GHANA COMMUNICATION
TECHNOLOGY UNIVERSITY

INSTITUTE OF CONTINUING
AND DISTANCE EDUCATION (ICDE)

COURSE CODE	CICS 112
COURSE TITLE	Programming with C++
DATE	22nd August, 2025
GROUP NAME	GROUP 13

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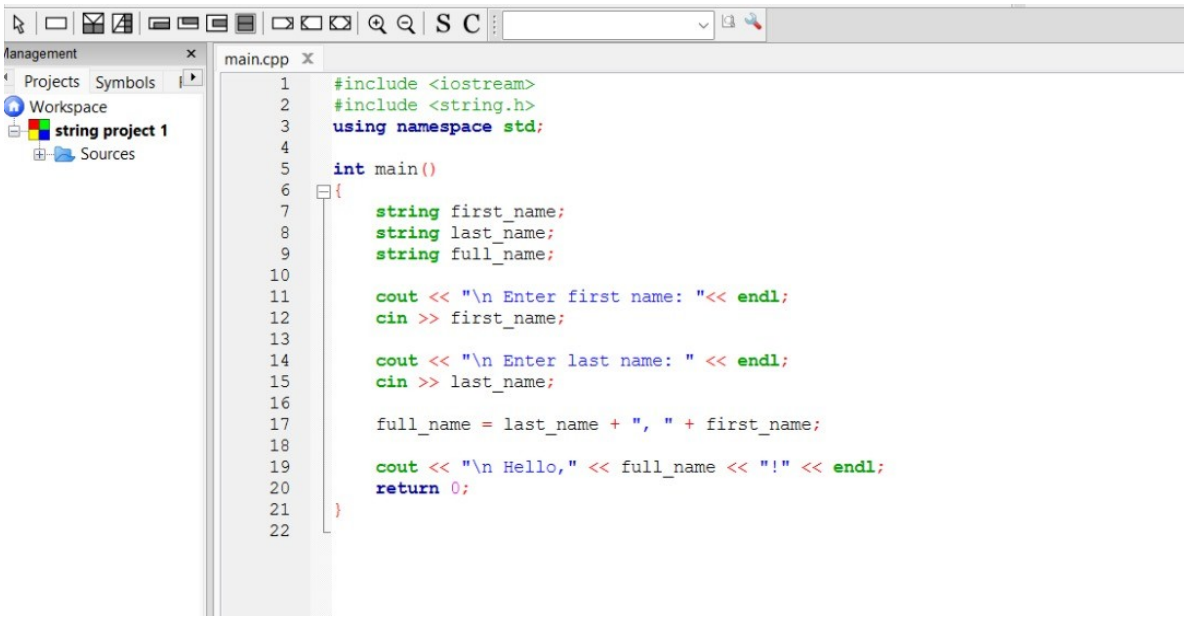
Question 1

Write a C++ program that accepts a user's first name and last name as separate string inputs, then combines them into a full name and displays it in the format: "Hello, [Last Name], [First Name]!"

