

## Week 8, Lecture 2

In this lecture we look at examples from Matplotlib. This library was developed by John Hunter in 2002 and is useful for doing graphical displays.

We begin with 4 programs with examples of data in the form of  $(x,y)$  pairs and do "scatterplots" of the data. Because of how graphing routines draw on a page, moving left to right, you want to have the data pairs sorted so that the pairs are arranged in increasing values of  $x$  (because the graphs drawn going from left to right with  $x$ -values).

Because we used random pairs to start with, we just sorted the  $x$ -values (using function `mysort()`) without moving the corresponding  $y$ -values when we moved the  $x$ -values in increasing order. But to make the idea clear, we wrote function `mysort2()` which takes care of this problem. You see its use in programs 3 and 4.

Next we look at how to develop histograms. For this we look at two routines to do the same task: one a naive algorithm, and the other a faster algorithm. We first understand the run-time complexity of each algorithm simply by looking at the code loops. Next we look at how to do actual timing using the `time` module in Python.

We finish by looking at programs 5, 6 and 7. In program 5 we devise our own way of generating Normal random

variates, based on the Central Limit Theorem. Then we plot a histogram of Normal samples. In program 6 we read in data containing the prices of different meats and build a bar chart. In program 7 we read in data containing pet types and their rankings in terms of likability and plot a pie chart.

With these examples and others you find on the Matplotlib site, along with other similar tutorials, you should be able to develop good graphing skills using Python.