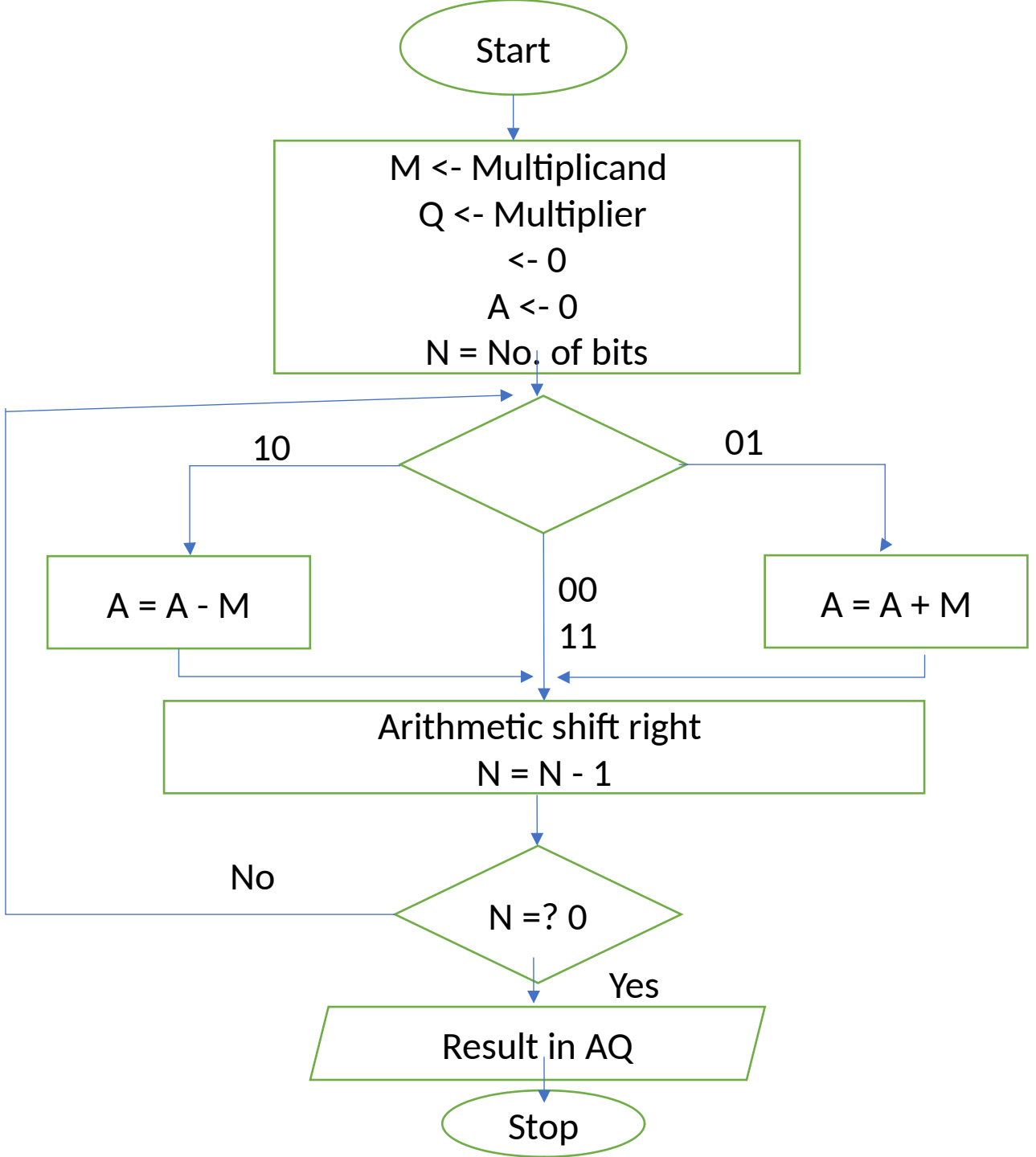
Booth’s Algorithm

S.M. Shovan

(- 7) * (+ 3) = (- 21)

