Engineering Topic

Computing Engine for Sorting Algorithms

Overview

The objective of the engineering topic is to develop software that provides a variety of sorting algorithms, intended as a programming or algorithmic teaching tool. This will be carried out as a team project. The development environment is flexible, but an object-oriented language (to which design patterns can be applied) and programming language in which a GUI can be built is recommended. So, for example your team can employ Java.

Requirement

Create software that takes a 1-dimensional integer array as input and sorts its elements in ascending order. Design and implement the software to meet the following requirements (your team will receive a reasonable grade for meeting the requirements).

- Not one, but several sorting algorithms are implemented.
- Software validity is ensured by data generators and testing engine.
- The software can be operated not only by CUI but also by GUI (no need to visualize the elements in this stage).
- The GUI provides easy-to-learn steps of the algorithm by visualizing the movement of elements.
- While meeting the above requirements, the software is designed to be flexible enough to expand when new sorting algorithms are added.
- Other innovations are incorporated to make the software a better educational tool (e.g. additional effects for visualization, analysis of complexity of each algorithm, etc.)

The project team should utilize a version management system to drive the development process.

Stages

1. Requirements identification and study of version management tools
2. Team formation, repository preparation, Algorithm implementation
3. Implementation of data generator and test engine
4. Design and implementation of the GUI
5. Implementation of visualizers
6. Refactoring to ensure maintainability and scalability
7. Presentation of the developed product

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