Math 291: Lecture 8

Dr. Fagerstrom

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March 15, 2018

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- To get things started, you will need to go to the course website and download some files that we will use in our examples today.
- Go to the course webpage and follow the link "Week 8 materials"
- Download all of the files to the folder that you are using to save your practice files and labs.

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- Open up an example document for this week. Add the normal preamble for a document.
- Next, load the package "graphicx".
- Note: Compile using the profile: LaTeX => PDF
- Then add the following command and try compiling. \includegraphics[width=1.5in]{marble4.jpg}

- Open up an example document for this week. Add the normal preamble for a document.
- Next, load the package "graphicx".
- Note: Compile using the profile: LaTeX => PDF
- Then add the following command and try compiling. \includegraphics[width=1.5in]{marble4.jpg}
- You should see the following:



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• You should also note that [width=1.5in] is an optional argument that is being used to "size" the image.

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- You should also note that [width=1.5in] is an optional argument that is being used to "size" the image.
- Experiment a bit to see how changing this number alters the output when you compile.

- You should also note that [width=1.5in] is an optional argument that is being used to "size" the image.
- Experiment a bit to see how changing this number alters the output when you compile.
- Another way to "size" an image file is to use the command [scale=#], where # is a decimal number that alters the size of the image.

- You should also note that [width=1.5in] is an optional argument that is being used to "size" the image.
- Experiment a bit to see how changing this number alters the output when you compile.
- Another way to "size" an image file is to use the command [scale=#], where # is a decimal number that alters the size of the image.
- for example, [scale=.50] reduces the size of the image by 50%, and [scale=2.0] doubles the size of the image.

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Including .JPG Graphics

Including .JPG Graphics Files

• Next, try adding the file AttackMaybe.jpg to your document.

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- Next, try adding the file AttackMaybe.jpg to your document.
- It should look something like this (if you also center it):



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Including .JPG Graphics Files

• In addition to setting the width, you can also set the height.

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- In addition to setting the width, you can also set the height.
- You can also rotate an included image specifying an angle as an optional argument, which sets an angle or rotation clockwise in degrees.

- In addition to setting the width, you can also set the height.
- You can also rotate an included image specifying an angle as an optional argument, which sets an angle or rotation clockwise in degrees.
- The option: keepaspectratio, which can equal either true or false, can be used to maintain the aspect ratio of the original image.

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• Start by including the file: Flower.jpg with a width of 2 inches.

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- Start by including the file: Flower.jpg with a width of 2 inches.
- Now, include a second Flower.jpg, and specify a width of 2 inches and a height of 1 inch by using [width=2in,height=1in].

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- Start by including the file: Flower.jpg with a width of 2 inches.
- Now, include a second Flower.jpg, and specify a width of 2 inches and a height of 1 inch by using [width=2in,height=1in].
- Note that although the original image is shorter than it is wide, this command still squashes the image. To fix that, add keepaspectratio to the option list.

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- When you specify all three of these, LATEX adjusts the image so that neither the width nor height specification is exceeded.

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- When you specify all three of these, LATEX adjusts the image so that neither the width nor height specification is exceeded.
- Finally, add the optional command angle to alter the previous image, displaying it at the angle shown below:

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 PT_{EX} has several commands built in that help to organize longer documents into different sections.

We've already seen them in the Beamer lesson, but they apply to other document classes as well.

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LATEX has several commands built in that help to organize longer documents into different sections.

We've already seen them in the Beamer lesson, but they apply to other document classes as well.

The most common of these commands are as follows:

- \part{name of part}
- \chapter[shorter name]{full name of chapter}
- \section{name of section}
- \subsection{name of subsection}
- \subsubsection{name of subsubsection}
- \paragraph{paragraph heading}
- \subparagraph{subparagraph heading}

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Notes:

• Parts, chapters, sections, and subsections are numbered within the document.

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- Subsubsections, paragraphs and subparagraphs are not numbered, but, like the other categories, they are given a bold heading. Smaller categories get smaller heading fonts.

Notes:

- Parts, chapters, sections, and subsections are numbered within the document.
- Subsubsections, paragraphs and subparagraphs are not numbered, but, like the other categories, they are given a bold heading. Smaller categories get smaller heading fonts.
- All these commands are built into the article document class, with the exception of the chapter command, which is used in the report document class.

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- Go to the same site that you got all of the picture files from and
- download s2018-291-Week8ExampleDoc.tex.
- Make sure that you got all of the pictures as well.
- Put these all in the same folder.
- Open s2018-291-Week8ExampleDoc.tex and build your document and open the .pdf file.

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- Read the file to see how the use of sections and figures is done.
- Then add some additional sectioning that includes
 - Another chapter
 - Another section
 - Another subsection
 - Another figure using the file safety.jpg. Create a caption for it referring to the cat in the picture (who is Jackie).
 - Create a label for your new chapter and a label for your new figure.
 - Write a sentence that refers to the labels that you created.
 - Find the label that I had used for the figure with Whitey in it, and use that label in a sentence as well.

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Notes about Figures

- Figures can be added to documents, but note that the graphic is added separately within the figure environment.
- The options for the placement parameter are h, t, b, and p (for here, top, bottom, and page).
- Captions are allowed (and expected). You can put the caption command before the figure if you want it on top of it instead of below it.
- LATEX can also create a list of figures for your document, similar to a table of contents.

