

L^AT_EX for Word Processor Users

version 1.0.10

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Abstract

Text processing with L^AT_EX offers several advantages over word processing. However, beginners may find it hard to figure out how to perform common tasks and obtain certain features. This manual attempts to ease the transition by drawing comparisons between word processing and L^AT_EX typesetting. The main word processor capabilities are listed, along with their equivalent L^AT_EX commands. Many examples are provided.

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1 Introduction

First of all, let me state that this is *not* a L^AT_EX primer! If you're reading this document, I assume that you have at least a basic understanding of L^AT_EX and of its basic commands. In this guide, I'll explain how to replace a word processor effectively using L^AT_EX.

Word processors are the 'killer app' in modern office automation. They're perceived to be easier than L^AT_EX as they have a friendly WYSIWYG interface, and the average secretary will learn to use them in a relatively short time. The problem is, these beasts keep growing slow, bloated,¹ buggy, crash-prone, expensive, virus ridden, and incompatible with each other. Not to talk about their default output quality.

L^AT_EX is an excellent alternative (in some cases, it is the *only* viable alternative); but it's not much intuitive for those accustomed to WYSIWYG.

To sum up, sometimes you may want to use word processor-like features—but using L^AT_EX. It would be nice to know how to obtain some effects with L^AT_EX when you know how to get them with your once-favourite :-) word processor.

That's why I wrote this quick reference. As I said, it assumes some basic L^AT_EX knowledge; if it's not the case, I suggest that you go to <http://www.ctan.org/starter.html> and download [The \(Not So\) Short Introduction to L^AT_EX2e](#). Another good primer is <http://en.wikibooks.org/wiki/LaTeX/>.

¹once upon a time, I wrote my thesis on a 128k RAM, Z80-based home computer. The word processor WordStar and my thesis fit on a single CP/M-bootable 720K floppy, with lots of room to spare!

In the following sections, we shall navigate through the menus and menu items of an imaginary word processor, finding out the corresponding \LaTeX way of doing the same work.

1.1 Preliminaries

Many word processor features are implemented by the editor; others by standard \LaTeX commands; others still are obtained using *packages*. These are sets of macros that extend \LaTeX providing new commands and environments. There are lots of packages around: the only problem is knowing where they are, what they do, and how to install them. More about packages in Section 1.1.2.

Packages and other \TeX -related material are available at many sites that constitute the CTAN: the Comprehensive TeX Archive Network. I already mentioned <http://www.ctan.org>; this site has a wide list of mirrors. From now on, CTAN: means ‘your favourite CTAN mirror here, starting from the \TeX directory’. For instance, you can get \LaTeX for your platform from CTAN://systems (e.g., <http://www.tex.ac.uk/tex-archive/systems/>).

To write your documents, you will need a good text editor. A better choice for beginners is a *\LaTeX IDE*: an editor dedicated to writing \LaTeX source, with preview and many facilities.

I suggest that you install one of the programs listed below; all of them are Free/Open Source software.

- Texmaker (multiplatform):
<http://www.xmlmath.net/texmaker/index.html>
- TeXstudio (multiplatform):
<http://texstudio.sourceforge.net/>
- TeXworks (multiplatform):
<http://tug.org/texworks/>
- TeXShop (Mac OS X):
<http://www.uoregon.edu/~koch/texshop/>
- TeXnicCenter (Windows):
<http://www.texniccenter.org/>

Information about \LaTeX on the Mac can be found at <http://www.esm.psu.edu/mac-tex/>.

1.1.1 Editor-Supported Features

\LaTeX is just a formatter: things like cut and paste, search and replace etc. are delegated to the editor. Table 1 summarises the main commands of popular editors for geeks: GNU *emacs* and *vim* with their native key bindings, and *jed* configured for Borland IDE key bindings.

1.1.2 Adding Packages

The following information applies to *TeX Live*, which ships with most GNU/Linux distributions. It may also work on MacTeX, but I have no first-hand experience. Instructions for *MiKTeX* (probably the most popular implementation for Windows) will follow below.

Action	Emacs	Vim	Jed
command mode	Alt-X	ESC	Alt-X
insert mode	n/a	i a o O	n/a
line editor mode	n/a	:	n/a
	<i>file operations</i>		
open file	Ctrl-X Ctrl-F	:e	Ctrl-KE
insert file	Ctrl-Xi	:r	Ctrl-KR
save file	Ctrl-X Ctrl-S	:w	Ctrl-KD
save as	Ctrl-X Ctrl-W name	:w name	Ctrl-KS
close file	Ctrl-XK	:q	Ctrl-KQ
change buffer	Ctrl-XB	bN	Ctrl-KN
undo	Ctrl-XU	u	Ctrl-U
redo	Ctrl-^	Ctrl-R	Ctrl-G Ctrl-U
exit	Ctrl-X Ctrl-C	:qa!	Ctrl-KX
	<i>moving around</i>		
word left	Alt-B	b	Ctrl-A
word right	Alt-F	w	Ctrl-F
start of line	Ctrl-A	O	Ctrl-QS
end of line	Ctrl-E	\$	Ctrl-QD
page up	Alt-V	Ctrl-U	Ctrl-R
page down	Ctrl-V	Ctrl-D	Ctrl-C
start of buffer	Alt-<	1G	Ctrl-QR
end of buffer	Alt->	G	Ctrl-QC
line n.	Alt-G n.	n.G	Ctrl-QI
	<i>deleting</i>		
character left	Ctrl-H	X	BS
character right	Ctrl-D	x	Alt-G
word left	Alt-DEL	db	Alt-BS
word right	Alt-D	dw	Ctrl-T
end of line	Ctrl-K	d\$	Ctrl-QY
line	Ctrl-A Ctrl-K	dd	Ctrl-Y
	<i>search & replace</i>		
search	Ctrl-S text	/text	Ctrl-QS
replace	Alt-%	:s/old/new/g	Ctrl-QA
	<i>blocks</i>		
start selection	Ctrl-SPACE	v	Ctrl-KB
cut	Ctrl-W	D	Ctrl-KY
copy	Alt-W	Y	Ctrl-KH
paste	Ctrl-Y	P	Ctrl-KC

Table 1: Useful key bindings for Emacs, Vim, and Jed in IDE mode.

A large collection of L^AT_EX packages is natively supported; for instance, Ubuntu provides lots of `texlive-*` packages. Please note the ambiguity: we're talking of *.deb packages* containing L^AT_EX *packages*.

If you need to install an unsupported package, do the following.

1. create this directory structure:

```
$ mkdir -p ~/texmf/tex/latex
```

Under this directory, new packages will be installed.

2. get the package (typically as a zip-compressed directory) from your favourite CTAN mirror; let's call it `foo.zip`
3. unpack it in the right place:

```
$ mkdir ~/texmf/tex/latex/foo
$ mv foo.zip ~/texmf/tex/latex/foo
$ cd ~/texmf/tex/latex/foo ; unzip foo.zip
```

4. If no `.sty` file exists, run the command `latex foo.ins` or `latex foo.dtx` to create it;
5. run the command `texhash ~/texmf`.

To add a package to MiK_TE_X, create the directory `\latex\newpackage` under `C:\localtexmf\text\` and put the relevant files in there. Proceed as above, then run MiK_TE_X Options and click on the 'Refresh now' button. Alternatively, issue the command `initexmf -u`. That's it!

Once a package is installed, you make it available in your documents adding a line under the `documentclass` declaration:

```
\usepackage{foo}
```

1.1.3 Adding the Info Page

'Man' and 'Info' pages are command-line sources of documentation for software, widely employed in UNIX and Linux systems. If your L^AT_EX distributions lacks the `latex2e.info` info page, do the following:

1. download it from <http://tug.ctan.org/info/latex2e-help-texinfo/latex2e.info>;
2. run these commands:

```
$ sudo cp latex2e.info /usr/share/info/
$ sudo ginstall-info latex2e.info dir
```

Now, `info latex` or `info latex2e` is available.

1.2 The Golden Rules

Before we start, please keep this in mind:

1. get used to *structuring* your documents: think in terms of parts, chapters, sections, and so on. This holds true even if you're not writing a scientific paper.
2. L^AT_EX explicitly discourages the user from messing about with formatting parameters. Don't worry too much about the *looks* of what you're writing, concentrate on the *contents*.

Applying these simple rules, your printed material will magically look professional.

That said, this guide (which breaks the second rule somehow!) will help you overcome the second rule. So, you will also be able to compose unstructured material such as circulars, notices, poster, etc.



2 The File Menu

Obviously, some entries of this menu have nothing to do with L^AT_EX: File/Open, File/Save, File/Close depend on the editor.

2.1 File/New

This is the L^AT_EX equivalent of a blank page:

```
\documentclass{article}
\thispagestyle{empty} % no page number
\begin{document}
% This is a comment. Write your stuff here.
\end{document}
```

As documents written in L^AT_EX are inherently structured, this is a more realistic example:

```
\documentclass[a4paper,12pt]{article}
\begin{document}
\title{My Document}
\author{John Smith}
\date{London, \today}
\maketitle
\begin{abstract}
This is a very short article.
\end{abstract}
\tableofcontents
\listoftables
\listoffigures
\section{First Section}
\label{sec:start}
This is the text of the section. See \cite{Gonzato} for details.
\section{End}
```

```

\label{sec:end}
This is the end of the document. Please go to Section
\ref{sec:start} to read it again.
\begin{thebibliography}{99}
\bibitem{Gonzato} Gonzato G. \textit{\LaTeX{} for Word Processor
Users}. CTAN, 2001--2015.
\end{thebibliography}
\end{document}

```

More document templates are listed in Appendix A.

