Subject: Computer Architecture and Organisation

Subject Code: CS205

Name: Subhojit Ghimire

Sch Id: 1912160

Branch: CSE - B

Q. Perform Booth Multiplication Algorithm for -21 and -35.

Soln:

Multiplicand, $M = (-21)_{10} = (11010111)_2$

Multiplier, $Q = (-35)_{10} = (10111101)_2$

$q_0 = 0$

$n = 7$

$A = 0$

n	A	Q	q_0	Operation
7	0000000	10111101	0	Initialisation
7	00101011	10111101	0	A = A-M
	00010110	11011110	1	ARS AQq_0
6	11101011	11011110	1	A = A+M
	11110101	11101111	0	ARS AQq_0
5	00011111	11101111	0	A = A-M
	00001111	11110111	1	ARS AQq_0
4	00000111	11111101	1	ARS AQq_0
3	00000001	11111110	1	ARS AQq_0
2	11011100	11111110	1	A = A+M
	11101110	01111111	0	ARS AQq_0
1	00010111	01111111	0	A = A-M
	00001011	10111111	1	ARS AQq_0

$(0000101110111111)_2$

$= (735)_{10}$

$\therefore (-21) \times (-35) = (735)$

Q. Perform Booth Modified Algorithm for -21 and -35

Soln:-

Multiplicand, $M = (-21)_{10} = (11101011)_2$

Multiplier, $Q = (-35)_{10} = (11011101)_2$

$q_0 = 0$

$n = 8/2 = 4$

$A = 0$

n	A	Q	q_0	Operation
4	00000000	11011101	0	Initialisation
4	11101011	11011101	0	A = A + (+1M)
	11111010	11111011	0	ARS 2 times
3	00001111	11111011	0	A = A + (-1M)
	00000011	11111101	1	ARS 2 times
2	11011001	11111101	1	A = A + (+2M)
	11110110	01111111	0	ARS 2 times
1	00001011	01111111	0	A = A + (-1M)
	00000010	11011111	1	ARS 2 times

$(0000001011011111)_2$

$= (735)_{10}$

$\therefore (-21) \times (-35) = (735)$