LaTeX Exercises

Due Monday, 4/6/20

1 Setup and Basics

1. Install a LaTeX editor, or use Overleaf, or in some way set up a functioning LaTeX editing system for yourself. [1]

2. Create a 'LaTeX' folder somewhere on your computer and, within it, create a new `.tex` file called `latex-exercises.tex`.

3. Open the `latex-exercises.tex` file with your editor, and before you do anything, familiarize yourself with your resources. Get the following manuals/tutorials:

   - AMS (American Mathematical Society) manual, `http://texdoc.net/texmf-dist/doc/latex/amsmath/amsldoc.pdf`
   - Another short manual, `http://www.docs.is.ed.ac.uk/skills/documents/3722/3722-2014.pdf`

   or any other tutorial you like. My favorite resource, which I use all the time, is the LaTeX Wikibook,

   - `https://en.wikibooks.org/wiki/LaTeX`

   I would personally just use this and the AMS manual.

4. Now, set up your first LaTeX document, by specifying the `documentclass` to be 'article,' and then begin and end your document, like this (I'm following the Wiki book):

[1] **Remark:** I have experience with Kile on Linux, Miktex on Windows, and Texworks on Mac, and of these three, Kile and Texworks saved me a lot of headache because they came with most of the packages I would ever want pre-installed. With more bare-bones editors you have to go into the 'file tree' and manually add each package (downloaded from CTAN or wherever). For example, you might want to add in a 'commutative diagrams' package, because you want to type up a fancy commutative diagram. If you're using Texworks, it has the `tikz` package already in there, so you just declare it in the preamble of your document—that's it!

```
\documentclass{article}

\begin{document}

... text goes here ...

\end{document}
```

5. Between \{documentclass} and \begin{document} goes the **preamble**, in which you declare all the packages you will use. At the very least, you will want to use amsmath, amsofonts and amssymb packages. To declare them, write

   ```
   \usepackage{amsmath,amsfonts,amssymb}
   ```

   There are other things you can include in the preamble, such as define color codes you will use later, define special commands, etc. For example, since I don't want to type

   ```
   \begin{theorem}
   ...
   \end{theorem}
   ```

   every time I declare a theorem, I create the new shortcut commands \bt and \et, like this:

   ```
   \newcommand{\bt}{\begin{theorem}}
   \newcommand{\et}{\end{theorem}}
   ```

   Then all I have to write is

   ```
   \bt
   ...
   \et
   to declare a theorem.
   ```

I'll stop here and let you explore the options on your own. To facilitate this, let's try the following exercises:

2 Some Practice LaTeX Exercises

1. Type your name in the top right corner of your document, and try compiling it (use the pdfLaTeX option to generate a PDF) to see how it looks.

2. Do the 'Easy' and 'Medium' exercises in Jason Gross: `https://web.mit.edu/~jgross/Public/latex/exercises.pdf`. That is, reproduce those two sections, and mark them off as separate sections.

3. In the next section, call it 'Arrays,' reproduce the following equations, with the right spacings:

$$\begin{aligned} a\alpha &+ b\gamma &&= 1 \\ a\beta &+ b\delta &&= 0 \\ c\alpha &+ d\gamma &&= 0 \\ c\beta &+ d\delta &&= 1 \end{aligned}$$

and

$$\begin{aligned} a\alpha + c\beta &&&= 1 \\ b\alpha + d\beta &&&= 0 \\ a\gamma &+ c\delta &&= 0 \\ b\gamma &+ d\delta &&= 1 \end{aligned}$$