FAST National University of Computer and Emerging Sciences Peshawar

OOP Lab # 2.1

DEPARTMENT OF COMPUTER SCIENCE

C++ Programming

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Contents

Operators

- Operator is a symbol which is used to perform some operation.
- Operators are used to perform operations on variables and values.
- In the example below, we use the + **operator** to add together two values:
- int x = 100 + 50;
- Although the + operator is often used to add together two values, like in the example above, it can also be used to add together a variable and a value, or a variable and another variable:

Operators…

Example

```
int sum1 = 100 + 50;        // 150 (100 + 50)
int sum2 = sum1 + 250;      // 400 (150 + 250)
int sum3 = sum2 + sum2;     // 800 (400 + 400)
```

Types of Operators

1. Unary operators
2. Binary operators
3. Ternary operators

1) Unary Operator

1. Increment (++)
2. Decrement (--)
3. Negation (!)

2) Binary Operator

1. Arithmetic (+, -, *, /, %)
2. Relational (>, <, >=, <=, !=, ==)
3. Logical (&&, ||)
4. Assignment (=)
5. Arithmetic Assignment operator (+=, -=, *=, /=, %=)

3) Ternary Operator

- Conditional operator (?:)

Example

(condition) **?** statement 1 **:** statement 2;

int result= (n1>n2) ? n1 : n2;

3) Ternary Operator…

```
#include<iostream>

using namespace std;

int main()
{
    int time = 20;
    string result = (time < 18) ? "Good day." : "Good evening.";
    cout << result;
    return 0;
}
```

Output: Good evening.

Arithmetic Operators in C++

Arithmetic operators are used to perform common mathematical operations.

Operator	Name	Description	Example
+	Addition	Adds together two values	x + y
-	Subtraction	Subtracts one value from another	x - y
*	Multiplication	Multiplies two values	x * y
/	Division	Divides one value by another	x / y
%	Modulus	Returns the division remainder	x % y

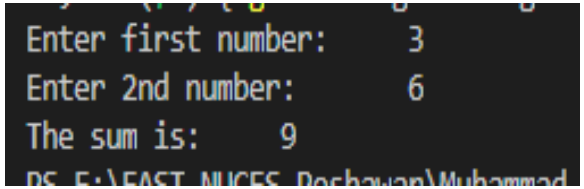
Adding two integers

```
#include<iostream>

using namespace std;

int main()
{
    int n1, n2, sum;
    cout<<"Enter first number:\t";
    cin>>n1;
    cout<<"Enter 2nd number:\t";
    cin>>n2;
    sum=n1+n2;
    cout<<"The sum is:\t"<<sum<<endl;

}
```



Assignment Operator

Assignment operators are used to assign values to variables.

In the example below, we use the **assignment** operator (=) to assign the value **10** to a variable called **x**:

Example

```
int x = 10;
```

Arithmetic Assignment Operator

The **addition assignment** operator (+=) adds a value to a variable:

Example

```
int x = 10;
x += 5;
```

Arithmetic Assignment Operator…

A list of all arithmetic assignment operators:

Operator	Example	Same As
=	x = 5	x = 5
+=	x += 3	x = x + 3
-=	x -= 3	x = x - 3
*=	x *= 3	x = x * 3
/=	x /= 3	x = x / 3
%=	x %= 3	x = x % 3

Relational/Comparison Operators

- Comparison operators are used to compare two values.
- **Note:** The return value of a comparison is either true (1) or false (0).
- In the following example, we use the **greater than** operator (>) to find out if 5 is greater than 3:

Example

```
int x = 5;
int y = 3;
cout << (x > y); // returns 1 (true) because 5 is greater than 3
```

Relational/Comparison Operators

A list of all relational operators:

Operator	Name	Example
==	Equal to	x == y
!=	Not equal	x != y
>	Greater than	x > y
<	Less than	x < y
>=	Greater than or equal to	x >= y
<=	Less than or equal to	x <= y

Logical Operators

Logical operators are used to determine the logic between variables or values:

Operator	Name	Description	Example
&&	Logical and	Returns true if both statements are true	x < 5 && x < 10
||	Logical or	Returns true if one of the statements is true	x < 5 || x < 4
!	Logical not	Reverse the result, returns false if the result is true	!(x < 5 && x < 10)

Increment and Decrement Operators

1) Increment Operator:

The operators that is used to add 1 to the value of a variable is called increment operator.

2) Decrement Operator :

The operator that is used to subtract 1 from the value of a variable is called decrement operator.

1) The Increment Operator (++)

- The increment operator is represented by a double plus (++) sign.
- It is used to add 1 to the value of an integer variable.
- This variable can be used before or after the variable name.
- For example, to add 1 to a value of variable xy, it is normally written as

```
xy = xy + 1;
```

- By using increment operator “++” it is written as

```
xy++
```

1) The Increment Operator (++)…

- The increment operator can be written either before or after the variable.
- If it is written before the variable, it is known as **prefixing.**
- If it is written after the variable, it is known as **post fixing**.
- Prefix and postfix operators have different effects when they are used in expressions.

i) Prefix Increment Operator

- When an increment operator is used in prefix mode in an expression, it adds 1 to the value of the variable **before** the values of the variable is used in the expression.

