Republic of the Philippines

University of the Philippines Cebu

College of Science

Mathematics and Statistics Program

KYoTI - Keep Your Track Iskolar: A Grade Tracker and Calculator

A README File

Submitted to the Department of Computer Science

In Partial Fulfillment of the Requirements of

CMSC 21.1 – Fundamental Programming Laboratory

Section D Group 2

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I. Project Overview

KYoTI is a software application designed to help students accurately track their grades and calculate their General Weighted Average (GWA), even without an internet connection. By utilizing file manipulation techniques, it allows users to fully manage their data—viewing, updating, and deleting records at any time. This project demonstrates the practical application of fundamental C programming concepts in building a functional and interactive tool.

II. Features

KYoTI is a grade-tracking and calculator software application developed using the C programming language. It enables users to:

- **Save and store your grades.**

  It allows the users to input their grades and save them to a file, ensuring that their data are not lost even after closing the program. By using file manipulation, the data can be accessed, updated, or deleted anytime, giving users full control over their data.

- **Arrange your grades**

  It uses structures to group related data such as subject names, grades, units, and such. With the help of pointers, it manages memory and enables sorting and rearrangement of grades based on user preferences, such as sorting them in their designated tab.

- **Calculate and predict your GWA**

  It includes functions that automatically calculate the General Weighted Average (GWA) based on the grades and units entered by the user. It will also use

functions to predict future GWAs by allowing users to input their hypothetical grades as well as setting target GWAs, helping them set academic goals ahead.

III. How to compile and run your program

Important Reminders

1. The database is specifically designed for BS Mathematics students. It includes only the courses and General Education (GE) subjects taken by BS Math students, based on the study plan provided by the Office of the University Registrar (OUR).
2. PE and NSTP are not included in the database, as they are not part of the GWA (General Weighted Average) calculation.
3. The course code entered must strictly follow the format and records provided by the Office of the University Registrar (OUR) in order for the program to recognize and process it correctly.
4. The code is case sensitive when taking inputs that is why you have to make sure that your inputs follow the format. Otherwise, you will be asked to input again and/or complications may arise.
5. The program currently does not include an option to edit the CSV files (such as user.csv) directly, except for adding grades. This means that if there is a mistake when inputting grades, you won't be able to correct it within the program itself.

   To handle this, it's recommended to either:

   - Use an external CSV editor (like Excel, Notepad, or any text editor) to make corrections manually, or
   - Keep backup copies of the original user.csv file (e.g., user_backup.csv) before making changes, so you can easily restore the data if needed.
6. The user also needs to be extra cautious, as the program does not check for duplicate course entries.
7. Once a menu option is selected during program execution, there is no option to go back or undo the action.

Instructions to Compile and Run the Program:

1. Make sure you have a C compiler installed. For Windows, we recommend installing **MSYS2**, which provides tools like gcc for compiling C code.
2. Download the following files:

- main.c (the source code)
- user.csv
- database.csv

3. Place all three files in the same folder.
4. Open **MSYS2** and navigate to the folder containing your files. You can do this by typing: ***cd /path/to/your/folder***
5. Compile the C program by typing: ***gcc main.c -o main.exe***
6. To run the compiled program, type: ***./main.exe***

IV. Sample Input/Output

- **Main Menu**

```
HELLO USER!

Please Select an Option
******************************
(1) Input Course
(2) Input Grades
(3) Calculate GWA
(4) Forecast GWA
(5) Print database
(0) Exit
******************************
ENTER CHOICE:
```

- *Invalid Input*

```
ENTER CHOICE: 7

******************************

Invalid choice!

******************************
```

