

Getting Started in L^AT_EX

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1 Welcome to L^AT_EX

Welcome to L^AT_EX , this guide is designed to give you a quick "crash course" introduction to this great formating tool. This document should help you with the minimal framework necessary to create a document and get started in your learning process.

1.1 A Quick FAQ

What is L^AT_EX

L^AT_EX is "a document markup language and document preparation system for the TeX typesetting program."¹ It could be described as a formatting language, in a close family with such things as HTML. Instead of using a graphical user interface to layout documents, in L^AT_EX you write out the information you want and you stylize it using the given commands and formatting codes. Much like programming, your documents are "compiled" into code that can be then transported across machines or printed and will appear identical no matter where you access it.

Why not use Word?

When you use Word or any other WYSIWYG (What You See is What You Get) program, you rely on the software, and the softwares internal formating structure to dictate the look and feel of the document. You can define styles, fonts, and sizes, but many times you have to fight auto-formatting, or turn it off entirely. When creating your documents your content is directly linked with the formating, to copy the content you generally are forced to copy the

¹From <http://en.wikipedia.org/wiki/LaTeX> retrieved on April 29,2008

formatting along with it and manually change each part off it. Also many times authors and students spend untold amounts of time laying out the documents visually. Additionally Word lacks a strong built-in mathematical formula editor, one does exist but it is only designed for more basic functions. There are more advanced math expression editors such as MathType, but MathType alone costs almost \$97 and is still linked to Word's layout engine and subsystems.

So why use \LaTeX , instead?

With \LaTeX you have a huge amount of control over the content and formatting of your document. \LaTeX allows granular control over things like spacing, text sizes, formatting and general editing. The mathematical formatting engine of \TeX that underlays \LaTeX is extremely powerful and allow for all matter of complex equations and formula's. Additionally (and to some students the best part) is that \LaTeX is free, both free as in speech and free as in beer, it is publicly available to download free of charge, and the source code is available, should one be so inclined.

Whats up with the name?

Good Question! The name is pronounced Lay-Tech, not latex. The spacing and look of the logo is to help set it apart and when written in normal ASCII characters it is written as LaTeX.

2 Basic Document Framework and Commands

2.1 The Most Basic Document

To begin lets start with the most basic document you can create a page with the text "Hello World" on it. The % represent comments (statements that will not be converted) explaining each line.

```
\documentclass[12pt]{article} %Specifies the type of document.
\begin{document}           %Start the Beginning of the document.
Hello World!               %Content Goes Here
\end{document}             %Close the Document
```

2.2 Title, Author, Date

With any document it is common to include a title, a author's name or names, and generally a date of printing. L^AT_EX provides a easy way to add this information to documents. The following commands are added in the preface of the document, the portion between the `\documentclass` and `\begin{document}` tags.

```
\title{A Example Document} %The title of the document.  
\date{Sunday April 27}    %The Date  
\author{Your Name}       %Your Name
```

Now, these commands will not automatically put this information into your document, to do this simply put in-between the begin and end tags of your document

```
\maketitle
```

2.3 Special Characters

It is important to note that most characters can be typed natively, and retain their original function, however the following characters cannot be typed on their own as they are used in the L^AT_EX markup.

```
\ { } $ ^ _ % # & ~
```

To access these characters, and many more, there exist Control Sequences, similar to many programming languages you can access most of these characters by typing a backslash (`\`) then the character. For example to get the list of symbols above you would type

```
\{ \} \$ \% \# \& \
```

However for the symbols `\ ^ ~` you have to type:

```
 $\backslash$ , \char94 , or \char126 respectively.
```

2.4 Headings

\LaTeX allows you to easily add in headings! To do so simply add in the following tag.

```
\section{This is a major section!}
\subsection{This is a subsection!}
\subsubsection{This is a Sub Sub Section yes they do go deep.}
Additionally \LaTeX also offers two other section dividers
\paragraph{...}
\subparagraph{...}
```

Other layouts may have more sectioning commands.

3 Mathematics Mode and Formulas

3.1 Enabling Mathematics Mode

To enter math mode, there are two main ways to enter it. You can enter math mode "inline", that is to create an equation in the same line as normal text for example:

To solve this equation we take $a = b + c$ and then we add $2 + c$ to calculate the total cost of the widget.

To start math mode in this style simply place a $\$$ before and a $\$$ after the math code.

Additionally, it is common to place equations on their own line, centered and away from the rest of the text for readability. \LaTeX makes this easy to do with one simple command.

```
\[ Math Code Here! \]
```

3.2 Math Mode Examples

Rather than list every possible command, I will instead provide some examples of code that will be particularly useful in designing a document for a Calculus report. All examples are done using the individual equation command from the previous section.

3.2.1 Fractions

$$\frac{3x}{8y}$$

`\frac{3x}{8y}`

3.2.2 Limits

$$\lim_{x \rightarrow +\infty}$$

`\lim_{x \to +\infty}`

3.2.3 Summations

$$\sum_{i=1}^{3n} 4i^2$$

`\sum_{i=1}^{3n} 4i^2`

3.2.4 Integrals

$$\int_a^b f(x) dx.$$

`\int_a^b f(x)\,dx`

3.2.5 Double Integrals

$$\int_a^b \int_c^d f(x) dx dy.$$

`\int_a^b \int_c^d f(x)\,dx`

4 Further Reading & Useful References

What are $\text{T}_{\text{E}}\text{X}$, $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ and friends?: A good site that argues some reasons for using $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ over a WYSIWYG editor like word. A interesting and convincing read.

http://www.ctan.org/what_is_tex.html

$\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ & $\text{T}_{\text{E}}\text{X}$ articles on Wikipedia: Always a good place to start in, be sure to check out the related links.

<http://en.wikipedia.org/wiki/TeX>

<http://en.wikipedia.org/wiki/LaTeX>

Getting Started with $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ A quick-start guide that covers all the basics.

<http://www.maths.tcd.ie/~dwilkins/LaTeXPrimer/GSWLaTeX.pdf>

The Not So Short Introduction to $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ 2 ϵ : A extremely useful beginners guide to $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ easier and more accessible to the average user. A great place to start after reading this guide.

<http://tobi.oetiker.ch/lshort/lshort.pdf>

$\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ - Wikibook: A community written reference guide to $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$, in a constant state of being updated with new information so may not be entirely comprehensive. Not the easiest thing to read, but does have some good reference examples for the information that is covered.

<http://en.wikibooks.org/wiki/LaTeX>

$\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ Cheat SheetA condensed pocket reference sheet detailing some of the more common $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ commands.

<http://stdout.org/~winston/latex/latexsheet.pdf>

$\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ Symbols: A handy reference guide listing different mathematical symbols and how to access them in $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$.

<http://omega.albany.edu:8008/Symbols.html>