately, this option also makes the references coloured when the document is physically printed, and this does not work well on non-coloured output.

The hypertext, including boxes and colour can be disabled with the following, which does not affect the package's other features.

```
\usepackage[draft]{hyperref}
```

There can be problems with maths mode and some TEX commands in section headers when the hypertext package is used. The solution is to use the following method:

```
\section{\texorpdfstring{LaTeX text}{PDF text alternative}}
```

Then 'PDF text' will appear in the document's PDF bookmarks, and there will be no error messages if it is suitably typeset.

5 Annotations

5.1 Margin Notes

Notes that look good in the margins can be made with the following command:

```
\newcommand{\mnote}[1]
     {\marginpar{\scriptsize \raggedright #1 }}
```

which is used like this

```
\mnote{This is a margin note.}
```

This is a margin note.

It is sometimes useful to have ticks and crosses (see §3.2) in the margin. The following commands, which are defined to work on two sided documents, can be used to do this:

```
\newcommand{\mused}{\marginpar[\hfill \huge \checkmark]
                              {\huge \checkmark}}
\newcommand{\mprob}{\marginpar[\Huge \bf !]{\hfill \Huge \bf !}}
\newcommand{\mokay}{\marginpar[\Huge \tick]{\hfill \Huge \tick}}
\newcommand{\mbad}{\marginpar[\Huge \cross]{\hfill \Huge \cross}}
```

The `\mused` example puts the symbol close to the text, the others put it as far away as possible. The difference is most noticeable on two sided layout. The `\mused` style looks better with lists that are being checked off.

5.2 Stamps

Text can be put anywhere on the page with the `textpos` package [9]. This can be used with the `rotating` package [7] and the `color` package, which is part of the 'graphics' bundle [5], to produce margin stamps like this:

```
\usepackage{textpos}
\usepackage{rotating}
\usepackage[usenames,dvipsnames]{color}
...
\begin{textblock}{2}(10,0)
\begin{rotate}{45}
\resizebox{!}{20pt}{\texttt{\textcolor{BrickRed}{STAMP}}}
\end{rotate}
\end{textblock}
```

This method can be used to put a 'draft copy' stamp at the top of the first page as follows:

```
\usepackage{textpos}
\usepackage{rotating}
\begin{document}
\maketitle
\begin{textblock}{3}(7,-3)
\begin{rotate}{-45}
\Huge\textsf{\textcolor{red}{DRAFT COPY 1}}
\end{rotate}
\end{textblock}
```

5.3 Watermarks

There are few ways to add a watermark to a document, but the `draftwatermark` package [3] offers the best combination of simplicity and versatility. Put the following in the document's preamble:

```
\usepackage{draftwatermark}
\SetWatermarkLightness{0.9}
\SetWatermarkText{\textsf{\textbf{DRAFT}}}
\SetWatermarkScale{0.6}
```

The set commands modify the default behaviour that prints 'DRAFT' in a Roman font. They change it to a sanserif bold font, which is a paler grey and slightly smaller.

5.4 Tracking Change

The `changes` package can be used to mark document changes:

```
\usepackage[ulem=normalem]{changes}
...
\added[remark={This is a changes remark.}]{added text}
\replaced{new stuff }{replaced text}
\deleted{deleted text}
```

The `ulem` option is needed to preserve normal emphasised text. The remark parameter can be used in all commands. Text can be marked for different authors, and (see package documentation for details [14]). The empty option in the add command is for author, but cannot be completely omitted in this case.

The above commands have been used in the following: Here is some added text[2]; some new stuff ~~replaced text~~; and some ~~deleted text~~.

There are some limitations: Markup cannot span multiple paragraphs; and you cannot markup figures or tables. The package's defaults do not work well with black and white printers. Additions are not underlined, so the output can be difficult to read without colour. Nevertheless, it should be possible to suitably configure the package for black and white if required.

5.5 Change Bars

Change bars can be added with the `changebar` package like this:

```
\usepackage{changebar}
...
\setcounter{changebargrey}{0} % make bars black
...
\begin{samepage}
\cbstart
   Text to be marked.
\cbend
\end{samepage}
```

Unfortunately, pdfLaTeX generates false errors and warnings if a change bar spans a page break, hence the `\begin{samepage}` ... `\end{samepage}` surrounding the bar in the above example.

A deleted marker can be also be added with `\cbdelete`. For more information see the package documentation [8].

