

A job ready bootcamp in C++, DSA and IOT

Operators in C Language



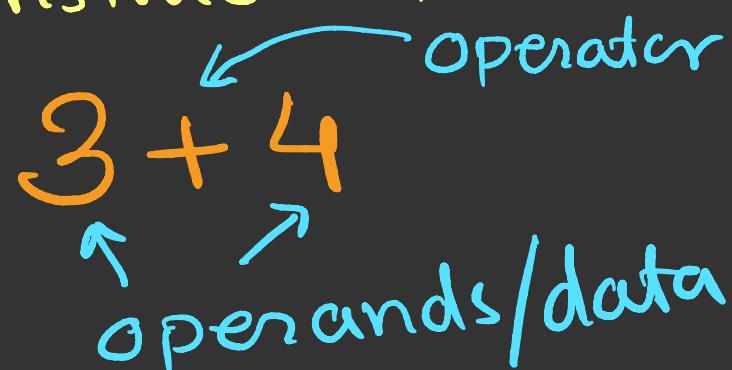
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Agenda

- ① Arithmetic Instruction
- ② Classification of operators
- ③ Unary operators
- ④ Arithmetic operators
- ⑤ Bitwise operators
- ⑥ Relational operators
- ⑦ Logical operators
- ⑧ Assignment operators

Arithmetic Instruction

An instruction which is used to manipulate data using operators, is known as Arithmetic Instruction.


3 + 4
↑ ↑
operands/data

- ① Unary
- ② Binary
- ③ Ternary

$$3 + 4 * 5 \\ = 23 \quad 35$$

Classification of Operators

- ① Unary operators +, -, ++, --, sizeof()
- ② Arithmetic Operators *, /, %, +, -
- ③ Bitwise Operators &, |, ^, ~, >>, <<
- ④ Relational Operators <, >, <=, >=, ==, !=
- ⑤ Logical Operators !, &&, ||
- ⑥ Conditional Operator ?:
- ⑦ Assignment Operators =, +=, -=, *=, /=, %=

Unary Operators

$+,-,\underline{++},--$

$+5$

-7

Increment operator

$++$

int $x=5;$

x
~~756~~

printf("%d", x); 5

$x++; \leftarrow x = x + 1$ post increment

printf("%d", x); 6

$++x; \leftarrow x = x + 1$ pre increment

printf("%d", x); 7

$x--$; post decrement
 $--x$; pre decrement

$x = x - 1$

$3++$; error

Find Output of the following program?

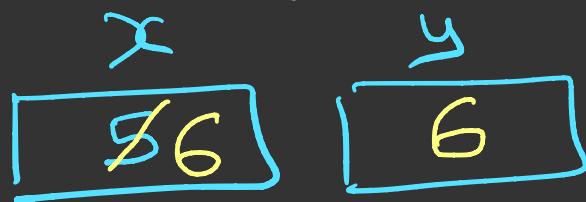
```
#include<stdio.h>
int main()
{
    int x=5, y;
    y=x++;
    printf("%d %d", x, y);
}
```

x y
56 5

6 5

Find Output of the following program?

```
#include<stdio.h>
int main()
{
    int x=5, y;
    y=++x;
    printf("%d %d", x, y);
}
```



6 6

Unary Operators

sizeof()



- ① Data type
- ② variable
- ③ Constant

• Integer constant is of type int	short	int x;
• Real Constant is of type double	long	short x;
• Character Constant is of type	char	1 byte
	short	2 bytes
	int	4 bytes
	long	8 bytes

Arithmetic Operators

Associativity Rule : L to R

* / %

+ -

3+4 7

3-4 -1

3*4 12

3/4 0

11/4 2

15%6 3

21%7 0

426%10 6

3%4 3

a * b / c *

a / b * c /

a + b * c *

3/4 → 0.75 ← maths

Integer / Integer → integer

$$4 \overline{)30} \\ \underline{-0} \\ 3$$

3.0/4 → 0.75

3/4.0 → 0.75

3.0/4.0 → 0.75

3.5%2 Error

Bitwise Operators

& | ^ ~ >> <<

int x;
x = 35 & 52;

$$0 \& 0 \rightarrow 0$$

$$0 \& 1 \rightarrow 0$$

$$1 \& 0 \rightarrow 0$$

$$1 \& 1 \rightarrow 1$$

$$0 \wedge 0 \rightarrow 0$$

$$0 \wedge 1 \rightarrow 1$$

$$1 \wedge 0 \rightarrow 1$$

$$1 \wedge 1 \rightarrow 0$$

$$35 = 00100011$$

$$52 = 00110100$$

$$32 = \overline{00100000}$$

$$0 | 0 \rightarrow 0$$

$$0 | 1 \rightarrow 1$$

$$1 | 0 \rightarrow 1$$

$$1 | 1 \rightarrow 1$$

$$\sim 1 \rightarrow 0$$

$$\sim 0 \rightarrow 1$$

$$x = 44 | 68;$$

$$44 = 00101100$$

$$68 = 01000100$$

$$108 = \overline{01101100}$$

$x = 53 >> 2;$

0000000000 00000000 00000000 00110101



13

$x = 12 << 3;$

~~00000000 00000000 00000000 0001100000~~



11000000

$$64 + 32 = 96$$

Relational Operators (L to R)

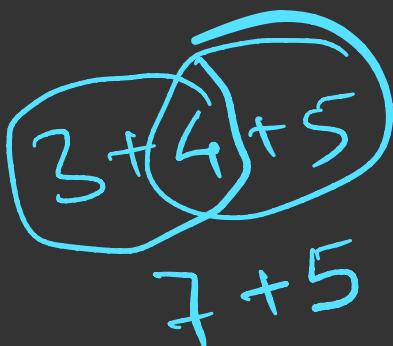
<, >, <=, >=,

==, !=

Always give result

as 0 or 1

True \rightarrow 1
False \rightarrow 0



0 $x = 3 > 4;$

1 $x = 5 \leq 5;$

0 $x = 4 != 4;$

0 $x = \underline{10} > 8 > 6;$

1 > 6

1 $x = 3 != 4;$

$x = 2 == '2'$

0 $x = 2 == 50$

Logical Operators

! NOT(unary)

$x = !5 > -2;$

&& AND

Every non-zero
value is True
zero is False

|| OR

!5

! True \rightarrow False (0)

0 > -2

! False \rightarrow True (1)

! (5 > -2)

exp1 && exp2

T	$\&\& T \rightarrow T$
F	$\&\& F \rightarrow F$
T	$\&\& X \rightarrow F$
F	$\&\& X \rightarrow F$

exp1 || exp2

F	$ F \rightarrow F$
F	$ T \rightarrow T$
T	$ X \rightarrow T$
O	$ O \rightarrow O$

$x > 0$ & $y > 0$

T	$\rightarrow T$
F	$\rightarrow F$
T	$\rightarrow F$
F	$\rightarrow F$

Assignment Operators

R to L

=

$x = 4 ; \checkmark$

$x = y = 4 ; \checkmark$

$4 = x ; \times$

variable =

int $x = 3;$



$x = x + 5;$

Container Content
 $= 3 + 5$

Compound Assignment Operators

$+ = , - = , * = , / = , \% =$

$\text{int } x = 5;$

$x += 3; \rightarrow x = x + 3$

$x -= 4; \rightarrow x = x - 4$

$x *= 7; \rightarrow x = x * 7$

$x /= 5; \rightarrow x = x / 5$

$x \% = 2; \rightarrow x = x \% 2$