

A (VERY SHORT) GUIDE TO L^AT_EX.

LaTeX is a typesetting system. A typical LaTeX document starts with a preamble—this includes command definitions, page-styles, etc. The body of your document should appear between the lines `\begin{document}` and `\end{document}` as shown below.

<code>\documentclass{amsart}</code>	
<code>\textwidth 6.5in</code>	width of writing on page.
<code>\textheight 9in</code>	length of writing on page.
<code>\pagestyle{empty}</code>	no page numbering.
<code>\definecolor{highlight}{rgb}{.357,1,.357}</code>	defines symbol <i>highlight</i> as color bright green.
<code>\newcommand{\fch}[1]{\fcolorboxhighlight}{highlight}{#1}}</code>	defines command <code>\fch</code> as bright-green box.
<code>:</code>	other stuff
<code>\begin{document}</code>	indicates the start of your document
<code>LaTeX is a typesetting system ...</code>	
<code>\end{document}</code>	the last line of your file.

Formatting

Paragraphs should be separated by a blank line. LaTeX will automatically indent the first line of the new paragraph. If you don't want a line indented, precede it by the command `\noindent`. Some common formatting examples:

<code>{\bf This text is bold-faced.}</code>	This text is bold-faced.
<code>{\it This text is in italics.}</code>	<i>This text is in italics.</i>
<code>\underline{This text is underlined.}</code>	<u>This text is underlined.</u>
<code>\tiny{This text is tiny.}</code>	This text is tiny.
<code>\huge{This text is huge!}</code>	This text is huge!

Math in LaTeX

All mathematical formulas (including variable names, etc.) should be within dollar signs. These dollar signs indicate the start and end of what is called math mode or the math environment. `$f(x) = 3^x - \frac{13}{35}$` creates $f(x) = 3^x - \frac{1}{3} + \frac{24}{35}$. Using double dollar signs (`$$`) at the beginning and end of the equation will center it on the page (this is the `displaymath` environment):

$$f(x) = 3^x - \frac{1}{3} + \frac{24}{35}.$$

The commands that produce most math symbols are generally not a surprise. Here's a list of some common symbols and the commands (in math mode) that produce them.

<code>\subseteq</code>	\subseteq	<code>\subset</code>	\subset	<code>\gamma</code>	γ
<code>\forall</code>	\forall	<code>\exists</code>	\exists	<code>\Gamma</code>	Γ
<code>\in</code>	\in	<code>\notin</code>	\notin	<code>\frac{a}{b}</code>	$\frac{a}{b}$

Equations can also be numbered by using the align environment. Equations should be typed between the lines `\begin{align}` and `\end{align}` in the form: left side `& = &` right side `\\`. You do not need to use dollar signs within the align environment. The ampersands will force alignment, the double backslash indicates the end of an equation. They will automatically be centered on the page and numbered to the right. A new align environment will continue the numbering where the previous align left off.

Any numbered equation can also be given a label and referred to later by that name. Notice that in the equation array below, the second equation is given the label *groovy*. Thereafter, whenever you type `\ref{groovy}` in the document, LaTeX will fill in the appropriate number. This means you don't need to keep track of equation numbers; LaTeX is kind enough to do it for you!

The align* environment aligns equations but does not number them. Simply using double dollar signs will center the equations but will not align them. The alignment comes in handy when you need to show a string of equivalent expressions. Compare the LaTeX commands below with their typeset outputs.

```
\begin{align}
|2x-5| & \leq 4 \\
3x-2 & \neq 3 \label{groovy} \\
\tan x & = e^x.
\end{align}
```

$$\begin{array}{lll} (1) & |2x-5| \leq & 4 \\ (2) & 3x-2 \neq & 3 \\ (3) & \tan x = & e^x. \end{array}$$

```
\begin{align*}
\int \cos^3 x \sin x dx & = - \int u^3 du \\
& = -\frac{1}{4} u^4 + C \\
& = -\frac{1}{4} \cos^4 x + C.
\end{align*}
```

$$\begin{aligned} \int \cos^3 x \sin x dx &= - \int u^3 du \\ &= -\frac{1}{4} u^4 + C \\ &= -\frac{1}{4} \cos^4 x + C. \end{aligned}$$

Things to note:

- The align and align* environments will be centered on the page. I forced the formatting above so that you could see a side-by-side comparison.
- We can now refer to equations by any labels they've been given.

Tex input: The solution to (`\ref{groovy}`) is `$x \neq 5/3$`.

Dvi output: The solution to (2) is $x \neq 5/3$.

- The command to create the highlighted text (`\fch{ highlighted text }`) is not a built-in command. I defined it in my preamble. If you have not defined it in your preamble, it will not work!!

Lists

LaTeX has several list environments. The general format is `\begin{environment}`
`\item item #1 here ...`
`\end{environment}`

If the environment is *itemize*, each item will be preceded by a bullet. If the environment is *enumerate*, each item will be numbered. The environments can also be nested.

```
\begin{enumerate}
\item peter piper
\begin{enumerate}
\item picked a peck
\item of pickled peppers.
\end{enumerate}
\item king phillip
\begin{enumerate}
\item could only find
\item green
\item strawberries.
\end{enumerate}
\end{enumerate}
```

(1) peter piper
 (a) picked a peck
 (b) of pickled peppers.

(2) king phillip
 (a) could only find
 (b) green
 (c) strawberries.

How it works

To begin, you should open the file `template.tex` in WinEdt (download the file from my website if you have not yet done so!). This file contains all of my user-defined commands and preamble formats. You simply need to start typing and save the document under the name of your choice with the file extension `.tex`. At that point, you must typeset your document by pressing `ctrl-shift-X` or selecting TeXify under the Accessories menu or clicking the brown bear. If everything in your `.tex` file is correct, WinEdt will generate three files of the same name— `filename.aux`, `filename.log`, `filename.dvi`. We only care about the `dvi` file. It should open automatically— it is the final typeset document. If you have an error (or two or three) in your `.tex` file, it will not compile. It will, however, let you know where your mistake is. I like to typeset as I work so that I don't have to fix too many errors at one time.

Other resources:

- More detailed introduction: <http://faculty.otterbein.edu/TJames/math365/LatexShortIntor.pdf>
- Users Guide for the `amsmath` Package: <http://faculty.otterbein.edu/TJames/math365/amslldoc.pdf>
- Short Math Guide for L^AT_EX: <http://faculty.otterbein.edu/TJames/math365/short-math-guide.pdf>
- LaTeX Reference Manual: <http://latex.computersci.org/Reference/Reference>

Good luck. Happy TeX-ing!