6 Footnote Repetition

Printing footnotes whose texts are identical as a single entry on each page can be done in a number of ways. However, using the `fixfoot` package is recommended as the most structured approach, but unfortunately it does not work in a minipage environment.

Here a common footnote is declare in the preamble, and referenced by a command in the body of the document:

```
\usepackage{fixfoot}
...
\DeclareFixedFootnote{\repA}{Repeated footnote.}
\DeclareFixedFootnote{\repB}{Another repeated footnote.}

This is in the body, and is footnoted\repA{}
...\repB{} ...\repA{} ...\repB{} ... \repB{}
```

Multiple LaTeX runs are needed to remove duplicates on the same page.

[2] This is a changes remark.

7 Superscripts

Text superscript can be formed thus: `text\textsuperscript{super}`, which would print text$^{\text{super}}$. This can be used for date suffixes like this:

```
\newcommand{\dst}{\textsuperscript{st}}
\newcommand{\dnd}{\textsuperscript{nd}}
\newcommand{\drd}{\textsuperscript{rd}}
\newcommand{\dth}{\textsuperscript{th}}
```

(See §2.1 for automatically formatted dates.)

8 Format and Styles

8.1 Margin Kerning and Font Expansion

The pdfTEX engine provides two important micro-typographic extensions: margin kerning and font expansion [38]. *Their use is highly recommended* for documents with significantly large blocks of text.

Although these features are complicated to enable in low level TEX, the `microtype` package [29] makes it very easy to use them. Just put the following in the preamble:

```
\usepackage{microtype}
```

The package's default settings work very well for Latin Modern (see §12.1) but might not be so good for other fonts.

8.2 Changing Page Margins

A common formatting need for laboratory and student related material is just to squeeze the margins, and loading the `geometry` package with

```
\usepackage[a4paper,scale=0.8]{geometry}
```

works well. The default scale setting is 0.7, and values more than this might cause problem with margin notes. Values higher than 0.8 might exceed physical printer margin limitations. The package is very comprehensive, and for more complicated requirements the package documentation [41] should be consulted.

More control is possible by changing the standard page parameters, but it it much more complicated:

```
\addtolength{\textheight}{3cm}
\addtolength{\textwidth}{4cm}
\addtolength{\evensidemargin}{-2cm}
\addtolength{\oddsidemargin}{-2cm}
\addtolength{\topmargin}{-2cm}
```

The `changepage` package [42], offers a more compact notation with the following command:

```
\changepage{textheight}{textwidth}{evensidemargin}{oddsidemargin}
           {columnsep}{topmargin}{headheight}{headsep}{footskip}
```

8.3 Landscape Orientation

The following orients the whole document, including headers and footers to landscape format:

```
\usepackage[landscape,a4paper,textwidth=26cm]{geometry}
```

The `a4paper` option can be omitted if it is included as a `documentclass` option; and the `textwidth` option can be left out for wider side margins. Consult [41] for more information on the geometry package.

Reorienting selected pages of a document can be done with the `pdflscape` [19] or `lscape` [6] packages, where the `landscape` environment is put on separate pages:

```
\usepackage{pdflscape}
...
\begin{landscape}
   ...
\end{landscape}
```

Page headers and footers are not affected. The `pdflscape` package always displays the pages in a PDF viewer rotated to landscape, but the `lscape` package, without its `pdftex` option, displays them oriented as portrait pages. Both packages are the same when the document is physically printed. (The `lscape` package can be used with plain LaTeX.)

Page headers and footers are not affected. In a PDF viewer, the `pdflscape` package always displays the pages rotated to landscape, but the `lscape` package without its `pdftex` option displays them oriented as portrait pages. Both packages are the same when the document is physically printed.[3]

Rotating a figure without affecting page orientation is described in §9; and doing this to tables is discussed in LaTeX Table Hints and Tips [25].

8.4 Disabling Page Numbers

Switching off page numbers is normally very simple, and well documented. Just change the page style like this:

```
\pagestyle{empty}
...
\begin{document}
```

Unfortunately this does not work for the first page in documents that use `\maketitle`. In this case, use the following instead:

```
\maketitle\thispagestyle{empty}
```

and there will be no numbers on any pages.

[3] The `lscape` package, without its `pdftex` option, can be used with plain LaTeX.