2.2 File/Save As...

The following tools are handy if you want to convert L^AT_EX to other formats:

- `TeX4ht` is probably the best L^AT_EX to HTML converter:
<http://tug.org/tex4ht>
- `latex2html`, another converter to HTML:
<http://saftack.fs.uni-bayreuth.de/~latex2ht/>,
CTAN://support/latex2html
- `latex2rtf`, a converter to Rich Text Format:
CTAN://support/latex2rtf
- `detex` (a command line converter) removes all L^AT_EX tags and outputs plain text:
<http://www.cs.purdue.edu/homes/trinkle/detex/>,
CTAN://support/detex/

See also Section 2.7 for details on PDF creation.

2.3 File/Save As Template

Saving a L^AT_EX ‘template’ would mean, as I see it, create a new L^AT_EX package. This is a complex matter that goes beyond the scopes of this guide.

2.4 File/Import

These tools convert from other formats to L^AT_EX:

- `rtf2latex`: <CTAN://support/rtf2latex>
- `html2latex`: <CTAN://support/html2latex>
- `wwware` is a set of tools that convert from MS Word to several formats including L^AT_EX; <http://wwware.sourceforge.net>
- the free word processor Abiword, <http://www.abiword.org>, imports MS Word and can export L^AT_EX.
- `txt2tex`: <CTAN://support/txt2tex> does a fairly good job at converting plain text files into L^AT_EX.

Other * \LaTeX converters are available at the same address.

Another interesting extension is OOoLatex, a set of macros for OpenOffice: <http://ooolatex.sourceforge.net/>. Libreoffice users have an equivalent extension called TexMaths, <http://roland65.free.fr/texmaths/>.

2.5 File/Page Setup

The normal method for setting paper size, orientation, and margins, is to use parameters in `\documentclass`. Paper size can be `a4paper`, `a5paper`, `b5paper`, `letterpaper`, `legalpaper`, `executivepaper`; orientation is `portrait` by default, or optionally `landscape`. For example,

```
\documentclass[a5paper,landscape,12pt]{article}
```

Document-wide margins are set with the `\setlength` command, which is used to change the value of variables and counters:

```
\setlength{\leftmargin}{2cm}
\setlength{\rightmargin}{2cm}
\setlength{\oddsidemargin}{2cm}
\setlength{\evensidemargin}{2cm}
\setlength{\topmargin}{-1cm}
\setlength{\textwidth}{18cm}
\setlength{\textheight}{25cm}
```

The `geometry` package allows for complete control of parameters such as paper size, margins width, and so on. `geometry` has far too many options to list them all, and you're invited to read its documentation. A fairly complete example of its usage is shown below. In this example, some parameters are not compatible with each other, and are there for purpose of argument only.

```
\usepackage{geometry} % top of document
...
\geometry{paperwidth=25cm}
\geometry{paperheight=35cm}
% or: \geometry{papersize={25cm,35cm}}
\geometry{width=20cm} % total width
\geometry{height=30cm} % total height
% or: \geometry{total={20cm,30cm}}
\geometry{textwidth=18cm} % width - marginpar
\geometry{textheight=25cm} % height - header - footer
% or: \geometry{body={18cm,25cm}}
\geometry{left=3cm} % left margin
\geometry{right=1.5cm} % right margin
% or: \geometry{hmargin={3cm,2cm}}
\geometry{top=2cm} % top margin
\geometry{bottom=3cm} % bottom margin
% or: \geometry{vmargin={2cm,3cm}}
\geometry{marginparwidth=2cm}
\geometry{head=1cm} % header space
```

Options can also be set this way:

```
\usepackage[left=3cm, right=2cm]{geometry}
```

2.5.1 Page Setup/Headers and Footers

The `fancyhdr` package provides the new command `\pagestyle{fancy}`. This will create a header reporting the current section (`chapter` in `book.cls`) and subsection, and a footer with the page number: pretty fancy indeed. Headers and footers can obviously be customised. They are made of three parts: a left-aligned part, a centre-aligned part, and a right-aligned part. To set those, use the commands like in this example:

```
\usepackage{fancyhdr}
...
\lhead{} % empty
\chead{Hello, world!}
\rhead{Page \thepage} % page number
\lfoot{}
\cfoot{\textbf{Hello!}}
\rfoot{}
```

2.6 File/Printer Setup

This is highly OS-dependent, and definitely outside of the scopes of \LaTeX . Assuming that you're using a UNIX-like system, these tips may come in handy:


- `lpr -P printername` prints to the specified printer;
- `lpr -# 10` prints 10 copies;
- `lpr -r` removes the file after printing it

See below for more tips.

2.7 File/Print Preview

When the \LaTeX input file is ready, you have several options:

- convert it to `.dvi` (`latex file.tex`) and previewing it with `xdvi`, `yap` or other DVI previewer;
- convert the `.dvi` to POSTSCRIPT with `dvips`, then use some variant of `Ghostview`;
- producing a `.pdf` file with `dvipdf` or directly with `pdflatex`.

In my opinion, producing a `.pdf` file is the best option, as it makes for widest portability. While `dvipdf` is just a script that converts the `.dvi` to `.ps` then to `.pdf`, using `pdflatex` is more interesting. In fact, some packages like `hyperref` and `url` make the resulting `.pdf` file browseable; see Section 4.15. However, using `pdflatex` you might experience problems with other packages. More details in Section 4.12. 

2.8 File/Print

Simply use `lpr file.ps` from the command line, or via the File/Print menu entry of your previewer.

2.9 File/Versions

Although the `version` package provides basic facilities for versioning \LaTeX sources, using external tools is usually a better choice.

There are lots of programs for revision control and collaborative writing. While old-style geeks may want to use a single-user tool like RCS (I do), more powerful and multi-user tools like Subversion, Git, Mercurial etc. may be preferable. Some of them are integrated with the editor.

An introduction to \LaTeX and Subversion is here:

<http://tug.org/pracjourn/2007-3/kalderon-svnmulti/>.

3 The Edit Menu

This menu has more to do with the editor than \LaTeX features. To begin with, refer to Table 1 that shows the key bindings for the entries Edit/Cut, Edit/Copy, Edit/Paste, Edit/Find, and Edit/Replace of some common editors.

Selecting text is not only performed for subsequent cut and paste, but also for applying styles to the selected text. The equivalent action in \LaTeX is to enclose the text either between braces, or in an environment. For example, to apply the bold attribute to a portion of text you will use one of the following:

```
this is \textbf{bold text;}\n
this is also
{\bfseries bold text;}\n
\begin{bfseries}
this is bold text, too!
\end{bfseries}
```

this is bold text ; this is also bold text ; this is bold text, too!

3.1 Edit/Autotext

We call *autotext* the feature that makes you type, say, ‘PS’ to have the word ‘PostScript’ automatically expanded. This is an editor feature, but there’s a rough \LaTeX equivalent:

```
\def\PS    {\textsc{PostScript}}
```

which will insert the equivalent of `\textsc{PostScript}` whenever you type `\PS`. Beware, case is important.

4 The Insert Menu

4.1 Insert/Breaks

- a non-breakable space is set with `~` (tilde)
- to force a line break, use `\linebreak` or `\newline`; see below for details
- to start a new paragraph use a blank line, or `\\` (possibly followed by an optional space, as in `\\ [1cm]`), or `\par`
- finally, for a page break use `\newpage` or `\clearpage`

Unlike `\newline`, `\linebreak` stretches the line to the margins:

```
I am stretched!\linebreak
But I am not.\newline
Ok, now you get it.
```

I	am	stretched!
But I	am not.	
Ok,	now you	get it.

Besides, `\clearpage` differs from `\newpage` in that it prints all pending *floats*, that is figures and tables. Floats will be explained in Section 4.12.

4.2 Insert/Enumerated List

Bulleted and enumerated lists correspond to the `itemize` and `enumerate` environments. To customise the bullet in a list environment, you can specify it as an argument to `\item`:

```
\begin{itemize}
  \item[*] with an asterisk;
  \item[-] with a dash;
  \item[.] with a dot.
\end{itemize}
```

* with an asterisk;
- with a dash;
. with a dot.

Another way is to redefine the style of the *counters*² that refer to the digits in the first- to fourth-level lists. These counters are `\labelitemi`, `\labelitemii`, `\labelitemiii` and `\labelitemiv` for itemised lists; `\labelenumi`, `\labelenumii`, `\labelenumiii` and `\labelenumiv` for enumerated lists.

There are several styles: `\arabic` for ‘normal’ numbers, `\roman` for lower-case roman numerals (e.g., viii is 8), `\Roman` for upper-case roman numerals, `\alph` and `\Alph` for lower- and upper-case letters, and `\fnsymbol` that I will not explain for now:

```
\begin{itemize}
\renewcommand{\labelitemi}{*}
\renewcommand{\labelitemii}{-}
  \item first level, item 1
  \item first level, item 2
  \begin{itemize}
    \item second level, item 1
    \item second level, item 2
  \end{itemize}
  \item first level, item 3
\end{itemize}
```

* first level, item 1
* first level, item 2
- second level, item 1
- second level, item 2
* first level, item 3

²each text element numbered by L^AT_EX (sections, lists, figures, etc.) has a counter associated with it.

To use, say, roman numbers and uppercase letters in enumerated lists, do this:

```
\begin{enumerate}
\renewcommand{\labelenumi}
{\Alph{enumi}}
\renewcommand{\labelenumii}
{\roman{enumii}}
\item first level, item 1
\item first level, item 2
\begin{enumerate}
\item second level, item 1
\item second level, item 2
\end{enumerate}
\item first level, item 3
\end{enumerate}
```

A first level, item 1

B first level, item 2

i second level, item 1

ii second level, item 2

C first level, item 3

Alternatively, use the `enumerate` package. It redefines the `enumerate` environment with the ability to specify an optional argument. Any occurrence of one of the characters `A a I i 1` will produce the value of the counter, using (respectively) `\Alph`, `\alph`, `\Roman`, `\roman`, or `\arabic`. To include some text, enclose it in braces:

```
\begin{enumerate}[{Example} I.]
\item First example.\label{item:first}
\item Second example.
\item Last example.
Go to Item~\ref{item:first}.
\end{enumerate}
```

Example I. First example.

