Lec. 10 (26/3/12)
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BINARY OFFSET REPRESENTATION

$$x = (x_0 - 1) + \sum_{i=1}^{W_d - 1} x_i 2^{-i}$$

If we define $Q = 2^{-W_d - 1}$

Then x value lies in the Range

$$1 \leq x \leq 1Q$$

CONVERSION

$$(0.828125)_{10} = (0.110101)_{BO}$$

$$-(0.828125)_{10} = (1.001011)_{BO}$$

$$(0)_{10} = (1.000000)_{BO}$$

Advantages :- Similar to 2'S Complement SYSTEM

$$\begin{array}{rccc} & 1 & & \\ & 1 & 1 & 1 \\ + & 0 & 1 & 0 \\ \hline & 1 & 1 & 1 \end{array}$$

↑
carry

$$\begin{array}{r|l} 5 & 9 \\ \times 1 & 5 \\ \hline & 4, \end{array} \qquad \begin{array}{r|l} 3 & 9 \\ \times 3 & 9 \\ \hline & 0, \end{array} \qquad \begin{array}{r|l} 2 & 9 \\ \times 4 & 8 \\ \hline & 1, \end{array}$$

$M \rightarrow \underline{2, 3, 4,}$

$\rightarrow 1, 0, 1, \longrightarrow 9$

$$178 = 1 \times 10^2 + 7 \times 10^1 + 8 \times 10^0$$

$r = 10$

Binary $r = 2$

$$(1101)_2 \Rightarrow 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = (13)_{10}$$

$0.578215)_{10}$

$= 1.\cancel{1}56430$

Binary $0.100 - - .$

$$\begin{array}{r} 156430 \\ \times 2 \\ \hline 0.312860 \\ 2\times \\ \hline 0.625720 \end{array}$$

$(37)_{10} =$

$$\begin{array}{r|l} 2 & 37 \\ 18 & 38 \\ \hline 9 & 1 \\ & 0 \end{array}$$

$32+4+1$

$= 1\times 2^5 + 0\times 2^4 + 0\times 2^3 + 1\times 2^2 + 0\times 2^1 + 1\times 2^0$

$= 100101$

1's, 011010_1

2's, 011011