Università
della
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Experimentation & Evaluation - 2024

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Assignment 1: The Bubble Algorithm Library

Bubble Inc. is a company developing a library providing utilities to Java developers. Among those utilities, the company would like to include the implementation of a sorting algorithm.

The company must decide **which of four candidate algorithms is the most suitable** to include in the final version of the library. The only **criterion** that will be used for this decision concerns performance, and in particular the **execution time** required by the three algorithms (the lower the better).

The four algorithms are provided in the Java files attached to this assignment:

- `BubbleSortUntilNoChange`
- `BubbleSortWhileNeeded`
- `QuickSortGPT`
- `SelectionSortGPT`

All of them implement the `Sorter` interface also provided in this assignment.

Steps to Perform

1. Design an experiment aimed at assessing the performance (running time) of the four algorithms, to provide an explicit recommendation to the Bubble Inc. company about the algorithm to include in their library. While one independent variable is obvious here (*i.e.*, the sorting algorithm), you can define multiple independent variables that you manipulate (*e.g.*, the type of data in the array to sort?). Try to come up with measurements that are as reliable as possible. Remember that measuring execution time is far from trivial. Repeat your measurements several times before reporting the results using descriptive statistics. Additional details are provided in the *experiment report template*, see point 4.
2. Develop the code needed to run your experiments. Write clean and well-documented code. This will help reproducibility. All code you used and the data you collected must be made publicly available for reproducibility. You can do that by creating a public GitHub repository and including its url in the report, or by submitting the material together with your assignment (as an archive).
3. Following your experimental design and using the developed code infrastructure, perform the planned measurements.
4. Summarize your experiment and its findings in the experiment report by making a copy of this template: `https://docs.google.com/document/d/1HO0JJgxPk6yLzUBy0lvHTZ-2GWu7FHLUNJz-8wTztos/edit?usp=sharing`.

Deadline for submission: Friday 8 November 2024 @ 18:00. Submit your report on iCorsi.