# Short Introduction to LaTeX $2_\varepsilon$

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## Contents

## 1 Introduction

This is a short, easy, nontechnical introduction to LaTeX2. After you have worked through it, you will be able to create a professional document, and have the ability to teach yourself how to extend your LaTeX $2_\varepsilon$ skills.

**What about LaTeX $2_\varepsilon$?** First, it's *free* in the sense that you do not have to pay for it. Second, it's *easy*, given that you know how to use it. As always, there are trade-offs, and "easy" to an expert tends to be hard for a beginner, and *vice versa*. Third, it's *stable*, the first version released in 1985. Fourth, it's *well documented*, not surprising since its purpose is document preparation. Fifth, it's *professioal*, as you will soon come to see. I will touch on these points from time to time in this introduction.

**How does this introduction work?** Each "lesson" consists of the introduction of a few commands and a couple of questions, which should not take more than fifteen minutes to complete. If you complete one lesson a day, within several weeks you will have a good foundation with LaTeX $2_\varepsilon$, and begin to see how the things I just wrote are true.

# 2　Document Basics

A `tex` document consists of plain text, and special characters, commands, and environments. You don't need to now the difference now, but you shortly will without being told. You *must* precede commands with a backslash (\) for the compiler to know that they are commands. This is easy to forget, so I will remind you the first couple of times.

**What should I have?**　You should have a working LaTeX 2$_\varepsilon$ program. If you do not have one, see Appendix 1 below.

## 2.1　Basic document

- documentclass
- begin/end

A basic document begins with a document class, and has a preamble and contents. Type (or copy) the following, save it as a `.tex` document and compile it. The percent signs (%) are comments and do not have any effect on the document.

```
\documentclass{article}
    %this is the preamble
\begin{document}
    %this is the contents section
    It works!
\end{document}
```

**Question:**　LaTeX 2$_\varepsilon$ has a number of different document classes. Name four of them.

**Question:**　A `documentclass` command can take optional arguments, like this: `documentclass[optional arguments]{document class}`.[1] Name two optional arguments.

## 2.2　Basic title

- title
- author
- date
- maketitle

A basic document usually has a title and author information. Create and compile a second document like this:

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[1] Don't forget to type a backslash before the command, like this: `\documentclass`

```
\documentclass{article}
    %this is the preamble
    \title{Title, Author, and Date}
    \author{This is my name}
    \date{July 4, 1776}
\begin{document}
    %this is the contents section
    \maketitle{}
    This document has a title, author, and date.
\end{document}
```

**Question:** What happens if you use the command `today{}`[2] as the date parameter (replacing July 4, 1776)?

**Question:** What happens if you use the command `thanks{email address}`[3] after your name in the `author{}` command?

## 2.3 Basic sections

- section

- subsection

- subsubsection

- label

LaTeX $2_\varepsilon$ provides a number of useful section levels, including part and chapter. Two of the most useful are `section` and `subsection`. Create and compile the following document.

```
\documentclass{article}
    \title{Basic Sections}
    \author{This is my name}
    \date{\today{}}
\begin{document}
    \maketitle{}
    \section{Introduction}
    \label{Introduction}
    \section{Body}
    \label{Body}
    \section{Conclusion}
    \label{Conclusion}
\end{document}
```

The `label{}` is used to create cross-references in documents. It's also very helpful in organizing your thoughts. The argument to `label{argument}` does not appear in the document and *in cannot contain a space*!!!

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[2]Remember, `\date{}`

[3]`\thanks{}`

**Question:** What do the commands `subsection{}` and `subsubsection{}` do?

**Question:** What does `section*{}` do? Note the asterisk (*) after `section`. You can also use this for `subsections` and `subsubsections`.