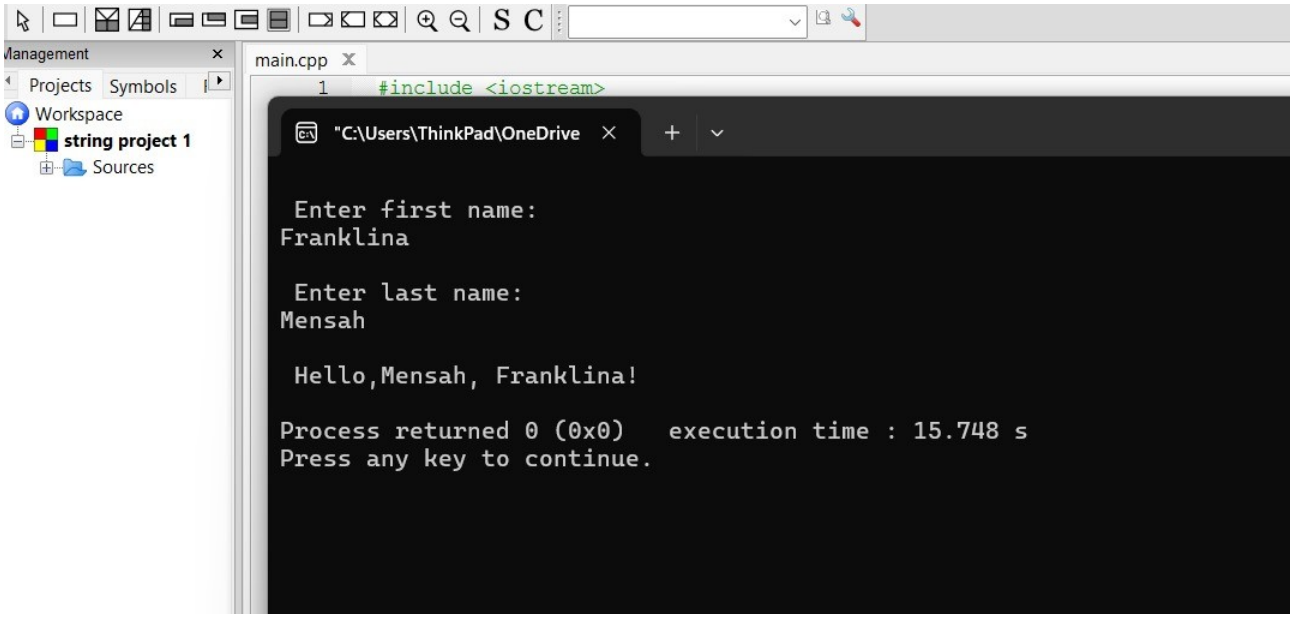
The Solution

```
#include <iostream>
#include <string.h>
using namespace std;
int main()
{
 string first_name;
 string last_name;
 string full_name;
 cout << "\n Enter first name: "<< endl;
 cin >> first_name;
 cout << "\n Enter last name: " << endl;
 cin >> last_name;
 full_name = last_name + ", " + first_name;
 cout << "\n Hello," << full_name << "!" << endl;
 return 0;
}
```

Screenshot Of The Source Code



Screenshot of the Output



Question 2

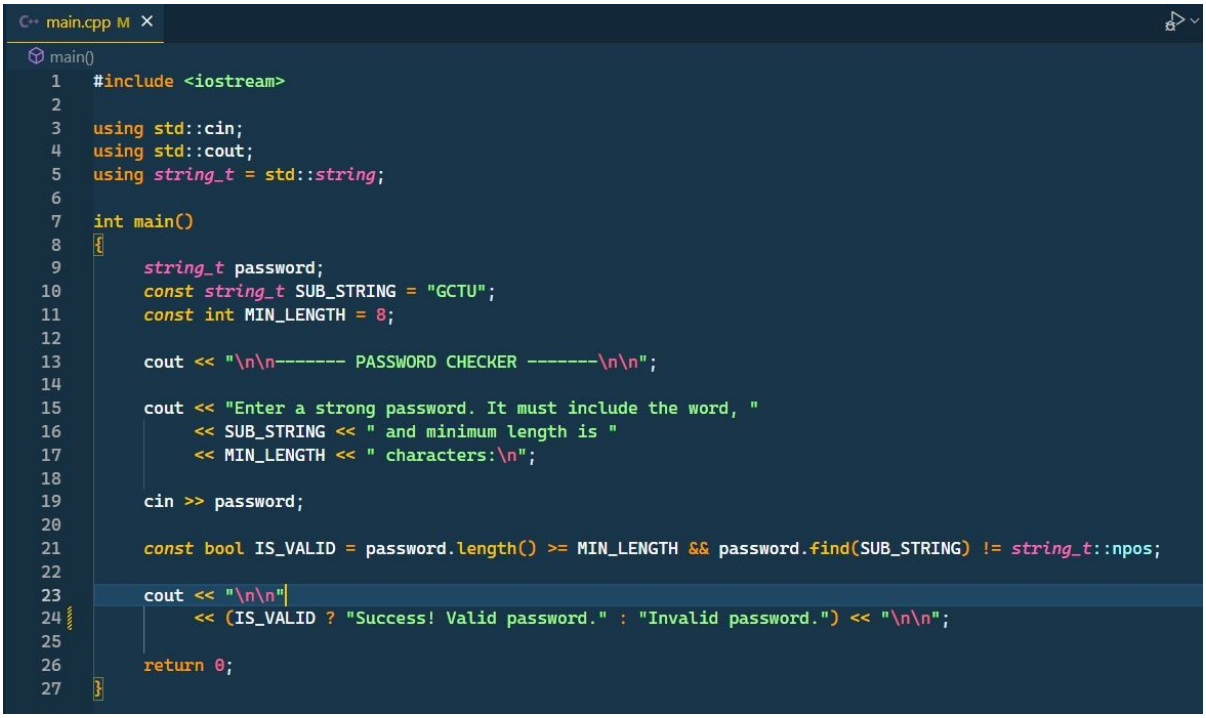
Create a C++ program that prompts the user to enter a password. The program should check if the password contains at least 8 characters and includes the word "GCTU" as part of it. Display a message indicating whether the password is valid or not.

