

Integer Devision.

Restoring & Non Restoring Method.

Restoring Method:-

- 1) $A \leftarrow 0, B \leftarrow \text{Diviser}, Q \leftarrow \text{Dividend}$
 $\text{Count} \leftarrow n$
- 2) Shift A & Q left one binary pos.
- 3) $A \leftarrow A + B$
- 4) If A is 1
 Yes Assign $Q_0 \leftarrow 0$
 $A \leftarrow A + B$ (Restore)
- 5) $\text{Count} \leftarrow \text{Count} - 1$
- 6) Repeat 2,3,4,5 - n times.

$$A = n + 1$$

Ex

Dividend = 1010100 Count = 4/3/2/1/0

Divisor = 0011 (B)

A
 $\begin{array}{r} 0000 \\ \overline{0000} \end{array}$ $\begin{array}{r} 1010 \\ \overline{0101} \end{array}$

Shift Left

$A \leftarrow A - B$
 $(2^s \text{ comp. } B)$

$\begin{array}{r} 10110101 \\ \overline{00110} \end{array}$

1 1 1 1 0 same 0 1 0 0

$A \leftarrow A + B$

(Restore)

$\begin{array}{r} 00011 \\ \overline{00001} \end{array}$ 0 1 0 0

Shift left

$(A \leftarrow A - B)$
 $(2^s \leq B)$

$\begin{array}{r} 11101 \\ \overline{11111} \end{array}$ same

$A \leftarrow A + B$

Shift left

$\begin{array}{r} 00010 \\ \overline{00001} \end{array}$ 0 0 0 0 0

$$\begin{array}{r}
 0\ 0\ 1\ 0\ 1 \\
 1\ 1\ 1\ 0\ 1 \\
 \hline
 0\ 0\ 0\ 1\ 0
 \end{array}$$

$A \leftarrow A - B$
 $\Delta \text{temp } B$

(no restore)

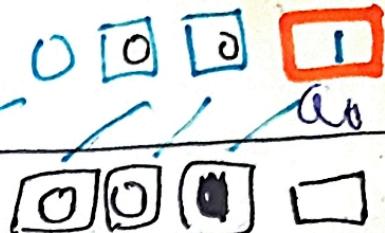
shift (L)

$(A \leftarrow A - B)$
 $2 \leq B$

$$\begin{array}{r}
 0\ 0\ 0\ 1\ 0 \\
 1\ 1\ 1\ 0\ 1 \\
 \hline
 0\ 0\ 0\ 0\ 1
 \end{array}$$

It's 0 no need to restore
 Remainder

$$\begin{array}{r}
 0\ 0\ 0\ 1\ 0 \\
 0\ 0\ 1\ 0\ 0 \\
 \hline
 \end{array}$$



Ex

$$\begin{array}{r}
 8\ 4\ 2\ 1 \\
 \times 1\ 0\ 0\ 0 \\
 \hline
 0\ 1\ 0\ 0
 \end{array}$$

non Restoring method

Alg'm

1) $A \leftarrow 0$, $B \leftarrow \text{Divisor}$, $Q \leftarrow \text{Dividend}$
 $\text{Count} \leftarrow n - 1$

2) Shift left $A \& Q$

3) If sign of A is 0
 $A \leftarrow A + B$ (add) $A \text{ is } 1$ $Q_0 = 0$

Yes $A \rightarrow A - B$ (sub) $A \text{ is } 0$ $Q_0 = 1$

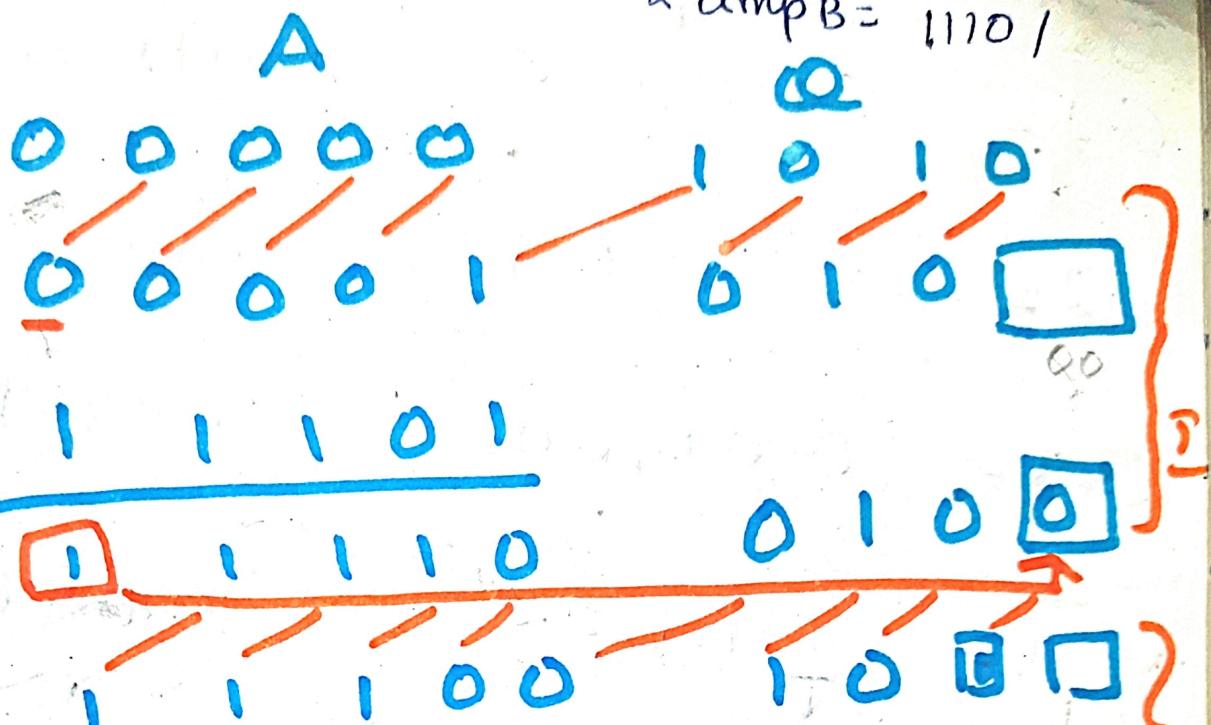
No $A \rightarrow A + B$ (add), $A \text{ is } 1$ $Q_0 = 0$
 $A \text{ is } 0$ $Q_0 = 1$

4) repeat 2 & 3 n times

5) If the sign of A is 1,
add divisor to A .

Σ^2 Dividend = 1010(0) Divisor = 0011 (B) Count = 4
 2^3 Comp B = 1110 /

Shift left



A < A - B
 2^3 Comp B

Shift left

A < A + B

Shift left

A < A + B

Shift left

A < A - B

2^3 Comp B.

