WEEK 5

AASMA ABDUL WAHEED (FOIT & CS)

C++ Increment /
Decrement Operators

Objectives

At the end of this lesson students should be able to:

1	2	3	4
Identify the increment/ decrement operators	Understand the working of the operators	Distinguish between the prefix and postfix forms	Evaluate different expressions containing these operators

How do they look like?

$$++$$

$$a = a + 1$$

$$\left.\begin{array}{c} a++ \\ ++a \end{array}\right]$$

$$--$$

$$a = a - 1$$

$$\left.\begin{array}{c} a-- \\ --a \end{array}\right]$$

Increment(++) / Decrement(--) Operators

The increment(++) and decrement(--) are unary operators that work only on integer variables.

The syntax is :

Examples:

```
variable ++;
 or
++ variable;
```

```
variable --;
 or
-- variable;
```

```
a++;
++ x;
p=--q;
t--;
```

The increment / decrement operators do not work on constants.

Thus :

```
6++;     //gives error as 6 is a constant
x=--9;   // gives error as 9 is a constant
```

Increment(++) / Decrement(--) Operators

The increment operator increases the value of a variable by 1
The decrement operator decreases the value of a variable by 1.

Thus   and

```
a++;
is the same as
a=a+1;
```

```
b--;
is the same as
b=b-1;
```

Increment(++) / Decrement(--) Operators

Both the increment and decrement operators can be prefixed or postfixed.
i.e:

```
++a;  (prefix)
is the same as
a++;  (postfix)
```

In the above statements both prefix and postfix forms do not make any difference in the output as these are stand alone statements.

But when the pre/post increment or decrement operators are part of an expression the prefix and postfix notation does matter

Increment(++) / Decrement(--) Operators
Pre Increment

In the prefix form the increment or decrement operation is carried out before the rest of the expression.
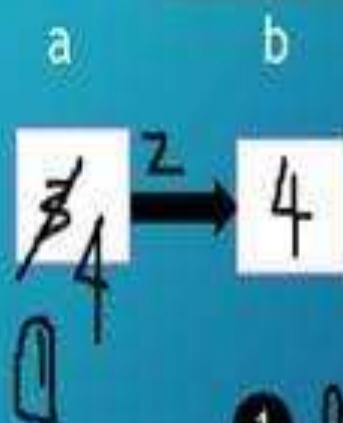
Consider the following code snippet:

code

```
int  a,b;
a=3;
b=++a;
cout<<"a= "<<a<<"\tb= "<<b;
```

output

```
a= 4      b= 4
```

Working

a   b

Explanation

1. $a = a + 1$
2. $b = a$

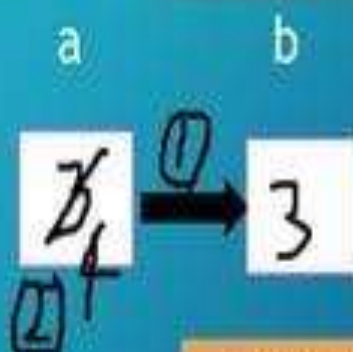# Increment(++) / Decrement(--) Operators
Post Increment

In the postfix form the increment or decrement operation is carried out after the rest of the expression.

Consider the following code snippet:

code

```
int a, b ;
a=3;
b=a++;
cout<<"a= "<<a<<"\tb= "<<b;
```

Working

a   b

$\cancel{3}4$ ⟶ ① 3

② ↑

output

```
a= 4      b= 3
```

Explanation

① $b = a$

② $a = a + 1$

Thumb rule

- **Prefix: change and use**
    1. CHANGE the Value of the variable
    2. USE the new value

- **Postfix : use and change**
    1. USE the original value of the variable
    2. CHANGE the Value of the variable

Program to illustrate Increment, Decrem operators

```
#include<iostream.h>
void main()
{
int  a,b,c,d;
a = 0;
b = 2;
c = 4;
d = a -- + b++ + ++c;
cout<<"A= "<<a<<"\tB= " <<b<<"\tC= "<<c"\tD = "<<d;
}
```

a   b   c

$\not 0$ $\not 2$ $\not 4$
-1   3   5

$d= \underline{a} -- + \underline{b}++ + ++\underline{c};$
    0   2   5

d

7

```
A= -1      B= 3      C= 5      D=  7
```

TEST YOURSELF

Question 1

Select font size T **T** T:

Which of these is NOT true of the increment / decement operators?

● Allow Single Choice Only   ○ Allow Multiple Choices: ☐ Shuffle Answers   ☑ Allow Retry   ☐ Limit Attempts

They work only on integer variables

They cannot work on constants

They increment operaotor can increase the value of a variable by 1 or 2 only

Both exist in prefix and postfix forms

Preview

Question 2

The statement : a=++b;

Increases the value of a by 1 and then assigns the new value to b ✓

Increases the value of b by 1 and then assigns the new value to a. ✓

Assigns the value of a to b and then increases a by 1. ✓

Assigns the value of b to a and then increases b by 1. ✓

Edit

Retry   Continue

Question 3

Consider the following code snippet and answer the question that follows :

```
int x, y;
x=0;
y=x++;
y--; --x;
```

Question 3

What will be the value of x and y after the execution of the above code?

Select the correct answer

The value of x will be 0 and y will be 1 ✓

The value of x will be 0 and y will be -1 ✓

The value of x will be 1 and y will be -1 ✓

The value of x will be 0 and y will be 0 ✓

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Question 4

Consider the following code and answer the question that follows :

```cpp
#include <iostream.h>
void main()
{
    int x = 4, y = 7, z;
    x = ++x; y = --y;
    z = x++ + y--;
    cout << z;

}
```

Question 5

What will be the value of x after the execution of the following statement if the values of y, z and t are 2, 6 and 7 respectively?

X= y++ - ++z + t--;

● Allow Single Choice Only   ○ Allow Multiple Choices

☐ Shuffle Answers   ☑ Allow Retry   ☐ Limit Attempts

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