**Learn to Code in Python!!** Final Project

Watch *What most schools don’t teach* on YouTube.

Register for an account on Codeacademy.com and work through some of their exercises for learning to code in Python. It is recommended that you get through at least exercises 1 Python Syntax – 4 Functions while also trying some of the projects. You can use the attached cheat sheet or look up help online.

You will then go to plot.ly to write your own code! (Click on the Try It Out button at the bottom, then click on the new tab button that has a plus sign, click on Script to go to the editor where you will write and run your code).

Wouldn’t it be great if you could simply type in the coefficients [a, b, c, d, e] of any conic section equation:

and the computer could spit out the type of conic section it is, the center point, and the radius or major/minor axis vertices? Let’s try to write a program to do this for circles and ellipses.

**Mini Project #1: Start with circles.**

1. Your code should take the following values as input from the user: [a, b, c, d, e].

* Since we’re starting with circles and want to make this easy to begin with, make a and c positive 1.

1. The code should calculate the center point of the circle, outputting the correct value for h and k.

* Remember that h and k are opposite values than what is in the graphing form of the equation.

1. The code should calculate the radius of the circle, outputting the correct value for r.

* Remember that you must add the appropriate value to e and take the square root to get r.

Once you have this code running, try to write a code that can also take equations of circles that have values of a and c that are not 1.

**Mini Project #2: What about ellipses?**

Now update your code from above to recognize whether you have a circle or an ellipse. If it is an ellipse, it should output the major and minor axis vertices (a and b in the graphing form of the ellipse equation).

**Mini Project #3 (Extension): Prime Numbers**

This is a common interview question at Facebook. Try to write a function when given an integer, like 50, it returns the number of prime numbers less than the input value (50). What’s the largest number your program can handle?

Plotly has great graphing tools. You can try graphing the conic sections too!

**Remember to comment your code** so that others can understand what each part of your code is to do and why.

For your final project write up you should include your code and an example of a successful run. Explain any issues you encountered while trying to code and what you learned.