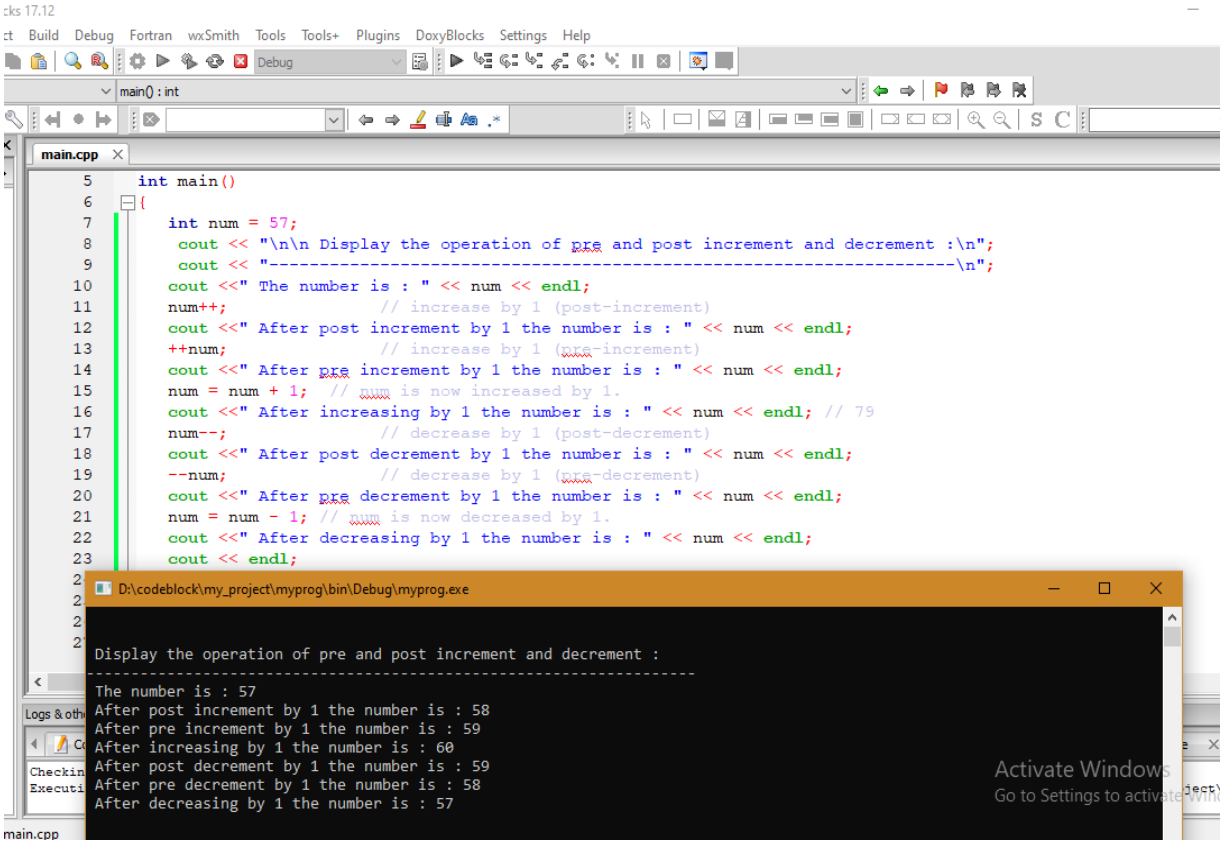
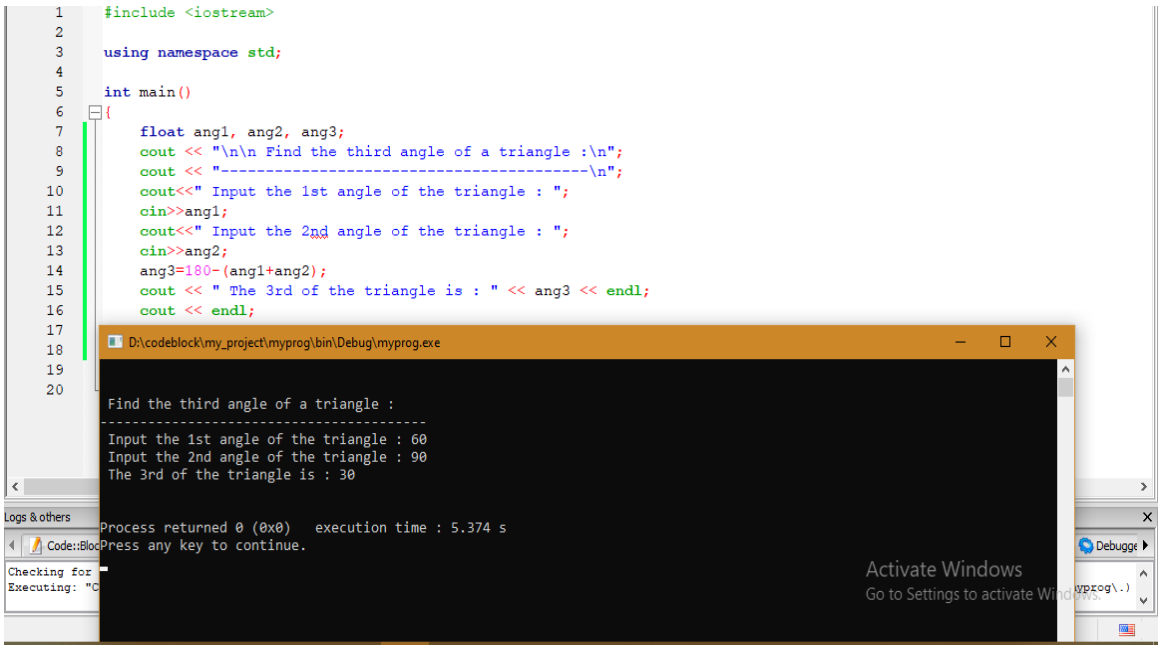
1-Write a program in C++ to display the operation of pre- and post-increment and decrement.



```
#include <iostream>

using namespace std;

int main()
{
    int num = 57;
     cout << "\n\n Display the operation of pre and post increment and decrement :\n";
     cout << "-----------------------------------------------------------------------\n";
    cout <<" The number is : " << num << endl;
    num++;                  // increase by 1 (post-increment)
    cout <<" After post increment by 1 the number is : " << num << endl;
    ++num;                  // increase by 1 (pre-increment)
    cout <<" After pre increment by 1 the number is : " << num << endl;
    num = num + 1;  // num is now increased by 1.
    cout <<" After increasing by 1 the number is : " << num << endl; // 79
    num--;                  // decrease by 1 (post-decrement)
    cout <<" After post decrement by 1 the number is : " << num << endl;
    --num;                  // decrease by 1 (pre-decrement)
    cout <<" After pre decrement by 1 the number is : " << num << endl;
    num = num - 1; // num is now decreased by 1.
    cout <<" After decreasing by 1 the number is : " << num << endl;
    cout << endl;
```

```
D:\codeblock\my_project\myprog\bin\Debug\myprog.exe


Display the operation of pre and post increment and decrement :
-----------------------------------------------------------------
The number is : 57
After post increment by 1 the number is : 58
After pre increment by 1 the number is : 59
After increasing by 1 the number is : 60
After post decrement by 1 the number is : 59
After pre decrement by 1 the number is : 58
After decreasing by 1 the number is : 57
```

