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Using Booth's Algorithm do the simulation of multiplication number between :

1. 10 x (-12)
2. (-10) x (-12)
3. 10 x 12

Answer :

1. $(10)_2 = 01010$

   $(-12)_2 = 01100$

   10011 (1^{st} complement)
   -------- + 1 (2^{nd} complement)
   10100

Step	A	Q	$Q_{(-1)}$	M	
0	00000	10100	0	01010	Shift
1	00000	01010	0	01010	Shift
2	00000	00101	0	01010	A–M,Shift
	10110	00101	0	01010	
3	11011	00010	1	01010	A +M,Shift
	00101	00010	1	01010	
4	00010	10001	0	01010	A-M,Shift
	11000	10001	0	01010	
	11100	01000	1	01010	

Last Result : 11100 01000

2. $(-12)_2 = 01100$

10011 (1^{st} complement)
-------- + 1 (2^{nd} complement)
10100

$(-10)_2 = 01010$

10101 (1^{st} complement)
--------- + 1 (2^{nd} complement)
10110

Step	A	Q	$Q_{(-1)}$	M	
0	00000	10100	0	10110	Shift
1	00000	01010	0	10110	Shift
2	00000	00101	0	10110	A-M,Shift
	01010	00101	0	10110	
3	00101	00010	1	10110	A+M,Shift
	11011	00010	1	10110	
4	11101	10001	0	10110	A-M,Shift
	00111	10001	0	10110	
	00011	11000	1	10110	

Last Result : 00011 11000

3. $(10)_2 = 01010$

$(12)_2 = 01100$

Step	A	Q	$Q_{(-1)}$	M	
0	00000	01100	0	01010	Shift
1	00000	00110	0	01010	Shift
2	00000	00011	0	01010	A-M,Shift
	10110	00011	0	01010	
3	11011	00001	1	01010	Shift
4	11101	10000	1	01010	A+M,shift
	00111	10000	1	01010	
	00011	11000	0	01010	

Last Result : 00011 11000