

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

The screenshot shows the Code::Blocks IDE interface. The code editor window displays a C++ file named main.cpp. The code prints the value of num (57), then performs various operations using both pre-increment/post-increment and pre-decrement/post-decrement operators. The terminal window shows the output of the program, which includes the initial value of num, followed by a series of numbers resulting from each operator's execution. The logs & others panel shows the command to run the program.

```
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

Logs & others

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

The screenshot shows the Code::Blocks IDE interface. The code editor window displays a C++ file named main.cpp. The code prompts the user for two angles of a triangle and calculates the third angle using the formula $\text{ang3} = 180 - (\text{ang1} + \text{ang2})$. The terminal window shows the input of two angles (60 and 90) and the output of the third angle (30). The logs & others panel shows the command to run the program.

```
#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;
```

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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

Logs & others

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

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3-Create a Calculator using the switch Statement

The screenshot shows the Code::Blocks IDE interface. On the left is the code editor with the following C++ code:

```
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;
    }
}
```

To the right is the terminal window showing the program's output:

```
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)?

```
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";
    }
}
```

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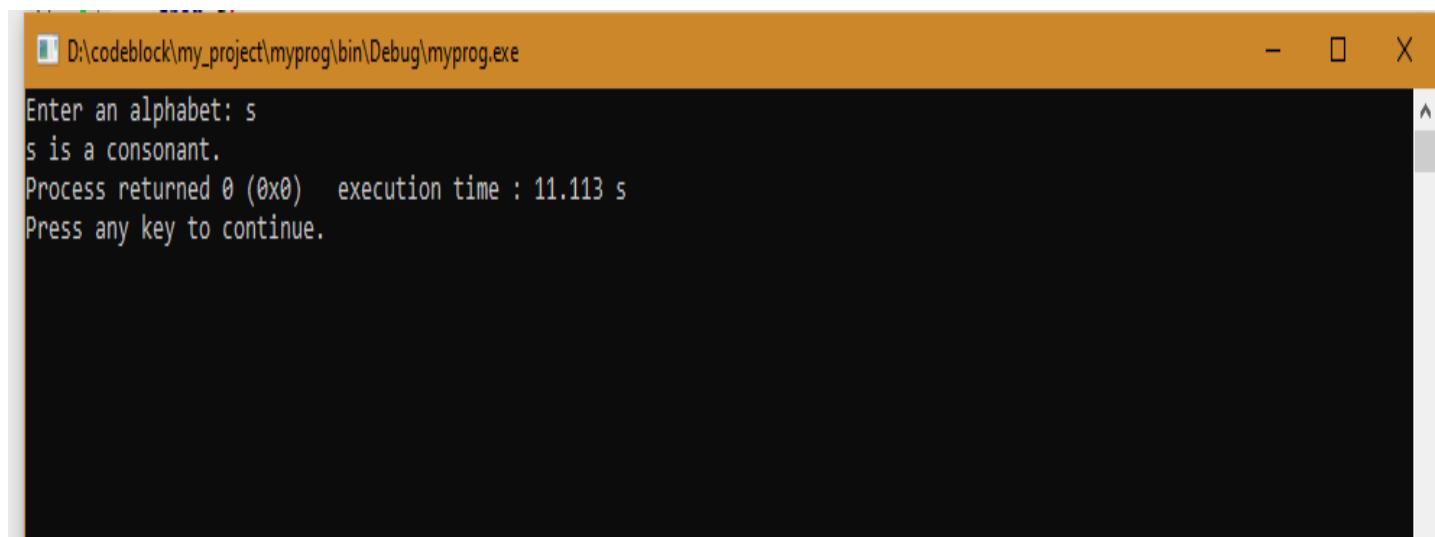
Output:

```
D:\codeblock\my_project\myprog\bin\Debug\myprog.exe
Program for applying from a job :
-----
es how old are you?
ain25
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), its roots are 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.

$$\text{If determinant} > 0, \quad \text{root1} = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

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

$$\text{If determinant} = 0, \quad \text{root1} = \text{root2} = \frac{-b}{2a}$$

$$\text{If determinant} < 0, \quad \text{root1} = \frac{-b}{2a} + i \frac{\sqrt{-(b^2 - 4ac)}}{2a}$$

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

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```
X [ ]  
 }  
 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.
```

