

Math 291: Lecture 1

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- 1 *What is L^AT_EX?*
- 2 *The Basics of Document Preparation*
- 3 *Environments*
- 4 *A Cool Example*



Outline

- 1 *What is \LaTeX ?*
- 2 *The Basics of Document Preparation*
- 3 *Environments*
- 4 *A Cool Example*



Software Components

- MikTeX
- TeXnicCenter
- Ghostscript



See Handout



The History and Development of \LaTeX

- \TeX was developed by Donald Knuth in the 1970's. He used it to help him typeset the classic volumes *The Art of Computer Programming*.
- \LaTeX was originally a large set of macros developed by Leslie Lamport in 1985.
- \LaTeX has gone through many upgrades since then. Currently the American Mathematical Society has developed AMS- \LaTeX with more symbols and macros.
- Today, in mathematics, it is almost unacceptable to use anything else. Graduate math professors often expect homework handed in via \LaTeX .



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The “Preamble”

- Open a blank document using TeXnicCenter.
- Type `\documentclass{article}`
- Leave some space and type `\begin{document}`.
Leave some additional space and type `\end{document}`
- The portion of the file between the statements `\documentclass{article}` and `\begin{document}` is called the Preamble.
- This is where overall control of your document takes place. We'll use this area to add one package before the end of class today.



The “Body”

- The text between the statements `\begin{document}` and `\end{document}` is the body of your document. This will contain (for the most part) all of the text that you want to see once your document has been compiled.
- In the body, type
This is my first `\LaTeX` document.
- To compile this document, we use build commend (after selecting the options we want). Set the build mode to `LaTeX` \implies `PS`.
- Save your file in “My Documents” as “Math291Week1”.
- Open the My Documents folder and you will see a document with a little ghost on it. Open this. This is your document (a postscript file).



Compiling Errors

- Go back to your document file in TeXnicCenter and change the cap X on the end of

`\LaTeX`

to a lowercase x.

- Build your document again. At the bottom it should tell you that you have 1 error.
- Press F9. This will take you to a description of the error.
- It should say “undefined control sequence”

`\LaTeX`

Notice the break.

- Fix the mistake. (Remember that the \LaTeX command is case sensitive).



Reserved Symbols in \LaTeX

Some “Reserved Symbols” in \LaTeX are:

\backslash , \sim , $\$$, $\%$, $\&$, $\#$, $-$, $\{$, $\}$, and \wedge .

The reason these symbols are reserved is that they each perform a special function within \LaTeX .

We will discuss the specific function of most of these later.



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Environments

- Documents created using \LaTeX are best thought of as being divided into different environments.
- We are going to change the statement that we originally wrote to make it a title.
- Before the statement write
 $\text{\begin{center}}$
 After the statement write
 $\text{\end{center}}$
- Build your document and see what happens.
- What if we want the text boldfaced? We could type the commands necessary by hand, but let's use TeXnicCenter to help us. Highlight the text and click the Boldfaced F on the top of the screen.
- Build, and see how the output has changed.



Making a Title Page

- Let's put our name before the title of this document.
- Above the title type
`<your name> \\ \today`
- Next, since we want this text to be in the upper right hand corner, we highlight and click on the flushright icon.
- Build and see how the output has been modified.



The Math Environment

- The main power of \LaTeX is its ability to typeset mathematical formulae quickly and easily.
- The math environment is invoked by using the symbol: $\$$.
- To see this, first type

$$\$x^n\$$$
- Build your document and see the output.
- Next, add

$$\$x_n\$$$
- Then build again.



A Polynomial

Let's type a polynomial. Use what you know to add following polynomial to your document.

$$2x^{10} - x^8 + 5x^3$$

How many of you got:

$$2x^{10} - x^8 + 5x^3?$$



Using Curly Brackets

- When you want to apply a command to an object with more than one character within it, you need to use `{` and `}`.
- To get the correct polynomial from the previous slide we type
$$2x^{10}-x^8+5x^3$$
- Try this and build your document.



Typesetting Fractions

- To create the fraction $\frac{1}{2}$, we type

`\frac{1}{2}`

- Try it and build.

- To create the fraction $\frac{\frac{1}{3}x^3}{\frac{1}{2}x^2}$, we type

`\frac{\frac{1}{3}x^3}{\frac{1}{2}x^2}`

- Try it and build.



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A Cool Example

- Suppose you are explaining polynomial long division to a group of people and you don't want to go through the trouble of manually typing out the solution to the example that you are using to illustrate it.
- In your preamble type


```
\usepackage{polynom}
```
- Now in your document somewhere type


```
$$\polylongdiv{x^3+x^2-1}{x-1}$$
```
- Now build your document, and see what happens.
- This is the power of L^AT_EX.