Multiplicand * multiplier = product

N	A	Q		Action
4	0000	0011	0	Init



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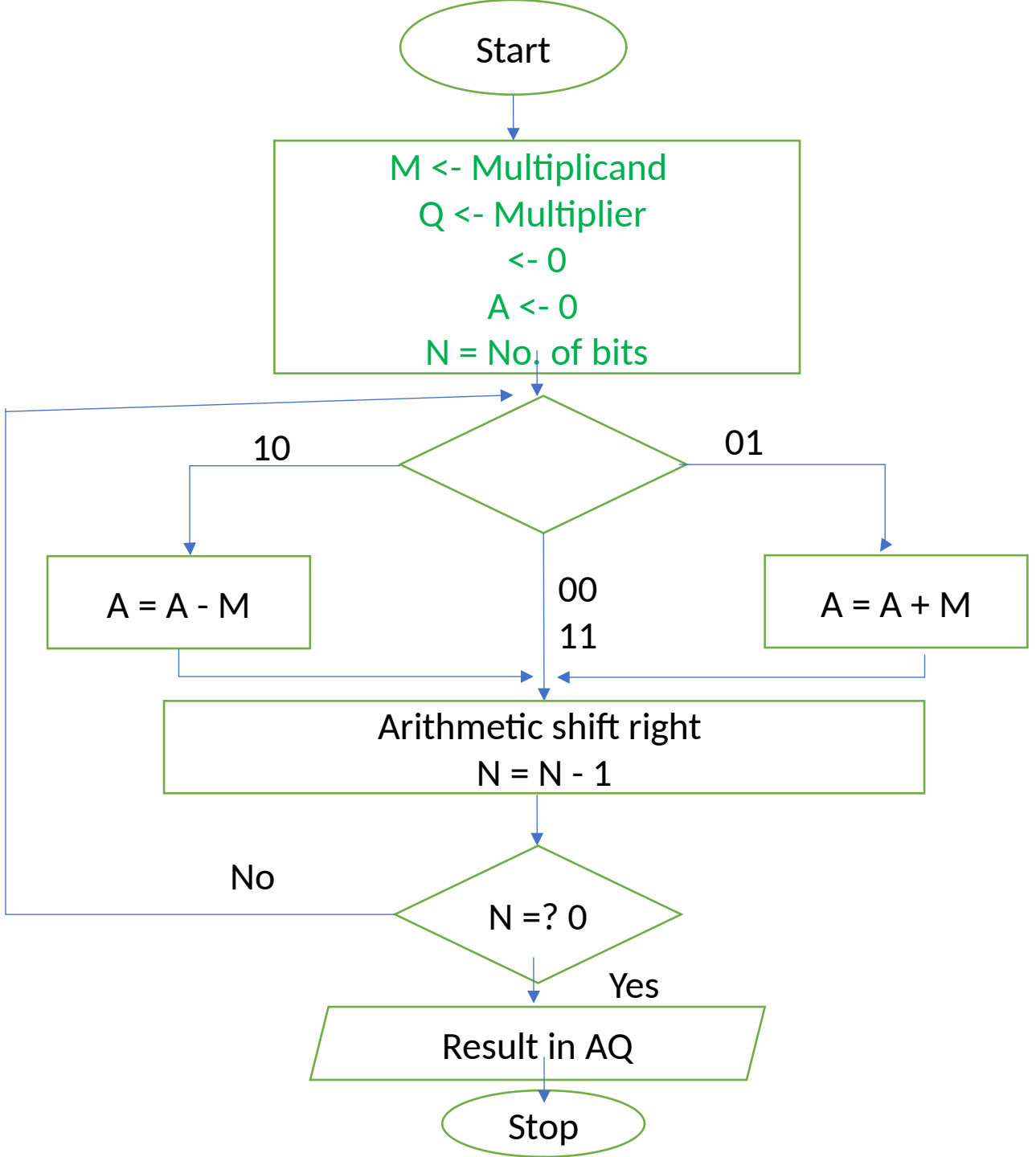
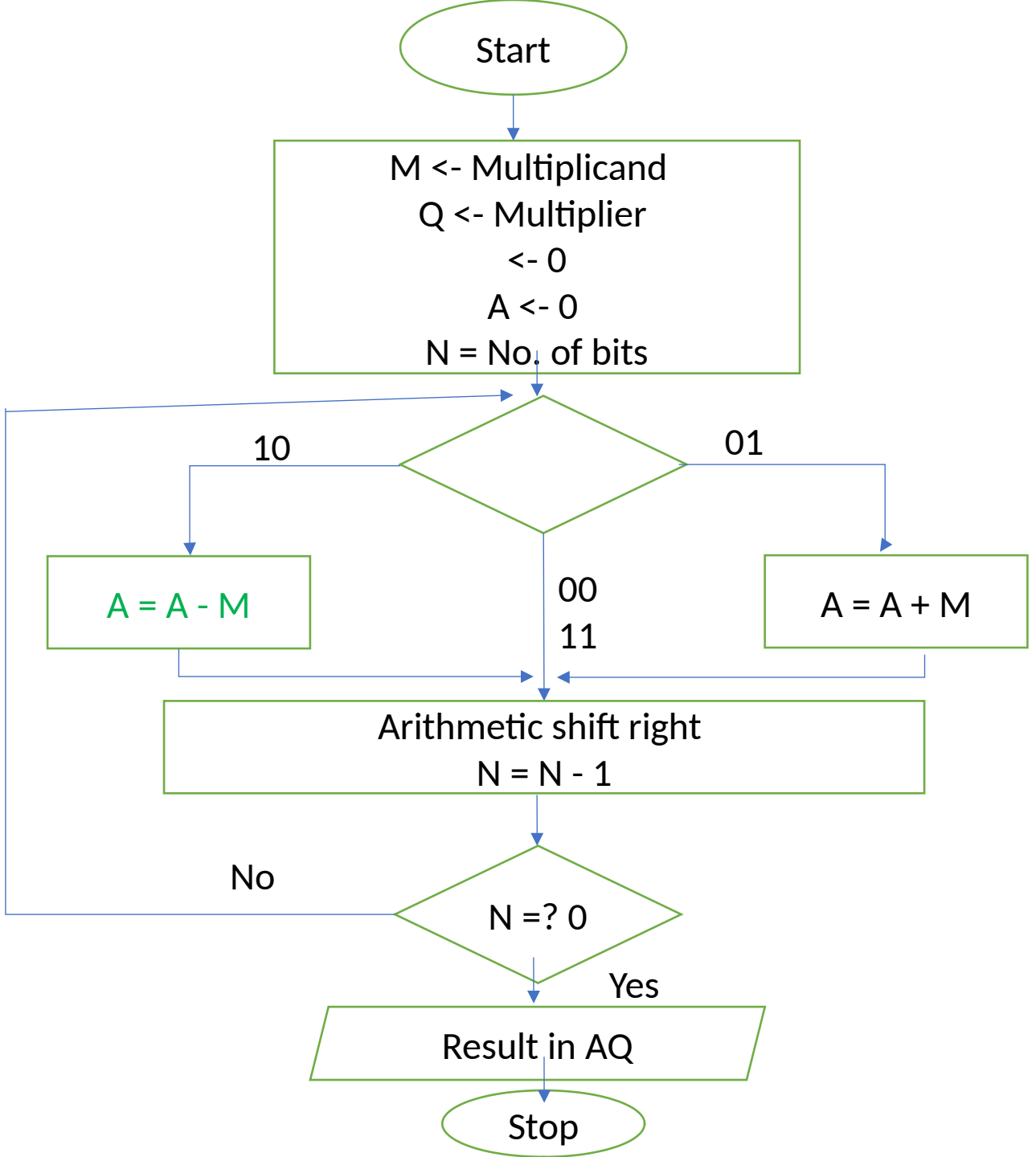
N	A	Q		Action
4	0000	0011	0	Init



