..IMPLEMENTATION OF BOOTH ALGORITHM..

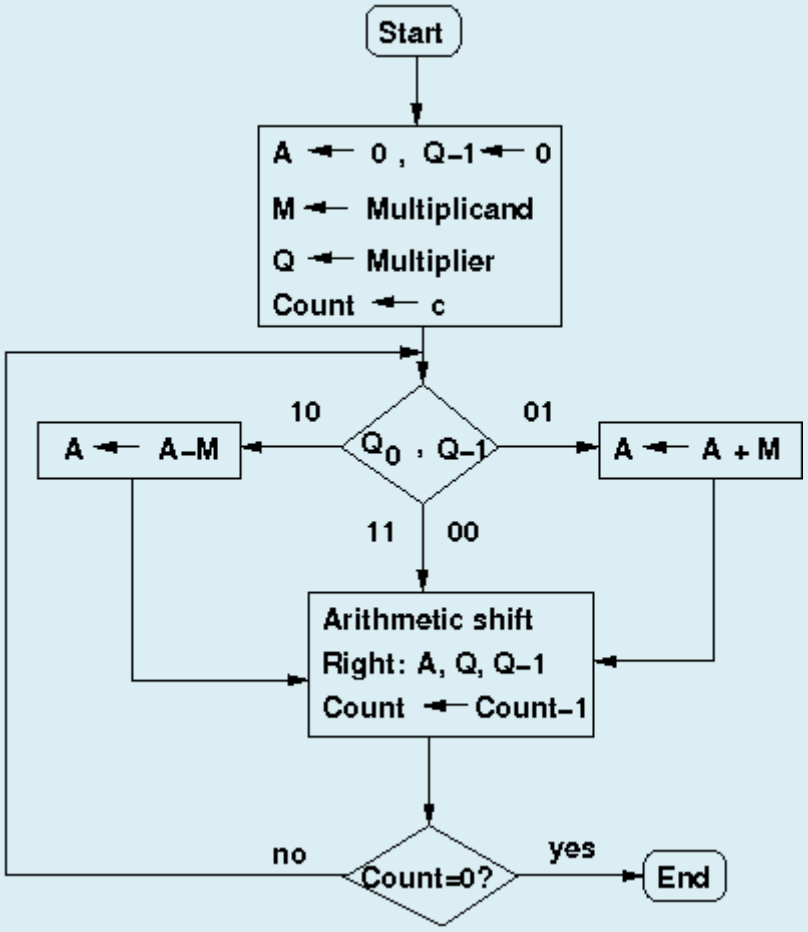
ABSTRACT

Booth multiplier is one of the standard techniques that allow smaller, circuits to operate with fast and quick multiplication by using encoding techniques to the signed numbers of 2's complement. In this way the booth multiplier can be able to reduce the number of iteration steps for performing the multiplication. When we consider the number of partial products of other conventional multiplier the booth multiplier can get less number of partial products.

INTRODUCTION

- Multiplication consists of three steps:
  - The first step to generate the partial products
  - The second step to add the generated partial products until the last two rows are remained
  - The third step to compute the final multiplication results by adding the last two rows.