8.5 Section Headers

The easiest way to change the style of section headers is to use the `sectsty` package [16]. Individual section levels can be changed or global changes can be made. For example, to get underlined sans serif headings we could put this in the preamble:

```
\usepackage{sectsty}
\usepackage[normalem]{ulem}
\allsectionsfont{\sffamily\underline}
```

The font used in all the section headers could be changed to say Augie with:

```
\usepackage{emerald}
\usepackage[T1]{fontenc}
\usepackage{sectsty}
\allsectionsfont{\ECFAugie}
```

And finally, headers can be moved to the right side of the page with:

```
\allsectionsfont{\raggedleft}
```

9 Graphics

The `graphicx` (bundle [5] and package [4]) works well with pdfLaTeX and JPEG files:

```
\usepackage{graphicx}
...
\begin{center}
\includegraphics[height=6cm]{mypicture.jpg}
\end{center}
```

As well as the `height` parameter used above, the image can be also be sized by `width`. Do not have any spaces in the image's file name even if the operating system allows such file names.

If the image has too much margin it can be cropped by using the `trim` parameter like this:

```
\includegraphics[clip,
   trim=1.5cm 2cm 1.5cm 2cm,height=6cm]{adrianrobson.jpg}
```

The order of `trim` parameters is left, bottom, right and top. In practice, getting the correct crop is achieved by trial and error.

Rotating from portrait to landscape is sometime needed:

```
\includegraphics
      [height=6cm,angle=-90]{adrianrobson.jpg} % clockwise
\includegraphics
      [height=6cm,angle=90]{adrianrobson.jpg}  % anticlockwise
```

A positive angle implies an anticlockwise rotation. The height parameter *must* proceed the angle or there is *sometimes* an error.

9.1 Wrapped Text

The `wrapfig` package can be used to create text that is wrapped around images:

```
\usepackage{wrapfig}
...
\begin{wrapfigure}{r}{0.5\textwidth}
  \vspace{-20pt}
  \begin{center}
    \includegraphics[width=0.48\textwidth]{adrianrobson}
  \end{center}
  \vspace{-20pt}
  \caption{Adrian P. Robson}
  \vspace{-10pt}
\end{wrapfigure}
```

The parameter 'r' indicates that the figure should be right positioned and non-floating. The full set of values are:

r	R	→ the right side of the text
l	L	→ the left side of the text
i	I	→ the inside edge, near the binding if a two sided document
o	O	→ the outside edge, far from the binding

where upper-case implies floating.

10 Conditional Text

Using the same LaTeX source in different documents can be very convenient, but this posses problems if different formatting is required. Conditional expressions can be used as a solution.

Define a Boolean variable, and input the shared text in the master document files like this:

```
% Boolean for holiday or personal journal
\newif\ifholiday
\holidaytrue
% or
% \holidayfalse
...
\input{shared.tex}
```

And then the following can be done in the shared text:

```
\ifholiday   % it is in holiday journal
   \hrule
   \section*{Sunday 16th}
\else        % it is in personal journal
   \subsection*{16th Sunday}
\fi
```

11 Listing Program Code

Program code is traditionally printed using a non-proportional font. This and the use of special characters in programs mean that the `verbatim` environment is normally used for program listings.

11.1 Straight Verbatim Apostrophes

Using `verbatim` environment or `\verb` to list program code mostly works, but standard LaTeX quotes and apostrophes need some help. The `"` character can be used in preference to normal text ``` `` ``` and `''`, which produce “ and ”. The apostrophe however needs more intervention. Without help verbatim apostrophes print as ’, which is inappropriate for code listings. Straight apostrophes can be obtained by invoking the `upquote` package thus:

```
\usepackage{upquote}
```

11.2 Alternative Typewriter Fonts

Computer Modern and Latin Modern typewriter fonts do not have a crossed zero as the following, which is in Latin Modern typewriter, shows. (This and the following examples have the `upquote` package invoked.)

```
abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ
0123456789 []() "`'+-/* <>= ~&|% :;,.?!\
5S 0O 2Z 1lI
```

However, there are two easily available alternatives, TXTT [28] and Bera Mono [27], which are used as follows:

TXTT: To make this the default typewriter font, use the following in the document’s preamble:

```
\usepackage[T1]{fontenc}
\renewcommand*\ttdefault{txtt}

abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ
0123456789 []() "`'+-/* <>= ~&|% :;,.?!\
5S 0O 2Z 1lI
```

Bera Mono: To make this the default typewriter font, use the following in the preamble:

```
\usepackage[T1]{fontenc}
\usepackage[scaled]{beramono}

abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ
0123456789 []() "`'+-/* <>= ~&|% :;,.?!\
5S 0O 2Z 1lI
```

The TXTT and Bera Mono fonts used above can be reviewed in *The LaTeX Font Catalogue* [12], which has lots of other free fonts. You might also look at *Fonts for Displaying Program Code in LaTeX* [26] for a fuller discussion.

