

WORKSHEET 1

WORKING WITH DATA

Goal: To create an executable Python program that will read in two columns of data from a text file and then plot that data.

A. GENERATE SOME DATA

First we need to create some fake data to work with. We want a single file, called `data.txt`, which has two columns of numbers – the first column x_i has 100 numbers going from 0 to 1.0, and the second column f_i corresponds to the function

$$f(x) = xe^{-x^2}.$$

Do this however you want - Python, Excel, by hand, whatever. Then we'll go over my method using Python and NumPy together.

B. PLOT SOME DATA

Now plot the data, using these basic steps:

1. Create a Python file called `plot.py`.
2. Use NumPy to read in the text file and assign arrays to each column.
3. Use Matplotlib to plot the data and display it on the screen.
4. Make the Python file executable so you can run it from the terminal.

Finally, consider some extensions to what you have:

- Comment the file so it's readable to others.
- Include an option to save the plot as a PDF file or PNG image.
- Extend the code to allow more than two columns, and provide an option for which columns to plot.
- Include an option to set the x and y limits of the plot.

Plus whatever else you think will be useful later.

C. GITHUB AND MAINTENANCE

Put the `plot.py` file on GitHub in the appropriate branch.

For the code maintainer this week: Look through all branches and decide on the cleanest, best example; put that on the main branch, make sure it's properly commented and has all the features it should. This main branch version will be the data plotting program we'll all use going forward.