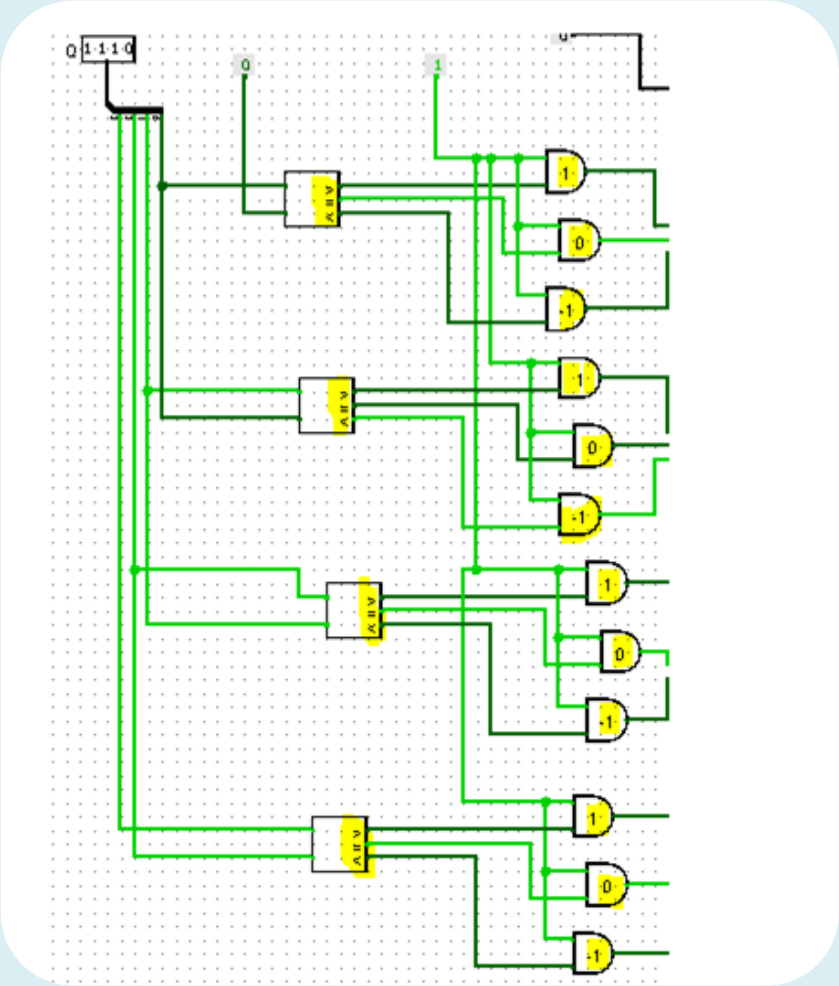
- Flowchart To Understand the Booth's Algorithm:



- Compare the input based on booth's Recording Table:

Yi	Yi-1	Partial Product
0	0	0 * Multiplicand
0	1	1 * Multiplicand
1	0	-1*Multiplicand
1	1	0 * Multiplicand

