Question:

You are a software developer tasked with creating a GPA Calculator for a university's student portal. The university follows a grading system where each course is graded based on marks obtained (out of 100), and each grade corresponds to a specific grading point. Students enroll in multiple courses, and each course carries a specific number of credit hours.

Develop and **accomplish** a system that should allow the user to:

a. Input the **course name**, **marks obtained** (out of 100), and **credit hours** for each course. [A semester has maximum of 5 courses]

b. Convert the marks into a **grading point** based on the following scale:

Marks Range	Grading Point
85 - 100	4.0
80 - 84	3.7
75 - 79	3.3
70 - 74	3.0
65 - 69	2.7
60 - 64	2.3
55 - 59	2.0
50 - 54	1.7
<50	0.0

c. Calculate the **GPA** using the formula:

$$\text{GPA} = \frac{\sum(\text{credit hours} \times \text{grading points})}{\sum \text{credit hours}}$$

d. Display the **GPA** at the end.

e. The program should **keep running** until the user selects the **Exit option** from the menu.

f. The program should have data validation.

Code:

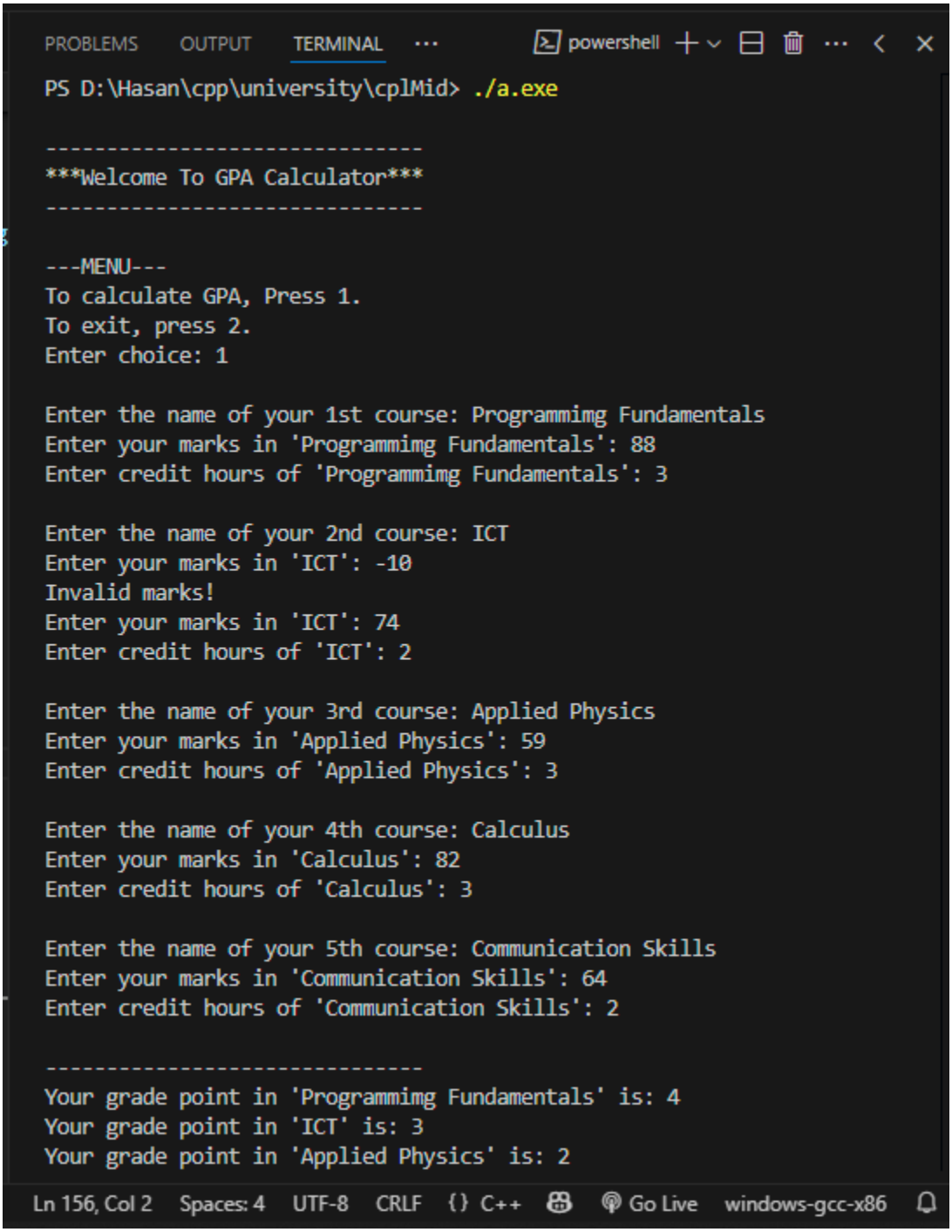
```
#include<iostream>
#include<string>
using namespace std;

float gradePoint(float marks){
    float gp = 0.00;
    if(marks >= 85 && marks <= 100){
        gp = 4.00;
    }
    else if(marks >= 80 && marks <= 84){
        gp = 3.7;
    }
    else if(marks >= 75 && marks <= 79){
        gp = 3.3;
    }
    else if(marks >= 70 && marks <= 74){
        gp = 3.0;
    }
    else if(marks >= 65 && marks <= 69){
        gp = 2.7;
    }
    else if(marks >= 60 && marks <= 64){
        gp = 2.3;
    }
    else if(marks >= 55 && marks <= 59){
        gp = 2.0;
    }
    else if(marks >= 50 && marks <= 54){
        gp = 1.7;
    }
    else{
        gp = 0.00;
    }
    return gp;
}

int main(){
    string sub1, sub2, sub3, sub4, sub5;
    float mark1 = 0.00, mark2 = 0.00, mark3 = 0.00, mark4 = 0.00, mark5 = 0.00;
    float cr1 = 0.00, cr2 = 0.00, cr3 = 0.00, cr4 = 0.00, cr5 = 0.00, totalCr =
0.00;
    float gp1 = 0.00, gp2 = 0.00, gp3 = 0.00, gp4 = 0.00, gp5 = 0.00, gpa = 0.00;
    int choice = 0;
```

```
    cout << endl;
    cout << "------------------------------"<<endl;
    cout << "***Welcome To GPA Calculator***"<< endl;
    cout << "------------------------------"<<endl;
    cout << endl;
    do{
        cout << "---MENU---"<<endl;
        cout << "To calculate GPA, Press 1."<<endl;
        cout << "To exit, press 2."<<endl;
        cout << "Enter choice: ";
        cin >> choice;
        cout << endl;
        if(choice == 1){
            cout << "Enter the name of your 1st course: ";
            cin.ignore();
            getline(cin, sub1);
            do{
                cout << "Enter your marks in \'"<<sub1<<"\': ";
                cin >> mark1;
                if(mark1 <0 || mark1 > 100){
                    cout << "Invalid marks!"<<endl;
                }