The Solution

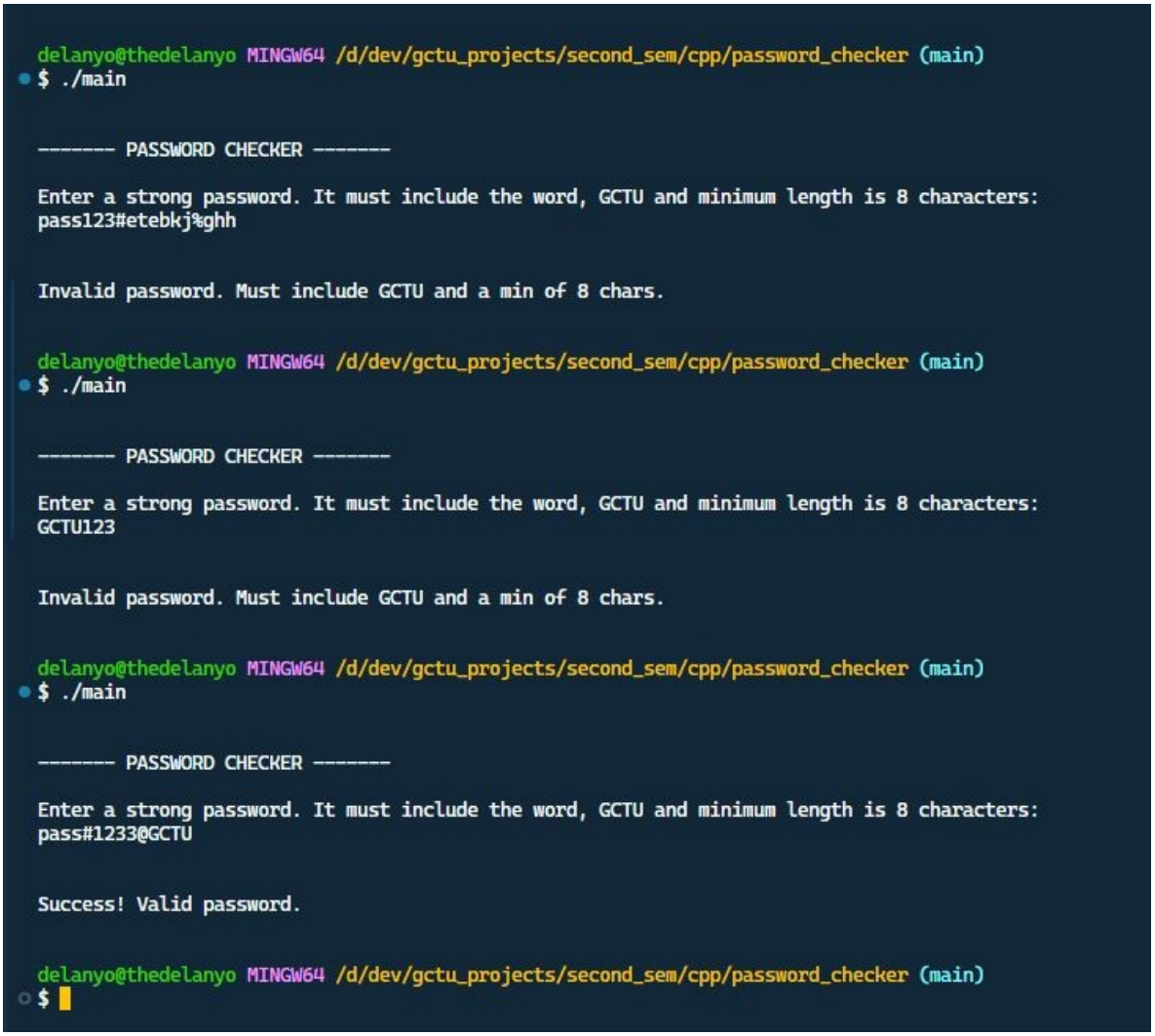
```
#include <iostream>
using std::cin;
using std::cout;
using string_t = std::string;
```

```
int main()
{
    string_t password;
    const string_t SUB_STRING = "GCTU";
    const int MIN_LENGTH = 8;
    cout << "\n\n------- PASSWORD CHECKER -------\n\n";
    cout << "Enter a strong password. It must include the word, "
        << SUB_STRING << " and minimum length is "
        << MIN_LENGTH << " characters:\n";
    cin >> password;
    const bool IS_VALID = password.length() >= MIN_LENGTH &&
password.find(SUB_STRING) != string_t::npos;
    cout << "\n\n" << (IS_VALID ? "Success! Valid password." : "Invalid password.") << "\n\
n";
    return 0;
}
```