2-Write a program in C++ to find the third angle of a triangle?



```
#include <iostream>

using namespace std;

int main()
{
    float ang1, ang2, ang3;
    cout << "\n\n Find the third angle of a triangle :\n";
    cout << "-----------------------------------------\n";
    cout<<" Input the 1st angle of the triangle : ";
    cin>>ang1;
    cout<<" Input the 2nd angle of the triangle : ";
    cin>>ang2;
    ang3=180-(ang1+ang2);
    cout << " The 3rd of the triangle is : " << ang3 << endl;
    cout << endl;
```

```
D:\codeblock\my_project\myprog\bin\Debug\myprog.exe


Find the third angle of a triangle :
-----------------------------------------
Input the 1st angle of the triangle : 60
Input the 2nd angle of the triangle : 90
The 3rd of the triangle is : 30


Process returned 0 (0x0)   execution time : 5.374 s
Press any key to continue.
```

3-Create a Calculator using the switch Statement

```cpp
int main()
{
    char oper;
    float num1, num2;
    cout << "Enter an operator (+, -, *, /): ";
    cin >> oper;
    cout << "Enter two numbers: " << endl;
    cin >> num1 >> num2;

    switch (oper) {
        case '+':
            cout << num1 << " + " << num2 << " = " << num1 + num2;
            break;
        case '-':
            cout << num1 << " - " << num2 << " = " << num1 - num2;
            break;
        case '*':
            cout << num1 << " * " << num2 << " = " << num1 * num2;
            break;
        case '/':
            cout << num1 << " / " << num2 << " = " << num1 / num2;
            break;
        default:
            // operator is doesn't match any case constant (+, -, *,
            cout << "Error! The operator is not correct";
            break;
    }
```

```
D:\codeblock\my_project\myprog\bin\Debug\myprog.exe
Enter an operator (+, -, *, /): +
Enter two numbers:
200
300
200 + 300 = 500
Process returned 0 (0x0)   execution time : 8.504 s
Press any key to continue.
```

4- write a C++ program to find if an integer is even or odd or neither (0)?

```cpp
int num;

cout << "Enter an integer: ";
 cin >> num;

// outer if condition
if (num != 0) {

    // inner if condition
    if ((num % 2) == 0) {
        cout << "The number is even." << endl;
    }
     // inner else condition
    else {
        cout << "The number is odd." << endl;
    }
}
```

```
    // outer else condition
    else {
        cout << "The number is 0 and it is neither even nor odd." << endl;
    }
    cout << "This line is always printed." << endl;
```

5- write a c++ program to check some personal data for a job applicant,the program asks him some questions then decide if he acceptable or not acceptable?

```
int main()
{
    cout << "\n\n Program for applying from a job :\n";
    cout << "--------------------------------------------------------------------\n";

    int  age ;
    char isEmployed_before;
    int year_graduate;
    int Years_of_Experience ;
    char grade;

    cout<<"how old are you?"<<endl;
    cin>>age;
    cout<<"when you graduated?"<<endl;
    cin>>year_graduate;
    cout<<"are you Employed_before:y/n?"<<endl;
    cin>>isEmployed_before;
    cout<<"how many Experience years?"<<endl;
    cin>>Years_of_Experience;
    cout<<"what is your graduate grade e=excellent,v=very good,g=good?"<<endl;
    cin>>grade;

    if(age<=30 && isEmployed_before=='y'&& year_graduate>=2013 && Years_of_Experience>=2 && grade=='e') {

     cout<<"you are acceptable for this job";
    }
    else{
         cout<<"Sorry,you can try another job";

    }
```

Output:

```
D:\codeblock\my_project\myprog\bin\Debug\myprog.exe


 Program for applying from a job :
--------------------------------------------------------------------
how old are you?
25
when you graduated?
2016
are you Employed_before:y/n?
y
how many Experience years?
4
what is your graduate grade e=excellent,v=very good,g=good?
e
you are acceptable for this job
Process returned 0 (0x0)   execution time : 15.227 s
Press any key to continue.
```

6-write c++ to Check Vowel or a Consonant alphabet? where a,e,I,o,u are vowel.(make with lower and uppercase)?

