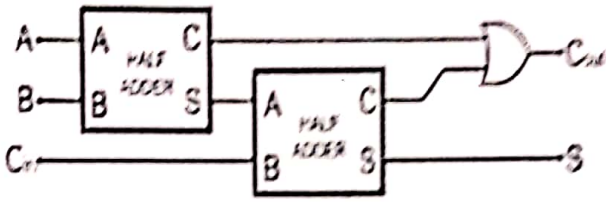
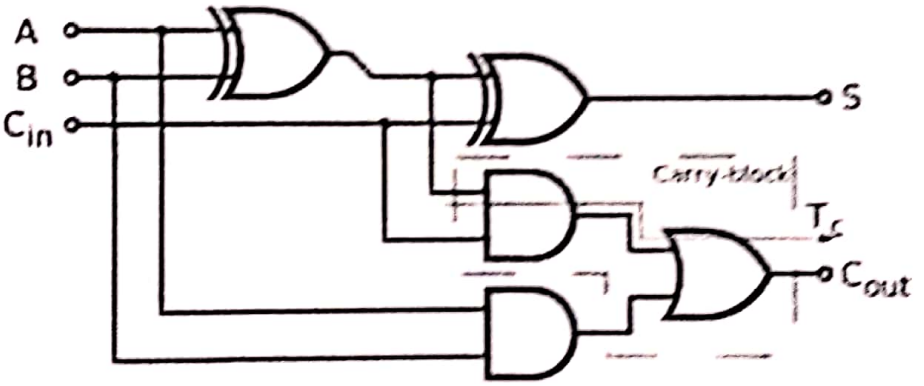
Mohammad Yehya Hayat
21K-3309
BCS-2G

2. Full Adder:

The downfall of half adders is that while they can generate a carry out output, they cannot deal with a carry in signal.

A full adder solves this problem by adding three numbers together - the two addends as in the half adder, and a carry in input. The outputs of the full adder are designated as Sum (S) and Carry out (Cout). A block diagram of Full Adder implementation is as follows:





Truth Table:

Inputs			Outputs	
A	B	Cin	S	Cout
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

LAB TASKS

Name Mohammad Yehya Hayati Student ID 21K-3309 Section BCS-2G

Exercise # 1

Use K-Map to find expression for Carry and Sum for Full Adder. Use Truth Table Given in manual.

Sum

AB \ C	0	1
00	0	1
01	1	0
11	0	1
10	1	0

$ABC + \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}\bar{C}$

$C(AB + \bar{A}\bar{B}) + \bar{C}(\bar{A}B + A\bar{B})$

(XNOR) (XOR)

$C\overline{(\bar{A}B + A\bar{B})} + \bar{C}(\bar{A}B + A\bar{B})$

$C \cdot \overline{XOR} + \bar{C} \cdot XOR$

$\Rightarrow C \text{ XOR } (A \text{ XOR } B)$

Carry

AB \ C	0	1
00	0	0
01	0	1
11	1	1
10	0	1

$AB + BC + AC$

Exercise # 2

Design and implement Full Adder Circuit on Bread board

Exercise # 3

Design and implement Full Subtractor Circuit on Bread board.