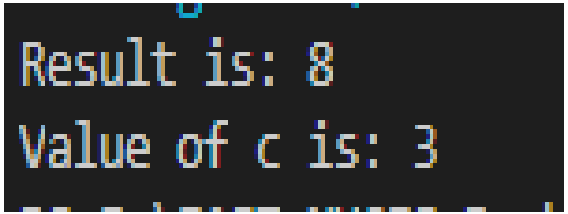
i) Prefix Increment Operator…

```
#include<iostream>

using namespace std;

int main()
{
    int a=2;
    int b=3;
    int c=2;
    int result=a+b+(++c);
    cout<<"Result is: "<<result;
    cout<<"\nValue of c is: "<<c;

}
```



i) Prefix Increment Operator…

- In the above program, 1 will be added to the value of **c** before it is used in the expression.
- Thus after execution, the result will be equal to 8 and the value of **c** will be 3.

ii) Postfix Increment Operator

- When an increment operator is used in postfix mode in an expression, it adds 1 to the value of the variable **after** the value of the variable is used in the expression.
- **For Example,** if in the above example, increment operator is used in postfix mode, the result will be different. The statement will be shown below:

```
result =a + b + c++;
```

ii) Postfix Increment Operator…

In this case, 1 will be added to the value of c after its existing value has been used in the expression. Thus after execution, the result will be equal to 7 and the value of c will be 3.

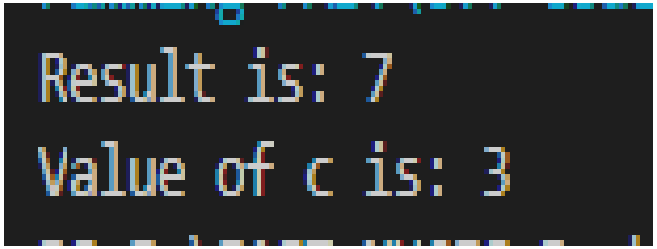
ii) Postfix Increment Operator…

```
#include<iostream>

using namespace std;

int main()
{
    int a=2;
    int b=3;
    int c=2;
    int result=a+b+(c++);
    cout<<"Result is: "<<result;
    cout<<"\nValue of c is: "<<c;

}
```



2) The Decrement Operator (--)

- The decrement operator is represented by a double minus (--) sign.
- It is used to subtract 1 from the value of an integer variable.
- This variable can be used before or after the variable name.
- For example, to subtract 1 from the value of variable xy, the decrement statement is written as

xy--; or --xy;

i) Prefix Decrement Operator

- When decrement operator is used in prefix mode in an expression, it subtracts 1 from the value of the variable **before** the values of the variable is used in the expression.

i) Prefix Decrement Operator…

```
#include<iostream>

using namespace std;

int main()
{
    int a=2;
    int b=3;
    int c=2;
    int result=a+b+(--c);
    cout<<"Result is: "<<result;
    cout<<"\nValue of c is: "<<c;

}
```

```
Result is: 6
Value of c is: 1
```

i)Prefix Decrement Operator…

- In the above program, 1 will be subtracted from the value of **c** before it is used in the expression.
- Thus after execution, the result will be equal to 6 and the value of **c** will be 1.

ii) Postfix Decrement Operator

- When an decrement operator is used in postfix mode in an expression, it subtracts 1 from the value of the variable **after** the values of the variable is used in the expression.

- For Example, if in the above example, decrement operator is used in postfix mode, the result will be different. The statement will be shown below:

```
result =a + b + c--;
```

ii) Postfix Decrement Operator…

In this case, 1 will be subtracted from the value of **c** after its existing value has been used in the expression. Thus after execution, the result will be equal to 7 and the value of c will be 1.

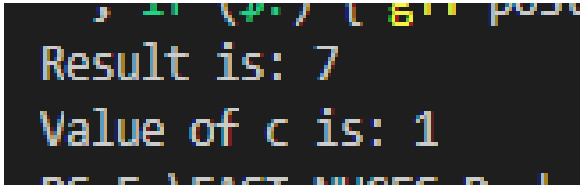
ii) Postfix Decrement Operator…

```
#include<iostream>

using namespace std;

int main()
{
    int a=2;
    int b=3;
    int c=2;
    int result=a+b+(c--);
    cout<<"Result is: "<<result;
    cout<<"\nValue of c is: "<<c;

}
```



Class Task-1

Ask user to enter a three digit number and then display the number in reverse order.

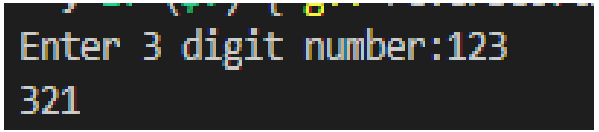
Task-1 Solution

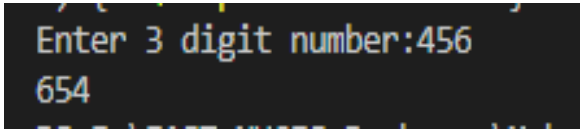
```
#include<iostream>

using namespace std;

int main()
{
    int number;
    cout<<"Enter 3 digit number:";
    cin>>number;
    cout<<number%10;
    number=number/10;
    cout<<number%10;
    number=number/10;
    cout<<number;

}
```





Tasks

1) Write a C++ program that will convert dollar to rupees (Dollar to Rupees Conversion Calculator).
2) Write a C++ program that will convert rupees to dollar (Rupees to Dollar Conversion Calculator).
3) Write a C++ program that will convert centigrade to Fahrenheit.
4) Take student name and marks of your 2nd semester from user and then generate DMC which will contain obtained marks out of total and percentage.

References

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- https://www.geeksforgeeks.org/c-data-types/
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THANK YOU