Assignment-3 (CS 232) by Utkarsh Ranjan

1-bit Half Adder

Components
1 XOR gate, 1 And gate

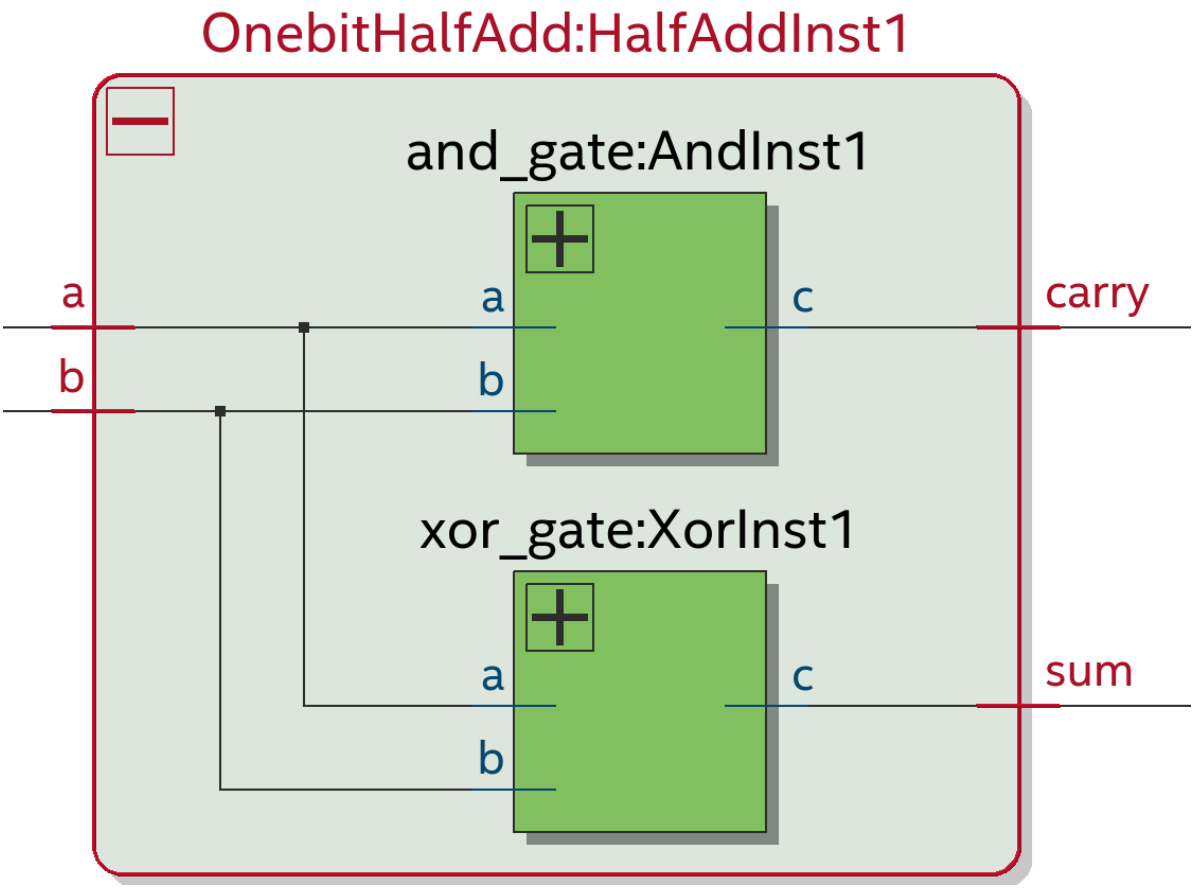
Description

- 2 Inputs :- two bits (A,B)
- 2 Outputs :- two bits (Carry, add)

```
Carry = A + B;      Sum = A xor B;
```

- To construct the Xor Gate - 1 And gate, 1 Or gate and 1 Nand gate were used

A	B	Sum	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1



1-bit full adder

Component

2 1-bit Half Adder, 1 Or gate

Description

- 3 Inputs: two bits (A , B) , one bit (Cin)
- 2 Outputs: one bit (Sum), one bit (Cout)

Idea

- A and B were made the input of the 1st half adder.
- The ouput of this adder was made input of the 2nd half adder with Cin as the 2nd input
- The carry of the two half-adder were Or-ed to get the Cout of the full adder

```
Sum = A xor B xor Cin;      Cout = A.B + B.Cin + A.Cin;
```

A	B	Cin	Sum	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