

MULTIPLICATION and DIVISION

Multiplication in different base

1)
$$\begin{array}{r} 234\overset{2}{5} \\ \times \quad \quad \quad \overset{2}{5} \\ \hline 1725 \end{array} \rightarrow \begin{array}{r} 25 \\ 10 \end{array} \begin{array}{l} 2 \rightarrow Q \\ 5 \rightarrow R \end{array}$$

2)
$$\begin{array}{r} 727 \\ \times 43 \\ \hline 2181 \\ 2908 \times \\ \hline 31261 \end{array}$$

3)
$$\begin{array}{r} (11010)_2 \\ \times (11)_2 \\ \hline 111010 \\ 11010 \times \\ \hline 1001110 \end{array}$$

4)
$$\begin{array}{r} (22120\overset{2}{8})_3 \\ \times \quad \quad \quad (2)_3 \\ \hline (1220111)_3 \end{array}$$

$$\begin{array}{r} 4 \\ 3 \end{array} \begin{array}{l} 1 \rightarrow Q \\ 1 \rightarrow R \end{array}$$
$$\begin{array}{r} 5 \\ 3 \end{array} \begin{array}{l} 1 \rightarrow Q \\ 2 \rightarrow R \end{array}$$

57

$$\begin{array}{r} (7214)_8 \\ \times (5)_8 \\ \hline 44274 \end{array}$$

$$\begin{array}{r} 20 \text{ --- } 2 \\ 8 \text{ --- } 4 \end{array}$$

$$\begin{array}{r} 10 \text{ --- } 1 \\ 8 \text{ --- } 2 \end{array}$$

$$\begin{array}{r} 36 \text{ --- } 4 \\ 8 \text{ --- } 4 \end{array}$$

$$\begin{array}{r} 6) (4AGC)_{16} \\ \times (2)_{16} \\ \hline 94D8 \end{array}$$

A \rightarrow 10

B \rightarrow 11

C \rightarrow 12

D \rightarrow 13

E \rightarrow 14

F \rightarrow 15

$$\begin{array}{r} 12 \\ 2 \\ \hline 24 \text{ --- } 1 \\ 16 \text{ --- } 8 \end{array}$$

$$\begin{array}{r} 20 \text{ --- } 1 \\ 16 \text{ --- } 4 \end{array}$$

$$\begin{array}{r} 5 \\ \times 2 \\ \hline 10 \\ - 8 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \text{ --- } 2 \\ 12 \text{ --- } 4 \end{array}$$

$$\begin{array}{r} (5)_8 \overline{) (764)_8} 144 \\ \underline{5} \\ 26 \\ \underline{24} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

Division direct is complicated

* Better Convert both to decimal divide and get back to decimal

Un Signed Number Vs Signed Number

Number

Un Signed Number

→ without +ve or -ve
sign has only magnitude

→ In nature we need
unsigned number

→ All bits are used to
represent magnitude

Ex:- 3 bits → (largest &
smallest
no)

(0, ..., 7)

→ Range 0 to $2^n - 1$

$n \rightarrow$ no. bits

$n = 3$

0 to $2^3 - 1$

(0 to 7)

→ Ex:- 432

Signed Number

↓
Signed No

↑
+ve -ve

followed by mag

profit & loss, temp
scale needs signed
nos

If 'n' bits number
one bit represents the
sign bit, rest $n-1$ bits
store magnitude

For uniform process
(MSB) bits sign.

0 → +ve

1 → -ve

$\overset{n}{\text{0}} \dots$
↓
sign

3 Methods to represent
sign

1) Sign magnitude
1's Comp, 2's Comp

Ex:- -2, -43