There exist several sorting algorithms, such as bubble sort, selection sort, insertion sort, merge sort, quick sort, heap sort, etc. There is a project about animation of the running process of sorting algorithms in the academic year 2016-2017. However, this project has a different emphasis, which is to help users to understand and prove the correctness of sorting algorithms. Students are expected to come up with new ideas and develop a new software from scratch (not build it upon the 2016-2017 project).

This project aims to develop an open-sourced software which helps students visualize and understand sorting algorithms and their correctness.

Most beginners of computer science need to learn sorting algorithms. A sorting algorithm is a sequence of steps which provides a solution to sorting problems. Sorting is often used in our daily life. For instance, if teachers need to enter students’ exam marks by student IDs to make the process of entering marks easier, they can use sorting algorithms to sort answer sheet first. Sorting algorithms are an essential part of algorithms and data structures. By learning sorting algorithms, people can save time when solving sorting problems. However, sorting algorithms are challenging to understand by only reading the descriptions in pseudo-code or programming languages. It is necessary to find some methods to enable more efficient ways of learning sorting algorithms.

The problem that this project aims to solve is:“How to develop a software tool to help people learn sorting algorithms more efficiently.”

To solve this problem, we find that a visualization is a useful tool. It describes the execution of sorting algorithms as a continuous sequence of graphical images. Michael claims that animations help people remember algorithms better because they explain a dynamic, evolving process clearly [1]. Lawrence, Badre, and Stasko utilized animations to help teach undergraduates about minimum spanning tree algorithms in 1994 [2]. A significant benefit was found when students could interact with the algorithm animations in a laboratory context. In this project, we will develop a creative open-sourced software to visualize sorting algorithms. This software should help people understand the correctness and efficiency of the sorting algorithms, facilitate learning and increase the interest of people.

1. Project introduction

动机：

引出问题

发现问题的契机（为什么发现了这个问题

分析：

问题的背景（应用性，普遍性，重要性，急缺性，贡献性

解决问题的好处，收益群体，资料支撑

目标与实现：

设想以及对于设想的分析

我们预计的实现

我们预计的时间线？

2. Team introduction

3. Sorting algorithm introduction