Bitwise Operator Part-2

- Bitwise left shift operator
- Bitwse Right shift operator.

Bitwise Left Shift Operator (<<)

Left shift operator is denoted by <<.

→ It moves all bits by a given number of bits to the left.

eg :- $x = 5$, find $x << 1$.

solution :- $x = (5)_{10} = (101)_2$

$$x = 0\ 1\ 0\ 1$$

$$x << 1 = 1\ 0\ 1\ 0$$

$$x << 2 = 0\ 1\ 0\ 0 = 4$$

$$x = 5 \; : \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 1 \quad 0 \quad 1 \qquad = 5 \quad = 5 \times 2^0$$

$$x << 1 \; : \quad 0 \quad 0 \quad 0 \quad 0 \quad 1 \quad 0 \quad 1 \quad 0 \qquad = 10 \quad = 5 \times 2^1$$

$$x << 2 \; : \quad 0 \quad 0 \quad 0 \quad 1 \quad 0 \quad 1 \quad 0 \quad 0 \qquad = 20 \quad = 5 \times 2^2$$

$$x << 3 \; : \quad 0 \quad 0 \quad 1 \quad 0 \quad 1 \quad 0 \quad 0 \quad 0 \qquad = 40 \quad = 5 \times 2^3$$

$$\boxed{x << i = x \times 2^i}$$

Bitwise Right Shift (>>)

It is denoted by >>.

→ It moves all bits by a given number of bits to the right.

eg: $x = 5$, find $x >> 1$.

solution: $x = (5)_{10} = (101)_2$

$$x = \underline{0} \; \underline{1} \; \underline{0} \; \underline{1}$$

$$x >> 1 = \underline{0} \; \underline{0} \; \underline{1} \; \underline{0}$$

$$x >> 2 = \underline{0} \; \underline{0} \; \underline{0} \; \underline{1}$$

$$x = (50)_{10} = (110010)_2$$

$x = 50:$ 0 0 1 1 0 0 1 0 $= 50 = \dfrac{50}{2^0}$

$x \gg 1:$ 0 0 0 1 1 0 0 1 $= 25 = \dfrac{50}{2^1}$

$x \gg 2:$ 0 0 0 0 1 1 0 0 $= 12 = \dfrac{50}{2^2}$

$x \gg 3:$ 0 0 0 0 0 1 1 0 $= 6 = \dfrac{50}{2^3}$

In general, $\boxed{x \gg i = \dfrac{x}{2^i}}$

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