(- 7) * (+ 3) = (- 21)

Multiplicand * multiplier = product

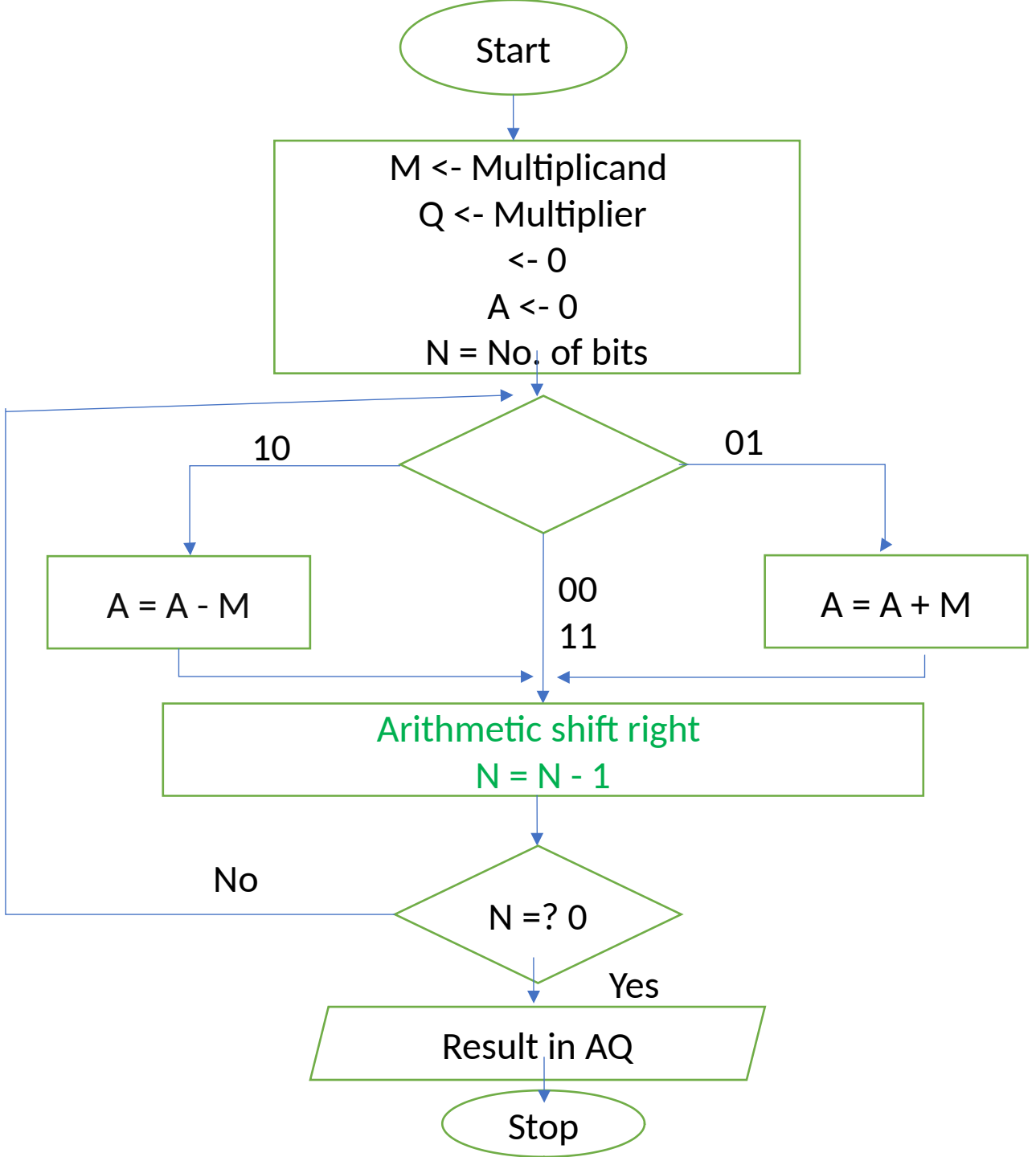
N	A	Q		Action
4	0000	0011	0	Init
	0111	0011	0	A= A-M



(- 7) * (+ 3) = (- 21)