11.3 A Better Verbatim

There are a couple of packages that can enhance the `verbatim` environment. The eponymous `verbatim` package [31] and `fancyvrb` [43].

The `fancyvrb` package is the richer, and can be used for things like changing font family and size, framing code examples, colouring text and conditionally processing text. Here is a simple example:

```
\usepackage{fancyvrb}
...
\begin{Verbatim}[xleftmargin=10mm, numbers=left]
int sum = 0;
for( i = 1; i <= 4; i++ ) {
   sum = sum + i;
}
\end{Verbatim}
```

This produces the following output:

```
1  int sum = 0;
2  for( i = 1; i <= 4; i++ ) {
3     sum = sum + i;
4  }
```

The `fancyvrb` package also has a command that inputs a whole file and prints it verbatim:

```
\VerbatimInput[numbers=left]{helloworld.c}
```

The `verbatim` package does little more that provides a file input command, but if this is all that is needed, it does the job:

```
\usepackage{verbatim}
...
\verbatiminput{helloworld.c}
```

12 Fonts

12.1 An Alternative to Computer Modern

The default font in LaTeX is Computer Modern, but Latin Modern font has better metrics and glyphs. To use it, put the following in the document's preamble:

```
\usepackage[T1]{fontenc}
\usepackage{lmodern}
```

Latin Modern and other alternative fonts are reviewed in *The LaTeX Font Catalogue* [12]; and §11.2 discusses alternative typewriter fonts. For more information on how to manage fonts in LaTeX have a look at *LaTeX 2ε font selection* [15].

12.2 Big Fonts

Arbitrary sized Computer Modern text can be printed if the `fix-cm` package [17] is used.

This is `Huge`: Big but this is even bigger Big

In this case, the extra large text was made with

```
\usepackage{fix-cm}
...
{\fontsize{30}{35}\selectfont Big}
```

The `fontsize` command has two parameters [15]. The first is the required *size* in points (pt), and the second *baselineskip*. The baslineskip is not important unless the text spans lines; and to get it to work sometimes needs this trick with `\par`:

```
{\fontsize{30}{35}\selectfont
   Big\\
   More
\par}
```

13 Table of Contents

13.1 Unnumbered Sections

The asterisk versions of the section commands, such as `\section*`, produce header titles without numbers. These unnumbered titles are not included in the document's table of contents.

If unnumbered sections and a table of contents are both required for a document, use the normal form of the section commands, such as `\section`, and put the following in the document's preamble:

```
\setcounter{secnumdepth}{0}
```

13.2 TOC Spacing Problem

Sometimes, when there is deep nesting of numbered sections, the title and number can overlap in the table of contents like this:

A potentially easy solution using the `tocloft` package,

```
\usepackage{tocloft}
\setlength{\cftsecnumwidth}{2.6em}
```

does not work because this package messes with the page header and numbering of the contents pages.

Fortunately, the behaviour of the standard TOC macros, can be modified with the following:

```
1 \makeatletter
2 \renewcommand{\l@section}{\@dottedtocline{1}{1.5em}{2.6em}}
3 \makeatother
```

This tidies up the TOC without changing the page layout. The parameter of the `\@dottedtocline` command are level, indentation and number width. The first two must be the same as the defaults, and the third is increased for the fix. Lines 1 and 3 are not needed if the command is in a `sty` file.

The relevant part of the standard macro, showing all the default values, is as follows:

```
\newcommand*\l@section{\@dottedtocline{1}{1.5em}{2.3em}}
\newcommand*\l@subsection{\@dottedtocline{2}{3.8em}{3.2em}}
\newcommand*\l@subsubsection{\@dottedtocline{3}{7.0em}{4.1em}}
\newcommand*\l@paragraph{\@dottedtocline{4}{10em}{5em}}
\newcommand*\l@subparagraph{\@dottedtocline{5}{12em}{6em}}
\newcommand*\l@figure{\@dottedtocline{1}{1.5em}{2.3em}}
\let\l@table\l@figure
```

14 Seminar Class

The `seminar` class [44] is the traditional way of writing presentations in LaTeX, but it needs a little help to work with pdfLaTeX. For landscape slides use the following preamble:

```
\documentclass[a4paper]{seminar}
\pdfpagewidth=11.69 truein     % A4 landscape
\pdfpageheight=8.27 truein     %
\pdfhorigin=1truein     % default values,
\pdfvorigin=1truein     %    but still needed
\slideheight 25cm       % This is width
\slidewidth  15cm       % This is height
```

For portrait slides the following should be used:

```
\documentclass[portrait,a4paper]{seminar}
\pdfpagewidth=8.27 truein      % A4 portrait
\pdfpageheight=11.69 truein    %
\pdfhorigin=1truein     % default values,
\pdfvorigin=1truein     %    but still needed
\slideheight 15.2cm     % This is width  - same as default
\slidewidth  22.2cm     % This is height - same as default
```

Notice that the `\slideheight` and `\slidewidth` values are reversed in both cases (!).