Output:

```
    char c;
    int isLowercaseVowel, isUppercaseVowel;

    cout << "Enter an alphabet: ";
    cin >> c;

    // evaluates to 1 (true) if c is a lowercase vowel
    isLowercaseVowel = (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u');

    // evaluates to 1 (true) if c is an uppercase vowel
    isUppercaseVowel = (c == 'A' || c == 'E' || c == 'I' || c == 'O' || c == 'U');

    // evaluates to 1 (true) if either isLowercaseVowel or isUppercaseVowel is true
    if (isLowercaseVowel || isUppercaseVowel)
        cout << c << " is a vowel.";
    else
        cout << c << " is a consonant.";


    return 0;
}
```

```
D:\codeblock\my_project\myprog\bin\Debug\myprog.exe
Enter an alphabet: s
s is a consonant.
Process returned 0 (0x0)   execution time : 11.113 s
Press any key to continue.
```

7-Write C++ Program to Find All Roots of a Quadratic Equation?

For a quadratic equation $ax^2+bx+c = 0$ (where a, b and c are coefficients), it's roots is given by following the formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The term b^2-4ac is known as the discriminant of a quadratic equation. The discriminant tells the nature of the roots.

- If discriminant is greater than 0, the roots are real and different.
- If discriminant is equal to 0, the roots are real and equal.
- If discriminant is less than 0, the roots are complex and different.

If determinant > 0,

$$root1 = \frac{-b + \sqrt{(b^2 - 4ac)}}{2a}$$

$$root2 = \frac{-b - \sqrt{(b^2 - 4ac)}}{2a}$$

If determinant = 0,

$$root1 = root2 = \frac{-b}{2a}$$

If determinant < 0,

$$root1 = \frac{-b}{2a} + i\frac{\sqrt{-(b^2 - 4ac)}}{2a}$$

$$root2 = \frac{-b}{2a} - i\frac{\sqrt{-(b^2 - 4ac)}}{2a}$$

```
    }
    cout << "This line is always printed." << endl;

*/
     float a, b, c, x1, x2, discriminant;
    cout << "Enter coefficients a, b and c: ";
    cin >> a >> b >> c;
    discriminant = b*b - 4*a*c;

    if (discriminant > 0) {
        x1 = (-b + sqrt(discriminant)) / (2*a);
        x2 = (-b - sqrt(discriminant)) / (2*a);
        cout << "Roots are real and different." << endl;
        cout << "x1 = " << x1 << endl;
        cout << "x2 = " << x2 << endl;
    }

    else if (discriminant == 0) {
        cout << "Roots are real and same." << endl;
        x1 = -b/(2*a);
        cout << "x1 = x2 =" << x1 << endl;
    }

    else {


        cout << "Roots are complex and different and the equation will be impossible to solve"  << endl;

    }
```

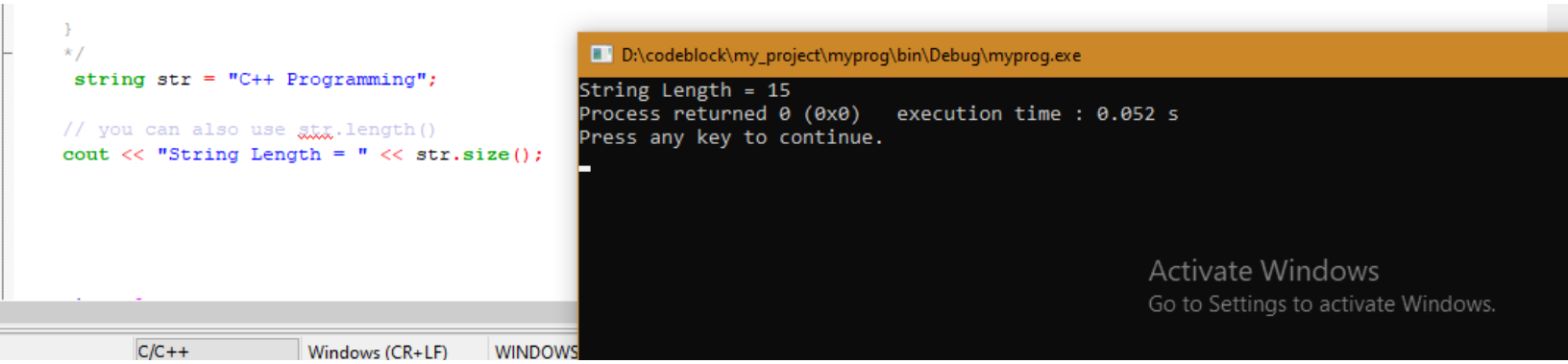
output:

```
D:\codeblock\my_project\myprog\bin\Debug\myprog.exe
Enter coefficients a, b and c: 45 100 2
Roots are real and different.
x1 = -0.0201833
x2 = -2.20204

Process returned 0 (0x0)   execution time : 6.926 s
Press any key to continue.
```

