Programming Fundamentals Using Python

2018

Problem Set 6

Most recent updated: July 12, 2018

Objectives

1. Analyze algorithm

Note: Solve the programming problems listed using your favorite text editor. Make sure you save your programs in files with suitably chosen names, **and try as much as possible to write your code with good style (see the style guide for python code)**. In each problem find out a way to test the correctness of your program. After writing each program, test it, debug it if the program is incorrect, correct it, and repeat this process until you have a fully working program. Show your working program to one of the cohort instructors.

Problems: Cohort sessions

1. *Sorting: Insertion Sort* Write a function to do insertion sort for a list of numbers. Check: `https://en.wikipedia.org/wiki/Insertion_sort`. Measure the computation for a random list with size: 10, 100, 1000, 10 000, and 100 000. Store the time taken in a list and plot a graph of time taken versus the number of items in the list.

2. *Computation Time* Do the same time measurement using Python's built-in function, i.e. `sorted()`. Plot a graph of time taken versus the number of items in the list.

3. *Asymptotic Notation* Modify the x-axis so that you can get a linear graph for both insertion sort and Python's sort computation time.

4. *Algorithm analysis* Derive the asymptotic notation for insertion sort computation time.

End of Problem Set 6.