

# Tutorial -3 . ADITYA RAJ U20CS100

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Date

① 1111 (multiplicand, 10101 (multiplier)

$$B = 1111 = (31)_{10}, 31 \times 21 = 651$$

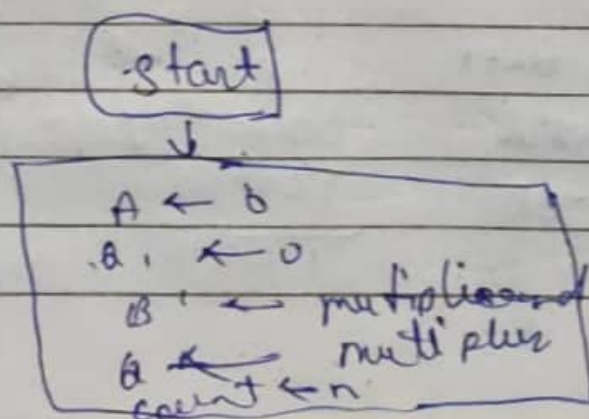
	E	A	Q	Sc
multiplier A --- 0		00000	10101	101
$a_n = 1$ ; add B --- 0		11111		
		<u>11111</u>		

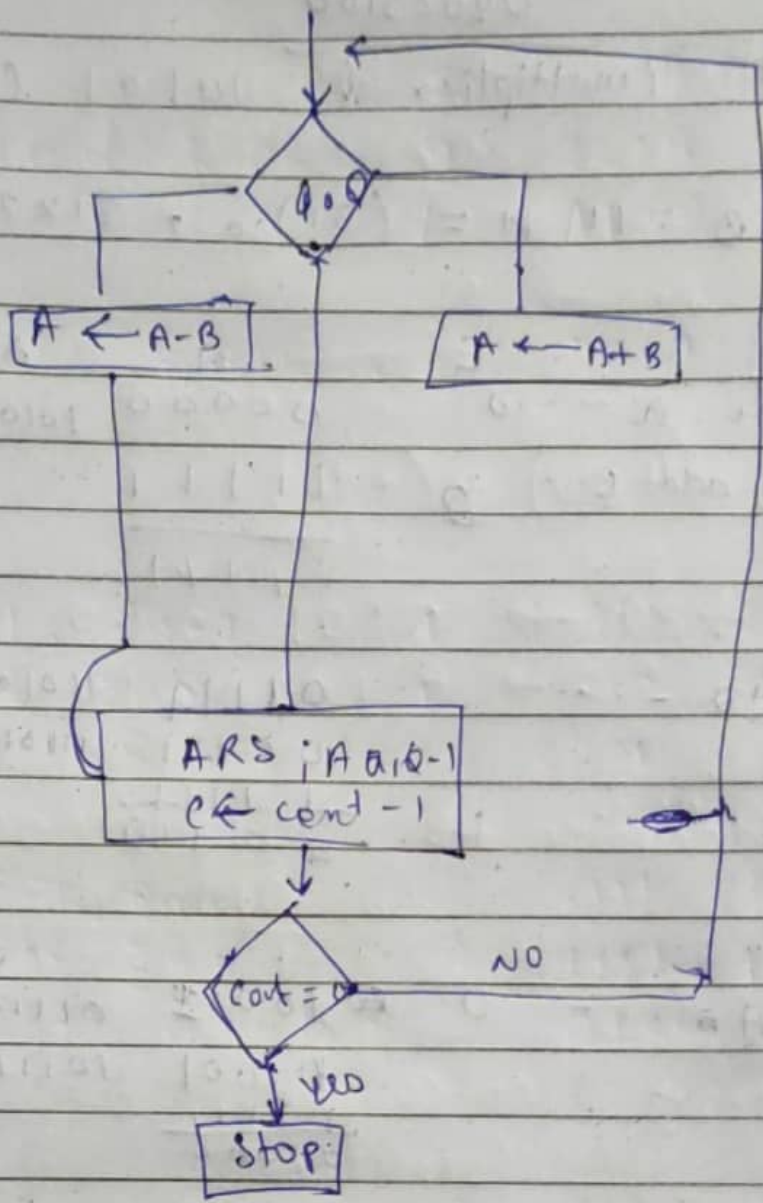
shr E A Q ---	01111	11010	100
	00111	11101	011
	<u>11111</u>		
	00110		

shr E A Q --- 0	01001	01110	010
	01001	10111	001
	<u>11111</u>		
	01000		

shr E A Q ---	10100	001011	000
	(651) <sub>10</sub>		

② Booth's Algorithm for multiplication





③  $(+15) \cdot (+13) = +195 \quad (0011000011)_2$

BR = 0111 (+15);  $\bar{B}R + 1 = 10001 (-15)$ ;  
 QR = 01101 (+13)

	$A_n \quad A_{n+1}$	AC	QR	$A_{n+1}$	Sc
	Initial	00000	01101	0	101
10	-BR	10001			
		<u>10001</u>			

$$\begin{array}{r}
 10 \text{ sshr} \quad 00011 \quad 11011 \quad 0 \quad 011 \\
 - 01 \quad 10001 \\
 \hline
 10100
 \end{array}$$

$$\begin{array}{r}
 11 \text{ a shr} \quad 11010 \quad 01101 \quad 1 \quad 010 \\
 01 \text{ a shr} \quad 11101 \quad 00110 \quad 1 \quad 001 \\
 + 01 \quad 01111 \\
 \hline
 01100
 \end{array}$$

$$\begin{array}{r}
 \text{a shr} \quad 00110 \quad 00011 \quad 000 \\
 + 115
 \end{array}$$

• Show content of register, ~~erase~~ c.

(a) 10100011 by 1011,

$$\frac{10100011}{1011} = \frac{1110 + 1001}{0111} = \frac{14 + 1}{11}$$

$$B = 1011$$

$$\bar{B} + 1 = 0101$$

$$OVP = 0$$



	E	A	Q	SC
Dividend in AB ---	0	1010	0011	100
	1	0100	0110	

B+1 suppresses carry -- 0101

E=1, Qn=1 ---	1	1001	0111	011
Shr EAB ---	1	0010	1110	
B+1, S carry ---		0101		

E=1, Qn, 1 ---	1	0111	1111	010
Shr EAB ---	0	1111	1110	
B+1, carry to E		<u>0101</u>		

E=1 ---	1	0100	1111	001
Shr ---	0	1001	1110	
B+1 carry to E ---		0101		

E=0, Qn=0	0	1110	1110	
add B ---		1011		

remainder ---	1	1001	1110	000
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