Screenshot Of The Source Code



Screenshot Of The Output



Question 3

Write a C++ program that accepts a sentence from the user and counts how many words are in the sentence. Assume words are separated by spaces.

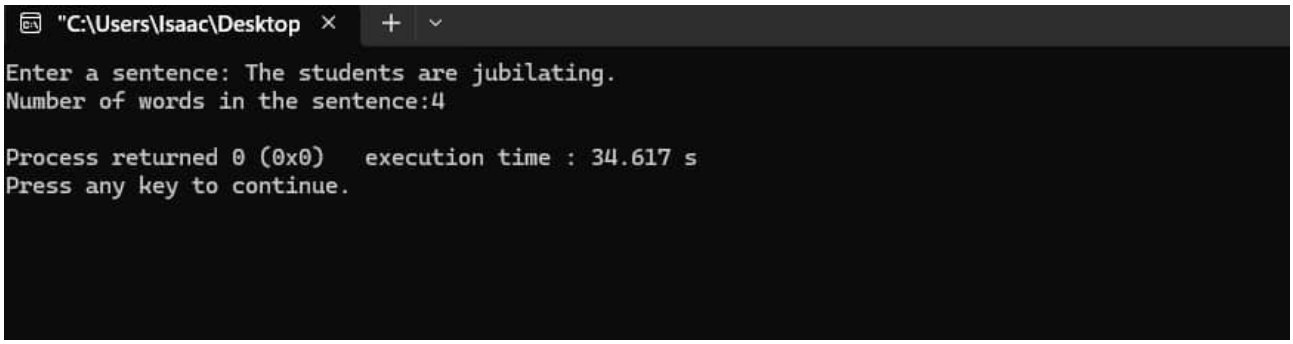
The Solution

```
#include <iostream>
#include<string>
using namespace std;
int main()
{string sentence;
int wordcount =0;
 cout << "Enter a sentence:";
 getline(cin,sentence); // Accepts entire sentence including spaces
 bool inWord = false;
for (char c:sentence){
 if (c!=' '&&!inWord) {
 //Start of a new word
 inWord = true;
 wordcount++;
 }
 else if (c==' '){
 //End of a word
 inWord = false;
 }
 }
 cout <<"Number of words in the sentence:" <<
 wordcount <<endl;
 return 0;
}
```

