

LaTeX Tutorial

There are some who call me... Tim

Don't worry.

It's pretty easy, and you don't have to be a fictional character to understand it.

It works for me, but we can't really help you on that, can we?

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Chapter 1

Introduction to \LaTeX

1.1 Why do we even use this when Microsoft Office exists?

\LaTeX , which is pronounced «Lah-tech» or «Lay-tech» (to rhyme with «blech», or «LaTeX», or «Anarchy is Hyperbole, in Bertolt Brecht»), is a document preparation system for high-quality typesetting. It is most often used for medium-to-large technical or scientific documents but it can be used for almost any form of publishing. Fortunately for you and I, it even allows low-effort documents to look professional.

\LaTeX is not a word processor! Instead, \LaTeX encourages authors not to worry too much about the appearance of their documents but to concentrate on getting the right content. For example, consider the following lines:

```
Cartesian closed categories and the price of eggs
Jane Doe
September 1994
```

```
Hello world!
```

To produce this in most typesetting or word-processing systems, the author would have to decide what layout to use, so would select (say) 18pt Times Roman for the title, 12pt Times Italic for the name, and so on. This has two results: authors wasting their time with designs; and a lot of badly designed documents!

\LaTeX is based on the idea that it is better to leave document design to document designers, and to let authors get on with writing documents. So, in \LaTeX you would input this document as:

```
\documentclass{article}
\title{Cartesian closed categories and the price of eggs}
\author{Jane Doe}
\date{September 1994}
\begin{document}
  \maketitle
```

```
Hello world!  
\end{document}
```



Figure 1.1: Here's a pro* tip: Do NOT Google the word LaTeX to search for reference images. The internet is a cold, terrible place, and we love it for that.

*Disclaimer: Author is not actually a pro, and spent most of his time making this on Google searching "Latex".

1.2 Tools that go a long way. Maybe too long, rendering this guide less useful.

Overleaf is your go-to for everything you could need out of \LaTeX . It contains documentation to learn how to use it properly, stores your past projects, and most importantly, templates so well formatted to what you'll learn how to use it very easily.

[Link to Overleaf](#)

In theory, you could drop this guide right now and go use Overleaf. But, you know, don't. It's a great site, but this will provide you a base to get off of.

You can even make headings like this.

<= What he said.

For those of you without constant, reliable internet access, you could always download and install \LaTeX editors on your computers. [TeXstudio](#) is a pretty great editor, but if you're adamant on not listening to us, you could always use [TeXmaker](#). If you're still reading this section, it means you still haven't made up your mind. So here, take this list of other editors: [Other editors without the Tim seal of approval](#).

Chapter 2

Syntax

2.1 Documentation

If, even now, you don't trust me, Tomathan, to help you, I give you one last chance to leave and find what you need on more official-looking sites.

[Official L^AT_EX documentation](#)

[Overleaf documentation](#)

2.2 Overview

A L^AT_EX document begins its main text after the

```
\begin{document}
```

line. Here is where you specify what chapters you would have, what sections, and what text, figures or expressions in each.

Before this, however, is the preamble of the document. Where you can specify what your document is, import packages, make a title page with your name and date, and even make the headings you see at the top of every page. For instance,

```
\documentclass[12pt, letterpaper]{article}
\usepackage[utf8]{inputenc}

\title{Do Androids Dream of Electric Sheep?}
\author{Hubert Farnsworth}
\date{December 2020}
\maketitle
```

Below a detailed description of each line:

```
\documentclass[12pt, letterpaper]{article}
```

As said before, this defines the type of document. Some additional parameters inside brackets and comma-separated can be passed to the command. In the example, the extra parameters set the font size (12pt) and the paper size (letterpaper). Of course other font sizes (9pt, 11pt, 12pt) can be used, the default size is 10pt. As for the paper size, other possible values are included A4 and legalpaper. Note that Overleaf uses a European LaTeX distribution, which produces documents in A4 size by default. See our [Page size and margins] article for information about using the Geometry package to set further formatting parameters.

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

This is the encoding for the document, to allow characters beyond ASCII (e.g. à, ü, č ...) to be used in the text. It can be omitted or changed to another encoding but utf-8 is recommended. Unless you specifically need another encoding, or if you are unsure about it, add this line to the preamble.

As for the next three lines, the intent should be self-explanatory, but because we don't trust you to figure it out, we'll explain it anyway.

The title line gives you a page-centric line on the title page, containing whatever is written between the brackets. And when we say whatever, we do mean anything. Even obscure 60's novels adapted to some of the most cult sci-fi films ever.