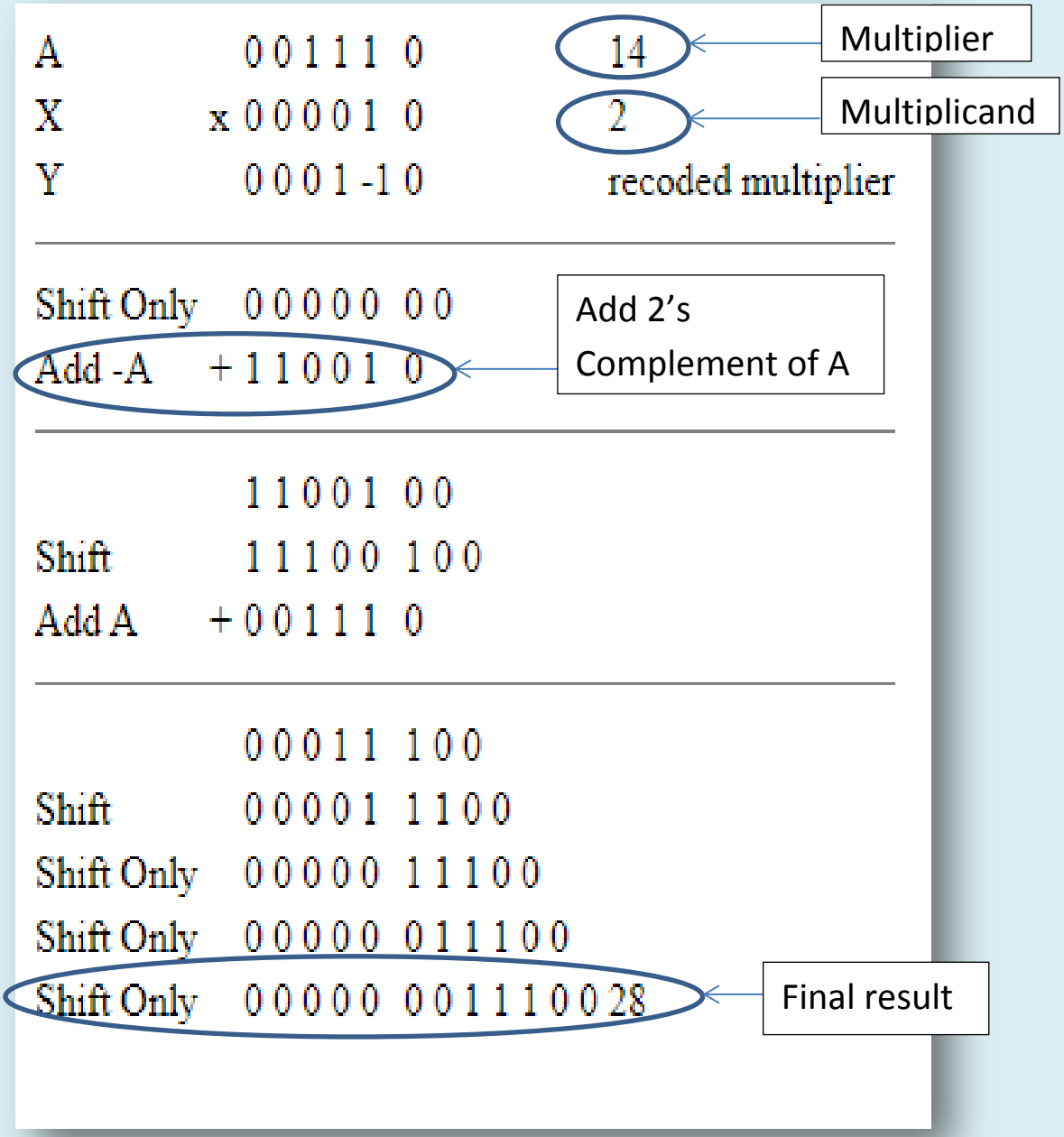
- In Our Circuit, Based on this table first comparison is done…



