

PRACTICAL-3

AIM: To Verify Half adder & Full adder Truth Table and Logic Diagram

- To verify the half adder and Full adder truth table and logic diagrams :

i). Boolean Expression :-

a). Half adder :

- Sum (S) : $S = A \oplus B$ (XOR operation)
- Carry (C) : $C = A \cdot B$ (AND operation)

b). Full adder :

- Sum (S) : $S = A \oplus B \oplus C_{in}$
- Carry (C_{out}) : $C_{out} = (A \cdot B) + (C_{in} \cdot (A \oplus B))$

ii). Truth Table :-

a). Half adder :-

A	B	Sum (S)	Carry (C)
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

b). Full adder :

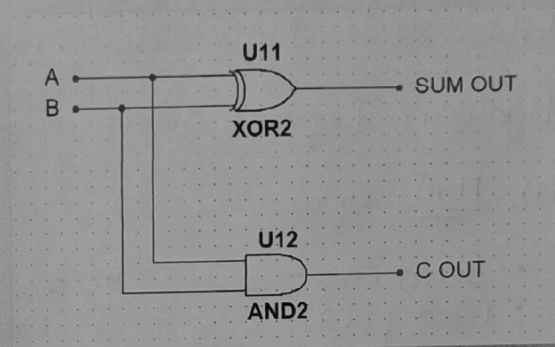
A	B	C _{in}	Sum (S)	Carry (C _{out})
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0

1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

iii). Logic Circuit Diagram :-

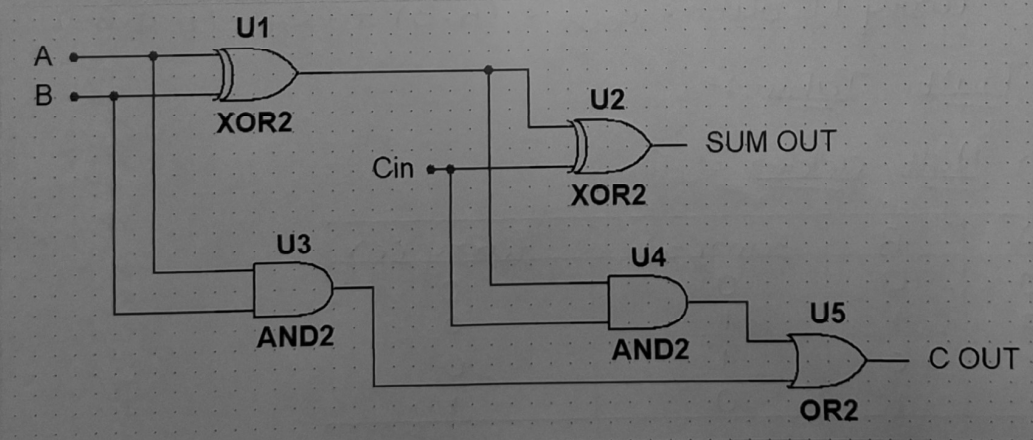
a). Half adder :

- Sum (S) : Use an XOR gate for $A \oplus B$.
- Carry (C) : Use an AND gate for $A \cdot B$.



b). Full adder :

- Sum (S) : $S = A \oplus B \oplus C_{in}$
- Carry (C-out) : $C_{out} = (A \cdot B) + (C_{in} \cdot (A \oplus B))$



Conclusion :-

In this experiment, we successfully verified the operations of both the Half adder and full adder circuits using their respective truth tables and logic diagrams.