            }while(mark1 < 0 || mark1 > 100);
            cout << "Enter credit hours of \'"<<sub1<<"\': ";
            cin >> cr1;
            cout << endl;
            cout << "Enter the name of your 2nd course: ";
            cin.ignore();
            getline(cin, sub2);
            do{
                cout << "Enter your marks in \'"<<sub2<<"\': ";
                cin >> mark2;
                if(mark2 <0 || mark2 > 100){
                    cout << "Invalid marks!"<<endl;
                }
            }while(mark2 < 0 || mark2 > 100);
            cout << "Enter credit hours of \'"<<sub2<<"\': ";
            cin >> cr2;
            cout << endl;
            cout << "Enter the name of your 3rd course: ";
            cin.ignore();
            getline(cin, sub3);
            do{
                cout << "Enter your marks in \'"<<sub3<<"\': ";
                cin >> mark3;
```

```
    if(mark3 < 0 || mark3 > 100){
        cout << "Invalid marks!"<<endl;
    }
}while(mark3 < 0 || mark3 > 100);
cout << "Enter credit hours of \'"<<sub3<<"\': ";
cin >> cr3;
cout << endl;
cout << "Enter the name of your 4th course: ";
cin.ignore();
getline(cin, sub4);
do{
    cout << "Enter your marks in \'"<<sub4<<"\': ";
    cin >> mark4;
    if(mark4 < 0 || mark4 > 100){
        cout << "Invalid marks!"<<endl;
    }
}while(mark4 < 0 || mark4 > 100);
cout << "Enter credit hours of \'"<<sub4<<"\': ";
cin >> cr4;
cout << endl;
cout << "Enter the name of your 5th course: ";
cin.ignore();
getline(cin, sub5);
do{
    cout << "Enter your marks in \'"<<sub5<<"\': ";
    cin >> mark5;
    if(mark5 < 0 || mark5 > 100){
        cout << "Invalid marks!"<<endl;
    }
}while(mark5 < 0 || mark5 > 100);
cout << "Enter credit hours of \'"<<sub5<<"\': ";
cin >> cr5;
cout << endl;

//calculating grade pooint in each course
gp1 = gradePoint(mark1);
gp2 = gradePoint(mark2);
gp3 = gradePoint(mark3);
gp4 = gradePoint(mark4);
gp5 = gradePoint(mark5);

//displaying them
cout << "------------------------------"<<endl;
cout << "Your grade point in \'"<<sub1<<"\' is: "<<gp1<<endl;
cout << "Your grade point in \'"<<sub2<<"\' is: "<<gp2<<endl;
```

```
            cout << "Your grade point in \'"<<sub3<<"\' is: "<<gp3<<endl;
            cout << "Your grade point in \'"<<sub4<<"\' is: "<<gp4<<endl;
            cout << "Your grade point in \'"<<sub5<<"\' is: "<<gp5<<endl;
            cout << endl;

            //calculation for final gpa
            totalCr = cr1 + cr2 + cr3 + cr4 + cr5;
            gpa = ((gp1*cr1) + (gp2*cr2) + (gp3*cr3) + (gp4*cr4) +
(gp5*cr5))/totalCr;

            cout << "-------------------------------"<<endl;
            cout << "Your GPA is: "<<gpa<<endl;
            cout << "-------------------------------"<<endl;
            cout << endl;
        }
        else if(choice == 2){
            cout << "Ending program..."<<endl;
        }
        else{
            cout << "Invalid choice!"<<endl;
        }

    }while(choice != 2);

}
```

