**Documentation**

**for**

CGPA Calculator

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**Language:** English

### ****1. Description****

The program calculates the Cumulative Grade Point Average (CGPA) of a student based on their grade (A-F), the number of courses completed, and the time spent (h) in each course. It allows the user to enter data for the student, their courses, grades, and credits, then calculates and displays the student’s CGPA. Additionally, the program outputs a list of all courses and their grades.

### ****2. Code Structure****

The program is divided into 4 main files:

* **“main.cpp”**: The main file of the program, which contains the main function and handles interaction with the user.
* **“student.h”**: Header file containing the definition of the Student class, which manages information about the student and their courses.
* **“student.cpp”**: Implementation of the methods of the Student class.
* **“course.h”**: Header file for the Course class, which contains information about individual courses of the student (name, credits, grade).
* **“course.cpp”**: Implementation of the methods of the Course class.

### ****3. Description of Classes and Functions****

**Course Class**: Represents a course that the student may choose. It contains information about the course name, credits, and grade.

* Methods:
  + Course(string courseName, int credits, char courseGrade): Constructor that initializes a Course object.
  + string getName() const: Returns the name of the course.
  + int getCreditHours() const: Returns the number of credits for the course.
  + char getGrade() const: Returns the grade for the course.
  + double getGradePoint() const: Converts the letter grade to a grade point based on the 4-point system.

**Student Class**: Represents a student with their courses, credits, and grades.

* Methods:
  + Student(string studentName): Constructor that initializes a Student object.
  + void addCourse(string courseName, int creditHours, char grade): Adds a new course to the student's list of courses.
  + void displayCourses() const: Displays the list of the student’s courses.
  + string getName() const: Returns the name of the student.
  + double calculateGPA() const: Calculates the student’s GPA (Grade Point Average) based on their courses and credits.

**Main Function**:

* The user enters data for the student and their courses.
* The program collects data for each course (name, credits, grade).
* The program outputs the information about the student’s courses and calculates the CGPA.

### ****4. Program Usage****

* a) Run the program from the terminal or IDE.
* b) Enter the name of the student when prompted.
* c) Enter the number of courses the student has.
* d) For each course:
  + Enter the course name.
  + Enter the number of credits for the course.
  + Enter the grade (the letter grade from 'A' to 'F').
* e) The program will calculate and display the student’s GPA.

### ****5. Errors and Remarks****

* **Invalid Grade Input**: The program only accepts grades from A to F. If an invalid grade is entered, the user will be prompted to enter a valid value.
* **Course Count**: The program does not accept negative numbers for the number of courses.
* **GPA Calculation with 0 Credits**: If no courses are entered (i.e., 0 credits), the program will give a GPA of 0, which may not be logical.
* **Limited Course Addition**: The program does not check whether the student has added more than one course with the same name.
* **Grades with Plus or Minus**: The program does not support grades with pluses or minuses, such as "A+", "B-", etc.
* **No Long-term Data Storage**: The program does not store information about students or courses for the long term. If the program is closed, all data is lost.

### ****6. Future Improvements****

* Adding a graphical user interface (GUI) to make the program more user-friendly.
* Adding the ability to save data to a file