Multiplicand * multiplier = product

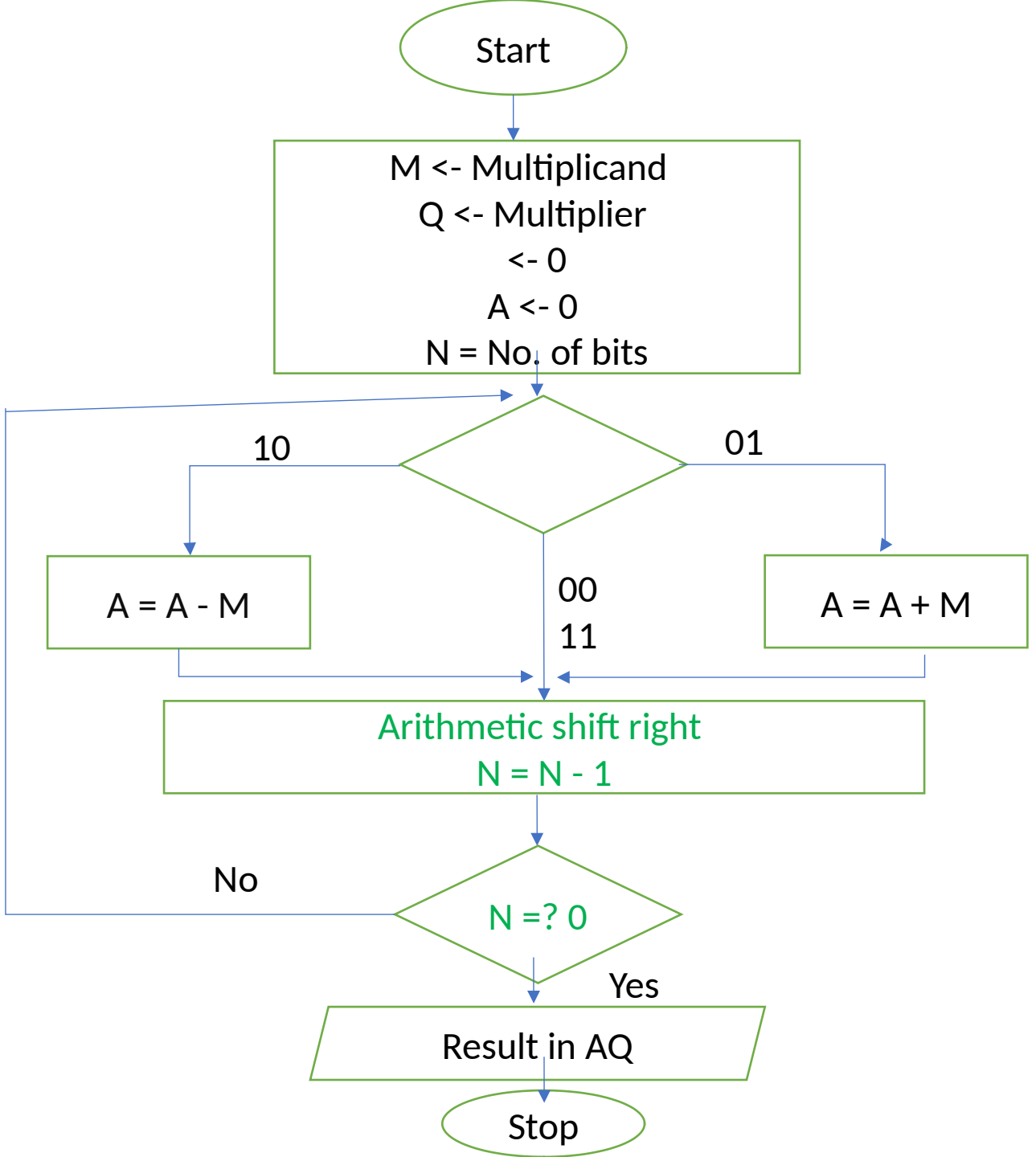
N	A	Q		Action
4	0000	0011	0	Init
	0111	0011	0	A= A-M
3	0011	1001	1	Shift



(- 7) * (+ 3) = (- 21)