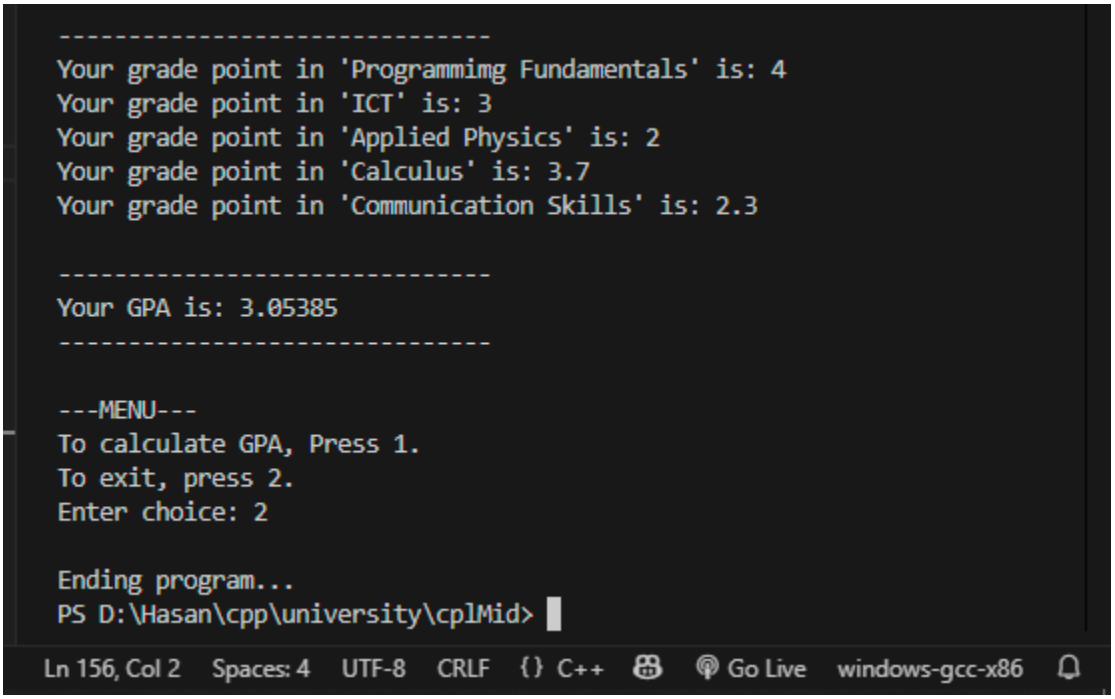
Output:


PROBLEMS
OUTPUT
TERMINAL
powershell
PS D:\Hasan\cpp\university\cplMid> ./a.exe

Welcome To GPA Calculator

---MENU---
To calculate GPA, Press 1.
To exit, press 2.
Enter choice: 1
Enter the name of your 1st course: Programmimg Fundamentals
Enter your marks in 'Programmimg Fundamentals': 88
Enter credit hours of 'Programmimg Fundamentals': 3
Enter the name of your 2nd course: ICT
Enter your marks in 'ICT': -10
Invalid marks!
Enter your marks in 'ICT': 74
Enter credit hours of 'ICT': 2
Enter the name of your 3rd course: Applied Physics
Enter your marks in 'Applied Physics': 59
Enter credit hours of 'Applied Physics': 3
Enter the name of your 4th course: Calculus
Enter your marks in 'Calculus': 82
Enter credit hours of 'Calculus': 3
Enter the name of your 5th course: Communication Skills
Enter your marks in 'Communication Skills': 64
Enter credit hours of 'Communication Skills': 2

Your grade point in 'Programmimg Fundamentals' is: 4
Your grade point in 'ICT' is: 3
Your grade point in 'Applied Physics' is: 2
Ln 156, Col 2
Spaces: 4
UTF-8
CRLF
{} C++
Go Live
windows-gcc-x86


Your grade point in 'Programmimg Fundamentals' is: 4
Your grade point in 'ICT' is: 3
Your grade point in 'Applied Physics' is: 2
Your grade point in 'Calculus' is: 3.7
Your grade point in 'Communication Skills' is: 2.3
Your GPA is: 3.05385
---MENU---
To calculate GPA, Press 1.
To exit, press 2.
Enter choice: 2
Ending program...
PS D:\Hasan\cpp\university\cplMid>
Ln 156, Col 2
Spaces: 4
UTF-8
CRLF
{} C++
Go Live
windows-gcc-x86