

# 1 Basic Document

A very basic document would consist of something like the following in a plain text file with a `.tex` extension.

```
\documentclass{article}
\begin{document}
\end{document}
```

# 2 Text Content

Text content should be composed just as you would write text in any other document—nothing special—except for a few tricks to do things you can't with plain text.

- Quotes are written as ``quote here'`—with two back-ticks, and two apostrophes. For single quotes, use one back-tick and one apostrophe.
- Hyphens should be made with one minus sign (ie `-`), dashes indicating a range of numbers should be made with two minus signs (ie `--`), and dashes in sentences should be made with three minus signs (ie `---`).
- Percent signs denote comments in L<sup>A</sup>T<sub>E</sub>X (which should be used) but to create a percent sign use `\%`.
- Dollar signs and ampersands should be prefixed with a backslash. (ie `\$` and `\&`)
- Paragraphs are made by leaving a blank line, with no indentation necessary:

```
Paragraph number one text...
```

```
Paragraph number two text...
```

# 3 Sectioning

A document can be separated into a hierarchical structure (and the table of contents automatically updated) by using the following lines in the document:

1. `\section{Section Name}`
2. `\subsection{SubSection Name}`
3. `\subsubsection{SubSubSection Name}`
4. `\paragraph{Paragraph Name}`
5. `\subparagraph{SubParagraph Name}`

# 4 Tables

## 4.1 Including Tables

For clarity and organization, I recommend that tables be composed as separate files and included in documents as follows.

```
\begin{table}[tb]
\input{tables/tablename.tex}
\caption{Caption for the Table}
\label{tab:referencetag}
\end{table}
```

This example assumes that the table file is located in a sub-folder called `tables`. Also, in this example, `tab:referencetag` is the text string which is used to reference the table in the text of the document, so make it descriptive (but without spaces or numbers).

## 4.2 Making Tables

Making tables in L<sup>A</sup>T<sub>E</sub>X can become very complex, so only what is necessary to make a simple table will be addressed here. (For further information, please visit the tables section [<https://en.wikibooks.org/wiki/LaTeX/Tables>] of the L<sup>A</sup>T<sub>E</sub>X documentation website.) Figure 1 is an example of how to create a basic table in L<sup>A</sup>T<sub>E</sub>X.

<code>\begin{tabular}{ r    r   c   l }</code>	
<code>Parameter &amp; Num1 &amp; Num2 &amp; Num3 \\ \hline \hline</code>	Parameter    Num1   Num2   Num3
<code>Param1 &amp; 23 &amp; 32 &amp; 86 \\</code>	Param1    23   32   86
<code>Param2 &amp; 26 &amp; 51 &amp; 19 \\ \hline</code>	Param2    26   51   19
<code>Param3 &amp; 32 &amp; 80 &amp; 31 \\</code>	Param3    32   80   31
<code>\end{tabular}</code>	

Figure 1: Sample Table

As shown, ampersand symbols ( & ) are used to separate columns within a row. Rows are placed on new lines with two backslashes ( \\ ) separating them. To define the alignment of each column, `r c l` are used to denote right, center, and left alignment, respectively. Pipes | are used to denote either one or two lines dividing columns. To divide rows, `\hline` is placed in between the rows it will separate.

## 5 Figures

Figures (images) are included in a document in much the same way as tables.

```
\begin{figure}[tb]
\includegraphics{figures/imagename.png}
\caption{Caption for the Image}
\label{fig:referencetag}
\end{figure}
```

This example assumes that the image file is located in a sub-folder called `figures`. It should be noted that L<sup>A</sup>T<sub>E</sub>X accepts PNG and JPEG images. For simplicity, do not include spaces in the filename. Also, in this example, `fig:referencetag` is the text string which you will use to reference the figure in the text of the document, so make is descriptive (but without spaces or numbers).

Note: `\usepackage{graphicx}` must be before `\begin{document}` if you would like to include images.

## 6 Internal Referencing

In a technical document, one is often required to reference tables, figures and other sections. To reference tables or figures use `Table~\ref{tab:referencetag}` and `Figure~\ref{fig:referencetag}` respectively.

To reference a section, one must first include a label to reference the section with. Under the `\section{. . .}` line, `\label{sec:sectiontag}` can be used to label a section where `sectiontag` is a text string related to the content. To then reference this section from another, use `Section~\ref{sec:sectiontag}`.

## 7 Equations

A complete explanation of formatting equations in L<sup>A</sup>T<sub>E</sub>X is far beyond this document, though Figure 2 gives an example. Further information can be found in the mathematics section [<https://en.wikibooks.org/wiki/LaTeX/Mathematics>] of the L<sup>A</sup>T<sub>E</sub>X documentation website.

<code>\begin{equation}</code>	
<code>x=\sin \left( \cfrac{1}{\sqrt[3]{\omega_0}} \right) \right)</code>	$x = \sin \left( \frac{n^5}{\sqrt[3]{\omega_0}} \right)$
<code>\end{equation}</code>	(1)

Figure 2: Sample Equation

## 8 Packages

If any special features of L<sup>A</sup>T<sub>E</sub>X are required to typeset the desired content, they will likely require additional packages. To include a package, simply put `\usepackage{packagename}` between the `\documentclass` and `\begin{document}` lines.

## 9 Pronunciation

L<sup>A</sup>T<sub>E</sub>X is generally pronounced either LAY-TEK or LAH-TEK (though I prefer the latter due to the fact that it was derived from Leslie Lamport's last name) with the emphasis on the second syllable.

## 10 Further Information

All the functions of L<sup>A</sup>T<sub>E</sub>X cannot be covered in one short document—this was just meant to get you going. The L<sup>A</sup>T<sub>E</sub>X documentation website [<https://en.wikibooks.org/wiki/LaTeX>] is a great reference for all the finer details.

## 11 Sample Document

```
\documentclass[10pt,letterpaper,oneside]{article}

\usepackage{fullpage}

\begin{document}
\author{Your Name}
\title{The Title}
\maketitle

\section{Some Section}
Content!

\end{document}
```

## 12 Software

To get started with L<sup>A</sup>T<sub>E</sub>X all you really need is a text editor and a L<sup>A</sup>T<sub>E</sub>X *distribution*, however I recommend installing a front end if you prefer not to use the command line—or just to get started even if you do.

On all operating systems, I recommend installing the TeXworks front-end for L<sup>A</sup>T<sub>E</sub>X which has syntax highlighting and will show you your finished document alongside the plain text file.

### 12.1 GNU/Linux

TeX Live is the most common L<sup>A</sup>T<sub>E</sub>X *distribution* used on GNU/Linux, and is likely available through your package manager (ie. `sudo apt-get install texlive`)

### 12.2 Mac OS

MacTeX is the most common L<sup>A</sup>T<sub>E</sub>X *distribution* used on Mac OS, and can be installed the same as any other piece of software.

### 12.3 Microsoft Windows

MiKTeX is the most common L<sup>A</sup>T<sub>E</sub>X *distribution* used on Microsoft Windows, and can be installed the same as any other piece of software.