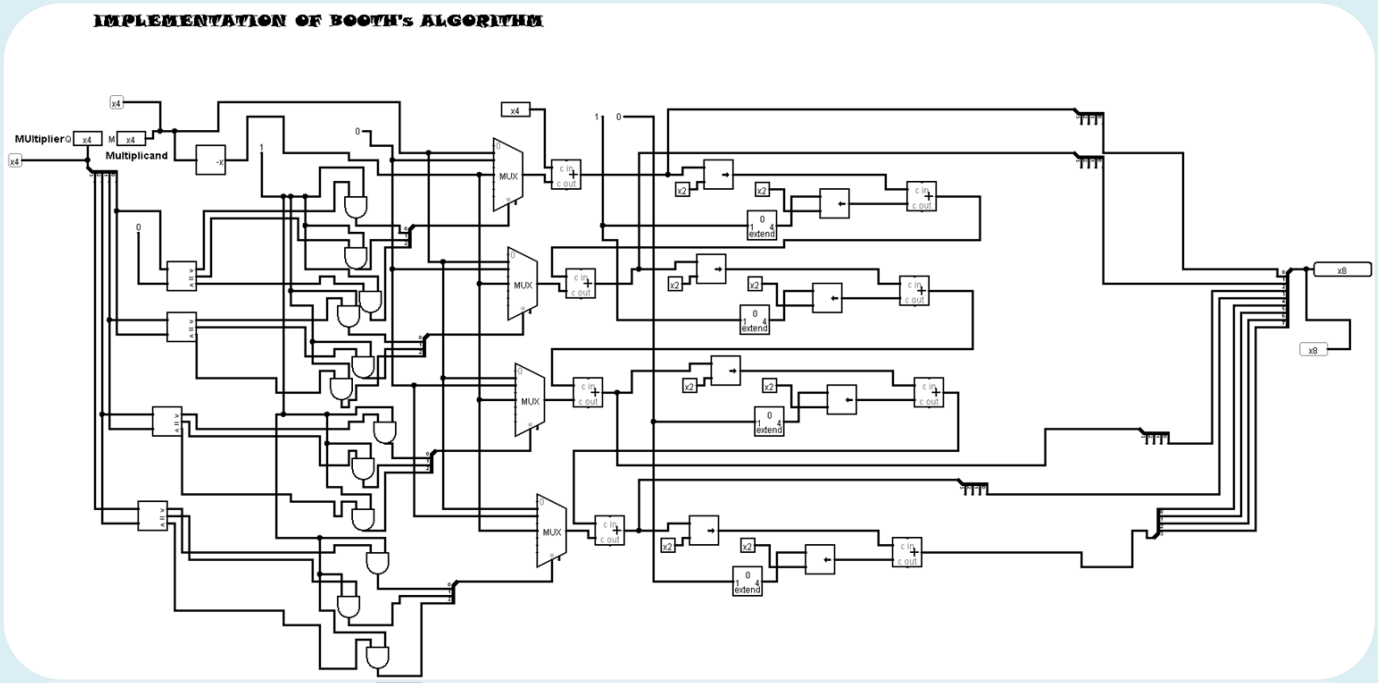
This part not only for comparison, But also calculate the 2's Complement for the Q (Multiplier).

