

Floating Point to Decimal:

(i) Hex to Binary.

(ii) Arrange the binary according to the format.

(iii) Determine the sign

(iv) Find out the exponent from biased exponent.

(v) Convert fraction to decimal.

$$(vi) \text{ Decimal Number} = (-1)^{\text{sign bit}} \times (1 + \text{Fraction}) \times 2^{(\text{Exponent})}$$

Example: $0xF2400120$; convert this single precision floating point number to decimal.

Solⁿ: $0xF2400120$

(i) 1111 0010 0100 0000 0000 0001 0010 0000

(ii) $\begin{array}{c} \overbrace{1}^{\text{sign Bit}} \quad \overbrace{111\ 00100}^{\text{Biased Exp.}} \quad \overbrace{100\ 0000\ 0000\ 0001\ 0010\ 0000}^{\text{Fraction}} \end{array}$

(iii) sign = -

(iv) Biased exp = 111 0010 0 = 228

$$\text{Bias} = 2^{8-1} - 1 = 127$$

$$\therefore \text{Exponent} = 228 - 127 = 101$$

(v) Fraction = 100 0000 0000 0001 0010 0000

$$= 0.100\ 0000\ 0000\ 0001\ 0010\ 0000$$

$$= 0.5000343323$$

$$(vi) \text{ Decimal Value} = (-1)^1 \times (1 + 0.5000343323) \times 2^{101}$$

$$= -1.5000343323 \times 2^{101}$$

$$= -3.80303884 \times 10^{30}$$

Extension: Upto 6 decimal points with rounding = -3.803039×10^{30}

$$\text{u} \quad 6 \quad \text{u} \quad \text{u} \quad \text{without} \quad \text{u} \quad = -3.803038 \times 10^{30}$$