NUMPY EXERCISES

INTRODUCTION

This set of exercises leverages base python package functionality as well as Numpy. These exercises cover the following topics:

- Numpy

DATA USED IN THIS EXERCISE:

There is no external data used in this exercise.

QUESTIONS

1) Create an ndarray representing the following matrix of data:

4	6	7
3	5	7
2	5	4

   a. Subset the list down to the 1st row, 1st column
   b. Add the 2nd row, 2nd column to the 3rd row, 3rd column
   c. Get the average value for each row of data.
   d. Get the average value for each column of data.

2) Create a 10x100 array drawing from the random normal with mean=10, variance=25.
   a. First generate the data, and then reshape the array.
   b. "center" this array by subtracting the observed mean.
   c. "scale" this array by dividing by the observed variance.
   d. Confirm your result by calculating the columns means and stdev of the resulting array. What do you expect the mean and stdev to be?

3) Create a series randomly generated Poisson distributions with lambda varying between 1 and 20. The size of each distribution draw should be 15 samples (n=15).
   a. Calculate the variance and the mean for each series.
   b. Plot the variance against the mean…is the relationship roughly linear?
      i. Hint: Use the following code to make a basic x,y plot:
      ```
      import matplotlib.pyplot as plt
      plt.plot(x,y)
      ```

c. Repeat this exercises with n=50 in each group. How does this change your plot? Do it again with n = 100 and n = 1000. What is the relationship between the mean and variance in a Poisson distribution?