## 2.4 Basic paragraphs

- paragraph

- subparagraph

We have reached the point where you need some real content. I will use the text of Abraham Lincoln's Gettysburg Address to illustrate paragraphs. Notice that ordinary paragraphs do not need a special commend – the "paragraph command" is simply two new lines to create a blank line. Create and compile the following document.

```
\documentclass{article}
    \title{Basic Paragraphs}
    \author{This is my name}
    \date{\today{}}
\begin{document}
    \maketitle{}
    \section{Introduction}
    \label{Introduction}
    \section{Body}
    \label{Body}


Four score and seven years ago our fathers brought forth on this
continent a new nation, conceived in liberty, and dedicated to
the proposition that all men are created equal.

Now we are engaged in a great civil war, testing whether that nation,
or any nation so conceived and so dedicated, can long endure. We
are met on a great battlefield of that war. We have come to dedicate
a portion of that field, as a final resting place for those who here
gave their lives that that nation might live. It is altogether fitting
and proper that we should do this.

But, in a larger sense, we can not dedicate, we can not consecrate,
we can not hallow this ground. The brave men, living and dead, who
struggled here, have consecrated it, far above our poor power to add
or detract. The world will little note, nor long remember what we say
here, but it can never forget what they did here. It is for us the
living, rather, to be dedicated here to the unfinished work which they
who fought here have thus far so nobly advanced. It is rather for us
to be here dedicated to the great task remaining before us, that from
these honored dead we take increased devotion to that cause for which
they gave the last full measure of devotion, that we here highly resolve
that these dead shall not have died in vain, that this nation, under
```

```
God, shall have a new birth of freedom, and that government of the people,
by the people, for the people, shall not perish from the earth.

    \section{Conclusion}
    \label{Conclusion}
\end{document}
```

**Question:** What happens if you include the `paragraph{}` or `subparagraph{}` commands before each paragraph?

**Question:** What happens if you include arguments with the `paragraph{argument}` or `subparagraph{argument}` commands?

## 2.5 Basic packages

- usepackage

- lipsum

Much of LaTeX 2$_\varepsilon$ functionality is contained in external packages. To use this functionality, you include the command `usepackage{}` in the preamble. Of course, you first have to install the package on your computer, but the MiKTeX distribution does that automatically. The `lipsum` package generates generic text (in Latin, of course). The `lipsum{}` command generates text. Notice that you can control the number of paragraphs to include. Below, I hgave included paragraph 1 in the introduction, paragraphs 2 through 4 in the body, and paragraph 5 in the conclusion.

Notice the paragraph indentation. First paragraphs are *not* indented. Following paragraphs *are* indented. This is normal typographic practice.

```
\documentclass{article}
    \usepackage{lipsum}
    \title{Using Packages}
    \author{This is my name}
    \date{\today{}}
\begin{document}
    \maketitle{}
    \section{Introduction}
    \label{Introduction}
        \lipsum[1]{}
    \section{Body}
    \label{Body}
        \lipsum[2-4]{}
    \section{Conclusion}
    \label{Conclusion}
        \lipsum[5]{}
\end{document}
```

**Question:** What is CTAN, the Comprehensive TeX Archive Network? How many packages are currently on CTAN?

**Question:** What are the most popular LaTeX 2ε packages?

## 2.6 Basic contents

---

- tableofcontents

---

Creating a table of contents is easy. Just include the `tableofcontents{}` command. You may have to compile the document twice to ensure that the table of contents is generated properly.

```
\documentclass{article}
    \usepackage{lipsum}
    \title{Table of Contents}
    \author{This is my name}
    \date{\today{}}
\begin{document}
    \maketitle{}
    \tableofcontents{}
    \section{Introduction}
    \label{Introduction}
        \lipsum[1]{}
    \section{Body}
    \label{Body}
        \lipsum[2-4]{}
    \section{Conclusion}
    \label{Conclusion}
        \lipsum[5]{}
\end{document}
```

**Question:** The `section[argument]{Section Title}` command takes an optional argument. How does this argument affect the table of contents?

