

COMPUTER ORGANIZATION AND ARCHITECTURE

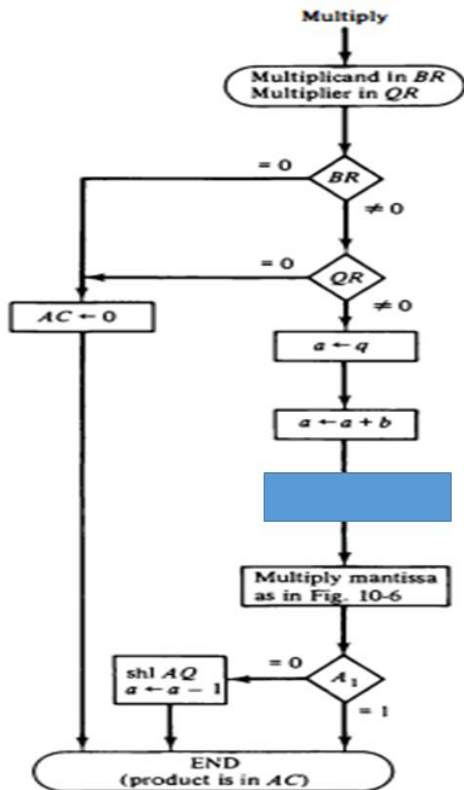
UNIT -III

TOPIC- FLOATING POINT MULTIPLICATION PART-2

Floating Point Multiplication

Example: 3.5×10^2
 5.25×10^4

Figure 10-16 Multiplication of floating-point numbers.



b-multiplicand exponent
q-multiplier exponent

EX : 3.5×10^2
 5.25×10^4

① check for zero

$$BR = 3.5 \times 10^2 \neq 0 = 011.1 \times 10^2 = BR$$

$$QR = 5.25 \times 10^4 \neq 0 = 101.01 \times 10^4 = QR$$

go to step ②

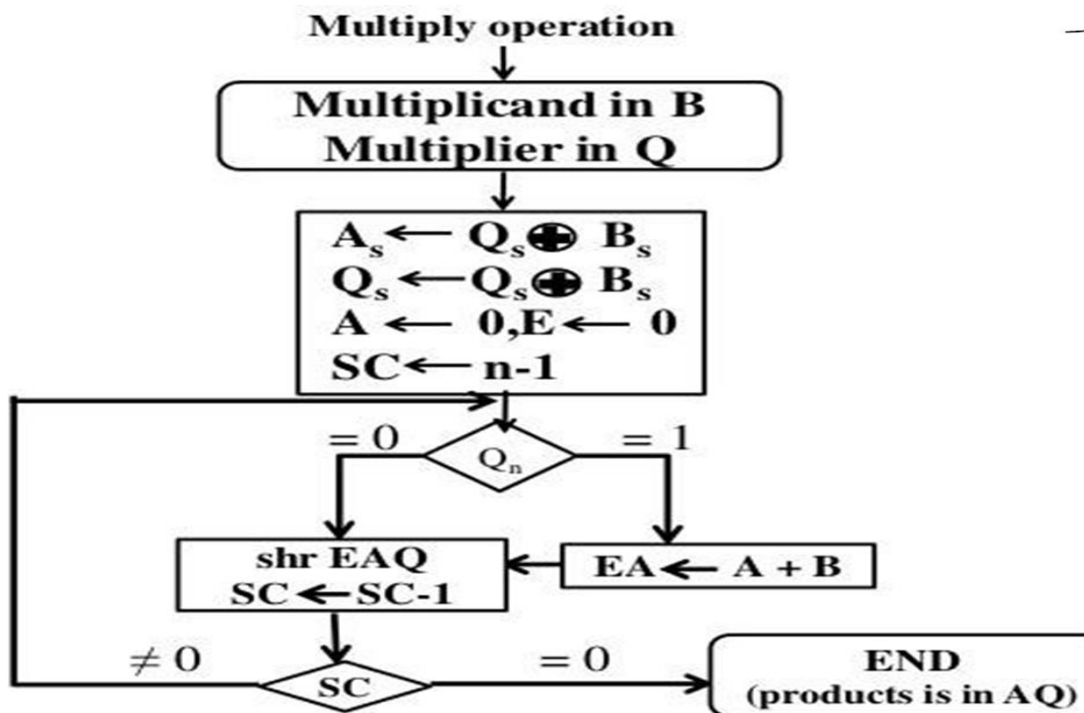
② Add The exponents

$$a \leftarrow 9, \quad b = 10^{(2)}$$

$$a \leftarrow 10^{(4)} \quad a \leftarrow a + b = 4 + 2 = 6$$

③ Multiply the mantissa.

Sign magnitude multiplication flowchart



Signed Magnitude Multiplication flowchart.

$A \rightarrow 0, E \rightarrow 0, SC \leftarrow 5$

$BR = 011 \cdot \underline{1} = 00111$

$QR = 101 \cdot \underline{01} = 10101$

E	A	Q	SC	
0	00000	1010 $\rightarrow Q_n$	5	$Q_n = 1$
0	+00111	10101	5	$EA \leftarrow A + B$
0	<u>00111</u>			
0	00011	11010	4	$Shr EAQ$ $SC \leftarrow SC - 1$
<hr/>				
	SC $\neq 0$			
0	00011	11010 $\rightarrow Q_n$	4	
0	00001	11101	3	$Shr EAQ$ $SC \leftarrow SC - 1$
<hr/>				
	SC $\neq 0$			
0	00001	11101 $\rightarrow Q_n$	3	$Q_n = 1$
0	+00111			$EA \leftarrow A + B$
0	<u>111</u>	11101	3	
0	01000			
0	00100	01110	2	$Shr EAQ$ $SC \leftarrow SC - 1$

E	A	Q	SC	
0	00100	01110 $\rightarrow Q_n$	2	$Q_n=0$
0	00010	00111	1	Shr EAQ $SC \leftarrow SC-1$
<hr/>				
0	00010	00111 $\rightarrow Q_n$	1	$Q_n=1$
	+ 00111			$EA \leftarrow A+B$
	<u>01001</u>	00111	1	Shr EAQ
0	00100	10011	0	$SC \leftarrow SC-1$

since $SC \neq 0$, End

$$AQ = 0010010.011 \times 10^6$$

④ Normalize the result.

$$0010010.011 \times 10^6$$

$\xrightarrow{A_1}$
underflow

$$0100100.11 \times 10^5 \Rightarrow \text{Normalized result}$$

$$\Downarrow$$

$$AC = 0100100.11 \times 10^5$$