Operators in C++

Operator : + - * / %

Operand :

operator → operands pe kaam karta hai

2 + 5 (operator, operand)

5 − 10

Expression : operand + operator

a + b = result

2 + 7 = 9

Example : 8 * (3 + 2)

* + → operators

8, 3, 2 → operands

8 * (3 + 2) → expression

Valid Expression

1) a+b ✓

2) 5 * (2 + 3) ✓

3) x = y - 7 ; ✓ — statement

Operator + required operands + proper syntax

4) 1;

5 + 3 = 8

Invalid Expression

1) + ✗

2) a+ ✗

3) a b ✗

4) =10; ✗

true;

Statement : complete instruction

```
{int a = 5;
 a = a+1; ✓ ✓
 cout<<a; ✓
```

5 (a)

- int =5; ✗
- x+; ✗
- cout x ✗
- 5 = x; ✗
- x = 5 ✗
- 5 = x ✗

E / S are same or not ✗

E
↳ fi
a+b
f —

S
complete
x = a+b;

x = (a+b) — expression
——— > statement

Types of Operators

1) Arithmetic Operator
add, sub, mul, div, remainder;

+ Addition
- Substraction
* Multiplication
/ Division
% Remainder
modules

```
int a=4, b=10;
cout<<a+b<<endl;
cout<<a-b<<endl;
cout<<a*b<<endl;
cout<<a/b<<endl;
cout<<a%b<<endl;
```

Division ⇒ 3/5 → 0.6

5 | 30 → 0.6
30
0

4/10 → 0.4 ↳ 0

10 | 40 → 0.4
40
0

C++ ⇒ 0.6 int/int ⇒ int
⇒ 0

float, int
float/int = float

int a = (3.0)/5 → int
float

double/int ⇒ double

int (a) ⇒ 0.6
⇒ 0

int/int ⇒ int
✓ float/int ⇒ float

float/float = float
double/float = double

Homework => 5/5 10/3, 6/9, 8/2

7/3

2.33
3|7
6
10
9
10
9
1

2.3333 —

7/3 => 2

% Modulus

Remainder

a=3, b=7

a % b

3 % 7

7/3 => 0

7%3 => 3 o -> quot

7|3
0
(3)

0.66 —

0.— X

1— 8/8 = 1

8|8
8
0 — 8%8=0

3%7=3

2%8=2

5%10=5

7/3

7%3

2 — 7|3

3|7 7

6

1 -> 7%3

i) a%b = a if a<b

2) a%a = 0

8%8=0

7%7=0

3) a%(-b) => a%b

4) -a%b => a%b

a=-6, b=10

-6%10 => 6%10 => 6.

10|6

=> b

5/, %

:w

Program1: Calculate perimeter of rectangle

formula a = 2*(l+b)

l=10, b=5

2*(l+b)

2*(10+5) => 2*15 => 30

Program2: 2^3 => 2x2x2

3^3 => 3x3x3

Program 3 C → F

$f = (c + 9/5) + 32$ ✓

$\frac{(f - 32)5}{9} = C$ ✓

$C = 3.5$

$f = \left(c + \frac{9}{5}\right) + 32$

$\Rightarrow \left(\frac{3.5 \times 9}{5}\right) + 32$

$\Rightarrow \frac{31.5}{5} + 32$

$\Rightarrow 6.3 + 32$

float $\Rightarrow$ 38.3 //

```
16.31
5 | 31.5
    30
    ---
     15
     15
     --
      0
```

Homework1 -> Farenheit to Celcius

Homework2 => Find Average of 3 marks

float m1, m2, m3

float av => $\frac{m1 + m2 + m3}{3}$

2> Relational Operator

2 Values

1> true — 1

2> false — 0

a = 5, b = 10

1) == -> Equal to

5 == 10 -> 0

2> != Not equal to

5 != 10 -> 1

3> > Greater than

5 > 10 -> 0

4) < -> less than

5 < 10 -> 1

5) >=

5 >= 10 → 0

a=10 , b=10

10 >= 10 → 1

a=11 , b=10

11 >= 10 → 1

6) <=

5 <= 10 → 1

a=10 , b=10

10 <= 10 → 1

a=9 , b=7

9 <= 7 → 0

3) Logical Operators.

2 values

True → 1

false → 0

&& → Logical AND

|| → Logical OR

! → Logical NOT

→ &&

C1	C2	
T	T	=> T
F	T	=> F
F	F	=> F

login

username ✓

password ✓ → login

✗ not login

a=10

b=0

a && b

=> 1 && 0

=> 0

→ ||

C1	C2	
T	F	→ T
T	T	→ T

login

- Email ✓
- Phone ✗
- Username ✗

} → Condition True

a=5 , b=0

5 || 0 = 1

→ !

