

CS 241: Data Structures II - Fall 2011

Programming Assignment 5

This is an individual assignment. This will be a very simple programming project in which you will simply implement and compare several **sorting algorithms**.

You are to implement the following sorting algorithms:

- **Merge Sort**
- **Quick Sort**
- **Counting Sort**

The algorithms should be implemented to sort lists of integers. You will then perform the following experiments:

- Create lists of 100 randomly generated numbers between 0 and 1000, inclusive, then have each algorithm sort the lists, and record the time required to sort the lists in each instance (repetitions allowed).
- Repeat the experiment above for 1000 numbers between 0 and 10000, and 10000 numbers between 0 and 100000.

Perform 100 repetitions of each experiment, and report on the respective average times for each experiment.

Report

After collecting all the data you are to write an thorough report discussing your results. Alternatively, you may want to collect data on the memory usage for each algorithm, to make for a richer discussion, though this is not required. After all this, which algorithm would you say is the best? On what circumstances? Be thoughtful, and provide convincing arguments for your conclusions.

Deliverables

Your submission, to be made by email **before December 5, 2011 at 12:00am**, should contain the following items:

- **Source Code:** You will of course provide source code for your solution (no binaries), which should be **properly documented** with Javadoc. You must also submit HTML documentation generated from Javadoc. The code should be delivered in a **.zip** file, or a compressed **.tar** file (**.tgz**). You should also include a README file with any information pertinent to the execution of your program (e.g., command line options, etc.). Your source code should also contain functions to easily duplicate all your experiments.
- **Documentation:** You will submit a project report, that will contain at least: a description of the project, approach, experimental data, discussion of experiments, and conclusions/lessons learned.

This project is optional for extra credit in the class.
