Homework

1 What is LaTeX?

- LaTeX is a document markup language
- You prepare a (.tex) document, and compile it into a PDF
- LaTeX helps make your homework pretty (just like this document!) and makes us happy when you use it!
- Make sure to open the provided `.tex` file to see how we coded all of these examples

2 Editing LaTeX files

- You'll want to use some LaTeX editor to edit and compile your `.tex` files
- Try using Kile for now by typing `kile` into your terminal, or open an existing `.tex` file by typing `kile filename.tex`
- It may be useful to open Kile and Okular (a PDF viewer) side by side
  - Then when you make a PDF from Kile (by clicking the blue gear with a PDF symbol), your product will refresh in Okular automatically
  - The PDF will be created in the same folder as your `.tex` file

3 Code

Here is an example of putting code in your homework:

```
def bubbleSort(A):
    swapped = True
    while swapped:
        swapped = False
        for i in range(len(A)-1):
            if A[i] > A[i+1]:
                A[i], A[i+1] = A[i+1], A[i]
                swapped = True
```

4 Lists

1. Enumerate automatically makes appropriate
2. numbers or letters at the start of your

3. list items.

    a. Itemize uses bullets unless you make labels.

    - This has no label.

    i. This has a label.

        (a) Nested lists
        (b) of the same kind
        (c) look different

You can format any text as code, if you'd like, by declaring it as \verb|code here|.

5 Tables

Perhaps you would like to put a table in your homework—here is how. Note that 'lll' means three left-justified columns, whereas 'lcr' would be a left-justified column, a center-justified column, and a right-justified column. Also, in a table (and in general) double backslash creates a
new
line.

Name	Street Number	Other random number
Anastasia	1441	13577893
Bob	6461	9085653233

If you want lines on your table, just put them there with vertical bars and `\hline`.

Name	Street Number	Other random number
Anastasia	1441	13577893
Bob	6461	9085653233

6 Math

To make math things look like math, write them between dollar signs. If you use double dollar signs, then your math goes on its own line with nice spacing. You can write a lot of useful things this way.

6.1 Sums

This is a plain old sum: $\sum a_i = 10$
This is a sum with upper and lower bounds: $\sum_{i=1}^{5} 1^i = 5$
That's ugly, so here's a prettier version, also with double dollar signs:

$$\sum_{i=1}^{23} a^i = 5$$

CS 16: Homework #

If we just want one character, we don't need braces: $\sum_{1}^{8} x_i = 5$

6.2 Fractions (and other math, like logs, exponents, and roots)

We can do a similar thing with fractions: $\frac{1}{5}$

Here's another version: $\dfrac{1}{5}$

Sometimes we get really complicated fractions: $(\dfrac{\sqrt{2} - \log_2(\beta \bmod x)}{\log 5^{x+1} \times \dfrac{2}{3}} \times 5) + \delta \leq 12$

Note: you should use log and mod instead of just typing 'log' and 'mod'. To do bases, you typically use an underscore. For example, $\log_2 n^2$.

6.3 Prettier Equations and alignment

Align can be used to make your equations line up in nice ways. Note that the syntax is similar to the syntax for tables. It puts your equations in the center of the page and right-justifies them.

$$x + 3 = 5$$
$$2x + 30 = 5000$$

You can use double ampersands to separate multiple equations on one line.

$$x + 3 = 5 \qquad y < 1 \qquad x = y \tag{1}$$
$$x + 3 = 5 \qquad z \geq 2 \tag{2}$$

In general, putting a * means that your equations won't get numbered.

6.4 Big-O Notation

Big-O notation is just written with a big O, as in $O(n \log n)$.

6.5 Other random stuff that will be helpful

- Floors and ceilings: $\lfloor x \rfloor$ and $\lceil x \rceil$
- Comparison: $\{\leq, \geq, >, <, =, \neq\}$
- Macros:
  - This is in `inline verbatim`.
  - I write $n \log n$ a lot.

CS 16: Homework #

- Special characters:
  - \ (backslash) - escapes, begins macros
  - ~ (tilde) - an unbreakable space
  - _ (underscore) - subscripts in math mode (they cause errors outside of math mode)
  - ^ (superscript) - superscripts in math mode (they cause errors outside of math mode)
  - { , } (curly brackets) - group commands

7 Images

You can also include images, such as this one:

8 Pseudocode

```
Surround your pseudocode with
    this environment, which will both respect your tabs and line breaks
        and allow M α † h formatting to work.
            This environment comes with the package
                /course/cs0160/latex/cs0160.sty
                    which is included at the top of this file.
```

9 If you're super fancy

Firstly, you can define macros by putting something like this at the top of your homework:

```
\newcommand{\command}[# args]{whatever you want using #arg1 #arg2 #argEtc}
```

CS 16: Homework #

Secondly, you can reflect, rotate, and scale text, and anything else:

Thirdly, you can include packages by putting this at the top of your homework:

```
\usepackage{package name}
```