

CS 202 – Fundamental Structures of Computer Sciences II

Assignment 1 – Algorithm Analysis

Due Date: June 24, 2012 (Sunday), 18:00

In this assignment, you are given a software program which is available at <http://www.cs.bilkent.edu.tr/~oalbayrak/cs202/hw1/hw1>. In this program 6 different sorting algorithms are implemented; insertion, bubble, selection, quick, merge and radix sort algorithms. These sorting algorithms are implemented according to the codes given in the course slides. Note that Quick Sort algorithm takes the first value as the pivot value.

In this assignment you are expected to match 6 unknown algorithms in the program to the sort algorithms given above. In order to run the program given, you must use the dijkstra environment which is a Linux based environment, if you don't have an account please contact your TA immediately (Omer Erdil Albayrak).

The executable requires 3 parameters from the user to run, these parameters are;

1. Index of the algorithm
2. Array Size
3. Order of the initial array (ascending, descending and random)

Note that;

- Index of the algorithm varies between 1 to 6
- Array Size varies between 0 to 500000
- Order of the initial array can be only "a" for ascending, "d" for descending and "r" for random.

For example, the program with parameters:

```
hw1 3 100000 r
```

Creates an array of size 100000 with random ordered numbers and sorts it with algorithm #3.

In this assignment you are expected to match 6 algorithms in the program to the algorithms given, insertion, bubble, selection, quick, merge and radix sort. In order to do this, test each algorithm with different sizes and different orders. Note that, some algorithms might have different complexities for different orders. Also for some algorithms there might be more than one answer.

You are expected to write a report showing your test results and graphs. And at the end of the report make a table showing your matching. Also explain your reasoning.

Hint: First study the algorithms, their best case, worst case and average complexities.

Note: If executable "hw1" doesn't run right away, use the following command to make it a valid executable.

- First enter the directory contains " hw1 "
- Then type the command " chmod a+x hw1 "