Lab 1

The purpose of this exercise is to get familiar with Python and your execution environment.

Get up and running with Anaconda for Python 3.x on your personal computer (https://www.anaconda.com/distribution/), using Google Colab online (https://colab.research.google.com/notebooks/intro.ipynb), or using the WAVE HPC (will show you during lab).

Demo and submit the files using the following format:

COEN140_Lab1_<firstName>_<lastName>_<problemNumber>

Part 1:

1. Define a function that takes an argument *n* and returns a list of odd numbers from [*0..n*]
2. Define a function to read the provided "students.csv" file.
    a. Sort the list returned by the above function and return it. Hint: Use Python's *list.sort()* or *sorted(list)*.
    b. Bonus: Instead of sorting by the first element (names), sort by the second element (ages). Google is your friend.
3. Define a function that counts the number of times all characters appear in a string and returns the most frequent character. It should run in O(N). Hint: Use a dictionary.
4. Redo Question 2 using Pandas DataFrames.

Part 2:

5. Write a program that uses NumPy creates two 100 x 100 arrays, then adds them together in two different ways: first by using a double for loop, and then by using the '+' operator.

   Time how long each method takes to add the matrices. Use the "time" module.
6. Time each method 1000 times and record the timing results in a vector of length 1000.

   For each method:
    - Print the average and standard deviation of the running time

    - Plot a histogram of the running times
7. Write a small example program of your own choosing in Jupyter Notebook. Clearly describe in the comments what the program is supposed to do, and make sure we can run it.

Useful resources on Python:

Google's Python class

The SciPy Lecture Notes

Stanford Python Numpy Tutorial

Python Subreddit