Screenshot Of The Source Code

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

int main()
{string sentence;
int wordcount =0;

    cout << "Enter a sentence:";
    getline(cin,sentence); // Accepts entire sentence including spaces

    bool inWord = false;

    for (char c:sentence){
            if (c!=' '&&!inWord) {
                //Start of a new word
                inWord = true;
                wordcount++;
            }
            else if (c==' '){
                    //End of a word
                    inWord = false;
            }
    }

    cout <<"Number of words in the sentence:" <<
    wordcount <<endl;

     return 0;
}
```

The Output



Question 4

As software engineer, write a C++ program to solve the quadratic equation y = ax^2 + bx + c. using constants for the coefficients a, b, and c.

The Solution

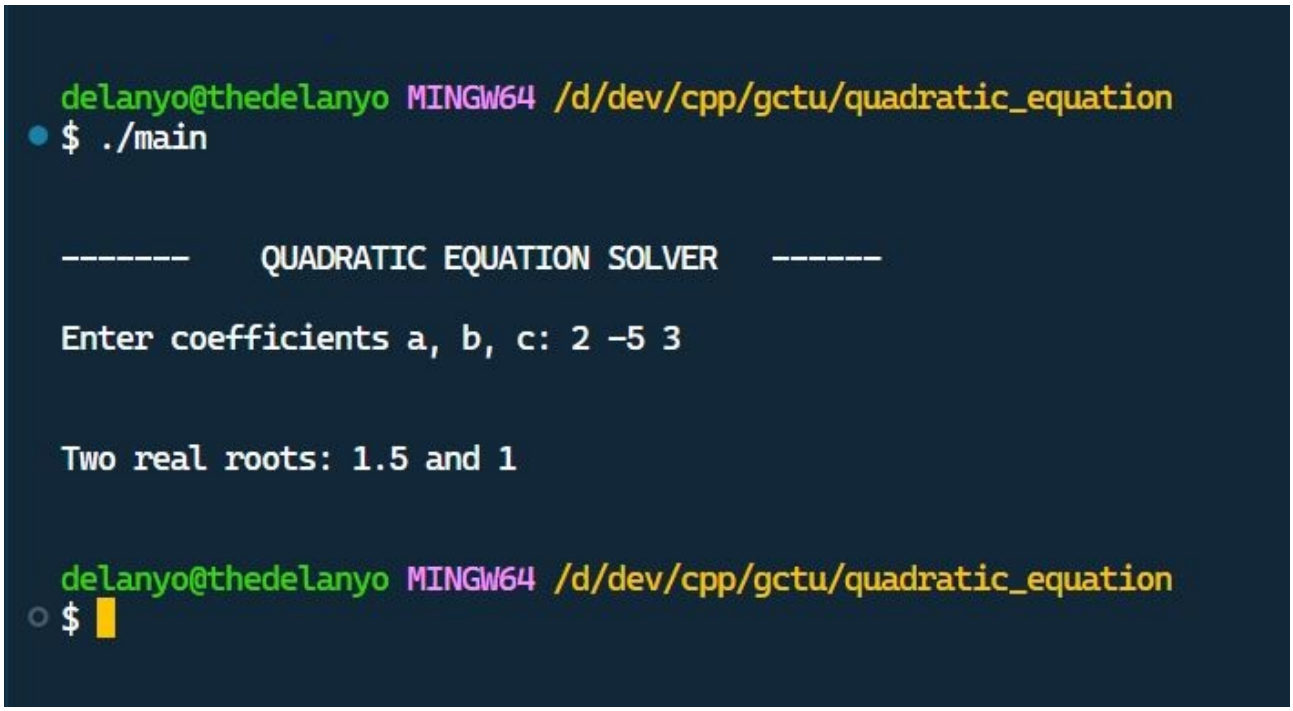
```
#include <iostream>
#include <cmath>
using std::cin;
using std::cout;
using std::sqrt;
int main()
{
   cout << "\n\n-------    QUADRATIC EQUATION SOLVER   ------\n\n";
   double a, b, c;
   cout << "Enter coefficients a, b, c: ";
   cin >> a >> b >> c;
   cout << "\n\n";
   if (a == 0)
   {
      cout << "Not a quadratic equation (a must not be zero)";
      return 0;
   }
   double discriminant = b * b - 4 * a * c;
   if (discriminant > 0)
   {
      // two real roots
      double root1 = (-b + sqrt(discriminant)) / (2 * a);
      double root2 = (-b - sqrt(discriminant)) / (2 * a);