The author line outputs your, or whoever you decide to pin your writing on's, name.

The date line... You know the drill at this point. It outputs whatever date you put between its brackets.

```
\maketitle
```

This line ensures that those three lines above is printed on the first page, as a title page, instead of just at the top of the first page of text.

2.3 Document Classes

The following classes are distributed with LATEX:

article : For short documents and journal articles. Is the most commonly used.

book : Useful to write books.

report : For longer documents and dissertations.

letter : For letters.

beamer : Slides in the Beamer class format. This is to make presentations in \LaTeX .

2.4 Dividing Text

To properly divide the document into chapters and sections, simply use the

```
\chapter{}  
\section{}
```

commands.

To divide text to different paragraphs, use the

```
\begin{  
<Enter text here>  
\end{}
```

command. If you're feeling particularly picky today, you can also give parameters for text alignment in the paragraph, with **center** or **flushleft** or **flushright**, for center, left, and right alignments.

2.5 Basic formatting

Below, you will find a sample piece of text in LaTeX, with various formatting techniques.

```
\documentclass[12pt]{article}  
\usepackage[utf8]{inputenc}
```

```
\begin{document}
```

```
\begin{abstract}
```

```
This is a simple paragraph at the beginning of the document. A brief introduction  
\end{abstract}
```

```
In this document some extra packages and parameters  
were added. There is an encoding package,  
and pagesize and fontsize parameters.
```

```
This line will start a second paragraph. And I can  
brake\\ the lines \\ and continue on a new line.
```

```
\end{document}
```

Below, an image containing the text printed out with the specified formatting.

Abstract

This is a simple paragraph at the beginning of the document. A brief introduction to the main subject.

In this document some extra packages and parameters were added. There is an encoding package, and pagesize and fontsize parameters.

This line will start a second paragraph. And I can brake the lines and continue on a new line.

Figure 2.1: This is what the above lines looks like.

2.6 Images

```
\begin{figure}
\centering
\includegraphics[scale=1.0]{Basic_Formatting.png}
\caption{This is what the above lines looks like.}
\end{figure}
```

The image file name, and specifying parameters are enclosed within a begin and end block.

```
\centering
```

This line centers the image on the page.

```
\includegraphics[scale=1.0]{Basic_Formatting.png}
```

The image file name is one that must exist in the folder, or online directory, you use \LaTeX in. The [scale = 1.0] line is to ensure that the image is outputted at 1.0 times the image size.

2.7 Math

One of the greatest advantages of \LaTeX is the sheer pain of trying to use Math symbols in other editors. Kinda makes you wonder whether there's a large-scale conspiracy behind all the major Office software manufacturers, removing valuable functions from one program, to ensure that we have to use so many different programs and languages. Or companies are just pricks with their copyrights over stuff like this.

Regardless, in \LaTeX , mathematical functions are very easy to output. Mathematical powers can be as easy as

```
\(a^b\)
```

You can even make headings like this.

<= What he said.

which gives you a^b . Should you be extra picky, you can use square brackets instead of parantheses, to display the equation in the center of a new line, as such:

$$a^b$$

.

```
$<Mathematical expression>$  
$$<Mathematical expression>$$
```

These fulfill the same function as the parantheses and square brackets above, respectively.

Below is a reference guide for mathematical symbols:

Greek Letters:

```
$\alpha$:  $\alpha$   
$\beta$:  $\beta$   
$\gamma$:  $\gamma$   
$\rho$:  $\rho$   
$\sigma$:  $\sigma$   
$\delta$:  $\delta$   
$\epsilon$:  $\epsilon$ 
```

Binary Operators:

```
$\times$:  $\times$   
$\otimes$:  $\otimes$   
$\oplus$:  $\oplus$   
$\cup$:  $\cup$   
$\cap$:  $\cap$ 
```

Relation Operators:

```
$\subset$:  $\subset$   
$\supset$:  $\supset$   
$\subseteq$:  $\subseteq$   
$\supseteq$:  $\supseteq$ 
```

Others:

```
$\int$:  $\int$   
$\oint$:  $\oint$   
$\sum$:  $\sum$   
$\prod$:  $\prod$ 
```

You can even make headings like this.

<= What he said.

2.8 Comments

If you feel compelled to put comments in between your lines, for no reason other than your own sick pleasure, the process is pretty straightforward. Just put a % before the comment, and \LaTeX will ignore it. Now, you can really go crazy venting about how crazy Tim is, without worrying about what he thinks.