National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Computing

CS250: Data Structure and Algorithms

Class: BSCS 5AB

Lab 8: Algorithms and Complexity

Date: 26th November, 2016

Time: 9am- 12pm / 2pm – 5pm

Instructors: Shamyl Bin Mansoor / Akhtar Munir

Lab 8: Sorting Algorithms and their Complexity

Introduction

We have been discussing sorting algorithms and their complexities using asymptotic analysis. We would like to now verify our theoretical analysis by conducting experiments with code to see if our analysis is correct.

Objectives

To do a complexity comparative analysis of sorting algorithms

Tools/Software Requirement

Visual Studio c++ / Java / Python

Lab Tasks

You are required to upload the lab tasks on LMS and the name of that tasks must be in this format YourFullName_reg#.cpp

Remember to comment your code properly.

Description:

Shell sort is an algorithm that exploits the properties of an insertion sort, improving on its efficiency. Since this is a Saturday, we will keep the lab short and simple to implement ☺.

Task 1

Implement Shell Sort with different N and with different values of H. Compare the performance of the algorithm with respect to number of iterations vs N and time taken vs N. Can you find a mathematical model for the best, average and worst cases?

Task 2:

Compare Insertion Sort with Shell sort for the same values of N vs time and plot the graph in excel or using any library. Take very large values of N.

Deliverable

Upload code and your word document that discusses your analysis of the three algorithms