15 Beamer Class

The `Beamer` class [35] is excellent for writing presentations and lectures.

15.1 Recommended Set Up

The choice of Beamer theme is often a personal matter, but the following is recommended as a simple style with plenty of room on its slides.

```
\usetheme[secheader]{Boadilla}
\usecolortheme{seagull}
\setbeamertemplate{navigation symbols}{} % loose navigation bar
\setbeamersize{text margin left=0.6cm}
\setbeamersize{text margin right=0.6cm}
```

This is a rather plain theme that is compatible with black and white printing. The navigational buttons are disabled.

15.2 Contents Format

Automatically printing a highlighted table of contents at the beginning of each section with `\AtBeginSection` is a good facility but the standard layout is poor. A kludge is to put it in a quotation, thus

```
\AtBeginSection[]
{
  \begin{frame}<beamer>
    \frametitle{Outline}
    \begin{quotation} % Kludge to compress contents
       \tableofcontents[currentsection]
    \end{quotation}
  \end{frame}
}
```

15.3 Footer Problems

The `Boadilla` and other themes puts the tile page's 'institute' in the footer in parenthesis, which is nice. But it might not fit, or we get 'air brackets' if it is blank. To fix this, an abbreviated version can be given in `[]`, which will be a better fit:

```
\institute[NEPSweb]{adrian.robson@nepsweb.co.uk}
```

If there is no suitable abbreviation or no institute then a copyright notice could be used as a plausible filler, like this:

```
\institute[\copyright{} 2012]{}
```

If these methods are no good, and the brackets *must* be removed then the file `beamerouterthemeinfolines.sty` must be copied to the presentation's folder and edited to remove the relevant code. Look for '`(\insertshortinstitute)`' and delete.

16 PDF Metadata

Metadata can be set if pdfTEX is used. However, two methods are required depending on whether or not the `hyperref` package is used.

16.1 Just pdfTEX

With just pdfTEX, the `\pdfinfo` command [37] can be used to set file metadata, like this:

```
\pdfinfo{
   /Author(Adrian Robson)
   /Title(Latex Notes)
   /Subject(A collection of useful LaTeX methods.)
   /Keywords(LaTeX;hints;tricks)
}
```

PDF creation and modified dates can also be be set with the `pdfinfo` command. *However, there is a peculiar problem with PDF metadata dates.* Dates are stored in the PDF file exactly as given in the `\pdfinfo` command, but PDF viewers treat the dates as Coordinated Universal Time (UTC) and then convert them to local time for display. So for example, 1pm 25th March 2018 (`D:20180325130000`) will be reported as 2pm 25th March 2018 in the United Kingdom. This date is in British Summer Time (BST), which is one hour behind Greenwich Mean Time (GMT) and UTC.

The solution is to specify your country's time zone in the date with the following format:

$$\texttt{D:}\langle\text{YYYY}\rangle\langle\text{MM}\rangle\langle\text{DD}\rangle\langle\text{hh}\rangle\langle\text{mm}\rangle\langle\text{ss}\rangle\pm\langle\text{zz}\rangle\texttt{'00'}$$

where $\pm\langle$zz$\rangle$ is the time zone hour offset, which is minus westward and positive eastward from the meridian. So GMT (Newcastle UK) is `+00`, and AST (New York USA) is `-04`. In some parts of the world a summertime correction also applies. In the UK when it is BST the time zone is `+01`. Unfortunately, the exact dates when BST starts and finishes change from year to year. So taking all of this into account, we can use the following to set the PDF dates of a document in the UK:

```
\pdfinfo{
   /CreationDate(D:20170326133000+00'00') % GMT
   /ModDate(D:20180619133000+01'00')      % BST
}
```

