

Operator

* special symbols & used for calculation, decision making in order to create a flow/process

*** Data manipulation → Calculations
Decision making
Optimization

Types :

1. Arithmetic
2. Relational (a.k.a) Comparison
3. Logical (a.k.a) Conditional
4. Bitwise
5. Unary Operator

1. Arithmetic :

+, -, *, /, % ← operators

← remainder

$$\begin{array}{r} \text{int}(2.57225) \quad 2 \overline{) 5 (2.5} \\ \times \\ \hline 10 \overline{) 20} \quad \text{quotient } 2 \\ \hline 0 \quad \text{remainder} \end{array}$$

(/)

We get only integer part
when it encounters decimal
it stop proceeding

(%) if we get remainder value as '0' so dividend value is equally
divided by divisor, otherwise it is not equally divided

Relational Operator :

>, <, >=, <=, ==, !=

→ '=' already for assignment operator

* we use it for comparison between two values

* the yield of comparison will be always boolean value i.e True/False

Logical Operator :- $\&\&$, $\|\$, $!$

AND OR NOT

$$a=4 \quad b=1$$

expulsion

$$= \frac{\text{emp}_3}{((a > 2) \&\& (b > 2))}$$
$$\underline{5+2} + 3 - 1$$
$$T_{200} = 0$$
$$= \begin{array}{r} (5+1 \mid 2 \ -1) \\ - \quad \quad \quad \\ \hline 5+0 \ -1 \\ - \quad \quad \quad \\ \hline 5+ \ -4 \end{array}$$
$$\frac{(5 + \frac{2xy}{\exp_2} + \frac{(1|_2) - 1}{\exp_1})}{\exp_3}$$

(OR operator) :

$$q = 1$$
$$b = 3$$
$$a > 2 \quad || \quad b > 2$$
$$\begin{array}{r} 222 \\ 272 \\ \hline \end{array}$$

172 113 > 2

F 11 7

True

Logical OR

A D

1 1 1

1 6 T

A diagram showing a box containing the characters '0' and '1'. An arrow points from the box to a '0' character below it.

0 0 0

logical NOT

$$1 \rightarrow 0$$
$$0 \longrightarrow 1$$

Logical Gate

A

B

Logical AND

11

0

U

A hand-drawn diagram showing a square with a circle inscribed inside it. The square is drawn with purple lines, and the circle is drawn with an orange line. The circle touches all four sides of the square.

7

1 - True
0 - False

Bitwise Operator : $\&, |, \wedge, \sim, \ll, \gg$

↑ Bitwise ↑ AND OR XOR NOT leftshift rightshift

Operator AND 12 & 10

	8	4	2	1
12	1	1	0	0
10	1	0	1	0
	<hr/>			
	1	0	0	0

decimal \rightarrow 12, 10 \rightarrow Binary representation

64	32	16	8	4	2	1
			1	1	0	0
			1	0	1	0

Base 2 } Binary representation

Bitwise OR

	8	4	2	1
14	1	1	0	0
12	1	0	1	0
	<hr/>			
	1	1	1	0

Bitwise (XOR)

	8	4	2	1
14	1	1	0	0
12	1	0	1	0
	<hr/>			
	0	1	1	0

Logical Bitwise

	1	1	0
	1	0	1
	0	1	1
	0	0	0

Bitwise NOT (~)

0 \rightarrow 1
1 \rightarrow 0

operand \rightarrow $5 \times 2^{\text{operand}}$
↑
operator

leftshift (\ll) \rightarrow multiplication
 $5 \ll 1$

	8	4	2	1
	0	1	0	1
	<hr/>			
	0	0	1	0
	<hr/>			
	0	0	1	0

10

5×2^n
 $5 \times 2^1 = 10$
 $5 \times 2^4 \rightarrow 5 \times 16 \Rightarrow 80$

	5	16
	<hr/>	
32	1	0
	0	1
	1	1
	1	1

rightshift (\gg) \rightarrow Division

5 \gg ① 5 \gg 2

8 4 2 1

0 1 0 1 \gg 1

0 0 1 0

2

$5/2^n$
 $5/2 = 2$
 $5/4 = 1$

Unary Operator : $++$, $--$, $+$, $-$

\downarrow \downarrow
 $n+1$ $n-1$
 11 9

$a=10$

$++a$ $a++$
 $\rightarrow a=a+1$ $a=a+1$ (10)
 \uparrow $\rightarrow a=11$
 $a=11$

pre increment : $int\ a=5$
 $b = ++a \rightarrow$ increment first Σ assignment

post increment : $int\ a=5$
 $b = a++$
 \uparrow assign first Σ then increment

2's Complement

(2)

1. If MSB = 1 it's negative

Step 1 In 8 bit system

2. Invert bit

128 64 32 16 8 4 2 1 3. Add 1

0 0 0 0 1 1 0 0 4. Result

Step 2 Flip

$\Delta \sqrt{0}$
 \downarrow
 $\boxed{1}$

MSB \nearrow 0 +ve

1 1 1 0 0 1

Step 3 Invert 0 0 0 0 1 1 0 0

Step 4 Add 1 Bit

Ignore \rightarrow 0 0 0 0 1 1 0 1

$\begin{array}{r} 8\ 4\ 2\ 1 \\ 0\ 0\ 0\ 0 \\ +\ 1 \\ \hline 1 \end{array}$

