

Conversion to Floating Point Representation: 5.375_{10}

step 1: Convert decimal to Binary: 5.375_{10}

- First convert whole number or integer: 5

$$\begin{array}{r} 2 \\ \hline 2 \overline{) 5} \\ \underline{4} \\ 1 \end{array} \rightarrow 1$$

$$\begin{array}{r} 1 \\ \hline 2 \overline{) 2} \\ \underline{2} \\ 0 \end{array} \rightarrow 0$$

$$\begin{array}{r} 1 \\ \hline 2 \overline{) 1} \\ \end{array} \rightarrow 1$$

$$5_{10} = 101_2$$

- Now we take Fraction piece: 0.375_{10}

$$0.375 \times 2 = 0 + 0.75$$

$$0.75 \times 2 = 1 + 0.5$$

$$0.5 \times 2 = 1 + 0 \quad \text{END}$$

$$0.375_{10} = 011_2$$

$$5.375_{10} = 101.011_2$$

$$\text{Step 1: } +5.375_{10} = 101.011_2$$

Step 2: Converting Binary to Scientific Notation : $5.375_{10} = 101.011_2$

Convert 631.65_{10}

$$631.65_{10} \xrightarrow[\text{Notation}]{\text{Scientific}} 6.3165 \times 10^2$$

Convert 101.011_2

$$101.011_2 \xrightarrow[\text{Notation}]{\text{Scientific}} 1.01011 \times 2^2$$

$$5.375_{10} = 101.011_2 \times 2^{0+2}$$

$$\text{Step 2: } 1.01011 \times 2^2$$

Step 3: Calculate the Biased Exponent:

$$\text{Biased offset: } 7$$

$$\text{Biased Expo} = \text{Unbiased Exp} + \text{Biased offset}$$

$$= 2 + 7$$

$$= 9_{10}$$

$$1.01011 \times 2^{2+7} = 1.01011 \times 2^9$$

$$\text{Biased Exponent} = 9_{10} = 1001_2$$

Biased offset

$N = \#$ of bits used to store Biased Exponent

$$N = 4$$

$$\text{Biased offset} = 2^{N-1} - 1$$

$$= 2^{4-1} - 1$$

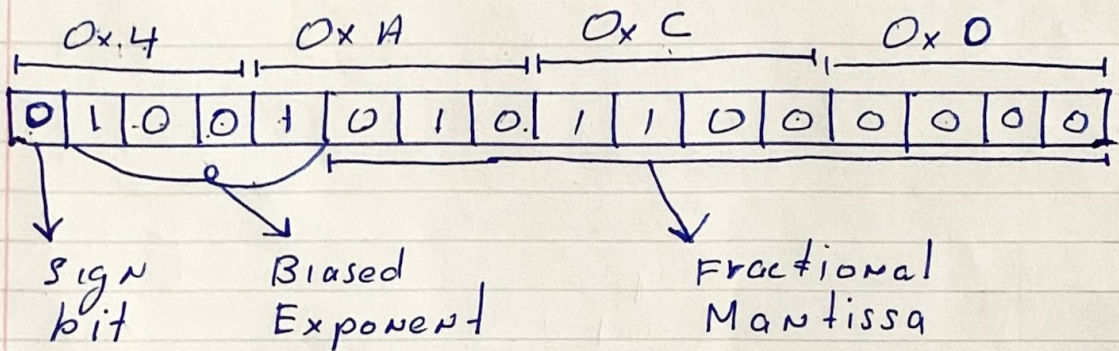
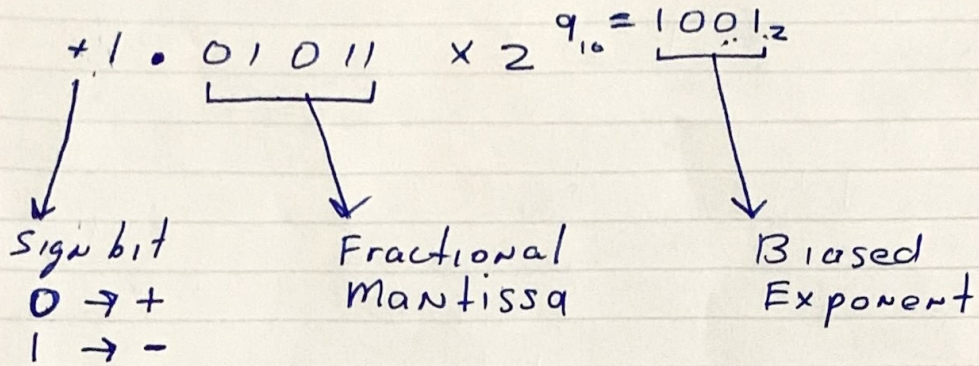
$$= 2^3 - 1$$

$$= 8 - 1$$

$$= 7$$

Step 3: 1.01011×2^9

Step 4: Fusion of Floating Point: 1.01011×2^9



Step 5: Convert to Hex

0x 4AC0

Hexadecimal Numbers

Dec	Binary	Hex
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

$$\underline{0x10} = 16$$

$$\begin{aligned} 0x10 &= 1 \times 16^1 + 0 \times 16^0 \\ &= 16 + 0 \times 1 \\ &= 16 + 0 \\ &= 16 \end{aligned}$$

$$= 18$$

$$= 1 \times 10^1 + 8 \times 10^0$$

$$= 10 + 8 \times 1$$

$$= 10 + 8$$

$$= 18$$