Example II. Second example.

Example III. Last example. Go to Item **I**.

To change the number of an enumerated item, just redefine its counter:

```
\begin{enumerate}
\setcounter{enumi}{2}
\item Example 3.
\item Example 4.
\setcounter{enumi}{5}
\item Example 6.
\end{enumerate}
```

3. Example 3.

4. Example 4.

6. Example 6.

Lists within paragraphs are implemented by the `paralist` package, which provides the `inparaenum` environment:

I'll throw in a list of items:

```
\begin{inparaenum}
\item apples,
\item pears, and
\item oranges.
\end{inparaenum}
```

The same list can be labelled with letters:

```
\begin{inparaenum}
[\itshape a) \upshape]
\item apples, \label{first}
\item pears, and
\item oranges. The first item is \ref{first}.
\end{inparaenum}
```

I'll throw in a list of items: 1. apples, 2. pears, and 3. oranges. The same list can be labelled with letters: a) apples, b) pears, and c) oranges. The first item is a.

As seen above, the characters `A a I i 1` can be used to modify the counter. `paralist` can do much more, and I suggest that you read its documentation.

Character	L ^A T _E X Sequence
\$	\\$ or \textdollar
&	\&
%	\%
-	_ or \textunderscore
{	\{ or \textbraceleft
}	\} or \textbraceright
<	\$<\$ or \textless
>	\$>\$ or \textgreater
\	\textbackslash
	\textbar
•	\textbullet
‡	\textdaggerdbl
†	\textdagger
¶	\textparagraph
§	\textsection
©	\textcopyright
^	\textasciicircum
~	\textasciitilde or \~{}
~	~\sim\$
®	\textregistered
™	\texttrademark
ª	\textordfeminine
º	\textordmasculine

Table 2: How to obtain some special characters.

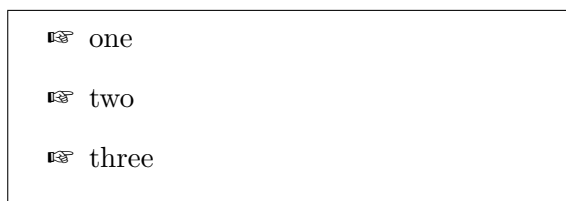
4.3 Insert/Special Character

First of all, let's remind that some characters have a special meaning in L^AT_EX. They must be entered either with a leading \, or using them in math mode, or even writing special commands: see Table 2.

Another way to enter special characters is using their ASCII code and the \char command. For example, you could insert the characters \$&~ entering \char36 \char38 \char94 \char126.

There are packages that provide thousands of unusual characters and symbols. For instance, pifont provides the commands \ding, \dingfill, \dingline, and \dinglist. The first command produces the Dingbat character of the specified code. The other commands are equivalent to the \fill, \line, and \list commands and environment, but use the Dingbat code given as parameter:

```
\begin{dinglist}{43}
  \item one
  \item two
  \item three
\end{dinglist}
```



Another nice variant is this:

```
\begin{dingautolist}{172}
  \item one
  \item two
  \item three
\end{dingautolist}
```



There are far too many symbols to mention them all in this guide. Rather, I'll point you to 'The Comprehensive L^AT_EX Symbol List' at CTAN://info/symbols/comprehensive.

4.3.1 The € Sign

The official Euro sign is provided by the `eurosym` package, which can be used in two ways:

```
\usepackage[gen]{eurosym}
\usepackage[official]{eurosym}
```

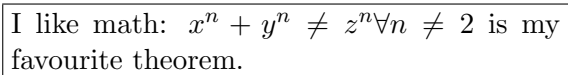
Both provide the `\euro` command, which produces €. The actual shape of the symbol depends on the declaration: the `[gen]` option provides a symbol that works with all font styles; the second declaration produces €. Please note the difference. The latter shape can always be obtained with `\officialeguro`.

Another package that provides the Euro sign is `marvosym`, which also provides many more fine characters. You get € with `\EUR`.

4.4 Insert/Formula

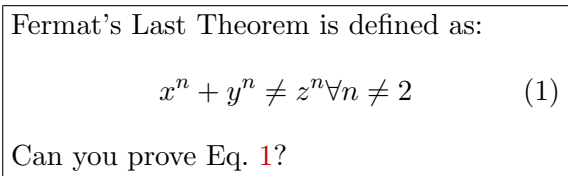
L^AT_EX is particularly strong at typesetting math. To insert math symbols in the main text, you must enclose them between `$`:

I like math: $x^n + y^n \neq z^n$
 $\forall n \neq 2$
is my favourite theorem.



The environments `displaymath` and `equation` typeset formulae aside from the text. The latter adds an equation number for later reference:

```
Fermat's Last Theorem is
defined as:
\begin{equation}
x^n + y^n \neq z^n
\forall n \neq 2
\label{eq:fermat}
\end{equation}
Can you prove
Eq.~\ref{eq:fermat}?
```



4.5 Insert/Footnote

The command `\footnote[n]{footnote text}` is all you need; the optional parameter `[n]` modifies the footnote number. The `\footnote` command should be placed after commas, full stops, and other punctuation signs that follow the word.

To use a symbol or arbitrary text instead of a number, redefine the counter associated with `\footnote`:

```
\renewcommand{\thefootnote}{read me!}
This \footnote{\footnote}
{I mean this one.}
says it all.
```

<p>This ^{read me!}footnote says it all.</p> <hr/> <p>^{read me!}I mean this one.</p>

Using this method, you can get footnote numbers in roman numerals, or replaced by nice symbols:

```
\renewcommand{\thefootnote}
{\Roman{footnote}}
This\footnote{The first.}
is the first footnote,
and this\footnote{The second.}
is the second.
\renewcommand{\thefootnote}
{\fnsymbol{footnote}}
The end.\footnote[8]{At last!}
```

<p>This^{II} is the first footnote, and this^{II} is the second. The end.[†]</p> <hr/> <p>^{II}The first. ^{II}The second. [†]At last!</p>
--

Note the `\fnsymbol{footnote}` thing. It uses 9 symbols associated with the values 1...9 of the `footnote` counter: * † ‡ § ¶ || ** †† ‡‡.

To make several references to the same footnote, don't write its number explicitly. Rather, do this:

```
This\footnote{the first.}
\newcounter{myfootnote}
\setcounter{myfootnote}
{\value{footnote}}
and that\footnote{the second.}
are footnotes: please read note
\footnotemark
[\value{\myfootnote}] again.
```

<p>This¹ and this² are footnotes: please read note¹ again.</p> <hr/> <p>¹the first. ²the second.</p>
--

Warning: `minipages` use their own counters, `mpfootnote` and `thempfootnote`.

4.5.1 Footnotes at End of Document

The `endnotes` package lets you move all footnotes at the end of the document. You'll have to add this line to the preamble:

```
\let\footnote=\endnote
```

and these lines as the last thing in your document:

```
\newpage
\begingroup
\parindent 0pt
\parskip 2ex
\def\enotesize{\normalsize}
\theendnotes
\endgroup
```

Other commands are available, please read the `endnotes.sty` source.

4.6 Insert/Indices

Generating and inserting a table of contents, list of tables, and list of figures is a trivial task in L^AT_EX. All you have to do is insert these lines before the first `\section` or `\chapter` of your document:

```
\tableofcontents
\listoffigures
\listoftables
```

4.7 Insert/Vertical and Horizontal Space

This entry doesn't actually exist in any word processor I am aware of. This is in fact a limitation that L^AT_EX fills in a very elegant way.

Space filling is used to center text horizontally, vertically, or both; this is a difficult task to perform with any word processor, and requires a lot of trial and error. Use a combination of `\null` or `~` to set fixed marks, followed by `\vfill` and `\hfill` like in this example:

```
one \hfill two\\
\vfill
~ \hfill three \hfill ~\\
\vfill
four \hfill five
\null
```

one	two
three	
four	five

Normally, L^AT_EX won't let you insert blank spaces at your will: two or more are considered a single space. However, if you do want to make your document look messy, use `~` to make a non-breakable space.

Also, use the command `\hspace` like in this example:

```
This is a \hspace{2cm}
2-cm-wide hole.
```

This is a	2-cm-wide hole.
-----------	-----------------

4.8 Insert/Tabs

The `tabbing` environment provides a rough equivalent to the action of the TAB key, and it's used to align text in columns. These are the most commonly used commands:

Command	Action
<code>\=</code>	Sets a tab stop
<code>\></code>	Advances to the next tab stop
<code>\+</code>	Sets the left margin one tab stop to the right
<code>\-</code>	Sets the left margin one tab stop to the left
<code>\\</code>	Ends a line
<code>\pushtabs</code>	Saves all tab stop positions
<code>\poptabs</code>	Restores previously saved tab stop positions

This example shows some of the available commands:

```
\begin{tabbing}
% let's set the tab positions
~ \hspace{1cm} \= ~ \hspace{2cm} \=
~ \hspace{3cm} \= \kill % discard text
Zero \> One \> Two \> Three \\
Zero \> One \> \> Three \+ \\ % go right
Zero \> Two \> Three \- \\ % go left
Zero \> One \> Two \\
\pushtabs % save tab positions
new tab 1{\ldots} \= new tab 2 \\
new \> tab \\
\poptabs % restore tab positions
Zero \> One \> Two \> Three
\end{tabbing}
```

Zero	One	Two	Three
Zero	One		Three
	Zero	Two	Three
Zero	One	Two	
new tab 1...	new tab 2		
new	tab		
Zero	One	Two	Three

See also the `tabular` and `table` environments.