- Learn More From The Example…

Q	**14**
M	**2**
NO. OF BITS	**4**

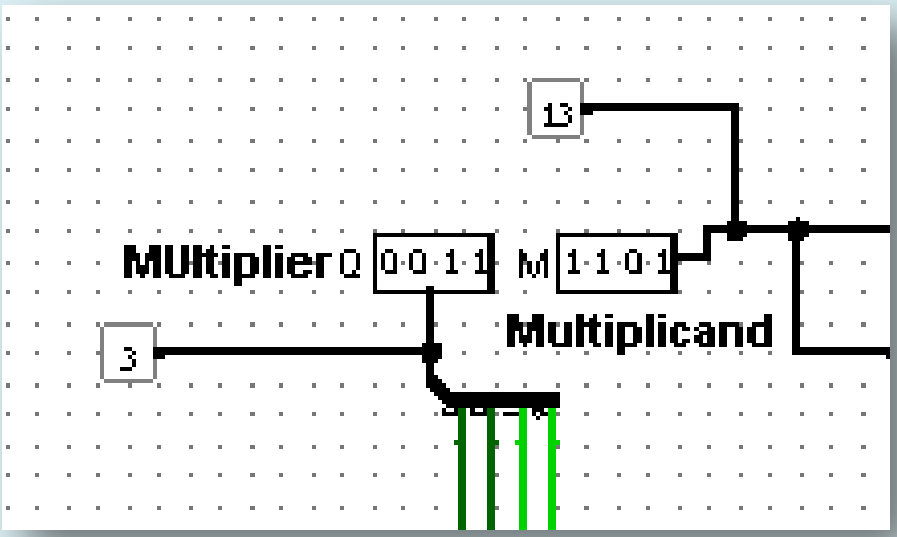


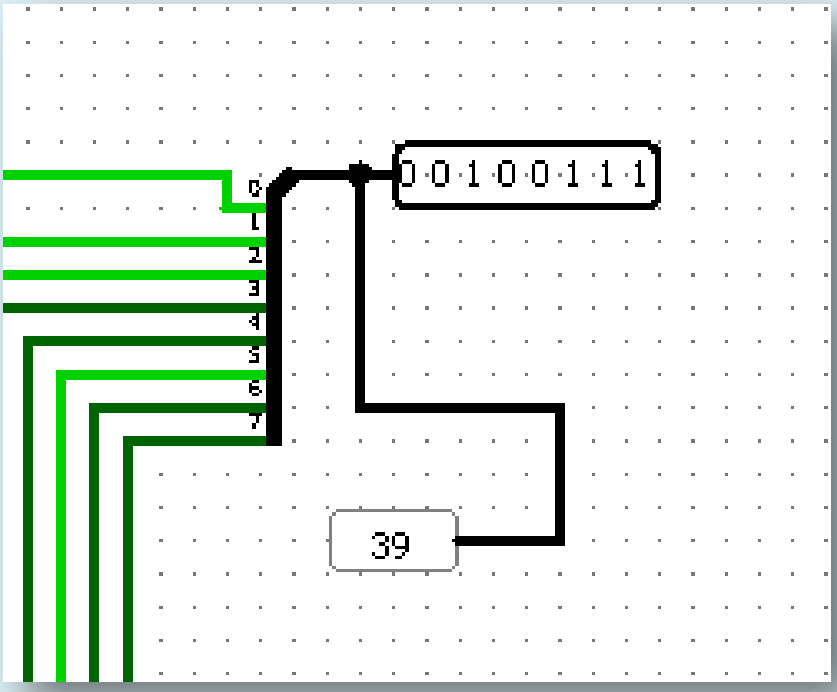
Our Full & Final Circuit



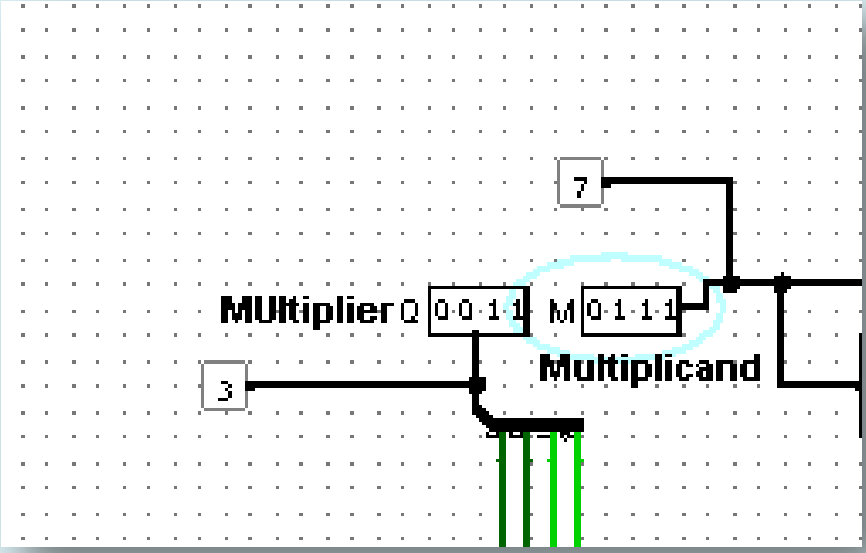
..Some Test Cases of Our Circuit..

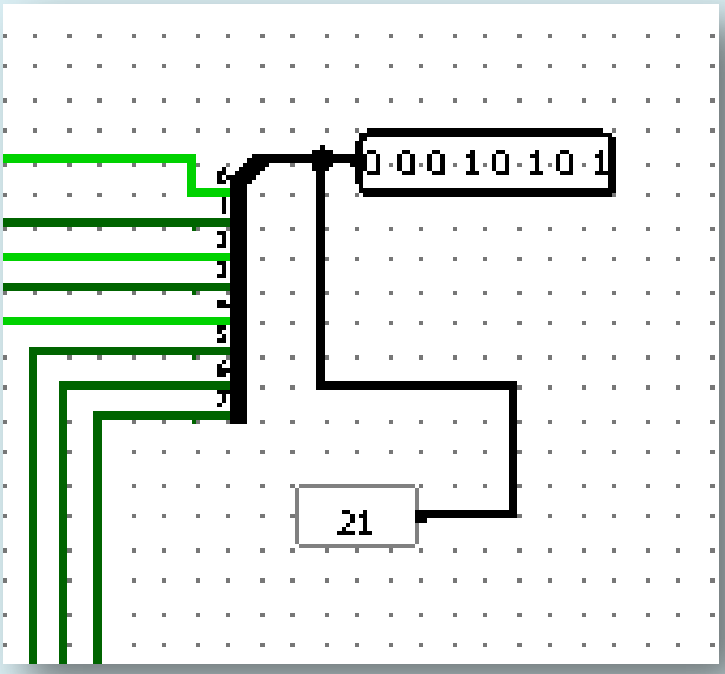
1. If 3(0011) is Multiplier and 13(1101) is Multiplicand Then Final Result is 39(00100111).



