Roll - 200050006

Ques - 1:

1-Bit Half Adder :

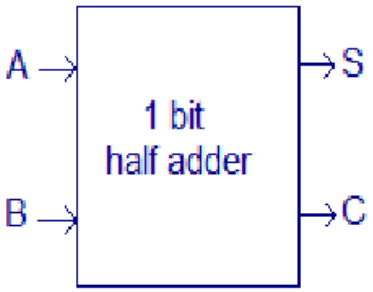
Inputs		Outputs	
A	B	S	C
0	0	0	0
1	0	1	0
0	1	1	0
1	1	0	1

Truth table

From the truth table, it is clear that the one bit half adder takes two single bits as input has two output bits referred to as sum(S) and carry(C)

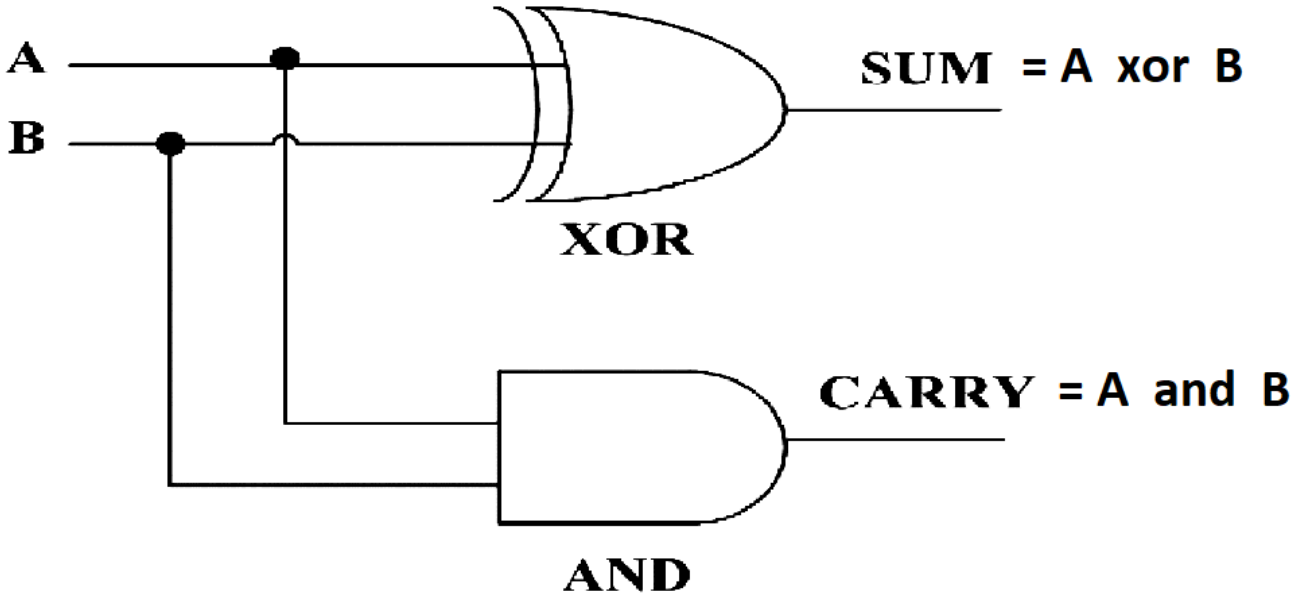
From the truth table we can easily represent sum and carry in some combination of A and B using some basic gates.

S = A xor B
C = A and B



Schematic

Actual Circuit Representation of Half Adder:



Now using this half adder and OR gate we have to design 1 bit full adder whose design and implementation is shown in the next page

1-Bit Full Adder using 1-Bit Half Adder:

TRUTH TABLE (Full Adder - 1bit)

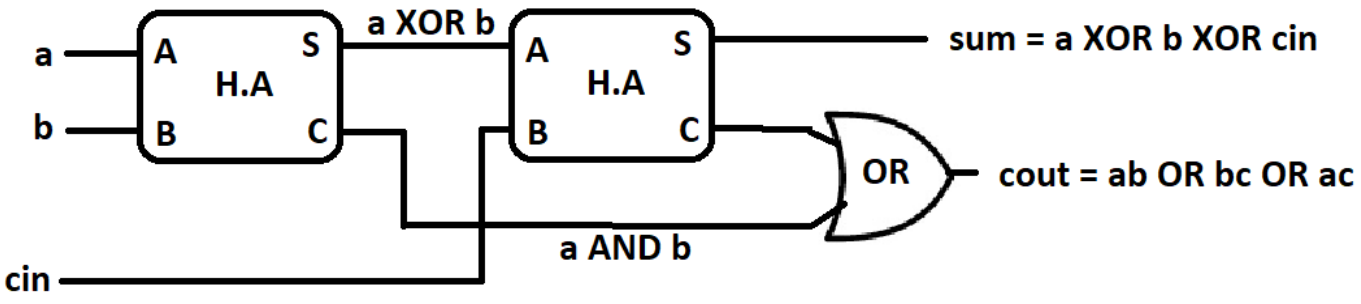
X	Y	Cin	Cout	S
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

From the truth table, we will try to find the formula for sum and cout in terms of 3 inputs namely a,b,cin.

Sum = A'B'Cin + A'BCin' + AB'Cin' + ABCin
= Cin(A'B' + AB) + Cin'(A'B + AB')
= Cin XOR (A XOR B)
= A XOR B XOR Cin

Cout = A'BCin + AB'Cin + ABCin' + ABCin
= AB + BCin + ACin

Ciruit Implementation of Full Adder:



So finally, I have designed the 1 bit full adder using 1 bit half adder and OR gate only.