**Programming Project Report**

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**Academic Integrity Statement:** I pledge that I have neither given nor received unauthorized help on this programming assignment.

**Problem Statement:**

The goal of this project was to create 4 sorting algorithms called merge, quicksort, selection sort, and insertion sort. The input of this is a book.csv file that contains a large number of books with a bunch of characteristics. The goal of the algorithms are to sort the csv file as quick as possible then push the changes to a csv file.

**Design:**

The design of this program will consist of 3 files. The book.h and book.cpp contain the class of the book and will allow us to get attributes of the book.csv. The main.cpp will contain a readFile, writeFile that will be able to read and write the file provided. Then there are 4 algorithms that need to be produced. The quicksort algorithm needs 2 functions to operate due to a partitions needed. Then these algorithms will be called in main and then using the clock class to capture the run times of each algorithm.

**Implementation:**

The first implementation was of the book.h and book.cpp which contains all the attributes of a book. Then in the main function the write and read functions were added, then the insertion sort. Following this the selection sort, partition, and quick sort were added. Finally merge was worked on, this one was troubling as there were many problems with it. After merge was added, all of the functions were implemented in main. Finally the clock was added to monitor run time.

**Testing:**

Testing this project was very straightforward as it was all based on the algorithms efficiency to process and sort data from a provided csv file. The following image shows that selection Sort is the slowest of the algorithms, followed by insertion sort, then merge sort, and finally the fastest algorithm quick sort.

Text, chat or text message

Description automatically generated

**Conclusions:**

The project was a success as each algorithm was able to successfully sort a different index of data at their respective speed. If this project were to be continued more algorithms would be added. This project took 5 hours to complete with the report.