4.9 Insert/Cross Reference

The commands `\label`, `\ref`, and `\pageref` are all you need to insert labels in the text and do cross referencing. The standard format of labels is the `prefix:suffix` form, where `prefix` is one of the following: `cha` for chapters, `eq` for equations, `fig` for figures, `sec` for (sub)sections, and `tab` for tables.

References to a page (section, table, figure, etc.) number can be obtained using `\label` and `\ref` as in this example:

```
\paragraph{Example.}
\label{par:example}
This paragraph appears
in Section~\ref{par:example}
on page~\pageref{par:example}.
```

Example. This paragraph appears in Section 4.9 on page 16.

Of course, you may use your own prefixes. For example, take this enumerated list:

```
\begin{enumerate}
\item{first step: skip to
\ref{item:end} \label{item:start}}
\item{another step (unreferenced)}
\item{end: go back to
\ref{item:start} \label{item:end}}
\end{enumerate}
```

- | |
|--------------------------------|
| 1. first step: skip to 3 |
| 2. another step (unreferenced) |
| 3. end: go back to 1 |

4.10 Insert/Margin Notes

Very simple: use `\marginpar{text}`.

4.11 Insert/Text Frame

A text frame is used to define a part of text that does not break across pages. To place a text frame on a fixed position on the page, use the `textpos` package, as shown in the example listed in fig. 9 (see Appendix A).

If you don't need to specify a fixed position, then use the `minipage` (miniature page) environment. This text is enclosed in a `minipage`...

... and this is some other text enclosed in a `boxedminipage` environment, provided by the package of same name.

I remind you what a `minipage` declaration looks like:

```
\begin{minipage}[position]{width}
...
\end{minipage}
```

In a `boxedminipage`, the space between the frame and the text is set with this command:

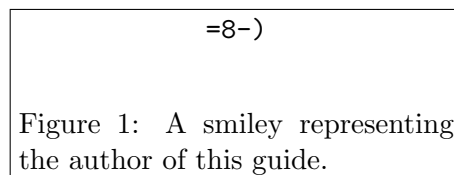
```
\setlength{\fboxsep}{5mm}
```


4.12 Insert/Figure

(The reference guide for graphic inclusion in \LaTeX is 'Using Imported Graphics in $\text{\LaTeX}2\epsilon$ ', a.k.a. `epslatex.ps`.)

A 'figure' can be not only a picture, but also a portion of text, a table, etc. that you put in a `figure` environment. This is an example:

```
\begin{figure}[htbp]
% [htbp] specifies the
% preferred placement: here, top,
% bottom, or separate page.
  \begin{center}
    \texttt{=8-)}
  \end{center}
  \caption{A smiley representing
    the author of this guide.}
  \label{fig:mysmiley}
\end{figure}
```



Please note that figures are not guaranteed to appear exactly where you write the code! In fact, the main difference with word processors is that figures don't have a fixed placement; they 'float' to the optimal position that \LaTeX finds for them. So, the text shouldn't refer to a figure like 'the figure below' or 'the figure above'; use 'see fig.~\ref{fig:label}' instead. 

Owing to this property, figures and tables are called *floats*. If you do need to position a float exactly, use the `here` package that provides an optional placement argument `H` (meaning, "right HERE!").

Given a picture in Encapsulated POSTSCRIPT (`.eps`) format, you insert it in a \LaTeX source file using the `graphicx` package and commands like those shown in fig. 2.

When you typeset your document with `\latex` then `dvips`, graphic inclusion only works with EPS files; `pdflatex` accepts JPG, PNG, and of course PDF files. The latter choice might be preferable for most users.

```

\begin{figure}
\begin{center}
\fbbox{\includegraphics
[width=0.5\textwidth, angle=-90]
{gnuplot.ps}}
\caption{A Gnuplot graph.}
\label{fig:gnuplot}
\end{center}
\end{figure}

```

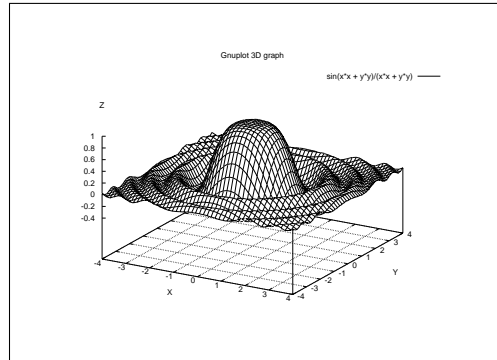


Figure 2: A Gnuplot graph.

There are several packages that convert common graphic formats like .jpg, .gif, .png etc. to .eps and/or .pdf; for example, ImageMagik (<http://www.imagemagik.org>) and The GIMP (<http://www.gimp.org>). However, these applications produce huge POSTSCRIPT files.

Best results are obtained using applications that wrap the bitmap, turning it into a compact POSTSCRIPT file. You'll want to use jpeg2ps (<http://www.pdfib.com/jpeg2ps/index.html>) or bmeps (<CTAN://support/bmeps>). The former is often the best choice for wrapping .jpg files, but the latter handles more graphics formats.

If you wish to make both .pdf and .ps from the same source file, include these commands:

```

\usepackage{ifpdf}
...
% include the right options
\ifpdf
  \usepackage[pdftex]{graphicx}
  \pdfcompresslevel=9
\else
  \usepackage{graphicx}
\fi
...
% include the right graphic file
\ifpdf
  \includegraphics{file.png}
\else
  \includegraphics{file.eps}
\fi

```



If you have more than 18 figures without text between them, you'll get the 'Too many unprocessed floats' L^AT_EX error. The quickest way to solve this problem is to put `\clearpage` after three or four figures.

4.12.1 Wrapping Floats

For a magazine-like layout, use the `wrapfig` package:

If you meet this guy, give him some money.

```
\begin{wrapfigure}[4]{1}[5pt]{2cm}
{\Huge
 \texttt{=8-)}
}
\end{wrapfigure}
```

The reason may not be apparent to you, but I can assure that your money will end up in good hands. I say again, if you meet this guy, give him some money: he knows how to use it properly. OK?

If you meet this guy, give him some money. The reason may not be apparent to you, but I can assure that your money will end up in good hands. I say again, if you meet this guy, give him some money: he knows how to use it properly. OK?

The parameters are the number of lines to be narrowed, the figure placement, the overhang, and the figure width.

4.13 Insert/Shapes

\LaTeX provides a `picture` environment within which you use commands like `\circle`, `\oval` and so on. In my opinion, drawing pictures without a graphical environment is just too hard, and `picture` has several limitations too. It's much better to use a couple of great programs, both free and open source: the vector drawing program Inkscape, <https://inkscape.org/>, along with Pstoedit, <http://www.pstoedit.net/>.

Start Inkscape and draw any shape you wish using its tools. To insert text rendered by \LaTeX , select `Extensions/Render/LaTeX formula...`, insert your text as in fig. 3, then click on `Apply`.

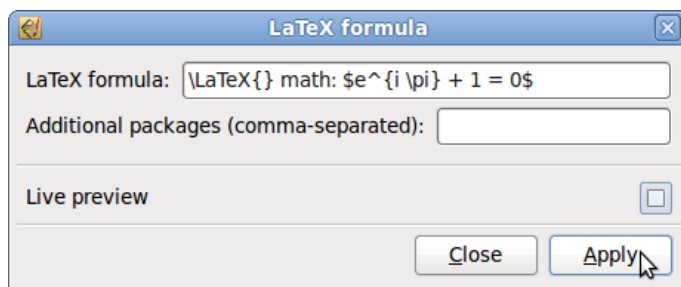


Figure 3: Inserting a \LaTeX formula.

Your \LaTeX -rendered text will be included as a graphics object, and you'll be able to edit it as you wish. The resulting picture can be exported to several formats supported by \LaTeX , such as PDF, PNG, and many others. More information here: <http://www.ctan.org/tex-archive/info/svg-inkscape>.

If you wish to do real magic, then check out the following packages/programs:

- `pgf` is a \TeX macro package for generating graphics: <http://sourceforge.net/projects/pgf/>

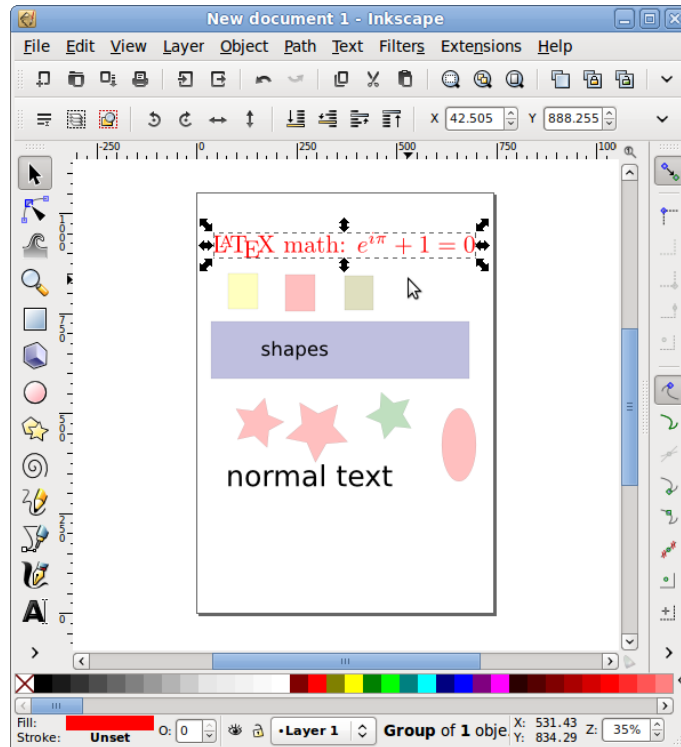


Figure 4: A \LaTeX object can be edited as desired.