**Question:** What other kinds of tables can LaTeX 2ε generate? To start with, look at figures and tables.

## 2.7 Basic decorations

---

- textit

- textsf

- texttt

- textbf

- textsc

- underline

---

In this section, you will fiddle with the appearance of text. To *create text in italics*, use `textit`. To create text in sans serif, use `textsf`. To `create text in monospace font`, use `texttt`. To **create text in boldface**, use `textbf`. To CREATE TEXT USING SMALL CAPS, use `textsc`. <u>You should almost never underline text</u>! If you choose to do so, use `underline`.

```
\documentclass{article}
    \title{Font Appearance}
    \author{This is my name}
    \date{\today{}}
\begin{document}
    \maketitle{}
    \section{Introduction}
    \label{Introduction}
    \section{Body}
    \label{Body}
        \paragraph{}In this section, you will fiddle with the appearance of text.
        \paragraph{}To \textit{create text in italics}, use \texttt{textit}.
        \paragraph{}To \textsf{create text in sans serif}, use \texttt{textsf}.
        \paragraph{}To \texttt{create text in monospace font},use \texttt{texttt}.
        \paragraph{}To \textbf{create text in boldface}, use \texttt{textbf}.
        \paragraph{}To \textsc{create text using Small Caps}, use \texttt{textsc}.
        \paragraph{}\underline{You should almost never underline text}!
        If you choose to do so, use \texttt{underline}.
    \section{Conclusion}
    \label{Conclusion}
\end{document}
```

**Question:** As with much else in LaTeX $2_\varepsilon$,there are multiple ways to italisize or bold-face text. Can you find other ways?

## 2.8  Basic fontsizes

- tiny

- scriptsize

- footnotesize

- small

- normalsize

- large

- Large

- LARGE

- huge

- Huge

LaTeX $2_\varepsilon$ has several different ways to alter the size of the font. Perhaps the simplest way is to create a *size environment.* You do this by using one of the commands listed above, and this controls the size of all text until it is changed by another command. You would typically use this for sections of text that need to be made smaller, such as tables, block quotes, technical sections not germane to the main discussion, and similar.

```
\documentclass{article}
    \title{Font Sizes}
    \author{This is my name}
    \date{\today{}}
\begin{document}
    \maketitle{}
    \section{Introduction}
    \label{Introduction}
    \section{Body}
    \label{Body}
    \normalsize{}\paragraph{}This paragraph has a normalsize font size.
    \tiny{}\paragraph{}This paragraph has a tiny font size.
    \scriptsize{}\paragraph{}This paragraph has a scriptsize font size.
    \footnotesize{}\paragraph{}This paragraph has a footnotesize font size.
    \small{}\paragraph{}This paragraph has a small font size.
    \normalsize{}\paragraph{}This paragraph has a normalsize font size.
    \large{}\paragraph{}This paragraph has a large font size.
    \Large{}\paragraph{}This paragraph has a Large font size.
    \LARGE{}\paragraph{}This paragraph has a LARGE font size.
    \huge{}\paragraph{}This paragraph has a huge font size.
    \Huge{}\paragraph{}This paragraph has a Huge font size.
    \normalsize{}\paragraph{}This paragraph has a normalsize font size.
    \section{Conclusion}
    \label{Conclusion}
\end{document}
```

**Question:** The issues of font, font size, and font decoration, are difficult, complicated, and subject to internecene wars. You may want to postpone your exploration of these issues until you have created and compiled several hundred `.tex` documents. If you want, and have discretionary time available and nothing else to do, you may want to delve into the complex and divisive world of fonts, font sizes, and font decorations.

# LaTeX $2_\varepsilon$ is *Professional*

LaTeX $2_\varepsilon$ is flexible to an extreme. You can customize every part of your document. However, its authors have spent much time and effort to ensure that it gives a professional appearance "out of the box." This short tutorial does not cover customization. After you have created and compiled several dozen `.tex` files, you will begin to see the need for customization.[4] Unless you have special requirements, such as page margins, paragraph spacing, and page page numbers, and you are happy with the appearance of your document, you do not need to think about customization.

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[4]The first thing you may want to do is to change the page margins. An easy way to change page margins is to use the `geometry` package.