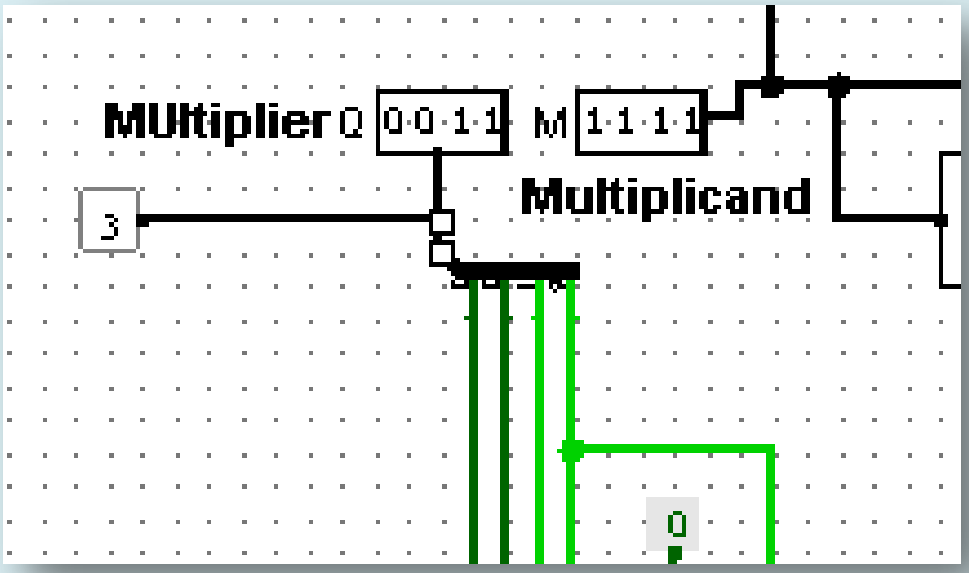


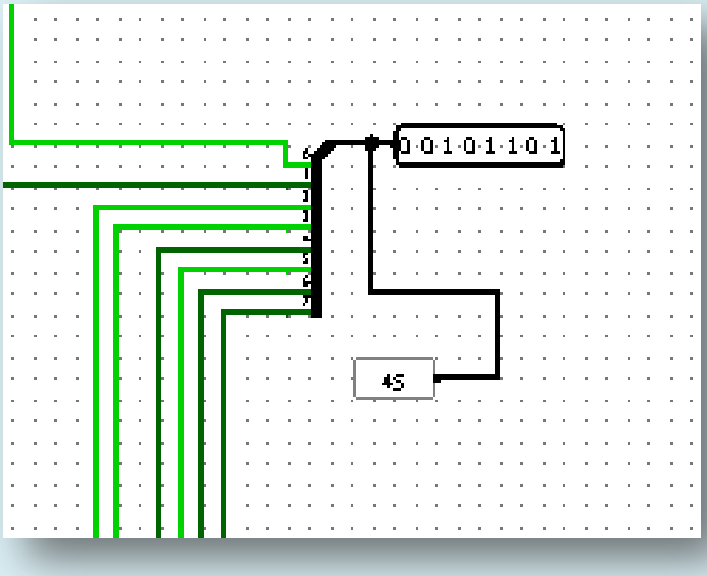
2. If 3(0011) is Multiplier and 7(0111) is Multiplicand Then Final Result is 21(00010101).





3. If 3(0011) is Multiplier and 15(1111) is Multiplicand Then Final Result is 45(00101101).





Reference From:

- https://www.geeksforgeeks.org/computer-organization-booths-algorithm/
- https://en.wikipedia.org/wiki/Booth%27s_multiplication_algorithm
- https://www.youtube.com/watch?v=anR_Nyu2e1Q
- https://github.com/topics/booths-algorithm