

5118006-03 Data Structures

Homework 6. Sorting

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Outline

- Due date: 7 PM, June 24 Mon
- Task
 - compare the runtime cost at sorting large data with four different algorithms
 - personal work
- Submission: via LMS
 - source code files
 - report (in PDF)
- Evaluation
 - test (30%)
 - source code quality (30%)
 - report (40%)

Tasks

- Implement the four sorting algorithms consistently on the given structure
 - insertion sort
 - quick sort
 - merge sort
 - heap sort
- Measure the time for completing the sorting
 - sorting a large number of double values
 - four datasets of different sizes are given
 - measure the average time over 10 runs

Base code: sort.c

- Usage: `./a.out -n <N> -i <in> -o <out> -s <algo>`
 - N: the number of double numbers in the input file
 - in: the name of the input file
 - out: the name of the output file
 - s: a sorting algorithm to use, which must be one of the following fours: insert, quick, heap, merge
- sort.c prints out the time taken at the sorting
- Task
 - implement the following four sorting functions
 - insertion_sort()
 - heap_sort()
 - merge_sort()
 - quick_sort()
 - you can add new functions if needed
 - you must not change the other given source code

Dataset

- Obtain the four data files at `data.zip`
 - `data-25000`
 - `data-50000`
 - `data-100000`
 - `data-200000`
- Task
 - measure running time of each sorting algorithm with each of the four dataset
 - measure the average running time over at least 10 repetitions

Report

- Write a 1-page report to describe the experiment results and discuss the comparison of the four sorting algorithms
 - draw the plots varying the size of input and the algorithm, and the running time
- You can use your convenient language, Korean or English, in writing this report