Homework using LaTeX

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1   Introduction

LaTeX (pronounced Lay-Tek) is a computer typesetting language that is particularly good for technical writing. A user of LaTeX types code in a file with the extension ".tex" and then sends this file to a compiler, which interprets the code and produces an output PDF file (extension ".pdf").

For working with LaTeX you will want to use an Integrated Development Environment (IDE), which is a software application that facilitates the process of typing code, sending it to the compiler, and viewing the output. It usually has a split screen with the code on the left and the output on the right and with a button to press for compiling (though some IDE's compile automatically as you enter code).

I recommend that you use the online IDE called ShareLaTeX. The free version is all that you will need for this course.

2   ShareLaTeX

Register for a free account at ShareLaTeX (https://www.sharelatex.com/).

Click on New Project, choose Blank Project, and call it something like MATH 7310 Homework. You will be presented with the start of a document. On the far left you will see main.tex. This is the name of the file that contains the coding. To the right of that you will see the contents of that file, namely, the code. Then to the far right you will see the results of compiling the code.

Experiment a bit. For instance, under the line \section{Introduction}, type something like "I am excited about learning \LaTeX." Now click on the Recompile button and see the results on the far right pane. Go back to the code, leave a blank line after your first sentence, and type something else. Recompile.

Click on a word in the first line you typed (in the code) and then click on the

right arrow between the panes (the mouseover reads "Go to code location in PDF"). The first sentence in the PDF will be highlighted momentarily. Now, double click on a word in the PDF. The cursor in the code will move to the beginning of the paragraph containing that word. (I think the left arrow is supposed to have a similar effect, but I haven't been able to get it to work.)

Use the < and > arrows between the panes to hide and unhide them. Most of the time you will probably want to hide the pane at the far left (the list of files) and have the split screen view with the code on the left and the output on the right. There is a button at the upper right for toggling between the full screen view of the output and the split screen view.

The defaults for the output make the type so small that it is hard to read. Move the mouse toward the upper left of the output until you see a menu appear. Choose the left option "Fit to Width." Also, you can drag the divider between the two panes to the left in order to devote more space to the output. This will make the type larger.

The output should look just like the print in a textbook. If it doesn't look quite right (strange spacing, no serifs), then there might be an issue with your browser. As a test, type the word "file" in your code and recompile. If you just see "le" in the output, then things aren't working as they should since your viewer doesn't recognize the ligature "fi." I notice this problem using Internet Explorer 11 in Windows 10. If you have the same problem, you can try using a different browser. For instance, Google Chrome works fine for me. The problem involves just the browser's PDF viewer, so if you download the PDF file and open it using Adobe, things should look fine no matter which browser you use.

The next step is to learn a little bit about the LaTeX language so that you can start typing mathematics. I have provided a basic LaTeX Primer for this.

3 LaTeX Primer

Before proceeding, you need to have accepted my invitation to share a Dropbox folder and you need to have installed Dropbox so that you can navigate to the shared folder on your computer.

In the shared folder, inside the subfolder LaTeX, you will find two files: LaTeXPrimer.tex and 7310Homework.sty. Don't try to open these files on your computer. Unless you have LaTeX installed, your computer will not know how to open them. (They are actually simple text files, so you could tell your computer to open them using Notepad, for instance, if you wanted.) Instead, upload the files to ShareLaTeX as follows:

At the ShareLaTeX site, make sure that the pane to the far left with the list of files is visible and mouse over the icons at the top of that pane until you

find Upload. Click on this. Then click on the red Upload button that appears, navigate to the folder on your computer where the files are located, select the two files, and click Open. You should see the two uploaded files in the list at the left. (You can delete the file main.tex at this point.)

Click on LaTeXPrimer.tex to make it the active file. The contents of this file will appear. Now click on Recompile to see the results.

You are now ready to read through the primer. It will work best if you focus on the code, looking at the output only when you want to see the effect.

4   Preparing homework

After I send email announcing when the next homework assignment is due you will find a template for the homework (like HW1.tex) in the Templates subfolder of the shared Dropbox folder. Upload the template to your project, click on it to make it the active file, and you will be ready to type your solutions.

5   Submitting homework

When you have the homework the way you want it, submit only the code file (like HW1.tex) as follows:

At the upper left, click on the Menu icon (three horizontal lines) and under Download click on Source (a ZIP file). At the bottom of the screen, choose to open the ZIP file. You will see a folder with all of the code files currently in your project. Copy or drag *only the homework code file* (like HW1.tex) to the Submissions subfolder of the shared Dropbox folder. Look at the icon of the submitted file to make sure that a check mark appears showing that the file has been synced to the cloud. (If the check mark doesn't appear, it probably means that you have lost your Internet connection.) At that point I will receive notification on my computer that the file has been submitted.

That is all you have to do (except that you might want to do some clean-up by deleting the unused files from your download folder).

6   Alternatives

An alternative to ShareLaTeX is Overleaf (https://www.overleaf.com/). It works very much like ShareLaTeX. You could try both services to see which one you prefer.

You might also choose to install LaTeX on your computer. This would be desirable if, say, you didn't have access to a fast, reliable Internet connection. For this, I would recommend MiKTeX (http://miktex.org/download), which is a free download. MiKTeX is just the compiler, so along with it you would probably want an IDE (see the Introduction). MiKTeX comes with an IDE, called TeXworks, but there are probably better ones that you can download for free. (I use the IDE called WinEdt provided to me by my department. It's good, but unfortunately it isn't free.)