Multiplicand * multiplier = product

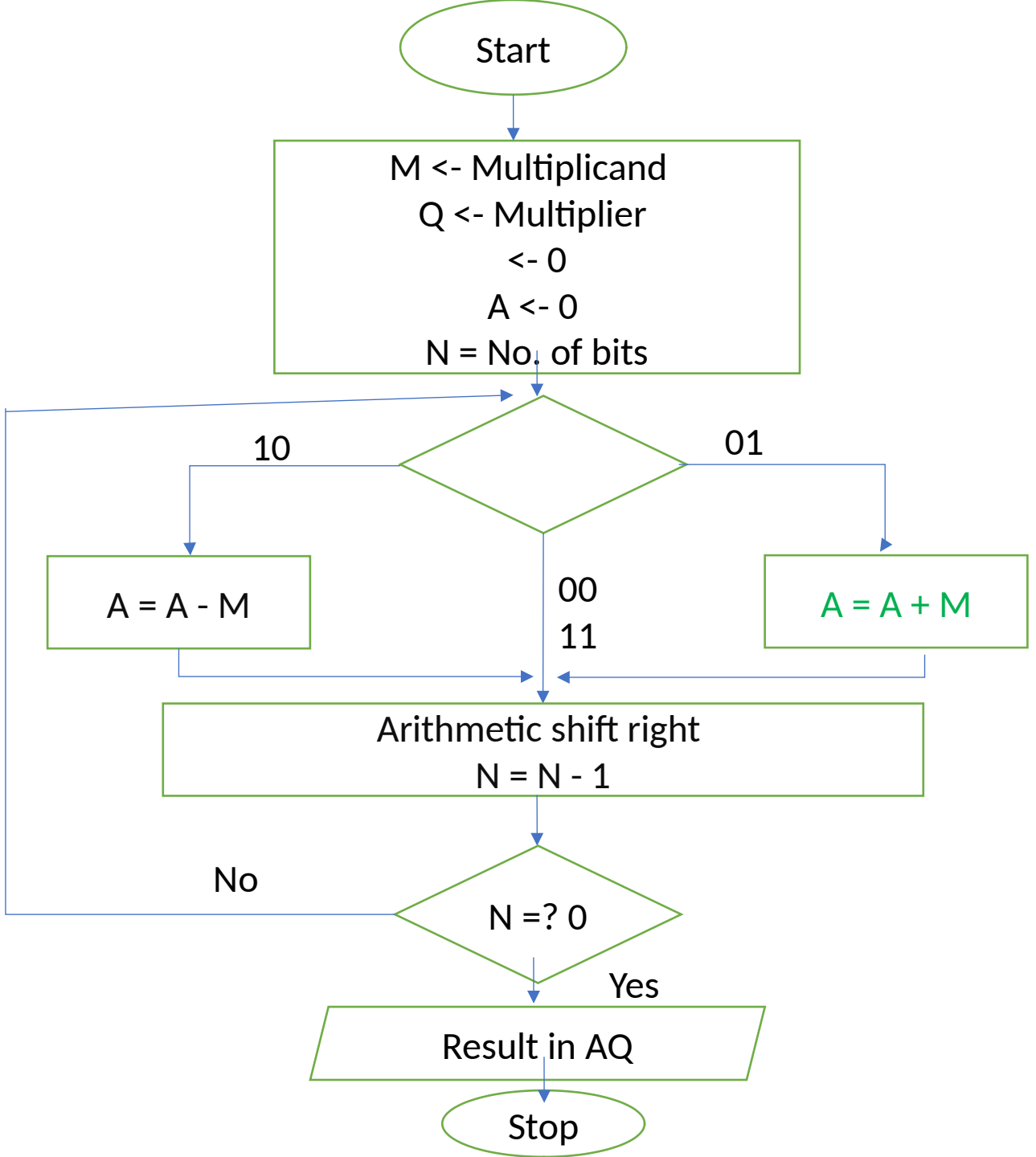
N	A	Q		Action
4	0000	0011	0	Init
	0111	0011	0	A= A-M
3	0011	1001	1	Shift
2	**0001**	**1100**	**1**	**Shift**



(- 7) * (+ 3) = (- 21)