      cout << "Two real roots: " << root1 << " and " << root2;
   }
   else if (discriminant == 0)
   {
      // one real root
      double root = -b / (2 * a);

      cout << "One real root: " << root;
   }
   else
   {
      // complex roots
      double realPart = -b / (2 * a);
      double imaginaryPart = sqrt(-discriminant) / (2 * a);

      cout << "Complex roots: "
          << realPart << " + " << imaginaryPart << "i and "
```

```
        << realPart << " - " << imaginaryPart << "i";
    }
    cout << "\n\n";
    return 0;
}
```

Screenshot Of The Source Code

```cpp
#include <iostream>
#include <cmath>

using std::cin;
using std::cout;
using std::sqrt;

int main()
{

    cout << "\n\n-------    QUADRATIC EQUATION SOLVER   ------\n\n";

    double a, b, c;
    cout << "Enter coefficients a, b, c: ";
    cin >> a >> b >> c;

    cout << "\n\n";

    if (a == 0)
    {
        cout << "Not a quadratic equation (a must not be zero)";
        return 0;
    }

    double discriminant = b * b - 4 * a * c;

    if (discriminant > 0)
    {
        // two real roots
        double root1 = (-b + sqrt(discriminant)) / (2 * a);
        double root2 = (-b - sqrt(discriminant)) / (2 * a);

        cout << "Two real roots: " << root1 << " and " << root2;
    }
    else if (discriminant == 0)
    {
        // one real root
        double root = -b / (2 * a);

        cout << "One real root: " << root;
    }
    else
    {
        // complex roots
        double realPart = -b / (2 * a);
        double imaginaryPart = sqrt(-discriminant) / (2 * a);

        cout << "Complex roots: "
             << realPart << " + " << imaginaryPart << "i and "
             << realPart << " - " << imaginaryPart << "i";
    }

    cout << "\n\n";