C1 → ~C1

din → right

a=10 → 1

!a → 0

4) Assignment Operator

1) int x = 5;

2) x = x + 7

x += 7 → Add & assign

3) x = x - 7

x -= 7

4) x = x * 7

x *= 7

(=) → to (==)

5) x = x / 7

x /= 7

6) x = x % 7

x %=

5) Increment & Decrement operator

x = x + 1 x = x + 2

x += 1 x += 2

x++ IO

x = x - 1 DO

x --

a

IO (++)

1) Post Increment (a++)

2) PreIncrement (++a)

Postpaid prepaid

money → use use + more

Example → Post increment

```
int a = 4;
cout << a << endl;
cout << a++ << endl;
cout << a << endl;
```

5
a

output
4
4
5

Example : Pre increment

```
int a = 4
cout << a << endl;
cout << ++a << endl;
cout << a << end;
```

5
a

output
4
5
5

DO (--)

1) Pre-dec (--a)

2) Post-dec (a--)

int a = 4

Post Decrement

a

a--

a

3
a

4
4
3

4
3
3

#3
a

Pre decrement
a = 4
a
--a
a

Post -> ++ --

Pre -> -- , ++

Operator Precedance (※)

3 * 5 + 2 ; * +

BODMAS

Brackets, Orders, Division, Multiplication, Addition, Subtraction

→

3 * 5 + 2 => 15 + 2 => 17 //

Example : 5 * 2 / 6 ; } *, /

: 5 * 0.33 } /

1.6 //

MD - same priority

=> 5 * 2 / 6

=> 10 / 6 (*/)

=> 1.6

0.33
6 | 20
18
20
18
2

1.6
6 | 10
6
40
36
4

C++ (int) => 5 * 2 / 6

=> 5 * 0

=> 0

0.33

1.6

BODMAS

0, 1 ✓

*/

=> 10 / 6

=> 1

*

1-What will be the output of the following?

```
int main() {
  int a = 2 + 3 * 4;
cout << a << endl;

}
```

a) 20
b) 14
c) 12
d) 24

LTR
RTL

2-What is the output?

```
int main() {
int x = 10;
int y = x++ + 5;
cout << y;
}
```

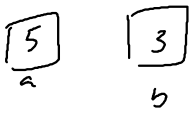
a) 16
b) 15
c) 10
d) 11

=> 10 + 5
=) 15

3-What is the output?

```
int main() {
int a = 5;
int b = 3;
int result = a > b && b < 2;
cout << result;
}
```

a) 1
b) 0
c) 2
d) Compiler Error



a > b && b < 2
5 > 3 3 < 2
1 && 0 => 0

4-What is the output?

```
int main() {
int x = 4, y = 2;
int z = x * y + x / y;
cout << z;

}
```

a) 9
b) 10
c) 11
d) 8

x = 4 , y = 2
x * y + x / y ;
4 * 2 + 4 / 2
8 + 2
= 10

*, +, /
-> LTR

5-What is printed?

```
int main() {
int a = 1, b = 0, c = 3;
int result = a && b || c;
cout << result;
}
```

a) 1
b) 0
c) 3
d) Compilation Error

a = 1
b = 0
c = 3
a && b || c
1 && 0 || 3
0 || 3 (1) = 1

6-Find the result:

```
int main() {
int a = 4;
int b = ++a * 5 / a-- + --a;
cout << b;

}
```

a) 7
b) 8
c) 9
d) 10

=) ++a * 5 / a-- + --a
25
5 * 5 =) 25
25 / 5 => 5
5 + 3 =) 8

7. Final output?

```
int main() {
int a = 10;
int b = 5;
int c = 2;
int result = a - b - c;
cout << result;
}
```

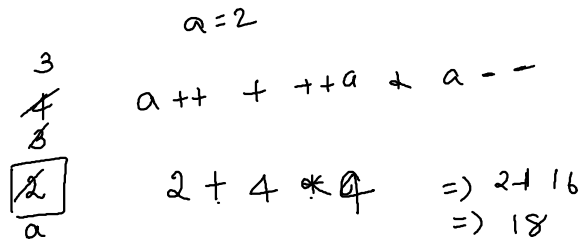
a) 7
b) 3
c) 5
d) -3

8. Evaluate:

```
int main() {
int a = 2;
int result = a++ + ++a * a--;
cout << result;

}
```

a) 18
b) 14
c) 10
d) 13



Homework

1-Predict the output (0 or 1) and explain why.

```
int a = 10, b = 4, c = 6;
bool result = (a + b * c) > (a * b - c);
cout << result;
```

2-Dry run this and find the value of y.

```
int x = 5;
int y = ++x + x-- + --x;
cout << y;
```

3-Predict the output

```
int a = 7, b = 2;
bool res = (a > b) && (b > 5);
cout << res;
```

4-Predict the output

```
int a = 0, b = 10;
bool res = (a != 0) || (b / 2 == 5);
cout << res;
```

5-What will be the final result of res?

```
int x = 3;
int y = 4;
bool res = (++x * 2 > y++) && (--y == x);
cout << res;
```