Project Design/Implementation Document

1 Title Page

Class Project(Student database), Thanh Hung Tran, 04/13/2022

2 Problem Description

The program presents the user with a menu that contains a couple of options. This includes R1(read), R2(add new item), R3(search), R6(write), R7(display on screen), R8(calculate and display summary)and R11(exit). Overall, this program help store students' performance on quizzes and exams.

3 Overall Software Architecture

database.cpp contains the main function, as well as menu(). In main(), we have the vector that stores all of the gradeItem, mains() would also make a call to menu() to start the program. Menu() present the user with a list of options. R1() ask the user for the name of the file they want to read from and store the information in a vector. R2() add a new item to the list/vector. R3() prompt the user for what they want to search by. Then search all of these items that correlate with the user's input and display them. R6() prompt the user for the file name that they want to write to and then writes the information to that file. R7() display all of the data onto the screen(terminal). R8() calculate the summary of all grade item and display them. R11() allow the user to exit the program.

4 Input Requirements

Input from file:
Date: string, less than 10 characters
Description: string, less than 20 character
Type: string, less than 12 characters
MaxGrade: int, less than 9 characters
Grade: int, less than 9 characters

Input from users:
Option selection: string, must be either R1, R2, R3, R6, R7, R8, or R11 (case sensitive)
Options if user select R3: R3.1, R3.2 (case sensitive, string)
Filename for both R1() and R6(): string

5 Output Requirements

Output to file:
Header: string
Date: string, less than 10 characters

Description: string, less than 20 character
Type: string, less than 12 characters
MaxGrade: int, less than 9 characters
Grade: int, less than 9 characters

Output to terminal(screen)
Header: string
Date: string, less than 10 characters
Description: string, less than 20 character
Type: string, less than 12 characters
MaxGrade: int, less than 9 characters
Grade: int, less than 9 characters
As well as the summary of all grade item if R8() is chosen
Everything is format as a table

6 Problem Solution Discussion

R1(Read) is O(n): Go through the input files line by line and store the information into a vector
R2(add new item) is O(1): add a new GradeItem object to the end of the vector
R3(search) is O(n): Go through the vector(container) and compares the user input with what is in the vector, if they matches, display.
R6(write) is O(n): Go through the vector(container) one by one and output it into the provided file
R7(Display) is)(n): Go through the vector(container) and display all of the elements line by line in a table format
R8(Calculate and display summary): Go through the vector(container) and pick out separate gradeItem types and calculate a summary of them. Finally, calculate the grand total, percentage, and letter grade from those summaries.

7 Data Structures

I chose vector as my data structure because it allows me to navigate through the container effortlessly. The data that I'm getting is also simple and therefore vector is the best fit

8 User Interface Scheme

Menu:
Please select one of the following options(Case Sensitive):
R1-Read the csv formatted database file.
R2-Add a new grade item
R3-Search for grade items
R6-Save the grade items into a csv formatted file.
R7-Display list of grade items on screen.
R8-Generate summary of grade item
R11-Exit

R1():
Please provide the name of your input file:

R2():
Please enter the date:
Please enter the description:
Please enter the type:
Please enter the max grade:
Please enter the grade:

R3():
Please select what you want to search by:
R3.1-Search by date
R3.2-Search by description

R6():
Please provide the name of your output file:

R7() and R8(): Display all the information

9 Status of Application

I developed the program on visual studio code and checked it on csegrid. The program compiled and operate correctly

10 This is a living document and will be updated after each phase of the project.