- **Successful Input of Grades & Course**

```
Before we begin, please be reminded of the applications strict input formats.
Academic school years should be inputted in the format YYYY-YYYY.
Semesters inputs should be a number between 1 to 3. 1 meaning the first semester,
2 meaning the second semester, and 3 meaning the third/summer semester.
Course codes should be inputed WITHOUT spaces and letters should ALL be uppercase.
The course codes should be the same as those used in the official study plan
given by the OUR.

Sample Input: 2024-2025 2 CMSC21

*****************************
Enter the academic school year, semester, and course you're taking:
2024-2025 2 CMSC21

Do you wish to input a grade? Input 1 if yes, 0 if no.
1
Enter the grade you recieved:
1.0

Do you wish to continue inputting courses? Input 1 if yes, 0 if no.
1

Enter the academic school year, semester, and course you're taking:
2024-2025 2 MATH111

Do you wish to input a grade? Input 1 if yes, 0 if no.
*****************************

Enter the academic school year and semester you wish to input grades for:
2024-2025 2

*****************************

*****************************
There are no courses inputted that occur within the school year and semester you inputted.

Here is the updated database.

A.Y. SEMESTER COURSE UNITS GRADE
 2024-2025 2 CMSC21 3 2.50
 2024-2025 2 CMSC21 3 1.00
 2024-2025 2 MATH111 3 1.75

*****************************
```

    - *Invalid Input*

```
Do you wish to input a grade? Input 1 if yes, 0 if no.
1
Enter the grade you recieved:
0
Error! Invalid input. The UP grading system uses numbers in 0.25 increments. Try again

Enter the grade you recieved:
```

```
Do you wish to input a grade? Input 1 if yes, 0 if no.
0

Do you wish to continue inputting courses? Input 1 if yes, 0 if no.
2
Error! Invalid input. Inputs must either be 1 for yes or 0 for no. Try again.


Do you wish to continue inputting courses? Input 1 if yes, 0 if no.
```

```
******************************
Enter the academic school year, semester, and course you're taking:
2024-2025 2 PSYCH111
Error. The inputted course code isn't in the database. Please try again.


Enter the academic school year, semester, and course you're taking:
```

- **Calculated GWA**

```
Enter the academic school year and semester you wish to calculate the GWA for:
2024-2025 2
Your GWA in the 2nd semester of the 2024-2025 A.Y. is 1.125.

******************************
```

- **Identify target grades to attain a desired GWA**

```
Enter the academic school year and semester you wish to forecast the GWA for:
2024-2025 2
Enter the target GWA for that semester:
1.001

*****************************

GWA FORECASTER MENU
Please Select an Option
(1) Set temporary grades
(2) Set the maximum and minimum grades
(3) Forecast GWA
(0) Return to main menu

*****************************
ENTER CHOICE: 2
*****************************


Enter your best possible grade: 1.0
How many classes at least will have that grade?
2
Enter your worst possible grade: 2.0
How many classes at least will have that grade?
1

*****************************


GWA FORECASTER MENU
Please Select an Option
(1) Set temporary grades
(2) Set the maximum and minimum grades
(3) Forecast GWA
(0) Return to main menu

*****************************
ENTER CHOICE: 3
*****************************


It is impossible to attain your target GWA with the parameters set.
Kindly try again


*****************************
```

V. Programming Concepts Used

KYoTI is a C program that demonstrates the use of the following programming concepts:

- **Structures:** The program uses typedef struct to define custom data types such as courseProfile, courseToUnit, and minmaxGrade. This allows grouping related data into single units, facilitating organized and manageable code when handling complex information.
- **Functions and Modularity:** The program is divided into multiple functions, each responsible for a specific task (e.g., inputCourse, inputGrade, gwaCal, and printFile). Functions receive arguments by value or by pointer, including file pointers and pointers to structures, promoting code reuse and modular design.
- **Arrays and Strings:** Character arrays are used for string storage and manipulation, utilizing functions such as strcpy, strcmp, and strtok. The program employs both one-dimensional arrays (e.g., char buffer[], int unit_count[]) and arrays of structures (e.g., courseProfile arr[]) to manage collections of data efficiently.
- **Pointers:** Pointers are extensively used for file operations and data manipulation, particularly when passing file pointers (FILE *fp) and pointers to structures or arrays to functions. This enables dynamic and efficient memory and resource management.
- **File Manipulation:** The program performs file input/output operations using standard library functions such as fopen, fgets, fprintf, fflush, and fclose. It reads from and writes to CSV files, allowing persistent storage and retrieval of course and grade data.
- **Control Structures and Input Validation:** The program uses loops (for, while, do-while) and conditional statements (if, switch) to control program flow and validate user input, ensuring robustness and a user-friendly experience.