- GLE (Graphics Layout Engine) is a graphics scripting language designed for creating publication quality graphs, plots, diagrams, figures and slides:
www.gle-graphics.org
- Asymptote is a powerful descriptive vector graphics language that provides a natural coordinate-based framework for technical drawing:
<http://asymptote.sourceforge.net/>
- ePiX, a collection of batch utilities for GNU/Linux and similar platforms, creates mathematically accurate figures, plots, and movies using easy-to-learn syntax:
<http://mathcs.holycross.edu/~ahwang/current/ePiX.html>;
- pstricks is a set of macros that allow the inclusion of PostScript drawings in \LaTeX documents:
<http://tug.org/PSTricks/main.cgi/>

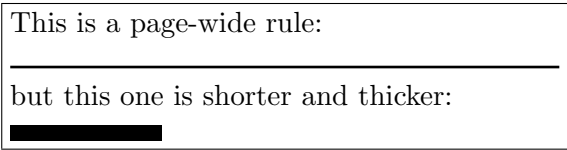
These packages let you make publication-quality POSTSCRIPT drawings in \LaTeX . Many more are available; search the web for “ \LaTeX vector graphics”.

Many more kinds of ‘shapes’ can also be inserted. To whet your appetite, please visit the \TeX Showcase page, <http://www.tug.org/texshowcase/>.

4.14 Insert/Line

Draw lines of any length and thickness with `\rule`:

```
This is a page-wide
rule:\\
\rule{\linewidth}{1pt}
but this one is shorter
and thicker:\\
\rule{2cm}{2mm}
```



Another interesting ‘line’ is that made of dots (`\dotfill`), often used to relate things. This is how it’s done:

```
Total price \dotfill \euro~10
```



4.15 Insert/Hyperlink

The `hyperref` package lets you write URLs and other external references. When used together with `dvipdf` or `pdflatex`, `hyperref` lets you make browseable `.pdf` documents! For instance, this document uses this declaration:

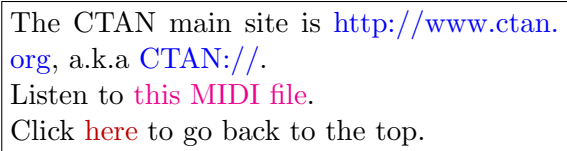
```
\usepackage[colorlinks,
             urlcolor=blue,
             filecolor=magenta,
             linkcolor=darkred,
             hyperfootnotes=false]{hyperref}
```

Let’s see an example:

```
The \hypertarget{ctan}{CTAN} main site
is \url{http://www.ctan.org}, a.k.a
\href{http://www.ctan.org}{CTAN://}.
```

```
Listen to \href{run:midifile.mid}
{this MIDI file}.
```

```
Click \hyperlink{ctan}{here} to go
back to the top.
```



As you can see, the `\url` command typesets its contents using a monospace font. To use the same font as the remaining text, use the command:

```
\urlstyle{same}
```

after the `\hyperref` declaration.

The `\hypertarget` and `\hyperlink` commands provide internal links, just like HTML; `\href` creates links to URLs or external files. Note the `run:` parameter: you can run external programs like multimedia players, office applications, whatever. As far as I know, this feature only works in Adobe Reader, Okular, and Evince.

On Linux and possibly other UNIX variants, you’ll have to instruct your favourite PDF reader what to run when an external file is referenced. Insert lines like the following in your `.mailcap` or `/etc/mailcap`:

```
audio/midi;/usr/bin/timidity %s
audio/*; xms %s
video/*; xine -pfhq %s
```

Please read `hyperref`'s documentation for further examples and possibilities.

4.16 Insert/Comment

This is done inserting `%` before each line, or by using the package `comment` that provides the environment of the same name.

5 The Format Menu

In general, the main format properties of a document are set with parameters in `\documentclass`: default font size (10, 11, or 12pt), paper (`a4paper`, `a5paper`, `b5paper`, `letterpaper`, `legalpaper`, `executivepaper`), and orientation (`portrait`, `landscape`). For example,

```
\documentclass[a5paper,landscape,12pt]{article}
```

Alternative font sizes can be specified as explained in Section 5.2.3.

5.1 Format/Line Spacing

The package `setspace` provide the environments `singlespace`, `onehalfspace`, and `double-space`. In addition, the environment/command `\spacing{amount}` will set the spacing to the specified amount:

```
\begin{spacing}{2.5}
These two lines \
are crazily spaced!
\end{spacing}
\begin{spacing}{1}
Much better, these lines\
have a pretty space.
\end{spacing}
```

<p>These two lines</p> <p>are crazily spaced!</p> <p>Much better, these lines</p> <p>have a pretty space.</p>

To apply line spacing to the whole document, use the `\linespread{factor}` command in the preamble. Default value of `factor` is 1; larger values give larger line spacing (1.6 is roughly double line spacing).

5.2 Format/Character

Standard character properties are listed in Table 3, font sizes in Table 4. Please note that actual font size depends on the default size defined in `documentclass` (10, 11, or 12 pt); see Table 5.

Please note the difference between italics and emphasised text. *For example, this portion of text is typeset in italics, and these words are emphasised in upright.* As you can see, `\emph` is a *logical* rather than typographic command.

Text attribute	Environment form	Example
<code>\textnormal</code>	<code>textnormal</code>	main document font
<code>\textrm</code>	<code>rmfamily</code>	roman
<code>\textit</code>	<code>itshape</code>	<i>italics</i>
<code>\emph</code>	n/a	<i>emphasis</i>
<code>\textmd</code>	<code>mdseries</code>	medium weight (default)
<code>\textbf</code>	<code>bfseries</code>	boldface
<code>\textup</code>	<code>upshape</code>	upright (default)
<code>\textsl</code>	<code>slshape</code>	<i>slanted</i>
<code>\textsf</code>	<code>sffamily</code>	sans serif
<code>\textsc</code>	<code>scshape</code>	SMALL CAPS
<code>\texttt</code>	<code>ttfamily</code>	typewriter
<code>\underline</code>	<code>underline</code>	<u>underline</u>
<code>\textsuperscript</code>	n/a	this is ^{superscript}
<code>\mathrm</code>	n/a	$x^n + y^n \neq z^n \forall n \neq 2$
<code>\mathbf</code>	n/a	$x^n + y^n \neq z^n \forall n \neq 2$
<code>\mathsf</code>	n/a	$x^n + y^n \neq z^n \forall n \neq 2$
<code>\mathtt</code>	n/a	$x^n + y^n \neq z^n \forall n \neq 2$
<code>\mathit</code>	n/a	<i>$x^n + y^n \neq z^n \forall n \neq 2$</i>
<code>\mathnormal</code>	n/a	$x^n + y^n \neq z^n \forall n \neq 2$
<code>\mathcal</code>	n/a	$\S \ + \ \dagger \ \neq \ \ddagger \ \forall \ \neq \ \in$

Table 3: Font attributes.

Also, please note that subscript is normally used in math mode only. The trick to use it in normal text is:

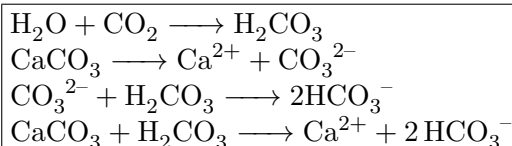
```
this is
$_{\mbox{\footnotesize{subscript}}}$
```

this is _{subscript}

5.2.1 Superscript and Subscript in Chemical Formulae

Most chemical formulae could be entered as math formulae, using `^` and `_` to obtain superscript and subscript. The `mhchem` package provides a simpler command, though. Digits are printed as subscripts by default, as superscript when preceded by `^`. Formulae must be enclosed in the `\ce` command:

```
\ce{H2O + CO2 -> H2CO3}\
\ce{CaCO3 -> Ca^2+ + CO3^2-}\
\ce{CO3^2- + H2CO3 -> 2 HCO3^-}\
\ce{CaCO3 + H2CO3 -> Ca^2+ + 2HCO3^-}
```



5.2.2 Underline styles

Normally, `\underline` is not used. It's just a relic of the old teletype era, and it doesn't look really good. If you still want to use underline, the `ulem` package provides some fancy

Font size	Example
tiny	sample text
scriptsize	sample text
footnotesize	sample text
small	sample text
normalsize	sample text
large	sample text
Large	sample text
LARGE	sample text
huge	sample text
Huge	sample text

Table 4: Font sizes

Default font size	10pt	11pt	12pt
tiny	5	6	6
scriptsize	7	8	8
footnotesize	8	9	10
small	9	10	10.95
normalsize	10	10.95	12
large	12	12	14.4
Large	14.4	14.4	17.28
LARGE	17.2	17.28	20.74
huge	20.7	20.74	24.88
Huge	24.8	24.88	24.88

Table 5: Actual font size in pt

styles:

```
\uline{important}
\uuline{urgent}
\uwave{boat}
\sout{wrong}
\xout{removed}
```

important <u>urgent</u> <u>boat</u> wrong removed

Beware: ulem redefines the `\emph` command, which will be replaced by underline. To avoid this behaviour, use this declaration:

```
\usepackage[normalem]{ulem}
```

5.2.3 Format/Character Size

If the standard font sizes aren't enough for you, the package `extsizes` may be handy. It provides 'extended' versions of the standard document classes, with support for sizes 8–12, 14, 17, and 20 pt.

For example, let's suppose you want to typeset an article using a 17 pt font. You'll use this document preamble:

```
\documentclass[17pt]{extarticle}
```

Another way to get big fonts is to use the package `type1cm`, which provides commands like the following:

```
\fontsize{72pt}{72pt}\selectfont  
No Smoking
```

(The example above is way too large to fit on this page...)

Parameters are font size and baseline. Yet another approach is this:

```
\resizebox{!}{1cm}{1-cm tall}
```

1-cm tall

DROPPED capitals at the start of a paragraph can be obtained using the `lettrine` package, which provides a fully customisable `\lettrine` command. This paragraph uses the default behaviour:

```
\lettrine{D}{ropped} capitals at the start...
```

5.2.4 Format/Character Font

L^AT_EX uses its own fonts (Computer Modern), automatically generated when needed by the METAFONT subsystem. This ensures portability and yields very good results. However, many of us are accustomed to other fonts: Times, Helvetica, Sans Serif. . .