16.2 Synchronising Title and PDF data

The following, which uses the `datetime2` package [33], can be put in the preamble to synchronise a report's printed title, author and date, and PDF metadata title, author and modification date.

```
\usepackage[en-GB]{datetime2}
\DTMlangsetup[en-GB]{ord=raise}
```

```
% Title and author
  \newcommand{\reportTitle}{Latex Notes}
  \newcommand{\reportAuthor}{Adrian Robson}
% Creation timestamp - constant once report created (GMT)
  \DTMsavetimestamp{createTimestamp}{2014-03-01T12:00:00+00:00}
% Modification timestamp - changed on report update (BST)
  \DTMsavetimestamp{modifyTimestamp}{2018-06-17T12:00:00+01:00}

% set pdf metadata
{ \DTMsetstyle{pdf}
  \pdfinfo{
    /Author(\reportAuthor)
    /Title(\reportTitle)
    /CreationDate(\DTMuse{createTimestamp})
    /ModDate(\DTMuse{modifyTimestamp})
    /Subject(A collection of useful LaTeX methods.)
    /Keywords(LaTeX;hints;tricks)
  }
}

% set report title data
\title{\reportTitle}
\author{\reportAuthor}
\date{\DTMusedate{modifyTimestamp}}
```

The significant variables are

Name	Title	PDF Data
`\reportTitle`	✓	✓
`\reportAuthor`	✓	✓
`createTimestamp`		✓
`modifyTimestamp`	✓	✓

The timestamp data in the `\DTMsavetimestamp` commands should have the following format:

$$\langle \text{YYYY} \rangle\text{-}\langle \text{MM} \rangle\text{-}\langle \text{DD} \rangle\texttt{T}\langle \text{hh} \rangle\texttt{:}\langle \text{mm} \rangle\texttt{:}\langle \text{ss} \rangle \pm \langle \text{zz} \rangle\texttt{:00}$$

The $\pm\langle \text{zz} \rangle$ part gives the time zone hour offset, which must be used to get correct PDF timestamps. The problem and its solution are explained in §16.1.

16.3 With hyperref package

Alternatively, if the `hyperref` package [22] is being used (see §4.2), then the document's PDF information must be set like this:

```
\usepackage[
   pdftitle={LaTeX Notes},
   pdfauthor={Adrian Robson},
   pdfsubject={A collection of useful LaTex methods.},
   pdfkeywords={LaTeX;hints;tricks}]{hyperref}
```

However, the dates must still be set using the `\pdfinfo` command (see §16.1). Title, author, subject and keyword information in `\pdfinfo` will be ignored. PDF metadata will not be stored if the `hyperef` package's `draft` option is used.

17 List Formatting

The easiest way to change the layout of the standard `itemize`, `enumerate` and `description` lists is to used the `enumitem` package [2]. For example:

```
\usepackage{enumitem}
...
\begin{description}[itemsep=-1ex,labelindent=1cm,leftmargin=2cm]
   \item [First item] ...
   \item [Second item] ...
\end{description}
```

This reduces the line space between items; indents the whole list, and adjusts the item body indention, to produce the following:

First item Lorem ipsum dolor sit amet, consectetur adipiscing elit. Velit felis, mollis id pretium at, dignissim eget nulla.

Second item Nulla vel velit sed arcu tempor tempus. Duis quis sem tellus, ut mattis lacus.

Alternatively, all the `description` lists in a document could be modified with the global command

```
\setlist[description]{itemsep=-1ex,labelindent=1cm,
                      leftmargin=2cm}
```

17.1 Compact Lists

Commonly, reducing the vertical spacing of a list is all that is required, and this can be done with the `nosep` option. This also takes out vertical space above the list, so we might want to put some back as the following does:

```
\medskip
\begin{description}[nosep]
   \item [First item] ...
   \item [Second item] ...
\end{description}
```

This gives us the following compact list format:

First item Lorem ipsum dolor sit amet, consectetur adipiscing elit. Velit felis, mollis id pretium at, dignissim eget nulla.

Second item Nulla vel velit sed arcu tempor tempus. Duis quis sem tellus, ut mattis lacus.

17.2 Resuming List Counters

Starting an enumerated list with numbers continuing from the last list, rather than 1, can also be achieved with the `enumitem` package. It is done with the `resume` option like this:

```
\begin{enumerate}
   \item First item
   \item Second item
\end{enumerate}
Some text.
\begin{enumerate}[resume]
   \item Third item
\end{enumerate}
```

1. First item
2. Second item

Some text.

