ISE 5123 Software Tools-Dec Support
Spring 2020

Homework 2
Due Date: February 21

There are 4 problems in this homework assignment. Submit the codes for all problems in a notebook file on canvas. All the problems are from our textbook:

1. A group of statisticians at a local college has asked you to create a set of functions that compute the median and mode of a set of numbers, as defined in section 5.4. Define these functions in a module named **stats.py**. Also include a function named **mean**, which computes the average of a set of numbers, and a function named **standardDeviation** that returns the standard deviation of those numbers. Each function should expect a list of numbers as an argument and return a single number. Each function should return 0 is the list is empty. Include a **main** function that tests the four statistical functions with a given list.

2. Convert Newton's method for approximating square roots (group assignment II/ Case Study 3.6) to a recursive function named **newton**. (HINT: The estimate of the square root should be passed as a second argument to the function).

3. Python's **pow** function returns the result of raising a number to a given power. Define a function **expo** that performs this task, and state its computational complexity using big-O notation. The first argument of this function is the number, and the second argument is the exponent (non-negative numbers only). You may use either a loop or a recursive function in your implementation. CAUTION: do not use Python's ** operator or **pow** function in this exercise!

4. Write the Fibonacci sequence as a linear (non-recursive) algorithm. Let the function take in the desired term in the Fibonacci sequence, and return the appropriate number. For example, the sequence starts as 1, 1, 2, 3, 5, 8, 13,..., so if the number 4 was passed as the argument, 3 would be returned as it is the 4th term in the sequence.