(There are more notes about labels at the end of this presentation as well.)

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Figures

- We had a title page and table of contents in our Beamer file a few weeks ago.
- We can have similar pages in other document classes.
- Go back to the example file on cats and create a title page:

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- We can have similar pages in other document classes.
- Go back to the example file on cats and create a title page:
 - To create a Title Page put the following in the preamble:

Figures

- We had a title page and table of contents in our Beamer file a few weeks ago.
- We can have similar pages in other document classes.
- Go back to the example file on cats and create a title page:
 - To create a Title Page put the following in the preamble: \title{title text} \author{name (or add \\ name 2, etc)} \date{enter desired date}

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Figures

- We had a title page and table of contents in our Beamer file a few weeks ago.
- We can have similar pages in other document classes.
- Go back to the example file on cats and create a title page:
 - To create a Title Page put the following in the preamble: \title{title text} \author{name (or add \\ name 2, etc)} \date{enter desired date}
 - Note that if you don't supply a date, LATEX automatically uses today's date.
 - All of the above merely gave LATEX information to put into a title page, but didn't create the title page itself. To do that, type \maketitle

just after the begin{document} command.

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Figures

Creating a Table of Contents and a List of Figures:

- To create a table of contents, just type the following command at the beginning of your document:
 - \tableofcontents

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Figures

Creating a Table of Contents and a List of Figures:

- To create a table of contents, just type the following command at the beginning of your document: \tableofcontents
- To create a list of figures in the document, just type the following command at the beginning of your document: \listoffigures
- Note: As was the case with Beamer, you have to build twice to get these to populate.

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• Sometimes, when we are creating a very large documents, you may want to create the final document by piecing several smaller documents together.

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- Sometimes, when we are creating a very large documents, you may want to create the final document by piecing several smaller documents together.
- LATEX has nice commands for doing this:

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- You can use either the "include" command or the "input" command.

- Sometimes, when we are creating a very large documents, you may want to create the final document by piecing several smaller documents together.
- LATEX has nice commands for doing this:
- You can use either the "include" command or the "input" command.
 - To use these commands, we first create a separate .tex file that contains all of the material that we want to include as a portion of the larger document
 - This file has only the material we want to include (no beginning) or preamble or packages. Not even begin and end document commands.)
 - When this material is included, it will be read by the compiler as if it was actually typed into the main document. BRABR B 990

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The syntax for labeling a numbered object is:

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The syntax for labeling a numbered object is: \label{NameOfLabel}

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- Labels for objects at lower (or higher) "levels" must be placed at the appropriate "level".

Creating Labels

The syntax for labeling a numbered object is: \label{NameOfLabel}

- Labeling can be done anywhere within the body of the environment you are labeling.
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- You are **Strongly** encouraged to put the labels **immediately** after the command that makes the object you are labeling.

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- You are **Strongly** encouraged to put the labels **immediately** after the command that makes the object you are labeling.
- The name you give you label can be whatever you want it to be.

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Creating Labels

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- The name you give you label can be whatever you want it to be.
- It is common, especially in long documents, to use something like: \label{Fig:NameOfFigure} or \label{Chap:NameOfChapter}.

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- Using this syntax, the names are just easier to remember (but longer to type).

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- The name you give you label can be whatever you want it to be.
- It is common, especially in long documents, to use something like: \label{Fig:NameOfFigure} or \label{Chap:NameOfChapter}.
- Using this syntax, the names are just easier to remember (but longer to type).
- The name you use never appears in your final document: Dr. Fagerstrom (MSUM) Math 291: Lecture 8 March 15, 2018 23 / 27

• When we reference a label, the compiler will insert the number associated with the object we previously labeled in the place where we type the reference command.

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- When we reference a label, the compiler will insert the number associated with the object we previously labeled in the place where we type the reference command.
- Note that **only** the number will be inserted. We will usually add our own accompanying text to smooth out the phrasing of the reference. For example, we may want to use phrases like:
 - "In Chapter \ref{label},..."
 - "...back in Section \ref{label}, ..."
 - "...as we see in Figure \ref{label}..."
 - "...using Theorem \ref{label} ..."
 - "...as in part (\ref{label}) above ..."

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• Specific labels are referenced using the command: \ref{NameOfLabel}.

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- Specific labels are referenced using the command: \ref{NameOfLabel}.
- Note that you will need to run LATEX **twice** in order for the labels to appear correctly.

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- Specific labels are referenced using the command: \ref{NameOfLabel}.
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- LATEX will show *warnings* (**not** errors) when the labeling doesn't work.
- For this reason, when we compile, we may need to read the log file a bit more carefully when we are using labels and references.

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- LATEX will show *warnings* (**not** errors) when the labeling doesn't work.
- For this reason, when we compile, we may need to read the log file a bit more carefully when we are using labels and references.
- If a reference is bad, or if you forgot to run LATEX a second time, ?? will appear in place of the label in your final document.

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The Varioref Package

• In larger documents, we may want to add page numbers to our internal references.

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- In larger documents, we may want to add page numbers to our internal references.
- This would allow us to have references like: "In figure 12.2 on page 12..."

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- The "varioref" package will allow us to create references with page numbers.
- For more information, the web is a wonderful thing...

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