Lab 1 Exercises (12 Oct 2020)

Problem 1: Write a program that takes a positive integer as input and prints its factorial. Write two separate functions, one that computes the factorial iteratively, and the other recursively.

Problem 2: Write a program to print the first n Fibonacci numbers. Write separate iterative and recursive versions. Which version do you suspect is more efficient ? Why ?

Problem 3: Write a program that tests if a number is prime or not. Input a number from the user. The output should be 'True' if the number is a prime, 'False' otherwise.

Problem 4: Write a program to sort a list of integers using Insertion sort, Mergesort and Quicksort. First take as input the size 'n' of the array, then read in the 'n' input integers that need to be sorted.

Problem 5: Devise an experiment to verify that the runtime of the list index operator is indeed $O(1)$, You might want to read sections 2.5 and 2.6 of Miller and Ranum's book here: http://interactivepython.org/runestone/static/pythonds/AlgorithmAnalysis/PerformanceofPythonDataStructures.html and http://interactivepython.org/runestone/static/pythonds/AlgorithmAnalysis/Lists.html