Bits — 0, 1

Time consumption is very less

5 & 1

AND (&)

x	y	o/p
0	0	0
0	1	0
1	0	0
1	1	1

Truth Table

5 (Decimal)

```
101
001   1 AND
---
001 — 1
```

OR (|)

x	y	o/p
0	0	0
0	1	1
1	0	1
1	1	1

OR operator

```
5 | 1
|
101
001
---
101 — 5
```

NOT (!)

!0 = 1

!1 = 0

XOR (^)

x	y	x ^ y
0	0	0
0	1	1
1	0	1
1	1	0

XOR operation

```
5 ^ 1
101
001
---
100 = 4
```

Left Shift Operator (<<)

Binary Numbers — **Decimal**

2 1 0
0 0 1 ——— 1 (2^0)

3 2 1 0
0 0 1 0 ——— 2 (2^1)
Left shift by 1-bit

4 3 2 1 0
0 0 1 0 0 ——— 4 (2^2)
Left shift by 2-bit

$$4 \ll 3 = 4 * 2^3$$
$$= 4 * 8 = 32$$

$$x \ll y = x * 2^y$$

→ Generalized inference of Left shift Operator

Right Shift Operator (>>)

9 8 7 6 5 4 3 2 1 0 , Gone

1 1 0 0 1 1 0 0 1 0 = 2 + 16 + 32 + 256 + 512

= 818

0 1 1 0 0 1 1 0 0 1 = 409 ($818/2 = 409$)

$$x >> y = x * \frac{1}{2^y}$$

Generalized inference of Right shift Operator