

LARSON—MATH 255—HOMEWORK WORKSHEET 06
Bard’s Sage Book—Files.

1. Log in to CoCalc.
 - (a) Start the Chrome browser.
 - (b) Go to <https://cocalc.com>
 - (c) Login (**your VCU email address** is probably your username).
 - (d) You should see an existing Project for our class. Click on that.
 - (e) Click “New”, then “Worksheets”, then call it **h06**.
 - (f) **Annotate your work carefully and completely. The more explanation the better!**

Files

Reading in, and working with, data files is an important ability. Last class we created a data file (`one_hundred_numbers.txt`), learned how to read it in line-by-line, and work with the data.

An important thing to know/note is that a file is actually a big *string*. You can read the lines of a file with `readline()`. Those lines are also strings (and not numbers - despite how they look). If you want numbers they must be converted to numbers.

2. Here’s one more **a multi-step problem that builds on what we did in classes**. Create a new file `prime_data.txt` that consists of the first 1000 primes, one line each. Do not cut and paste these primes from somewhere. Rather `open` a FILE object, write your data to it, line by line, and close that FILE when you’re done. Then go and look at your `prime_data.txt` to make sure it looks right.

Plots From Bard's Sage Book

The following readings and related work come from Gregory Bard's *Sage for Undergraduates* (published by Springer and also on Prof Bard's web page). Here's a link: <http://www.people.vcu.edu/~clarson/bard-sage-for-undergraduates-2014.pdf>

3. **Chapter 3 plots.** Chapter 3 is about making nice plots. This seems less like mathematics than setting up systems of linear equations and using `solve` or manipulating a matrix that represents the system. In fact a graph or a visualization can help a lot when you are thinking about a mathematical problem.

As you read through Chapter 3, **run all the code** that you see. Annotate appropriately. In particular I should be able to determine what section/subsection of Bard's book your code snippets came from. Make sure that the code runs—or get help.

If you are cutting and pasting you will discover that you have to re-type all the apostrophes, and put the code back on appropriate lines. Fix it up. It will work (I ran it all myself).

Important Note: When Prof Bard's book was written `print` commands like the following worked:

```
print "Hello World!"
```

This (Python-2 style) `print` syntax is no longer supported in Version 9.x of Sage. The (Python-3 style) `print` command requires parentheses:

```
print("Hello World!")
```

4. Change all of Bard's `print` commands to Python-3 style as you work through this text.

Getting your homework recorded

When you are done writing up your nicely annotated code examples...

- (a) Click the “Make pdf” (Adobe symbol) icon and make a pdf of this worksheet. (If Cocalc hangs, click the printer icon, then “Open”, then print or make a pdf using your browser).
- (b) Send me an email with an informative header like “Math 255—h06 worksheet attached” (so that it will be properly recorded).
- (c) Remember to attach your homework worksheet!