Expanded the introduction

Introduce the sorting algorithms first

先介绍下

描述一下aim，要写出来aim和object是什么

用section number来写

写main content和structure，用section，强调结构。

举例子什么事排序算法

为什么排序算法很重要

详细的information

1. Introduction

Sorting is an operation that arrange a list of elements to be ordered ascending or descending in terms of one or more standards. Sorting algorithms are systematic methods to achieve this. A set of number can become ordered and display in an ascending order after using a sorting algorithm. There are many sorting algorithms applying different strategies. Sorting algorithms are valued many areas, such as big data processing. A good sorting algorithm can save many resources and time. In that case, sorting algorithms are considered as an essential part when learning algorithms and programming. However, they are not easy to be fully understood and implemented by beginners.

Animation is now widely used in educational area. Many researches have proved the effectiveness of algorithm animation in teaching and learning **[NUM]**. Though there are many existing similar software in the market, few of them are used among students, who are the main stakeholders for this type of software. Besides, many of them find difficulty when learning sorting algorithms. Therefore, developing a sorting algorithms animation software is necessary. Algorithms’ correctness is a more abstract concept, but useful for leaning, including this in the software could help advanced learners.

In this chapter, brief introduction of this program will be presented in three parts. Section 1.1 will introduce the motivation of doing this project and problrm description. Team’s aim and objectives is to develop an educational effective program and the animation process of sorting algorithms, more specific information is in section 1.2, and section 1.3 describes work the team plan to do to solve the problem.

**reference**

Végh, L., & Stoffová, V. (2017). Algorithm animations for teaching and learning the main ideas of basic sortings. Informatics in Education, 16(1), 121–140. <https://doi.org/10.15388/infedu.2017.07>

1. Background Information and Research

To know more about situation in the existing market, background research has been done. There are four sections in this chapter, 2.1 will present some collected background information. Analysis to existing similar software are included in section 2.2. Main stakeholders of this software have been confirmed as year 1 computer science students and beginners in learning programming. Other stakeholders are advanced learners who are interested in algorithm correctness and algorithms teachers. To gain requirements from them, focus group, a survey, and an interview to algorithm teacher have been accomplished. Brief reports are presented in 2.3 market research section. Furthermore, what is introduced in section 2.4, technical research was done to help the team make implementation decisions.

1. Requirements Specification

Requirements specification is a process of how the team gain proper and reasonable requirements from stakeholders. It is the foundation of this project **[NUM]**. Requirements should be precise and complete for team to develop further steps based on them. This chapter consists of use requirements, system specification and user story.

After analyzing and collating data gained from last stage, specific requirements and system specification have been confirmed. Section 3.1 and 3.2 will include this. Then, in section 3.3, user story is produced to further enhance the team’s understanding of requirements.

**Source**: Brian Lawrence, Top Risks of Requirements Engineering

1. Design

To design this software, its basic usage and appearance should be confirmed first to make next stage’s implementation more efficient. UMLs and low-fidelity prototype for user interface (section 4.3) are helpful in establishing this part. Particularly, team 10 has drawn use case diagram and sequence diagram, they are in section 4.1 and 4.2. Low-fidelity is shown in section 4.3.

1. Implementation

This chapter claims implementations that have done by the team. Basically, it will include decisions the team made. Team decided the program’s platform, programming language, software framework, development tools and IDE according to technical research and stakeholders’ preference. Version control and teamwork tools are applied to help validate the workflow, file sharing and team management. Results and analysis are presented in section 5.1. Further, team 10 has produced a high-fidelity prototype. Section 5.2 will show that.

1. Problem Encountered and Risk Management

As a team, conflicts cannot be avoided during teamwork. Section 6.1 includes problems that team 10 has already encountered. Team 10 also did risk management before the project started to effectively solve these problems, it is claimed in section 6.2.

Team 10 has worked on project 20, Animation of Sorting Algorithms and their Correctness, for approximately 10 weeks. This project asks the team to develop a software to animate the process of sorting algorithms working and help user learn sorting algorithms and their correctness. To achieve this, team 10 will go through the whole software engineering process, including background research, requirements specification, software design and implementation. Chapter 1 will briefly introduce the whole project. Next chapter is about background research, which includes