Requirement and Specification

This section specifies the requirements for our software. As mentioned before, the purpose of this software is to help users learn the principles and correctness of the sorting algorithm. Hence, users should have a basic understanding of what an algorithm is. Typical users include computer science students and those interested in sorting algorithms. The rest of this section presents the specifications of the software. The first part is an overall description of the user requirements of both functional and non-functional. The second part outlines functional system specifications and related non-functional specifications of the software.

User Requirements

Functional Requirements

Users want to learn sorting algorithms through the software.

Users want to watch animations of the process of sorting algorithms.

Users want to understand and prove correctness of sorting algorithms.

Non-functional Requirements

Majority but not all sorting algorithms will be animated.

System Specifications

Functional Specification

The lists give the main feature of what a stakeholder shall be able to do. We prioritized the requirements in which the highest priority is 2, followed by 1.5, 1, 0.5.

Priority is 2:

A user shall be able to access a starting module according to individual mastery level.

A user shall be able to select a module of a type of sorting algorithm.

A user shall be able to see the animation, which shows the sorting algorithm process.

A user shall be able to control the progress bar of the animation (previous step, next step, double speed, autoplay, pause, reset)

Priority is 1.5:

A user shall be able to follow the guide from the most basic algorithms.

A user shall be able to export learning notes.

A user shall be able to follow the novice operation guidance if it is the first time to access it.

Priority is 1:

A user shall be able to go back to the latest learned.

A user shall be able to compare different sorting algorithms’ time complexity.

A user shall be able to see his or her learning progress.

A user shall be able to do an after-class exercise.

Priority is 0.5:

A user shall be able to interact with the software to sort an array of numbers by itself.

A user shall be able to create breakpoints to see the output for each step.

A user shall be able to share and promote the software.

Unfunctional Specifications

1. Interoperability

The software should be able to run on windows.

1. Manageability:

The software should be able to provide a platform for users to write feedback to connect with developers.

1. Usability:

The software should allow users to input data by themselves, or systems will randomly generate input (random, nearly sorted, reverse, few unique).

The software should be Multilingual. The version of English, Chinese and other languages should be available.

The software should be able to provide the code using C, Python, and Java language.