Half Adder

The Half-Adder is a basic building block of adding two numbers as two inputs and produce out two outputs. The adder is used to perform OR operation of two single bit binary numbers. The **augend** and **addend** bits are two input states, and **'carry**' and **'sum** 'are two output states of the half adder.

Block diagram

Truth Table

Inputs		Outputs	
A	B	Sum	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

In the above table,

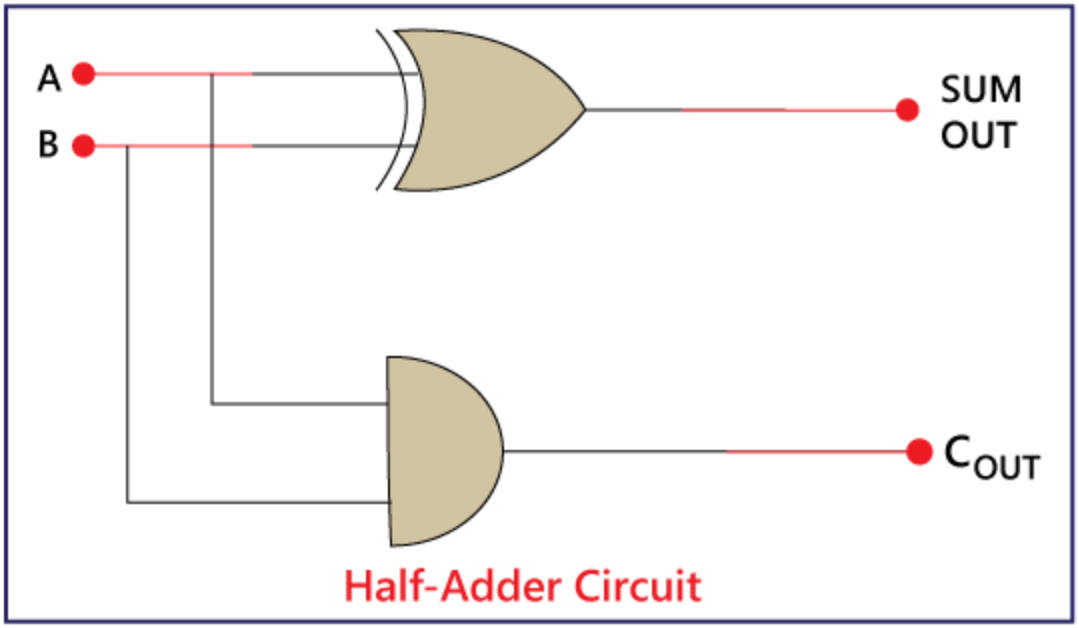
1. 'A' and' B' are the input states, and 'sum' and 'carry' are the output states.
2. The carry output is 0 in case where both the inputs are not 1.
3. The least significant bit of the sum is defined by the 'sum' bit.

The SOP form of the sum and carry are as follows:

Sum = x'y+xy'
Carry = xy

Half-Adder logical circuit:

So, the Half Adder is designed by combining the 'XOR' and 'AND' gates and provide the sum and carry.



There is the following **Boolean expression** of **Half Adder circuit**:

Sum= A XOR B

Carry= A AND B (A.B)

References:

https://www.javatpoint.com/