

Introduction

\LaTeX is a powerful typesetting system for creating mathematical documents. (\TeX is the original; \LaTeX is actually \TeX along with a giant set of macros to make things easier.) This is a brief introduction to \LaTeX to get you started; there are also many resources available on the web.

Your best bet for learning \LaTeX is to modify an existing \LaTeX file to make it do what you want. You will add capabilities to your repertoire as you need them. For example, although \LaTeX can make very nice matrices, you probably won't need to figure out how in the first week of class. Instead, focus on the things you do need.

Steps to \LaTeX ing a Document

There are three main steps to creating a \LaTeX document: you first write code in the \LaTeX language, then compile it, and then you can view it. The work is in the first step: this is where you actually write the document, including whatever special commands you need for the mathematical part of your document. This is done in a text editor such as WinEdt. While you can use any text editor, you are well advised to use one made to work with \LaTeX . The reason is that these have buttons you can click to perform the second step (compiling your document) and the third step (viewing it). (Otherwise, you will have to find a command line and learn the appropriate commands.) The \LaTeX file should have the extension `.tex`.

When you click the button to \LaTeX (i.e., compile) your document, a window will appear giving the progress of the compilation. This will report any errors in your \LaTeX code. (You will still have to find and fix them, which isn't always easy!) When the window closes successfully, you can click on the "DVI" button to view the `.dvi` file \LaTeX created. (DVI stands for "device independent," meaning it can be read on a Windows, Unix, Mac, etc. machine.) The DVI file shows you what will be printed.

There is another alternative, too: you can use the `dvi->pdf` button to convert the `.dvi` file to a `.pdf` file (which you can view with Adobe Acrobat), or you can use a `pdflatex` button to generate the `.pdf` file directly.

The Structure of a Document

Every \LaTeX document begins with a "preamble" in which you tell \LaTeX what parameters you want to apply to the whole document. This is not something you will need to mess with for the most part if you just use someone else's \LaTeX file. When you need to format documents differently than the default, you can learn how to modify the preamble. (Or you can just play with it!)

The body of the document begins with a `"\begin{document}"` command and ends with a `"\end{document}"` command. In between lies your work.

Note the backslash (`\`) in front of the word "end." \LaTeX commands are distinguished from ordinary text by the presence of a backslash in front of the command. For example,

“alpha” appears as “alpha” in the final document, while “\alpha” will appear as α (subject to being in math mode; see below).

Math Mode versus Text Mode

To enter mathematical text, you must enter math mode. This is done with a dollar sign (\$) for in-line mathematics like α, β, γ , and with two dollar signs \$\$ for centered, offset mathematics like

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}.$$

To get back to text mode, you must end math mode with the same symbol with which you began.

For example, here is what I entered to get the matrix above:

```
$$\bmat{cc}1&2\\3&4\emat.$$
```

For the Greek letters, I entered

```
$$\alpha, \beta, \gamma,$$
```

One of the most common errors you will encounter when you start compiling documents is forgetting to end math mode. The error message you will see is “missing \$ inserted,” and it will give a line number and the portion of the line in which \LaTeX thinks the error occurred. (Sometimes the problem is actually on the previous line or two; you may need to hunt.)

Go Forth and \LaTeX !

This is just the most basic of outlines about \LaTeX . There are many, many online resources with documentation, FAQs, etc. If you want a helpful manual, I recommend “A Guide to \LaTeX ” by Helmut Kopka and Patrick W. Daly; it is excellent. (But there are thousands of free resources online.)

I am providing you with my style file and a few examples of \LaTeX documents to work from. My style file contains some shortcuts for commands I use frequently; you should modify it (when you think you are ready!) to be useful to you. \LaTeX is extremely versatile; you can readily create your own commands to do what you need. The best advice I ever received about \LaTeX was, “if you aren’t satisfied with how it looks, keep trying – there is a way to get what you want.”

Finally, let me remind you of what I said at the beginning: the best way to learn \LaTeX is to modify what someone else has created. Just pull up a file when you are ready to do something specific, and try to do it. Good luck!