Math 291: Lecture 1

Prof. Fagerstrom

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Math 291: Lecture 1

January 17, 2019 1 / 20



2 The Basics of Document Preparation

3 Environments

4 A Cool Example

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Math 291: Lecture 1

<ロ > < 回 > < 三 > < 三 > < 三 > < 三 > 三 の Q () January 17, 2019 2 / 20 What is LATEX?



What is $\not ET_F X$?

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Math 291: Lecture 1

999 January 17, 2019 3 / 20

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What is ATEX?



MikTeX

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January 17, 2019 4 / 20

What is ATEX?



- MikTeX
- TeXnicCenter

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- MikTeX
- TeXnicCenter
- Ghostscript

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January 17, 2019 4 / 20

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What is LATEX?



See Handout

- Prepared in essence by Dr. James
- I'll try to help (tech support is not my strength, but I can usually muddle on through)
- Can also use the campus labs

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• TEX was developed by Donald Knuth in the 1970's. He used it to help him typeset the classic volume *The Art of Computer Programming*.

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- LATEX was originally a large set of macros developed by Leslie Lamport in 1985.

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- LATEX has gone through many upgrades since then. Currently the American Mathematical Society has developed AMS-LATEX with more symbols and macros.

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- 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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Math 291: Lecture 1

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- 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.
- Also used in physics (widely), computer science, and other physical sciences.

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January 17, 2019

The Basics of Document Preparation



What is BT_EX?

2 The Basics of Document Preparation

3 Environments

A Cool Example

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Math 291: Lecture 1

January 17, 2019 7 / 20

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• Open a blank document using TeXnicCenter.

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January 17, 2019 8 / 20



- Open a blank document using TeXnicCenter.
- Set up TeXnicCenter using the directions on the handout. Make sure that you follow the directions, or it won't work well!

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- Open a blank document using TeXnicCenter.
- Set up TeXnicCenter using the directions on the handout. Make sure that you follow the directions, or it won't work well!
- Type \documentclass{article}

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M. The "Preamble"

- Open a blank document using TeXnicCenter.
- Set up TeXnicCenter using the directions on the handout. Make sure that you follow the directions, or it won't work well!
- Type \documentclass{article}
- Leave some space and type

\begin{document}.

Leave some additional space and type

\end{document}

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M. The "Preamble"

- Open a blank document using TeXnicCenter.
- Set up TeXnicCenter using the directions on the handout. Make sure that you follow the directions, or it won't work well!
- 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.

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January 17, 2019 8 / 20

M. The "Preamble"

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- 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.

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January 17, 2019 8 / 20



\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.

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\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.

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\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.

• Save your file somewhere where you can find it again as "Math291Week1".

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\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.

- Save your file somewhere where you can find it again as "Math291Week1".
- To compile this document, we use build command (after selecting the options we want). Set the build mode to LaTeX ⇒ PS and then build.

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Math 291: Lecture 1

January 17, 2019

9 / 20

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M 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.

- Save your file somewhere where you can find it again as "Math291Week1".
- To compile this document, we use build command (after selecting the options we want). Set the build mode to LaTeX ⇒ PS and then build.
- View the file by using the preview icon.
- Open the folder where you saved the file: What do you see? Prof. Fagerstrom (MSUM) Math 291: Lecture 1 January 17, 2019 9/20



- Go back to your document file in TeXnicCenter and change the capital X on the end of \LaTeX
 - to a lowercase x.

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- Go back to your document file in TeXnicCenter and change the capital 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.



• Go back to your document file in TeXnicCenter and change the capital 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.

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• Go back to your document file in TeXnicCenter and change the capital 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.

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Math 291: Lecture 1

10 / 20

January 17, 2019



• Go back to your document file in TeXnicCenter and change the capital 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).

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January 17, 2019

The Basics of Document Preparation

\blacksquare Reserved Symbols in $\blacksquare T_E X$

Some "Reserved Symbols" in $\mbox{\sc brack}TEX$ are: $\, \sim,$ \$, %, &, #, _, {, }, and $\wedge.$

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January 17, 2019 11 / 20

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The Basics of Document Preparation

\blacksquare Reserved Symbols in $\blacksquare T_E X$

Some "Reserved Symbols" in $\mbox{\sc brucker} T_EX$ are: $\, \sim, \$ %, %, &, #, _, {, }, and $\wedge.$

The reason these symbols are reserved is that they each perform a special function within $\[Mathebar{E}]X$.

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January 17, 2019 11 / 20

Some "Reserved Symbols" in $\mbox{\sc brucket} TEX$ are: $\, \sim, \$ %, %, &, #, _, {, }, and $\wedge.$

The reason these symbols are reserved is that they each perform a special function within $\[Mathebase]$

The \setminus indicates to PTEX that there is a command rather than text.