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

```
#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

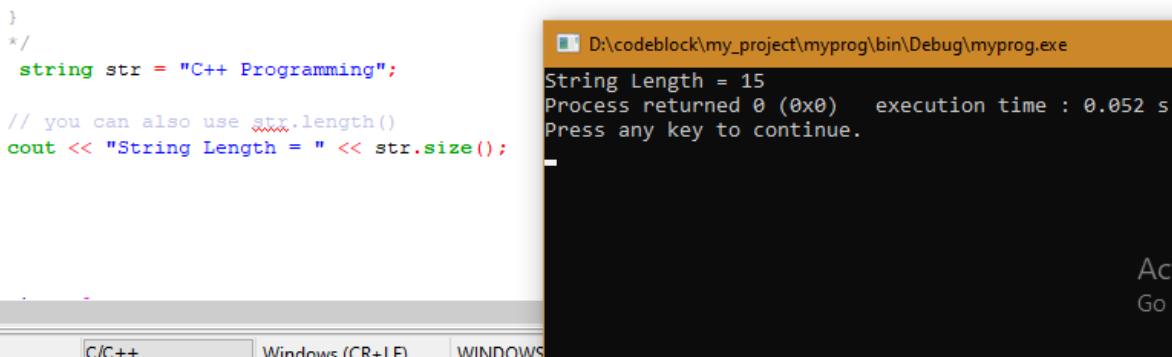
```
}
```

```
*/
```

```
string str = "C++ Programming";
```

```
// you can also use str.length()
```

```
cout << "String Length = " << str.size();
```



D:\codeblock\my_project\myprog\bin\Debug\myprog.exe
String Length = 15
Process returned 0 (0x0) execution time : 0.052 s
Press any key to continue.

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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)
{
    case '1': {
        cout << " Enter your first and last name: ";
        string name;
        getline(cin, name);
        cout << " Enter your destination: ";
        string dest;
        getline(cin, dest);
        cout << " Enter your departure date: ";
        string date;
        getline(cin, date);
        cout << " Enter your arrival date: ";
        string arrival;
        getline(cin, arrival);
        cout << " Enter your seat preference: ";
        string seat;
        getline(cin, seat);
        cout << " Your seat has been reserved.\n";
        cout << " Available seats: " << seats;
        cout << endl;
    }
    break;
    case '2': {
        cout << " Enter your first and last name: ";
        string name;
        getline(cin, name);
        cout << " Enter your destination: ";
        string dest;
        getline(cin, dest);
        cout << " Enter your departure date: ";
        string date;
        getline(cin, date);
        cout << " Enter your arrival date: ";
        string arrival;
        getline(cin, arrival);
        cout << " Your seat has been canceled.\n";
        cout << " Available seats: " << seats;
        cout << endl;
    }
    break;
    case '3': {
        cout << " Enter your first and last name: ";
        string name;
        getline(cin, name);
        cout << " Enter your destination: ";
        string dest;
        getline(cin, dest);
        cout << " Enter your departure date: ";
        string date;
        getline(cin, date);
        cout << " Enter your arrival date: ";
        string arrival;
        getline(cin, arrival);
        cout << " Enter your seat preference: ";
        string seat;
        getline(cin, seat);
        cout << " Your seat has been checked.\n";
        cout << " Available seats: " << seats;
        cout << endl;
    }
    break;
    case '4': {
        cout << " Thank you for using FlightSpace Airlines! ";
        cout << endl;
    }
    break;
    default: {
        cout << " Invalid selection. Please try again.\n";
        cout << endl;
    }
}
```

```
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" <<"Journey 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 journey 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
Journey 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.
```

