

Data Structures & Algorithms

Lab 2: Sorting Algorithms

Due on first session of lab 3 for your group

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Handing In

This lab should be completed and shown during the first session of lab 3 for your group. The TA will pass by your seat and evaluate each exercise. Upon successful completion of the lab, for each lab exercise, please provide a text file named `ex_n.txt` with the following content:

- indicate which file(s) implement the algorithm and/or data structure in the exercise;
- a brief explanation of the tests that were carried out to test the implementation;
- instructions on how to execute a test to verify the implemented code;
- answers to any theoretical questions asked in the exercise. Please submit all lab material collected into an archive (zip, rar, or tar.gz) via a Blackboard message to João Salvado and Federico Pecora.

Exercise 1 — Sorting I

Implement a sorting algorithm with quadratic complexity.

Exercise 2 — Sorting II

Implement a sorting algorithm with better than quadratic complexity.

Exercise 3 — Asymptotic Complexity of Sorting Algorithms

Choose the best algorithm (among Insertion Sort, Merge Sort and Quick Sort) to use in the following cases and explain your decision:

- The input array is sorted in descending order;
- The input array is sorted in ascending order;
- All elements in the array are the same.
- There are both positive and negative numbers in the array.

Exercise 4 — Testing I

Test your implementations with

- the lists given in Lab 1;
- your Swedish personal number (personnummer).

Exercise 5 — Testing II

Once you have completed the lab, test an exercise of a colleague and report which tests you conducted and the results of these tests.