

BINARY OFFSET REPRESENTATION

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

If we define $Q = \frac{2^{-w_d-1}}{2}$

Then x value lies in the Range

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

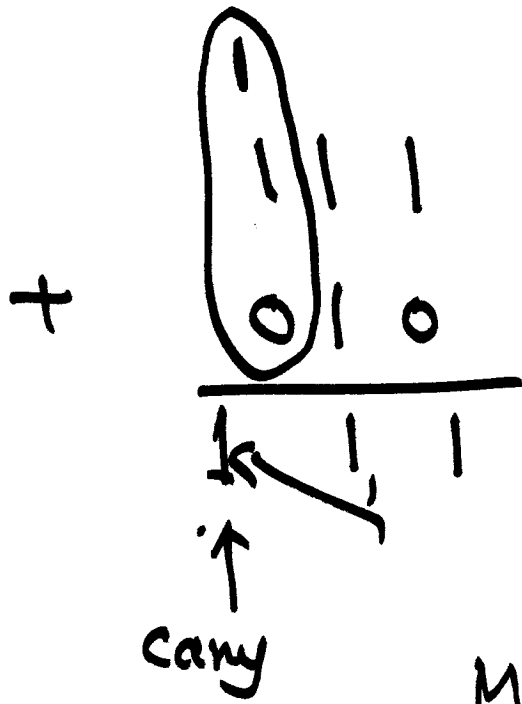
CONVERSION

$$(0.828125)_{10} = (0.110101)_{B0}$$

$$-(0.828125)_{10} = (1.001011)_{B0}$$

$$(0)_{10} = (1.000000)_{B0}$$

Advantages :- Similar to 2's Complement
SYSTEM



$$\begin{array}{r} x_5 \\ \hline 5 \end{array} \Bigg| \begin{array}{r} 9 \\ 5 \\ \hline 4 \end{array}$$

$$x_3 \begin{array}{r} 3 \\ \hline 9 \end{array} \Bigg| \begin{array}{r} 9 \\ 9 \\ \hline 0 \end{array}$$

$$x_4 \begin{array}{r} 2 \\ \hline 9 \end{array} \Bigg| \begin{array}{r} 9 \\ 9 \\ \hline 1 \end{array}$$

M → 2, 3, 4

→ 1, 0, 1, → 9

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

$$\underline{r = 10}$$

Binary $r = 2$

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

$$0.5782157_{10}$$

$$= 1.\underline{56430}$$

Binary $0.100 \dots$

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

$$(37)_{10} =$$

$$\begin{array}{r} 2 \overline{) 37} \\ \underline{38} \\ 1 \\ 0 \end{array}$$

$$32 + 4 + 1$$

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

$$= 100101$$

1's.

$$\underline{0110101}$$

2's.

$$\underline{011011}$$