Fortunately, L^AT_EX can use POSTSCRIPT fonts. Try using one of the following packages: `avant`, `avangar`, `bookman`, `chancery`, `charter`, `courier`, `helvet`, `helvetic`, `ncntrsbk`, `newcent`, `palatcm`, `palatino`, `pifont`, `times`, `utopia`, `zapfchan`. Insert `\usepackage{times}` and enjoy the results. The only caveat is that L^AT_EX handles maths at its best only with Computer Modern fonts: using POSTSCRIPT fonts might render your formulas slightly less appealing.

The packages above set the font for the whole document. To use a POSTSCRIPT font for a region of text only, specify the font family as in the example below. Common font families are listed in Table 6.



Beware, some font shapes may be unavailable on some systems!

```
This is Computer Modern Roman,  
{\fontfamily{phv}\selectfont  
this is Helvetica!}
```

This is Computer Modern Roman, **this is Helvetica!**

Yet another possibility is replacing a standard L^AT_EX font with a POSTSCRIPT one: for example, you may want to use Avantgarde whenever Computer Modern Sans Serif would appear. These commands can be renewed as in the example below:

- `\rmdefault` (roman)
- `\sfdefault` (sans serif)
- `\ttdefault` (typewriter)

Family	Name
cmr	Computer Modern Roman
cmss	Computer Modern Sans Serif
cmtt	Computer Modern Typewriter
pag	Avantgarde
pbk	Bookman
phv	Helvetica
pnc	New Century Schoolbook
ppl	Palatino
ptm	Times
pcr	Courier

Table 6: Common font families.

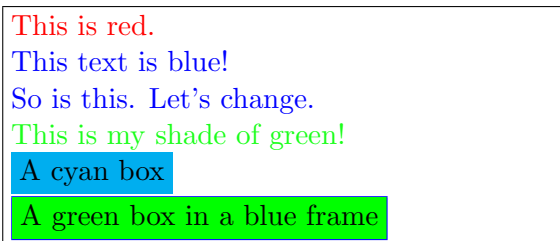
- `\bfdefault` (boldface)
- `\mddefault` (medium)
- `\itdefault` (italics)
- `\sldefault` (slanted)
- `\scdefault` (small caps)
- `\updefault` (upright)

```
% Avantgarde replaces sans serif
\renewcommand{\sfdefault}{pag}
```

5.2.5 Format/Character Colour

You can colour words using the package `color` and appropriate commands. Predefined colours are black, white, red, green, blue, cyan, magenta, and yellow; you can also define your own.

```
\textcolor{red}{This is red.}\
\color{blue}
This text is blue!\
So is this. Let's change.\
\definecolor{mygreen}
{rgb}{0.1,1,0.1}
\color{mygreen}
This is my shade of green!\
\color{black}
\colorbox{cyan}{A cyan box}\
\fcolorbox{blue}{green}
{A green box in a blue frame}
```



Moreover, the command `\pagecolor` lets you specify... guess what?

5.3 Format/Paragraph

Let's remind what a paragraph is according to L^AT_EX: a portion of text that either ends with `\`, or is followed by a blank line.

Environments are L^AT_EX's way of specifying properties like text alignment or font selection for a given portion of text. It's like selecting text with the mouse, then choosing the property you wish from a menu or clicking on a button. Another way is to enclose the text between brackets.

Environments have this general form:

```
\begin{environment}  
...text goes here...  
\end{environment}
```

For example, if you want to center a paragraph you'll use the `center` environment:

```
\begin{center}  
this text is centered  
\end{center}
```

this text is centered

Standard environments are listed in Table 7. In the following sections, I'll show you what to use and when.

5.3.1 Paragraph/Horizontal Alignment

By default, the text is justified. To get left-aligned, right-aligned or centered text, use the `flushleft`, `flushright` and `center` environments. The commands `\raggedright`, `\raggedleft`, and `\centering` are equivalent to their correspondent environments, but they do not start a new paragraph.

5.3.2 Paragraph/Vertical Alignment

The way paragraphs are separated is often puzzling to word processor users. *Empty lines and multiple spaces are treated like a single empty line or space.* This means that you can't get more space between paragraphs inserting more empty lines. The commands `\smallskip`, `\medskip`, and `\bigskip` provide some space between paragraphs.

If you need more space, use the command `\vskip{parameter}` as in this example:

```
These paragraphs will be  
separated by 1.3 cm:\\  
\vskip 1.3cm  
there is a 1.3 cm gap above me.
```

These paragraphs will be separated by 1.3 cm:

there is a 1.3 cm gap above me.

Note that `\vskip` only works between paragraphs. What if you wanted to start a page after an additional margin of, say, 1.5 cm? You'll have to use `\null`, which sets a 'mark' in the text:

```
\null  
\vskip 1.3 cm  
This text comes after 1.3 cm...
```

This text comes after 1.3 cm...

Environment	Purpose
<code>abstract</code>	abstract
<code>array</code>	Math arrays
<code>center</code>	Centered lines
<code>description</code>	Labelled lists
<code>displaymath</code>	Formulas on their own line
<code>document</code>	Encloses the whole document
<code>enumerate</code>	Numbered lists
<code>eqnarray</code>	Sequence of aligned equations
<code>equation</code>	Displayed equation
<code>figure</code>	Floating figures
<code>flushleft</code>	Flushed left lines
<code>flushright</code>	Flushed right lines
<code>itemize</code>	Bulleted lists
<code>letter</code>	Letters
<code>list</code>	Generic list environment
<code>math</code>	In-line math
<code>minipage</code>	Miniature page
<code>picture</code>	Picture with text, arrows, lines and circles
<code>quotation</code>	Indented environment with paragraph indentation
<code>quote</code>	Indented environment with no paragraph indentation
<code>tabbing</code>	Align text arbitrarily
<code>table</code>	Floating tables
<code>tabular</code>	Align text in columns
<code>thebibliography</code>	Bibliography or reference list
<code>theorem</code>	Theorems, lemmas, etc
<code>titlepage</code>	For hand crafted title pages
<code>verbatim</code>	Simulating typed input
<code>verse</code>	For poetry and other things

Table 7: Standard \LaTeX environments.

Finally, the command `\vfill` is used to add empty lines between two paragraphs so that the second paragraph goes exactly to the bottom of the page. For example,

```
This appears at the top of
the page{\ldots}
\vfill
{\ldots}and this at the bottom.
```

This appears at the top of the page... ...and this at the bottom.
--

5.3.3 Paragraph/Margins

Normally, the margins are set for the whole document as seen in Section 2.5. Redefining them for a section of text will not work: if you want to set a paragraph's margins, you'll have to create a new environment like in the following example:

```
\newenvironment{margins}[2]
{
  \begin{list}{} {
    \setlength{\leftmargin}{#1}
    \setlength{\rightmargin}{#2}
  } \item }
{\end{list}}
```

Then you will use the new environment:

```
As you can see, this paragraph
has normal margins.
\begin{margins}{0.5cm}{1cm}
  But please note that this
  paragraph has custom margins.
\end{margins}
```

As you can see, this paragraph has normal margins. But please note that this paragraph has custom margins.

5.3.4 Paragraph/Indentation

To set the amount of indentation of the first line of a paragraph, we redefine the value of the `\parindent` counter. In the following example, we set a 1-cm indentation:

```
\setlength{\parindent}{1cm}
```

The commands `\indent` and `\noindent` allow/disallow indentation on the following paragraph. Finally, the distance between paragraphs is set by the `\parskip` counter:

```
\setlength{\parskip}{3pt}
```

5.3.5 Paragraph/Border and Shade

To get framed (bordered) paragraphs or words, you have the choice of using the `framed` package or the `\parbox` command. The package `calc` is required in the latter case.

This is the simplest method, using `framed`:

```

\setlength{\FrameRule}{2pt}
\setlength{\FrameSep}{5pt}
\begin{framed}
  this is a framed paragraph!
\end{framed}
\definecolor{shadecolor}{rgb}
{0.9,0.8,1}
\begin{shaded}
  this is a shaded paragraph,
  do you like it?
\end{shaded}

```

this is a framed paragraph!

this is a shaded paragraph, do you like it?

Equivalently, use the `boxedminipage` package and the equally named environment. For those who want to know more: the commands

```

\framebox{
  \begin{minipage}[c]{\linewidth}
  text to be framed
  \end{minipage}
}

```

are functionally equivalent to the `boxedminipage` environment.

`\width` sets the width of the minipage equal to that of the remaining text. Obviously, you can specify the width as you like.

Finally, to frame something adapting the frame to the width of the text:

```

this is a
\framebox[\width]{framed}
word

```

this is a framed word

Modifying the parameter, you can adjust the frame width:

```

this is another
\framebox[2\width][r]{framed}
word

```

this is another framed word

Note that the second optional parameter specifies the alignment (to the right in this example).

5.3.6 Paragraph/Colour

Now that you have a bordered paragraph, you'll want to set its colour too. Do this:

```

\colorbox{yellow}{
  \begin{minipage}
  {0.8\linewidth}
  I am a minipage, my colour
  is yellow!
  \end{minipage}
}

```

I am a minipage, my colour is yellow!

Just as an example, we set the minipage colour for only the 80% of its width. More about colours in Section 5.2.5.

5.3.7 Format/Columns

The commands `\twocolumn` and `\onecolumn` start a new page and set the number of columns; they can also be used as parameters in `\documentclass`. If this is not enough for you, the package `multicols` provides an environment of the same name. I could have set this section in two columns with these commands:

```
\columnseprule=1pt
\begin{multicols}{2}[\subsection{\entry{Format}{Columns}}]
The commands \cmd{twocolumn} ...
\end{multicols}
```

The space between columns is controlled by the parameter `\columnsep`, and the thickness of the rule between columns by `\columnseprule`. The text given as optional parameter in brackets is excluded from the environment.