3. Third item

18 C++, μC/OS and pdfTeX logos

Logos for C++ and μC/OS can be made with the following definitions:

```
\def\CPP{C\kern-.05em\raise.23ex\hbox{+\kern-.05em+}}
\def\uCOS{$\mu$C\kern-.14em/\kern-.12emOS}
```

They are invoked with `\CPP` and `\uCOS`, and produce the better formed C++ and μC/OS instead of the plain text C++ and uC/OS.

There are no official pdfLaTeX or pdfTeX logos, and the simple `pdf\TeX`, for example, makes pdfTeX, which needs more space between its f and T. So the following macros can be defined:

```
\def\pdfTeX{pdf\kern0.07em\TeX}
\def\pdfLaTeX{pdf\kern0.07em\LaTeX}
```

Then `\pdfTeX` and `\pdfLaTeX` will produce the nicer pdfTeX and pdfLaTeX logos.

Like all such LaTeX commands, they might need to be followed by `{}` to introduce a space. So instead of '`\CPP code`', which makes 'C++code', we use '`\CPP{} code`', which produces the correctly spaced 'C++ code'.

To use these logos in section headers with the hypertext package, the method shown in §4.2 must be employed like this:

```
\section{\texorpdfstring{\CPP{} and \uCOS{} logos}
                        {C++ and uC/OS logos}}
```

References

[1] Donald Arseneau and Robin Fairbairns, *url.sty version 3.3*. Downloadable from www.ctan.org/tex-archive/macros/latex/contrib/url/url.pdf

[2] Javier Bezos, *Customizing lists with the enumitem package*. Download from www.ctan.org/tex-archive/macros/latex/contrib/enumitem/enumitem.pdf

[3] Sergio Callegari, *The draftwatermark package*. Download from www.ctan.org/tex-archive/macros/latex/contrib/draftwatermark/draftwatermark.pdf

[4] D. P. Carlisle and S. P. Q. Rahtz, *The graphicx package*. Download from texdoc.net/texmf-dist/doc/latex/graphics/graphicx.pdf

[5] D. P. Carlisle, *Packages in the 'graphics' bundle*. Download from www.ctan.org/tex-archive/macros/latex/required/graphics/grfguide.pdf

[6] D. P. Carlisle, *The lscape package*. Downloadable from texdoc.net/texmf-dist/doc/latex/graphics/lscape.pdf

[7] Robin Fairbairns, Sebastian Rahtz and Leonor Barroca, *A package for rotated objects in LaTeX*. Downloadable from www.ctan.org/tex-archive/macros/latex/contrib/rotating/rotating.pdf

[8] Michael Fine, *The Changebar Package*. Download from www.ctan.org/tex-archive/macros/latex/contrib/changebar/changebar.pdf

[9] Norman Gray, *Textpos: absolute positioning of text on the page*. Download from www.ctan.org/tex-archive/macros/latex/contrib/textpos/textpos.pdf

[10] Karel Horak and Peter Moller Neergaard, *The bbding-package*. Download from www.ctan.org/tex-archive/fonts/bbding/bbding.pdf

[11] David M. Jones, *The amsfonts package*. Download from www.ctan.org/tex-archive/fonts/amsfonts/doc/amsfonts.pdf

[12] Palle Jorgensen, *The LaTeX Font Catalogue*. Available at www.tug.dk/FontCatalogue

[13] Axel Kielhorn, *The wasysym macro package for LaTeX2e*. Download from www.ctan.org/tex-archive/macros/latex/contrib/wasysym/wasysym.pdf

[14] Ekkart Kleinod, *The changes-package, Manual change markup*. Downloadable from www.ctan.org/tex-archive/macros/latex/contrib/changes/changes.english.pdf

[15] LaTeX3 Project Team, *LaTeX 2ε font selection*. Downloadable from www.ctan.org/tex-archive/macros/latex/doc/fntguide.pdf

[16] Rowland McDonnell, *The sectsty package*. Downloadable from www.ctan.org/tex-archive/macros/latex/contrib/sectsty/sectsty.pdf

[17] Frank Mittelbach, David Carlisle, Chris Rowley and Walter Schmidt, *The fixltx2e and fix-cm packages*. Download from texdoc.net/texmf-dist/doc/latex/base/fixltx2e.pdf

[18] Heiko Oberdiek, *PDF information and navigation elements with hyperref, pdfTEX, and thumbpdf*, EuroTeX'99 Proceedings, 1999. Download from www.ctan.org/tex-archive/macros/latex/contrib/hyperref/doc/paper.pdf

[19] Heiko Oberdiek, *The pdflscape package*. Download from www.ctan.org/tex-archive/macros/latex/contrib/oberdiek/pdflscape.pdf

