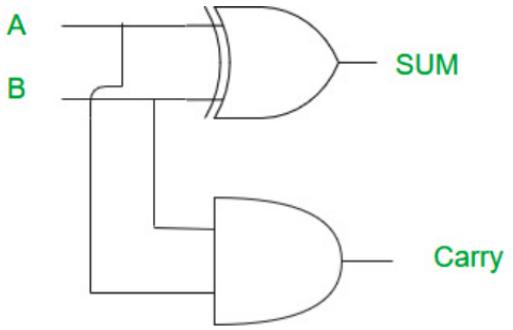
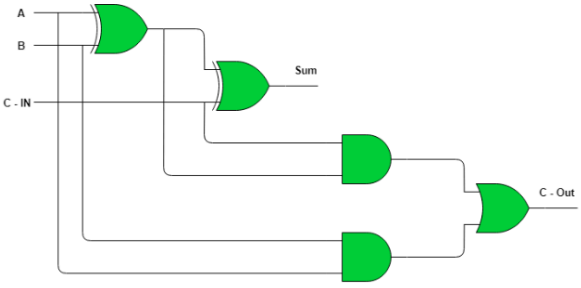


A	B	Sum	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Half Adder



Full Adder logic circuit.

Inputs			Outputs	
A	B	C – IN	Sum	C - Out
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

Logical Expression for SUM: = A' B' C-IN + A' B C-IN' + A B' C-IN' + A B C-IN = C-IN (A' B' + A B) + C-IN' (A' B + A B') = C-IN XOR (A XOR B) = (1,2,4,7)

Logical Expression for C-OUT: = A' B C-IN + A B' C-IN + A B C-IN' + A B C-IN = A B + B C-IN + A C-IN = (3,5,6,7)

Another form in which C-OUT can be implemented: = A B + A C-IN + B C-IN (A + A') = A B C-IN + A B + A C-IN + A' B C-IN = A B (1 +C-IN) + A C-IN + A' B C-IN = A B + A C-IN + A' B C-IN = A B + A C-IN (B + B') + A' B C-IN = A B C-IN + A B + A B' C-IN + A' B C-IN = A B (C-IN + 1) + A B' C-IN + A' B C-IN = A B + A B' C-IN + A' B C-IN = AB + C-IN (A' B + A B')

Therefore COUT = AB + C-IN (A EX – OR B)

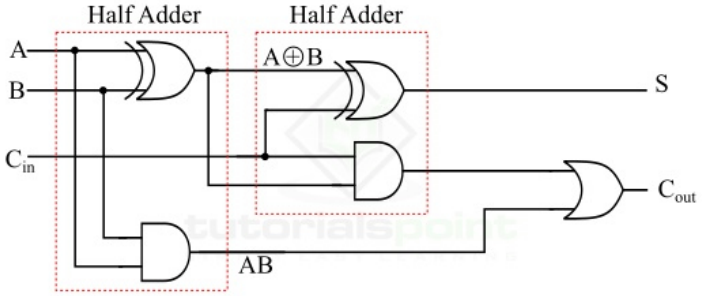
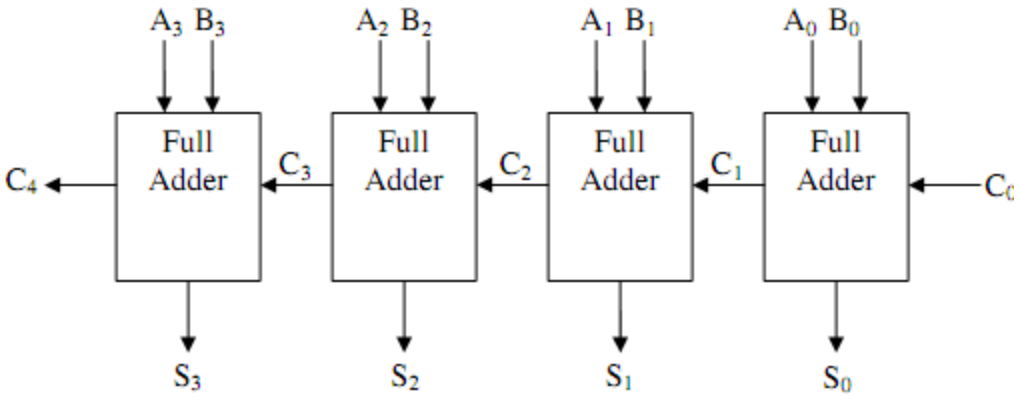
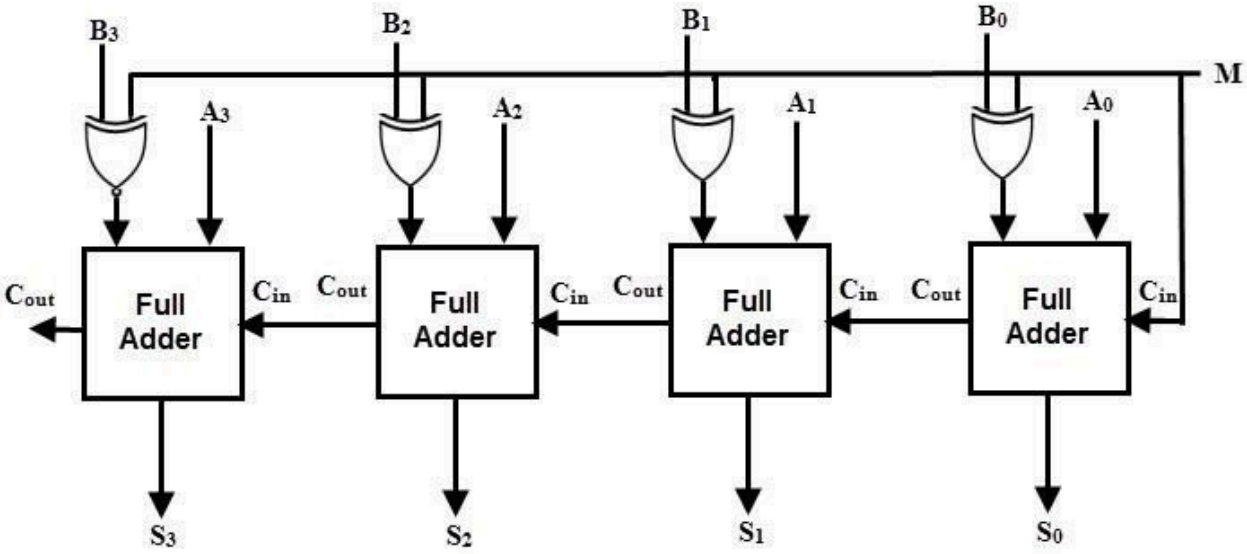


Figure 3 - Logic Diagram of Full Adder using Half Adder

Full Adder



4 bit parallel adder



Adder + Subtractor