

This is a basic LaTeX (or L^AT_EX if you want to be fancy) document.

Documents have two main sections: a preamble and a body.

The preamble always starts with the `\documentclass` command. This indicates the type of document you are creating. Although there are several document types, you're most likely to want to use the `article` class, which this document uses.

The preamble also contains definitions of commands and symbols, as well as imports of other L^AT_EX packages. There are hundreds of imports available in a complete L^AT_EX installation. Here are some that may prove useful for you:

- `\usepackage{geometry}` — allows you to change the document margins, among other things (note the margins on this document are quite wide; that's the default setting)
- `\usepackage{amsmath}` — adds more mathematical typesetting capabilities
- `\usepackage{amssymb}` — adds more mathematical symbols
- `\usepackage{amsthm}` — adds an environment for typesetting theorems, axioms, *etc*
- `\usepackage{algorithm}`
`\usepackage{algpseudocode}` — adds an environment for writing algorithms in pseudocode
- `\usepackage{listings}` — adds an environment for formatting program listings
- `\usepackage{tikz}` — adds TikZ commands. TikZ is a very complex subsystem which is useful for creating vector graphics (for example, trees and graphs). I'll provide more information in a separate document.

The document body consists of everything from the `\begin{document}` command down to the `\end{document}` command, which should be the last line of the file. Everything in this *environment* is rendered in the output document.

The body is essentially a sequence of blocks of symbols. These blocks can be:

- Paragraphs consisting of text and symbols
- Blocks of mathematics text and symbols (such as a proof)
- Itemized or enumerated lists
- Code listings or algorithms
- Images (either drawn or imported)

There are other types of blocks as well, but you're most likely to use these five.

When you begin typing in the `document` environment, by default you're creating a paragraph. The paragraph continues until you start a new paragraph or begin an environment for one of the other blocks listed above. To start a new paragraph, simply add a blank line to your input document.

The other blocks are environments, which are delimited by `\begin{...}` and `\end{...}` commands. Aside from the `document` environment, this document also uses the *itemize* environment, which creates bulleted lists.

The other commands used in this document are explained here:

- `\LaTeX` — produces the fancy L^AT_EX logo
- `{ }` — this doesn't produce any output, but it has two uses:
 - Ending a command without messing up spacing. Try, for example, removing the `{ }` after `\LaTeX` and render the document. Notice the change in spacing.
 - Preventing two adjacent symbols from combining. Try changing `-{ }` to `--` in the dashes explanation and render the document. Notice that instead of two hypens, it is rendered as an en-dash.
- `\\` — line break. The additional `[12pt]` adds an extra 12 points of vertical space before the next line. There are 72.27 points in an inch.
- `\tt` — switches the font to monospace / “typewriter” font.
Important note: switching fonts (*typefaces*) is a “set it and forget it” action; the switch continues until it is switched again. Place the command and the text that you want to appear in monospace in curly braces `{...}`.
- `\textbackslash` — displays a backslash character `\`

- `\item` — creates a new bullet in an itemized list
- `\{` and `\}` — displays open and close curly braces
- `---` — this is an *em-dash*, used for separating parts of a sentence. There is also an *en-dash* `--` which is used for the dash between the start and end of a range of values (like 1–10), and a *hyphen* which is used between individual words, or to split a word between lines (which L^AT_EX does automatically, as in “creating” on the previous page).
- `\emph` — italicizes (*emphasizes*) everything in the curly braces that follow
- `\vskip` — adds vertical space after the end of an environment
- `$` — starts and ends *math mode*. Math mode is used to render numbers, math symbols and formulas. Note that `$` *always* appear in pairs. More about math mode in other documents.
- `\ldots` — this produces an ellipsis ...
- `\"...\}` — draws an umlaut (or *diacesis*) over a vowel
- `\TeX` — typesets the fancy T_EX logo

Finally, if you’re *really* interested in learning L^AT_EX, here are a few references that I use:

- *Guide to L^AT_EX*, fourth edition, by Kopka and Daly
- *The L^AT_EX Companion*, second edition, by Mittelbach and Goosens
- *The L^AT_EX Graphics Companion*, second edition, by Goosens *et al.*
- *Math Into L^AT_EX*, by Grätzer
- *The T_EXbook*, by Knuth

Plus, there are many online references for L^AT_EX information.