6 The Table Menu

Quite a complex subject... A *table* is a float (as explained in Section 4.12) that must fit on one page. It usually contains a `tabular` environment, even though other possibilities exist. By default, a table adjusts its width to match the width of its contents.

Let me stress that the `table` environment is a float, but `tabular` is not. Keep this in mind if you want to write informal tabular material, i.e. without label and caption.

This is the general format of a table:

```
\begin{table}[htbp] % placement: here, top, bottom, separate page
% \begin{small}      % sets the table font
\begin{center}      % optional
% 4-column table; alignment is left, centered, right, fixed width
\begin{tabular}{|l|c|rp{4cm}|}
\hline                % horizontal line
\textbf{Left} & \textbf{Centre} & \textbf{Right} & \textbf{4 cm}\\
\hline
row 1, col 1 & row 1, col 2 & row 1, col 3 & row 1, col 4\\
\cline{1-2}          % horizontal line spanning columns 1-2
row 2, col 1 & row 2, col 2 & row 2, col 3 & row 2, col 4\\
\cline{1-2}
\multicolumn{2}{|c|}{spanning two columns} & row 3, col 3 &
row 3, col 4\\
\cline{1-3}
row 4, col 1 & row 4, col 2 & row 4, col 3 & ~ \hfill right\\
% force a space with "\ "
row 5, col 1 & row 5, col 2 & row 5, col 3 & left \hfill ~\\
row 5, col 1 & row 5, col 2 & row 5, col 3 &
~ \hfill centre \hfill ~\\
\hline
\end{tabular}
\caption{A sample table.}
% labels are used for cross references;
% for example, "see Table~\ref{tab:sampletab}"
\label{tab:sampletab}
\end{center}
% \end{small}
\end{table}
```

Left	Centre	Right	4 cm
row 1, col 1	row 1, col 2	row 1, col 3	row 1, col 4
row 2, col 1	row 2, col 2	row 2, col 3	row 2, col 4
spanning two columns		row 3, col 3	row 3, col 4
row 4, col 1	row 4, col 2	row 4, col 3	right
row 5, col 1	row 5, col 2	row 5, col 3	left
row 5, col 1	row 5, col 2	row 5, col 3	centre

Table 8: A sample table.


Table 8 shows the result.

Sometimes, a table is too wide and won't fit on the page. In that case, the `rotating` package provides the new environment `sidewaystable`. Also, `rotating` makes it possible to rotate the contents of a cell by a specified angle. Finally, the `tabularx` package lets one specify tables of fixed width: the `X` column specifier indicates that a column can be spread as needed.

Here's an example:

```
\begin{sidewaystable}
  \begin{tabularx}{7.5cm}{|l|X|X|}
    \hline
    \textbf{normal} & \textbf{tilted} &
    \textbf{wider}\\
    \hline
    normal & \rotatebox{30}{I'm tilted!} &
    I'm wider\\
    \hline
  \end{tabularx}
\end{sidewaystable}
```

wider	wider
tilted	I'm tilted!
normal	normal

The standard `tabular` environment cannot span more than one page! There are some packages that overcome this limitation: you will want to try out `longtable`, `supertabular`, and `xtab`. 

To enable colours in tables, you use the `colortbl` package:

```
Colour by row:\\vskip 2mm
\begin{tabular}{|l|c|r|}
  \hline
  \rowcolor{cyan}
  one & two & three\\
  \rowcolor{green}
  one & two & three\\
  \rowcolor{yellow}
  one & two & three\\
  \hline
\end{tabular}
```

Colour by row:		
one	two	three
one	two	three
one	two	three

```

Colour by column:\\vskip 2mm
\begin{tabular}
  {>{\columncolor{cyan}}l|
  >{\color{red}
  \columncolor{green}}c|
  >{\columncolor{yellow}}r|}
  \hline
  one & two & three\\
  one & two & three\\
  one & two & three\\
  \hline
\end{tabular}

```

Colour by column:

one	two	three
one	two	three
one	two	three

To conclude the subject, a neat little trick. If you think that writing L^AT_EX tables is too complicated, you could be relieved by OpenOffice Calc and Calc2LaTeX. The former is the well-known free spreadsheet, while the latter is a plugin that lets you turn a cell range into a L^AT_EX table. Links: <http://www.openoffice.org/>, <http://calc2latex.sourceforge.net/>.

6.1 Table/Line Spacing

A line adjusts itself to the height of the text it contains. To add some space *before* a line, the trick is to start it with a `\rule` of 0 length and specified height. To add space *after* a line, use `\\` followed by optional space. Here is an example:

```

\begin{tabular}{|l|l|l|}
one & two & three\\
0.3 centimeters & \textbf{after} & & this line\\
this line\\[0.3cm]
one & two & three\\
one & two & three\\
\rule{0pt}{1.2cm}1.2 centimeters & & & \textbf{before} & this line\\
\end{tabular}

```

one	two	three
0.3 centimeters	after	this line
one	two	three
one	two	three
1.2 centimeters	before	this line

6.2 Table/Rule Width

```

\begin{tabular}{|l|l|l|}
\hline
%\setlength{\arrayrulewidth}{5pt}
one & two & three\\
\hline
four & five & six\\
%\setlength{\arrayrulewidth}{1pt}
\hline
\end{tabular}

```

one	two	three
four	five	six

6.3 Table/Aligning Numbers

A special case of a tabular environment is when we want to align numbers with respect to the decimal positions.

The simplest method is using the `@` column specifier, which in practice is useful in tables

containing only numbers. The column separator & is replaced by the decimal dot:

```
\begin{tabular}{r@{.}l}
3&14159\\
1&61803\\
1&41421\\
100&00000
\end{tabular}
```

3.14159
1.61803
1.41421
100.00000

Alternatively, use the `dcolumn` package, which adds the `D` column specifier. `D` has three arguments: the separator to use in the \LaTeX source and in output (usually the same, ‘.’), and the number of digits to the right of the decimal place indicator. Optionally, the third argument can specify the number of digits to the left and to the right of the decimal place indicator, separated by a dot. Lastly, if the third argument is `-1`, the material of the column is centered around the separator.

All material in the table is typeset in math mode. To insert headings, you’ll have to put the text in an `\mbox`.

```
\begin{tabular}{|D{.}{.}{4.2}|%
D{.}{.}{5}|D{.}{.}{-1}|}
\hline
\mbox{One} & \mbox{Two} & &
\mbox{Three}\\
10.33 & 10.33 & 10.33\\
1000 & 1000 & 1000\\
5.1 & 5.1 & 5.1\\
3.14 & 3.14159 & 3.14159
\hline
\end{tabular}
```

One	Two	Three
10,33	10.33	10.33
1000	1000	1000
5,1	5.1	5.1
3,14	3.14159	3.14159

6.4 Using slashbox

This package add the `\backslashbox` command:

```
\begin{tabular}{|l|l|l|}
\hline
\backslashbox[2cm]{Lesson}{Date} & &
Monday & Tuesday\\
\hline
Stratigraphy & room A & room A\\
Chemistry & room B & Lab $\alpha$\\
Physics & room C & Lab $\beta$
\hline
\end{tabular}
```

	Date	Monday	Tuesday
Lesson			
Stratigraphy		room A	room A
Chemistry		room B	Lab α
Physics		room C	Lab β

6.5 Importing Data in \LaTeX Tables

For many people, data files are the bread and butter of everyday’s work. Most data files are simply ASCII text with columns of numbers, but some people use spreadsheets. Nearly all spreadsheet applications can export sheets in the ASCII-based `.csv` file format; values are usually separated by the ‘;’ character.

Converting a data file into a \LaTeX table is quite a tedious process. The following script for UNIX will convert a datafile with an arbitrary number of columns to a table. It will also work on `.csv` files.

```

#!/bin/sh

# dat2tex.sh: converts tabular data to a tabular environment

if [ $# != 1 ]; then
    echo "Usage: $0 <datafile>"
    exit 1
fi

# is this a csv file?
grep ";" $1 > /dev/null
if [ $? = 0 ]; then
    AWK="awk -F;"
else
    AWK=awk
fi

# ok awk, make my day
$AWK '{if (1 == FNR) { \
    printf "\\begin{tabular}{"; \
    for (i = 1; i <= NF; i++) {printf "l"; \
    printf "}\n"
    }
    for (i = 1; i < NF; i++) \
        {printf $i" & "} printf $NF"\\\\ \n"} \
    END {printf "\\end{tabular}\n"}' $1

# end of dat2tex

```

7 The Tools Menu

7.1 Tools/Mail Merges

This useful and time-saving tool is implemented in L^AT_EX by the `textmerg` package. Let's consider a simple document, in which the name, surname, and title of people we're writing to may vary. The remaining text does not change.

We'll define three *fields*, which are the variable part of the text: `\Name`, `\Surname`, and `\Title`. Their values will be gathered from an external file, `data.dat`.

```

\documentclass{article}
\usepackage{textmerg}
\begin{document}
% let's declare the variable fields:
% \Void is for empty lines
\Fields{\Name\Surname\Title-\Void}
\Merge{data.dat}{%
Dear \Title{} \Surname,\
may I call you \Name?\
Yours,\
\hspace{3cm}Guido\clearpage}
\end{document}

```

The fourth field, `\Void`, isn't really necessary and it's there for illustration. It's preceded

by a minus sign, which indicates that it can be empty in the data file. Simply put, we want to separate the records using empty lines.

The file `data.dat` reads:

```
Guido
Gonzato
Dr.

Francesco
Mulargia
Prof.

Marie
Curie
Mme
```

That's it: the resulting output will contain the merged text, one page for each recipient.