Multiplicand * multiplier = product

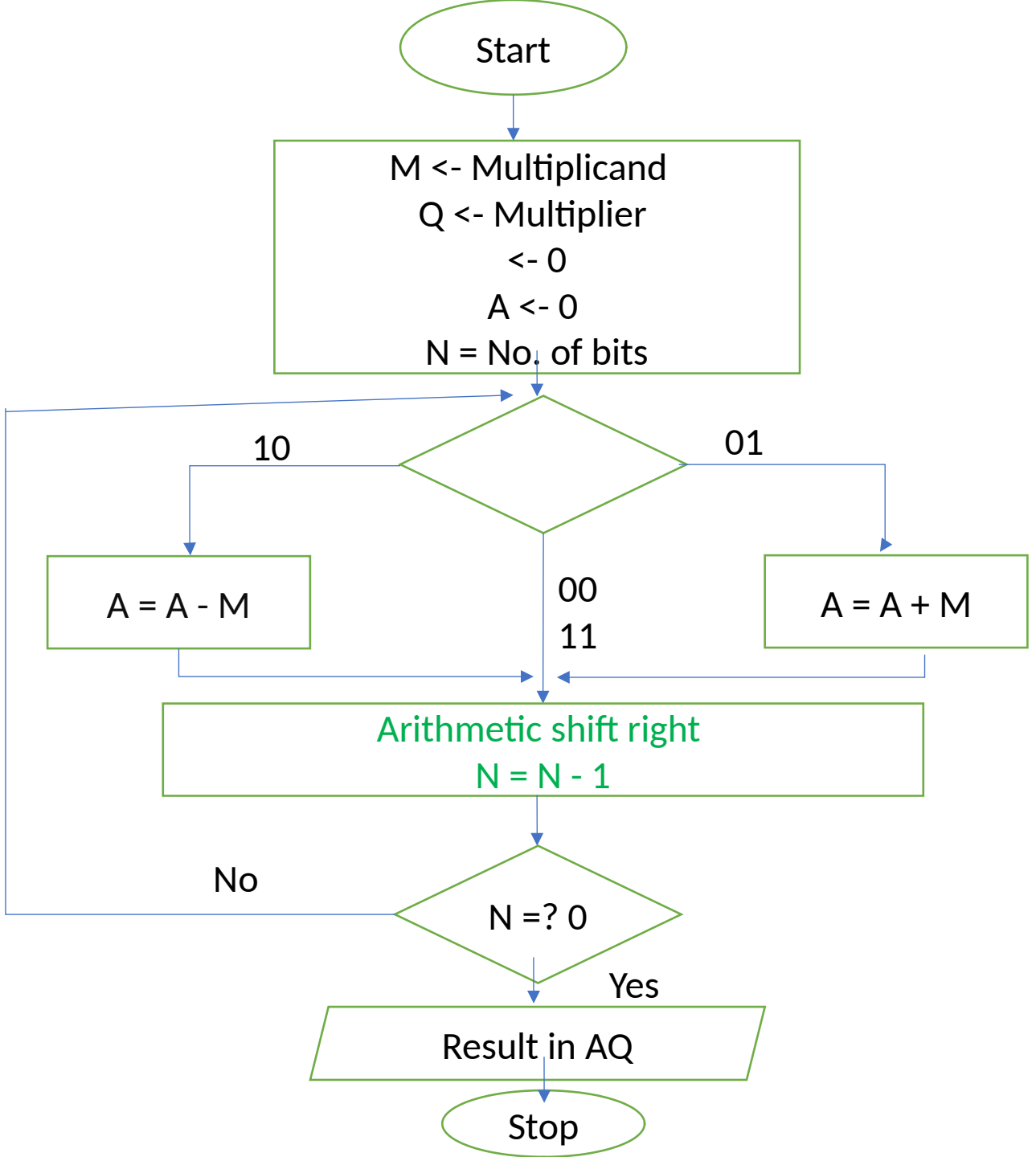
N	A	Q		Action
4	0000	0011	0	Init
	0111	0011	0	A= A-M
3	0011	1001	1	Shift
2	0001	1100	1	Shift
1	1010	1100	1	A= A+ M



(- 7) * (+ 3) = (- 21)

Multiplicand * multiplier = product

N	A	Q		Action
4	0000	0011	0	Init
	0111	0011	0	A= A-M
3	0011	1001	1	Shift
2	0001	1100	1	Shift
2	1010	1100	1	A= A+ M
1	1101	0110	0	Shift



