

## 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/1H00JJgxPk6yLzUBy0lvHTZ-2GWu7FHLUNJz-8wTztos/edit?usp=sharing>.

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