7.2 Tools/Labels

If making mail merges was easy, making labels is even trivial. Let's suppose you want to make 20 equal labels on a 3×8 peel-off label sheet. The package to use, predictably, is called `labels`. In this example, we'll make 10 plain labels and 10 boxed labels:

```
\documentclass[a4paper,12pt]{article}
\usepackage{labels}
\LabelCols=3      % n. of columns of labels
\LabelRows=8      % n. of rows of labels
\LeftBorder=8mm   % borders of each label
\RightBorder=8mm
\TopBorder=5mm
\BottomBorder=5mm
\LabelGridtrue    % show the grid
\numberoflabels=10 % number of labels of each type to print
% the text of the label is specified by
% the \addresslabel[]{} macro:
\begin{document}
  \addresslabel[\large] % optional arguments
  {\textbf{Guido Gonzato}, Ph.D.\\
  \textsl{Linux system manager}}
  % now on to the boxed labels
  \boxedaddresslabel[\fboxsep=4mm\fboxrule=1mm]
  {\textbf{Guido Gonzato}, Ph.D.\\
  \textsl{Linux system manager}}
\end{document}
```

To make labels containing different addresses, you may use either an external file or insert the addresses in the main file:

```
\documentclass[a4paper,12pt]{article}
\usepackage{labels}
\LabelCols=3
```

```

\LabelRows=8
\LeftBorder=3mm
\RightBorder=3mm
\TopBorder=8mm
\BottomBorder=8mm
\LabelGridtrue
\begin{document}
% use either this environment:
\begin{labels}
  1$^{st}$ name
  1$^{st}$ address
  1$^{st}$ city, state, zipcode

  2$^{nd}$ name
  2$^{nd}$ address
  2$^{nd}$ city, state, zipcode

  3$^{rd}$ name
  3$^{rd}$ address
  3$^{rd}$ city, state, zipcode
\end{labels}
% or an external file containing exactly the same text:
% \labelfile{addresses.dat}
\end{document}

```

It is left to you to combine textmerg and labels!

7.3 Tools/Default Language

L^AT_EX default language is English, but other languages are supported. By language support I mean the translation of terms like ‘Chapter’ or ‘Index’, correct hyphenation, and the possibility of inserting characters like ‘ç’ or ‘é’ directly via your keyboard. (The normal way being typing `\c c` and `\’e`.)

Your L^AT_EX distribution contains a file called `language.dat` (usually `$TEXMF/tex/generic/config/language.dat` that contains a list of languages. Editing this file you choose the languages for which you want hyphenation patterns.

If you are not a native English speaker, you’ll want to use the package `babel` as in the following example:

```
\usepackage[italian,english]{babel}
```



`babel` alters the way some characters behave in a language-dependent way. If you experience odd problems, insert the offending characters using the `\charXX` syntax.

In addition, to type accented letters and in general non-standard ASCII characters³ you may want to use the packages `inputenc` and `fontenc`. In most cases, UTF-8 is the right choice: remember to enable it in your editor too!

³in computer jargon, ‘standard ASCII characters’ are the characters whose code is included between 32 (space) and 126 (tilde).

```
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
```

A different way of inserting accented letters is configuring your editor to type those for you. For example, I set up my editor of choice (`jed`) to have it insert `\'e` whenever I type `'é`. I included this in my `.jedrc`:

```
define latex_mode_hook ()
{
  set_abbrev_mode (1);
  if ( () = abbrev_table_p ("LaTeX") )
    use_abbrev_table ("LaTeX");
#ifdef WIN32
  % prevent clash with movement keys
  undefinekey ("àà", "LaTeX-Mode");
  definekey (" \\'a", "àà", "LaTeX-Mode");
#else
  local_setkey (" \\'a", "à");
#endif
  local_setkey (" \\'e", "é");
  local_setkey (" \\'e", "è");
  local_setkey (" \\'i", "ì");
  local_setkey (" \\'o", "ò");
  local_setkey (" \\'u", "ù");
}
```

Please consult your editor's documentation.

7.4 Tools/Hyphenation

Although \LaTeX usually does a good job at hyphenating words, sometimes manual intervention may yield better results. Manual hyphens are specified inserting `\-` where we want the word to be broken. A better way is to declare hyphenation rules:

```
\hyphenation{ge-o-phy-sics ge-o-lo-gy earth}
```

The above declaration instructs \LaTeX not to hyphen the word `'earth'`. Another way to prevent a word to be hyphenated is to put it in `\mbox`:

```
Do not hyphen \mbox{internationalisation}, please. I'm a masochistic.
```

7.5 Tools/Spell Check

\LaTeX is not aware of spell spelling. This task is done using external tools like `ispell`, `aspell` or others. Under UNIX, you can use `ispell` this way:

```
shell> ispell -t mydocument.tex
```

The `-t` switch instructs `ispell` to ignore \TeX and \LaTeX commands. If your language is not English, specify the appropriate dictionary with the `-d` switch:

```
shell> ispell -d italiano -t mydocument.tex
```


8 The Help Menu

There are many ways of getting help with L^AT_EX, both online and offline. The best place to start is the CTAN site, <http://www.ctan.org/tex-archive/info/>.

- `info latex` (UNIX systems) gives a concise but very complete on-line summary of commands and concepts;
- <http://www.ctan.org/tex-archive/info/LatexHelpBook/> is a very nice help system for L^AT_EX, fully integrated with Windows.
- don't forget the <http://groups.google.com/group/comp.text.tex/topics> newsgroup: it's an invaluable source of help.

As of 2015, most GNU/Linux distributions ship with TeXLive, probably the most complete T_EX/L^AT_EX systems. A lot of documentation is provided; on my Ubuntu machine, it's found in `/usr/share/doc/texlive-doc/`.

9 The End

This document is copyleft © Guido Gonzato, 2001–2015, and released under the GNU Free Documentation Licence. I really hope you'll find this guide useful. For any suggestions or comments, please feel free to contact me.

A Document Templates

A template for the class `article` was presented in Section 2.1. More examples are shown in the following figures.

```
\documentclass[twoside,11pt]{book}
\begin{document}
\frontmatter
\begin{titlepage}
\title{The Book of Mine}
\end{titlepage}
\author{John B. Smith}
\maketitle
\tableofcontents
\mainmatter
\part{The Beginning}
\chapter{Introduction}
\section{Let's Start}
The book starts here.
\part{The End}
\backmatter
Thank you for reading this book.
\end{document}
```

Figure 5: Book template.

```

\documentclass[twoside,12pt]{report}
% tables and figures at the end:
\usepackage{endfloat}
\begin{document}
\title{Final Report}
\author{John B. Smith}
\date{London, \today}
\maketitle
\begin{abstract}
This is the final report.
\end{abstract}
\tableofcontents
\listoftables
\listoffigures
\part{Start}
\chapter{Begin}
\section{Introduction}
The report starts here.
\end{document}

```

Figure 6: Report template.

```

\documentclass[12pt]{letter}
\begin{document}
\address{My address}
\signature{Guido}
\begin{letter}{John's address}
\opening{Dear John,}
Thank you for being my friend.
\closing{Hope to see you soon,}
\ps{P.S. Say hello to granny!}
\encl{My son's photographs!}
\end{letter}
\end{document}

```

Figure 7: Letter template.

```

\documentclass[a4paper]{article}
\usepackage{type1cm}
\usepackage{times}
\usepackage{color}
\usepackage{rotating}
\pagestyle{empty}
\begin{document}
\begin{sidewaysfigure}
  \fontsize{2.5cm}{2.5cm}\selectfont
  \centerline{\textcolor{blue}{\textbf{Please:}}}}
  \vskip 1cm
  \fontsize{4cm}{3cm}\selectfont
  \centerline{\textcolor{red}{DO NOT}}
  \centerline{\textcolor{red}{SMOKE}}
  \centerline{\textcolor{red}{HERE!}}
  \vskip 1cm
  \fontsize{2cm}{2cm}\selectfont
  \centerline{\textcolor{magenta}{If you do,}}
  \centerline{\textcolor{magenta}{you'll be \emph{deboned!}}}
\end{sidewaysfigure}
\end{document}

```

Figure 8: How to write a notice.

```

\documentclass{article}
\usepackage[absolute,showboxes]{textpos}
\usepackage{color}
\usepackage{framed}
\usepackage{graphicx}
\setlength{\TPHorizModule}{10mm} % standard unit of length
\setlength{\TPVertModule}{\TPHorizModule}
\setlength{\TPboxrulesize}{1pt} % box line width
% start everything near the top-left corner
\textblockorigin{0mm}{0mm}

\begin{document}
\setlength{\parindent}{0pt}
\definecolor{shadecolor}{rgb}{0.9,1,1}
\begin{textblock}{5}(0,0)
% this block is 5 modules wide; height is
% automatically determined
\begin{center}
\begin{minipage}[c]{0.8 \linewidth}
\begin{shaded}
This block is placed with its top left corner at the 'origin'
on the page, which has been set to (0mm,0mm). The internal
margin and the shading are provided by the \texttt{minipage}
and \texttt{shaded} environments.
\end{shaded}
\end{minipage}
\end{center}
\end{textblock}
\begin{textblock}{6}(10,1)
\includegraphics[width=6cm,angle=-90]{gnuplot.ps}
This picture is at (10,1). Note that rotating it
by -90 makes it overflow the margin.
\end{textblock}
\begin{textblock}{5}[0.5,0.5](2.5,8)
This block is at position (2.5,8), but because the optional
argument [0.5,0.5] has been given, it is the centre of the block
which is located at that point, rather than the top-left corner.
\end{textblock}
\begin{textblock}{3,4}(6,4)
The dimensions of this block are 3 $\times$ 4 cm.
Its origin is position (6,4) on the page. Note that the text
overflows the margin in some cases; you'll want to
use the \texttt{minipage} environment to prevent that.
\end{textblock}
\end{document}

```

Figure 9: How to write a poster.