[20] Piet van Oostrum, *Page layout in LaTeX*. Download from www.ctan.org/tex-archive/macros/latex/contrib/fancyhdr/fancyhdr.pdf

[21] Scott Pakin, *The Comprehensive LaTeX Symbol List*. Downloadable from www.ctan.org/tex-archive/info/symbols/comprehensive/symbols-a4.pdf

[22] Sebastian Rahtz et. al., *hyperref package options*. Downloadable from www.ctan.org/tex-archive/macros/latex/contrib/hyperref/doc/options.pdf

[23] Sebastian Rahtz, *Section name references in LaTeX*. Downloadable from www.ctan.org/tex-archive/macros/latex/contrib/hyperref/nameref.pdf

[24] Sebastian Rahtz and Heiko Oberdiek, *Hypertext marks in LaTeX: a manual for hyperref*. Download from www.ctan.org/tex-archive/macros/latex/contrib/hyperref/doc/manual.pdf

[25] Adrian Robson, *LaTeX Table Notes*. Download from nepsweb.co.uk/docs/tableNotes.pdf

[26] Adrian Robson, *Fonts for Displaying Program Code in LaTeX*. Download from nepsweb.co.uk/docs/progfonts.pdf

[27] Malte Rosenau and Walter Schmidt, *"Bera" font pack for LaTeX*. Downloadable from www.ctan.org/tex-archive/fonts/bera/README

[28] Young Ryu, *The TX Fonts*. Download from www.ctan.org/tex-archive/fonts/txfonts/doc/txfontsdoc.pdf

[29] R. Schlicht, *The microtype package*. Downloadable from www.ctan.org/tex-archive/macros/latex/contrib/microtype/microtype.pdf

[30] Walter Schmidt, *Using common PostScript fonts with LaTeX*. Download from www.ctan.org/tex-archive/macros/latex/required/psnfss/psnfss2e.pdf

[31] Rainer Schöpf, Bernd Raichle and Chris Rowley, *A New Implementation of LaTeX's verbatim and verbatim* Environments*. Downloadable from www.ctan.org/tex-archive/macros/latex/required/tools/verbatim.pdf

[32] Nicola Talbot, *datetime.sty: Formatting Current Date and Time*. Download from www.ctan.org/tex-archive/macros/latex/contrib/datetime/datetime.pdf

[33] Nicola Talbot, *datetime2 v1.5.2: date and time formats*. Download from www.ctan.org/tex-archive/macros/latex/contrib/datetime2/datetime2.pdf

[34] Nicola Talbot, *English Module for datetime2 Package v1.04*. Download from www.ctan.org/tex-archive/macros/latex/contrib/datetime2/datetime2-english.pdf

[35] Till Tantau, Joseph Wright and Vedran Miletić, *The BEAMER class*. Download from www.ctan.org/tex-archive/macros/latex/contrib/beamer/doc/beameruserguide.pdf

[36] The TeX Users Group (TUG), *The pdfTEX project page*. Available at www.tug.org/applications/pdftex

[37] Hàn Thế Thành et. al., *The pdfTEX user manual*. Downloadable from www.ctan.org/tex-archive/systems/pdftex/manual/pdftex-a.pdf

[38] Hàn Thế Thành, *Micro-typographical Extensions of pdfTeX in Practice*. Downloadable from www.tug.org/TUGboat/tb25-1/thanh.pdf

[39] Henrik Theiling, *The European Currency Symbol € for LATEX*. Download from www.ctan.org/tex-archive/fonts/eurosym/doc/testeuro.pdf

[40] Henrik Theiling, *eurosym: The Euro Symbol Package for LATEX*, Theiling Online. Available at www.theiling.de/eurosym.html.en

[41] Hideo Umeki, *The geometry package*. Download from www.ctan.org/tex-archive/macros/latex/contrib/geometry/geometry.pdf

[42] Peter Wilson and Herries Press, *The changepage and chngpage packages*. Download from www.ctan.org/tex-archive/macros/latex/contrib/changepage/changepage.pdf

[43] Timothy Van Zandt, *The 'fancyvrb' package, Fancy Verbatims in LATEX*. Download from www.ctan.org/tex-archive/macros/latex/contrib/fancyvrb/fancyvrb.pdf

[44] Timothy Van Zandt, *seminar.sty, A LATEX style for slides and notes, User's Guide*. Download from www.ctan.org/tex-archive/macros/latex/contrib/seminar/doc/sem-user.pdf