

Truth table of half adder

Input		Output	
A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

K-map for Sum

A \ B	0	1
0	0	1
1	1	0

$$S = \bar{A}B + A\bar{B}$$

$$= A \oplus B$$

K-map for carry

A \ B	0	1
0	0	0
1	0	1

$$C = A \cdot B$$



Aim: To verify the operation of half adder.

Apparatus: Bread Board, connecting wires, power supply, IC 7408 and IC 7486.

Theory: Half adder can add two bit individually output of half adder has sum bit and carry bit for sum.

Sum is higher when (01 and 10) combination exist. Therefore

$$\text{Sum} = \bar{A}B + A\bar{B}$$

$$\text{Boolean expression sum} = A \oplus B$$

For carry

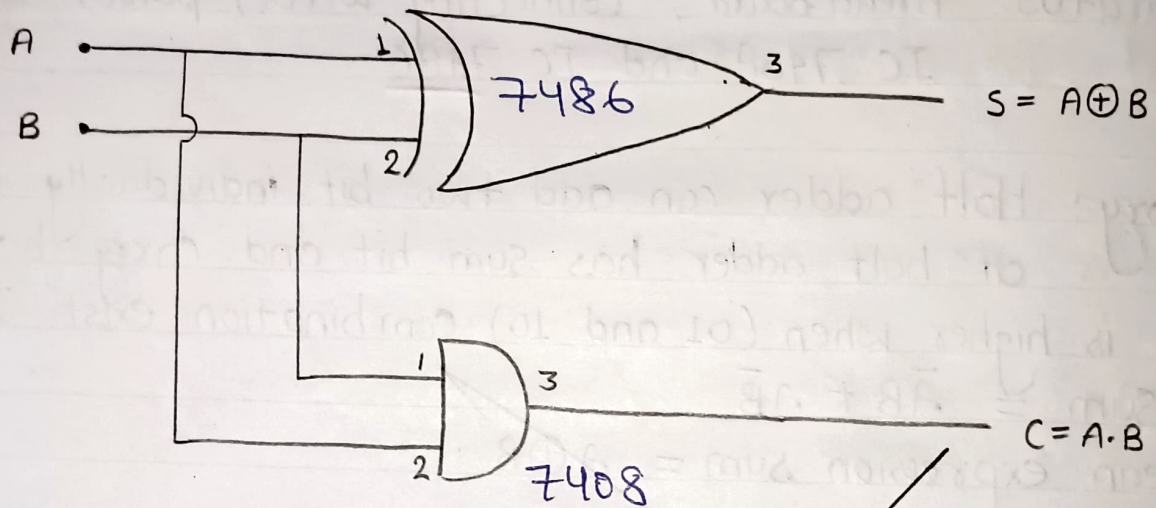
Carry is high only at the combination of
 $A=1$ and $B=1$

$$\text{Cout} = A \cdot B$$

$$\begin{aligned} \text{Half adder has output} &= \text{Sum} + \text{Cout} \\ &= A \oplus B + A \cdot B \end{aligned}$$

Procedure:

- Construct the circuit as given in the logic diagram.
- Insert the correct IC's on the bread board
- Give Vcc and ground to all IC's
- Verify the output by truth table



circuit diagram of Half adder



Result: observation of half adder has been verified.

Precautions:

- Insert the IC's carefully in the bread. board without damaging the pins.
- Switch off the bread board when not in use.

[Signature]