COMPUTER ORGANIZATION AND ARCHITECTURE

UNIT –III

TOPIC- FLOATING POINT DIVISION PART-2

Floating Point Division

Flowchart:

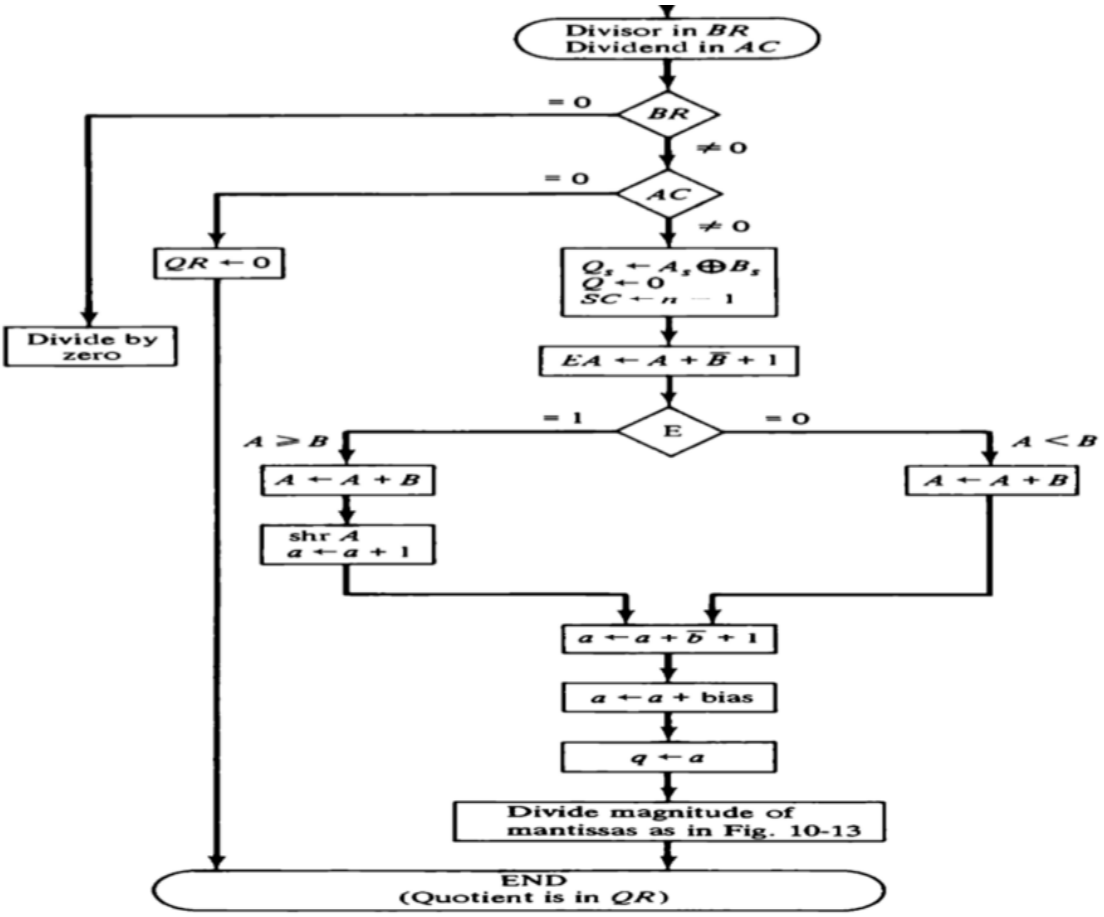


Figure 10-17 Division of floating-point numbers.

Example: $\frac{78.75 \times 10^{5}}{5.25 \times 10^{2}}$

Example

$BR = 5.25 \times 10^2$

$AC = 78.75 \times 10^5$

$$\frac{78.75 \times 10^5}{5.25 \times 10^2}$$

(1) check for zeros.

$AC = 78.75 \times 10^5 \neq 0 = 1001110.11$

$BR = 5.25 \times 10^2 \neq 0 = 101.01$

(2) Initialize the registers & evaluate the sign.

$Q_S \leftarrow A_S \oplus B_S = 0 \oplus 0 = 0.$

$Q \leftarrow 00000, \; SC \leftarrow 5.$

(3) Align dividend (or) check for divide overflow

$AQ = 0100111011$ (A | Q)

$A = 01001$ $\quad B = 10101$

$A \leftarrow A + \bar{B} + 1$

$\bar{B} = 01010$ $+$ 1

$\bar{B}+1 = 01011$

$A = 01001$

$\bar{B}+1 = 01011$ $+$

$A \leftarrow 10100$

$E \leftarrow 0$

$A = 10100$

$B = 10101$ $+$

$E \rightarrow 1\ 01000$

No carry; No divide overflow. $\rightarrow A < B$

(4) Subtract the exponents.

$a = 5, \; b = 2.$

$a \leftarrow a + \bar{b} + 1$

$a = 101$

$\bar{b}+1 = 110$ $+$

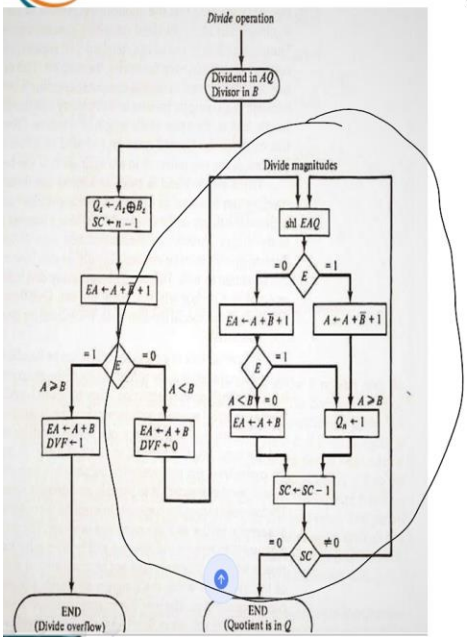
$1\,011 \rightarrow a = 3 \Rightarrow q$

$a = 101$

$b = 010$

$\bar{b} = 101$ $+$ 1

$\bar{b}+1 = 110$



(5) Divide the mantissa

E	A	Q	SC
1	01001	11011	5

$A = 00000$

$Q = 01111 = +15$