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January 17, 2019 11 / 20

Some "Reserved Symbols" in $\mbox{\sc brucket} TEX$ are: $\, \sim, \$ %, %, &, #, _, {, }, and $\wedge.$

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

The \setminus indicates to $\mbox{\sc bar} TEX \$ that there is a command rather than text. The \sim is a "hard space". Put one after the \LaTeX command to fix the spacing issue in your document.

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

The \setminus indicates to $\mbox{\sc eTE}X\$ that there is a command rather than text. The \sim is a "hard space". Put one after the $\LaTeX\$ command to fix the spacing issue in your document.

You can also use LaTeX, which has the effect of creating whatever is the 'usual' space for the context.

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The reason these symbols are reserved is that they each perform a special function within $\[Mathebase]$

The \setminus indicates to $\mbox{\sc eTEX}$ that there is a command rather than text. The \sim is a "hard space". Put one after the \LaTeX command to fix the spacing issue in your document.

You can also use LaTeX, which has the effect of creating whatever is the 'usual' space for the context.

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

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1 What is BT_EX ?

2) The Basics of Document Preparation

3 Environments

A Cool Example

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Math 291: Lecture 1

January 17, 2019 12 / 20

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• Documents created using LATEX are best thought of as being divided into different environments.

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- 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.

- 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}

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- 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.

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Math 291: Lecture 1

13 / 20

January 17, 2019

- 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.

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January 17, 2019 13 / 20

- Documents created using ATEX 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.

13 / 20

Build, and see how the output has changed: $\langle \sigma \rangle \langle z \rangle \langle z \rangle \langle z \rangle$ Prof. Fagerstrom (MSUM) Math 291: Lecture 1 January 17, 2019



• Let's put our name before the title of this document.

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Math 291: Lecture 1

January 17, 2019 14 / 20



- Let's put our name before the title of this document.
- Above the title type <your name> \\ \today \\

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January 17, 2019



- 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.

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Math 291: Lecture 1

January 17, 2019 14 / 20

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- 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.

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January 17, 2019



• The main power of LATEX is its ability to typeset mathematical formulas quickly and easily.

Math 291: Lecture 1

January 17, 2019 15 / 20

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- The main power of LATEX is its ability to typeset mathematical formulas quickly and easily.
- The math environment is invoked by using the symbol: \$.

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Math 291: Lecture 1

January 17, 2019 15 / 20

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The Math Environment

- The main power of $\[mathbb{E}T_{E}X\]$ is its ability to typeset mathematical formulas 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.

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M The Math Environment

- $\bullet\,$ The main power of $\mbox{\sc eTE}X$ is its ability to typeset mathematical formulas 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\$

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January 17, 2019

The Math Environment

- $\bullet\,$ The main power of $\mbox{\sc eTE}X$ is its ability to typeset mathematical formulas quickly and easily.
- The math environment is invoked by using the symbol: \$.
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\$x^n\$

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- Next, add

\$x_n\$

• Then build again.

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January 17, 2019



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

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

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January 17, 2019 16 / 20

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

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

How many of you got:

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

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• When you want to apply a command to an object with more than one character within it, you need to use { and }.

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- 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

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January 17, 2019



- 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.

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Math 291: Lecture 1

January 17, 2019



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

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January 17, 2019 18 / 20

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- To create the fraction ¹/₂, we type
 \$\frac{1}{2}\$
- Try it and build.

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January 17, 2019 18 / 20

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- To create the fraction ¹/₂, we type
 \$\frac{1}{2}\$
- Try it and build.
- To create the fraction ^{1/2}/_{1/2}x², we type \$\frac{\frac{1}{3}x^3}{\frac{1}{2}x^2}\$

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January 17, 2019 18 / 20

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- To create the fraction ¹/₂, we type
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- Try it and build.
- To create the fraction ^{1/3}/₂x³, we type
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- Try it and build.

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Math 291: Lecture 1

January 17, 2019 18 / 20

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A Cool Example



2) The Basics of Document Preparation

3 Environments



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• 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.

Math 291: Lecture 1

January 17, 2019 20 / 20

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- 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 (that is, between the documentclass and begin commands) type

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January 17, 2019



- 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 (that is, between the documentclass and begin commands) type

Now in your document somewhere type

\$\polylongdiv{4x^8-12x^6+7x^5-x^3+x^2-1}{5x^2-x-1}\$

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20 / 20

January 17, 2019

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• Now in your document somewhere type

\$\polylongdiv{4x^8-12x^6+7x^5-x^3+x^2-1}{5x^2-x-1}\$

• Now build your document, and see what happens.

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Math 291: Lecture 1

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- 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.
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• Now in your document somewhere type

\$\polylongdiv{4x^8-12x^6+7x^5-x^3+x^2-1}{5x^2-x-1}\$

- Now build your document, and see what happens.
- This is the power of LATEX.

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