Bitwise Operator

- When you are shifting , one of the bits will be vacant so that has to be filled with with 0

- Left and Right shift

int x = 5 , y;

X = 0 0 0 0 0 1 0 1

0 0 0 0 0 1 0 1 ___

- When you shift all the bits on left hand side by one space then 5 will get multiplied by 2 , if you move them by 2 space it will be multiplied by 4
- Here signed bit is not included , if the number is positive then it will be positive and vice versa

- In right shift the signed bit is untouched it remains -ve only whereas in unsigned right shift the bit become +ve
- In NOT if you take any number suppose 10 it will become -11, if you take 6 it becomes -7

Bitwise operators

int x=10, y=6, z;

Left shift operator :-

x ⟶ 00001010

z = x<<1 ⟶ This means Left shift by 1 bit.

1) z = x<<1 ⟶ x ⟶ 00001010

00001010

Last add another (0) bcoz [8 bits]

[00010100]

finally [z=20]

by this diverged formula is,

⟶ [$n \times 2^k$] z = x<<1

[n = x, k = 1]

2) z = x<<2. (Left shift by 2 then) then z becomes

$z = 10 \times 2^2$ (x=10)

$= 10 \times 4 = 40$!

Right shift

int x=10, y=6, z;

x → 00001010

z = x>>1 → 0 0 0 0 0 1 0 1

z = 5

By formula,

x >> k, $\frac{x}{2^k}$

For Negatives :-

int x = -10;

x = 00001010

1's comp = 11110101 (1+1=10)

2's comp = +1

11110110

2comp = add 1 to 1's comp

then

-10 = 11110110

x = 11110110
7 6 5 4 3 2 1 0

2+4+16 +32+64+128

$0(2^0) + 1(2^1) + 1(2^2) + 2^4 + 2^5 + 2^6 + 2^7$

$\boxed{n = 246}$

$n >> 1 \Rightarrow \dfrac{246}{2^1} = \boxed{123}$

Not operator

$x = 10$

$z = \sim x$

$k = \sim x \Rightarrow -(x+1)$

$z = -(10+1) = -(11) = -11$

→ If we wanted know +ve value

$x = 0000\ 1010$

$x = 0000\ 1010$

$\sim x = 1111\ 0101$

find 1's for $\sim x$

1's = 0000 1010

2's = +1

→ 0000 1011

↓

This is +ve value for $\sim x$