8- C++ Program to Find the Length of a String?

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

int main()
{
    string str = "C++ Programming";

    // you can also use str.length()
    cout << "String Length = " << str.size();

    return 0;
}
```

Output



9- Design a flight reservation program with input validation using menus using C++ ?

- program ask user to input his first and second name?

- program display a menu which contain the main services:

1. Make a reservation
2. Cancel a Reservation
3. Check Local Weather

When user choose one of these services:

The case 1:

Program ask user about what country want to travel, one-way trip? program tells users how many available seats and the time of flight to this country, how many hours will take?

The case 2:

Program ask user to cancel Reservation, then ask him about some information about his name, journey which will be canceled.

The case3: program tells user about the local weather .

```
string firstlastname;

int seats = 13;

char selection,answer;
string city;
cout << "Please enter your first and last name.\n";
getline(cin, firstlastname);



    cout << "  Welcome " << firstlastname << " to FlightSpace Airlines!\n";
    cout << "  ====================================\n";
    cout << "  1. Make a reservation\n";
    cout << "  2. Cancel a Reservation\n  ";
    cout << "  3. Check Local Weather\n ";
    cout << "\n";
    cout << "  4.  Exit\n";
    cout << "  ====================================\n";
    cout << "  Enter your selection: ";
    cin >> selection;
    cout << endl;

    switch (selection)

            {
```

```
    switch (selection)

            {
            case '1':
                cout << "Great! lets get started!\n";
                cout << "\n";
                cout << "You are currently in Dallas, Texas.\n";
                cout << "Where would you like to go to?\n";
                cin>>city;
                cout << "Would you like to make a reservation?\n";
                cin>>answer;
                cout << "You have selected a city: "<<city<<"     Time of Flight is at 8 a.m\n"<<"Journy will take 7 hours on the
                cout << "There are currently " << seats << " seats available!\n";
                cout<<"thank you";
                break;



    case '2':
        cout << "Cancel a Reservation"<<endl;
        cout<<"please,what journy you want to cancel?"<<endl;
        cin>>city;
        cout<<"your flight to "<<city<<"is canceled"<<endl;
        cout<<"goodbye";
        break;

     case '3':
        cout << "The Local Weather is 79f\n";
        cout<<"Temperate and sunny weather";
```

```
D:\codeblock\my_project\myprog\bin\Debug\myprog.exe
Please enter your first and last name.
sara ali
  Welcome sara ali to FlightSpace Airlines!
  ==================================
  1. Make a reservation
  2. Cancel a Reservation
    3. Check Local Weather

  4.  Exit
  ==================================
  Enter your selection: 1

Great! lets get started!

You are currently in Dallas, Texas.
Where would you like to go to?
paris
Would you like to make a reservation?
y
You have selected a city: paris     Time of Flight is at 8 a.m
Journy will take 7 hours on the air
There are currently 13 seats available!
thank you
Process returned 0 (0x0)   execution time : 25.999 s
Press any key to continue.
```