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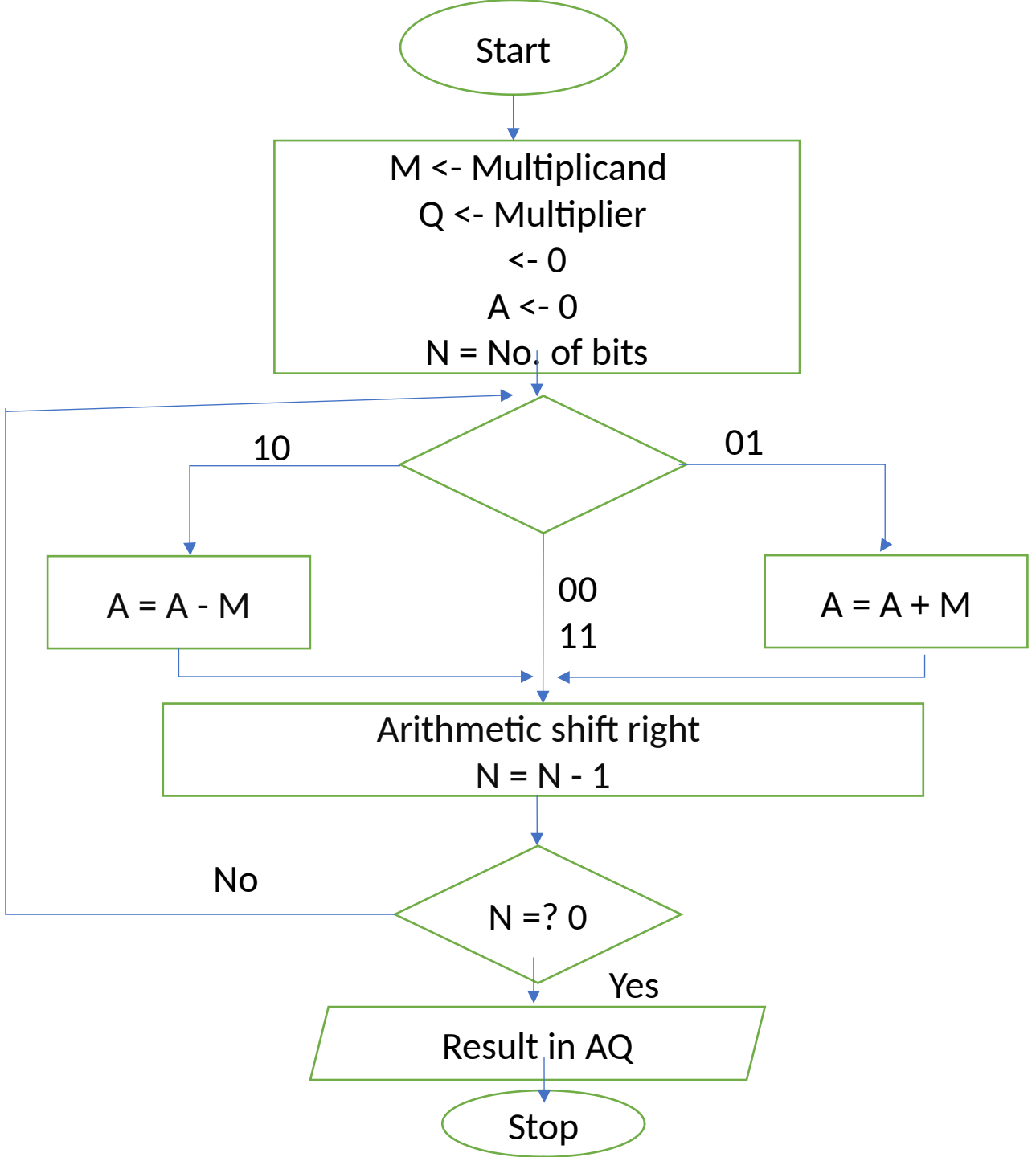
Multiplicand * multiplier = product

N	A	Q		Action
4	0000	0011	0	Init
	0111	0011	0	A= A-M
3	0011	1001	1	Shift
2	0001	1100	1	Shift
2	1010	1100	1	A= A+ M
1	1101	0110	0	Shift
0	1110	1011	0	Shift



Interpretation of result

(1) 110 1011

Here (1) is a sign bit that means it’s a negative number in a form of 2’s complement.

The magnitude of the negative number is 21

So the result is -21

Design Issue