    return 0;
}
```

Screenshot Of The Output



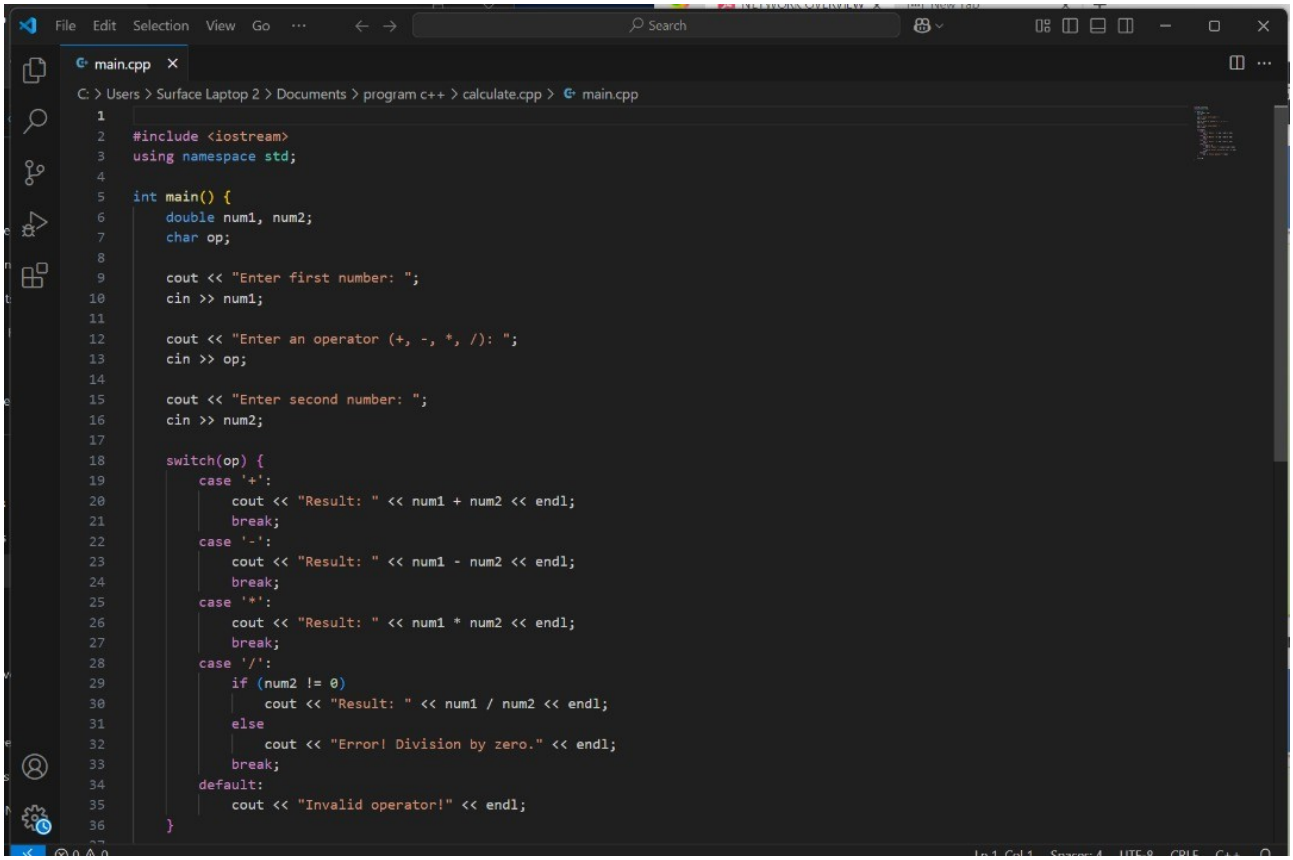
Question 5

Write C++ Program to build a simple calculator using switch Statement.

The Solution

```
#include <iostream>

int main()
{
    double first, second, result;
    char operate;

    std::cout << "Enter your first number: ";
    std::cin >> first;
    std::cout << "Enter operator (+, -, *, /): ";
    std::cin >> operate;

    std::cout << "Enter your second number: ";
    std::cin >> second;

    switch (operate)
    {
    case '+':
        result = first + second;
        break;

    case '-':
        result = first - second;
        break;

    case '*':
        result = first * second;
        break;
    case '/':
        result = first / second;
        return 1;

    default:
        std::cout << "Invalid operator";
    }
    std::cout << first << " " << operate << " " << second << " = " << result << std::endl;
    return 0;
}
```

Screenshot Of The Source Code



Screenshot Of The Output