

Math 290: \LaTeX Seminar Week 1

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

Outline

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Software Components

- MikTeX
- TeXnicCenter
- Ghostscript

Installation Instructions

See Handout

The History and Development of L^AT_EX

- T_EX was developed by Donald Knuth in the 1970's. He used it to help him typeset the classic volumes *The Art of Computer Programming*.
- L^AT_EX was originally a large set of macros developed by Leslie Lamport in 1985.
- L^AT_EX has gone through many upgrades since then. Currently the American Mathematical Society has developed AMS-L^AT_EX 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 L^AT_EX.

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The “Preamble”

- Open a blank document using TeXnicCenter.
- Type `\documentclass{article}`
- Type `\begin{document}`.
Leave some space and type
`\end{document}`
- Between the statements
`\documentclass{article}` and `\begin{document}`
is called the Preamble.
- Lots of stuff goes in here. We'll see one package by the end of the day.

The “Body”

- The text between the statements `\begin{document}` and `\end{document}` is the body of your document. This is (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` command (after selecting the options we want). Set the build mode to `LaTeX` \implies `PS`.
- Save your file in “My Documents” as “Math290Week1”.
- 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 cap sensitive).

Reserved Symbols in \LaTeX

The Reserved Symbols are \backslash , \sim , $\$$, $\%$, $\&$, $\#$, $-$, $\{$, $\}$, \wedge

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

We will discuss the 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
`\begin{center}`
After the statement write
`\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 on 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 got

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

Using Curly Brackets

- Anytime you want to apply a command to an object with more than one character or command within it, you need to use `{` and `}`.
- To get the 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 process of typing out the solutions to all of the examples that you've generated.
- In your preamble type
$$\backslash\text{usepackage}\{\text{polynom}\}$$
- Now in your document somewhere type
$$\$\backslash\text{polylongdiv}\{x^3+x^2-1\}\{x-1\}\$$$
- Now build your document, and see what happens.
- This is the power of L^AT_EX.