Software Requirements Specification

(SRS)

for

Merge Sort Simulator

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1.0 INTRODUCION

1.1 Scope

The project "Merge Sort Simulator" aims to implement a software which simulates the way sorting problem is solved using any number of element using Merge Sort.

This document provides an insight of all the requirements which will be fulfilled by the software.

1.2 Technologies used:

Front End: Python Tk, Python turtle

Back End: Not used

IDE: Pycharm

2.0 General Requirements

2.1 Functionalities

A) After clicking the executable file, a login screen will appear which would welcome the user and login the user for the sorting of their required list. Then there would be an 'LOGIN' button which will redirect the user to the next window.

B) The next window will be the main window which will simulate the Merge Sort algorithm. It will ask the user to insert the number of element for which the sorting animation of the problem is to be displayed using merge sort. After the user has entered the animation will be displayed on the screen. The user will also be able to adjust the speed with which the problem is solved.

C) Then there will be an option of resetting the input so that the user can enter other input. There will also be a button which will help the user to exit the software.

2.2 Use Case Model Diagram

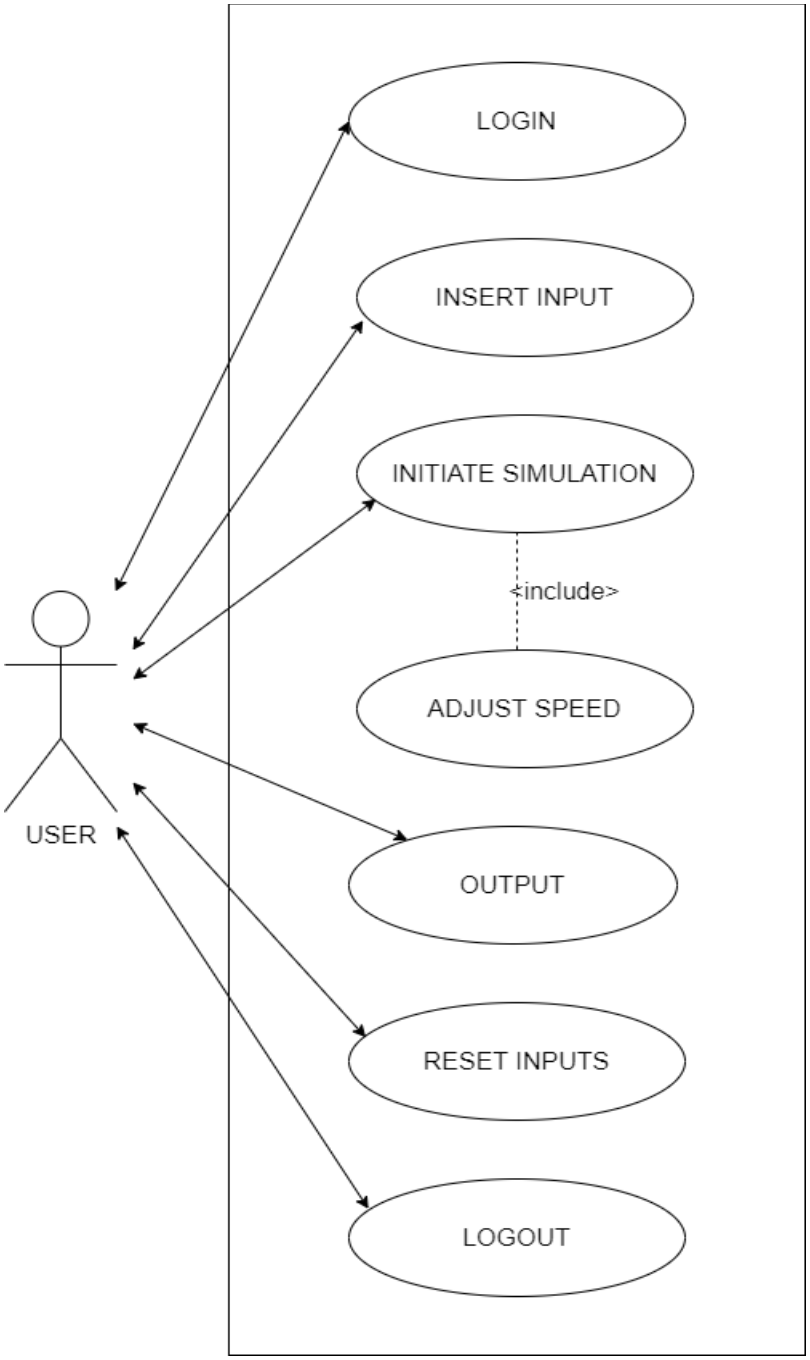

Fig 1.1 Use Case Diagram for Merge Sort Simulator

2.3 Interfaces:

Python interface to the Tk Graphical User Interface toolkit shipped with Python3.7.+.

2.4 General Constraints:

The number of element in this sorting algorithm is restricted to 30 for best simulation as number of disks greater than that would not be visualized properly due to screen dimension limitation. The elements position be fixed to “source”, “auxiliary”, and “destination” which the user will not be able to change as it creates confusion in deciphering the illustration.

2.5 Supplementary Requirements:

i)Operating System: Windows 7 or above, Linux (Debian or Ubuntu based), MacOS Yosemite or above

ii)Python 3.7+

3.0 Definitions, Acronyms and Abbreviations.

Merge sort is an efficient, general-purpose, comparison-based sorting algorithm. By using this, implementations produce a stable sort, which means that the order of equal elements is the same in the input and output. Merge sort is a divide and conquer algorithm.

A merge sort works as follows:

1. Divide the unsorted list into *n* sub lists, each containing one element.
2. Repeatedly merge sub lists to produce new sorted sub lists until there is only one sub list remaining. This will be the sorted list.

Data Structure: Array

Worst Case Performance: O(nlogn)

Best Case Performance: O(nlogn) typical, O(n) natural variant

Average Performance: O(nlogn)

Worst Case Space Complexity: O(n) total with O(n) auxiliary, O(1) auxiliary with linked list

Where n is the number of element

GUI: Graphical User Interface

Python Tk: Tkinter Python GUI

4.0 References:

https://krazytech.com/projects/sample-software-requirements-specificationsrs-report-airline-database

https://visualgo.net/en

https://www.geeksforgeeks.org/merge-sort/

https://en.wikipedia.org/wiki/Merge_sort

SRS of a senior shared by the teacher in the google classroom.