

HALF ADDER

EXP.NO: 27

AIM:

To design and implement the two bit half adder using Logisim simulator.

PROCEDURE:

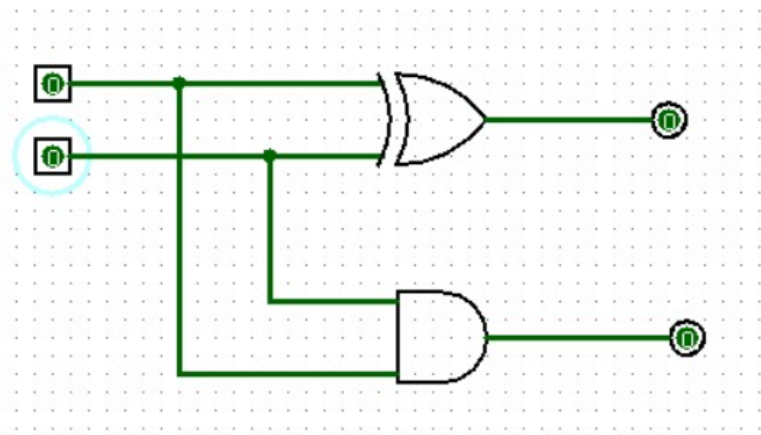
- 1) Pick and place the necessary gates.
- 2) Insert 2 inputs into the canvas.
- 3) Connect the inputs to the XOR gate and AND gate.
- 4) Insert 2 outputs into the canvas.
- 5) Make the connections using the connecting wires.
- 6) Verify the truth table.

TRUTH TABLE:

A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

$$S = A \text{ XOR } B \quad C = A \text{ AND } B$$

OUTPUT



RESULT: Thus 2-bit half adder has been designed and implemented successfully using logisim simulator.

TWO BIT HALF SUBTRACTOR

EXP.NO: 28

AIM:

To design and implement the two bit half subtractor using Logisim simulator.

PROCEDURE:

- 1) Pick and place the necessary gates.
- 2) Insert 2 inputs into the canvas.
- 3) Connect the inputs to the OR gate, AND gate and NOT gate.
- 4) Insert 2 outputs into the canvas.
- 5) Make the connections using the connecting wires.
- 6) Verify the truth table.

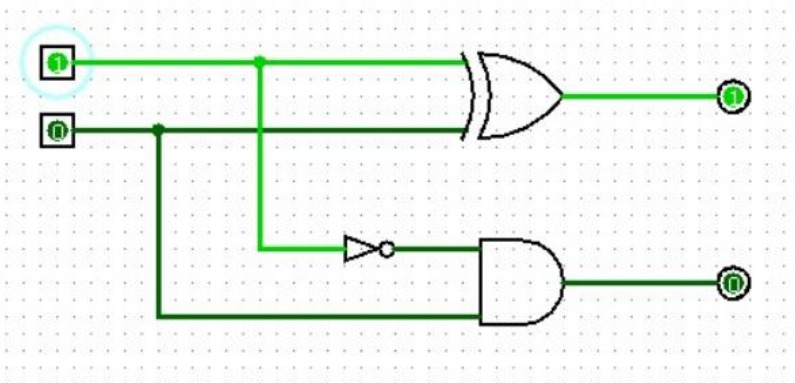
TRUTH TABLE:

Inputs		Outputs	
A	B	Diff	Borrow
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

$$\text{Diff} = A'B + AB'$$

$$\text{Borrow} = A'B$$

OUTPUT



RESULT: Thus 2-bit half subtractor has been designed and implemented successfully using logisim

simulator.

FULL ADDER

EXP.NO: 29

AIM:

To design and implement the full adder using Logisim simulator.

PROCEDURE:

- 1) Pick and place the necessary gates.
- 2) Insert 3 inputs into the canvas.
- 3) Connect the inputs to the XOR gate, AND gate and OR gate.
- 4) Insert 2 outputs into the canvas.
- 5) Make the connections using the connecting wires.
- 6) Verify the truth table.

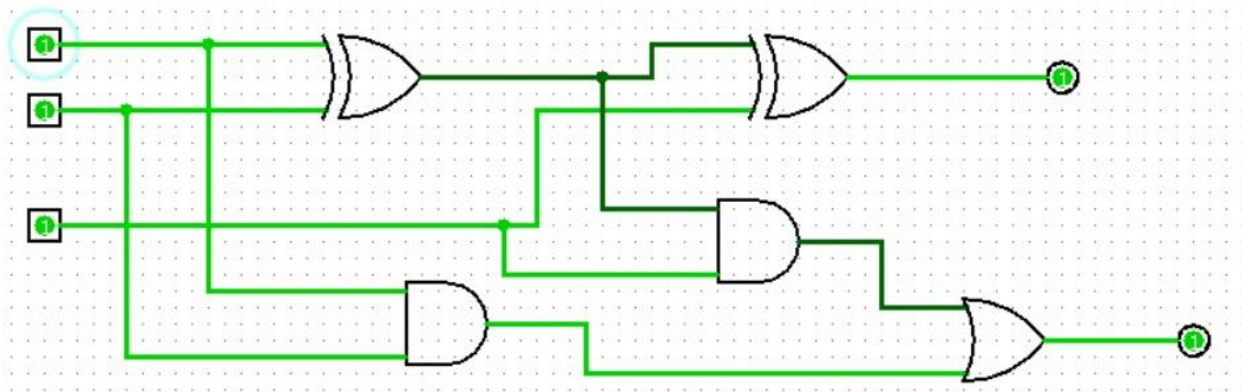
TRUTH TABLE:

Inputs			Outputs	
A	B	C _{in}	Sum	Carry
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

$$\text{Sum} = (A \oplus B) \oplus C_{in}$$

$$\text{Carry} = A.B + (A \oplus B)$$

OUTPUT



RESULT: Thus full adder has been designed and implemented successfully using logisim simulator.

FULL SUBTRACTOR

EXP.NO: 30

AIM:

To design and implement the full subtractor using Logisim simulator.

PROCEDURE:

- 1) Pick and place the necessary gates.
- 2) Insert 3 inputs into the canvas.
- 3) Connect the inputs to the XOR gate, AND gate and OR gate.
- 4) Insert 2 outputs into the canvas.
- 5) Make the connections using the connecting wires.
- 6) Verify the truth table.

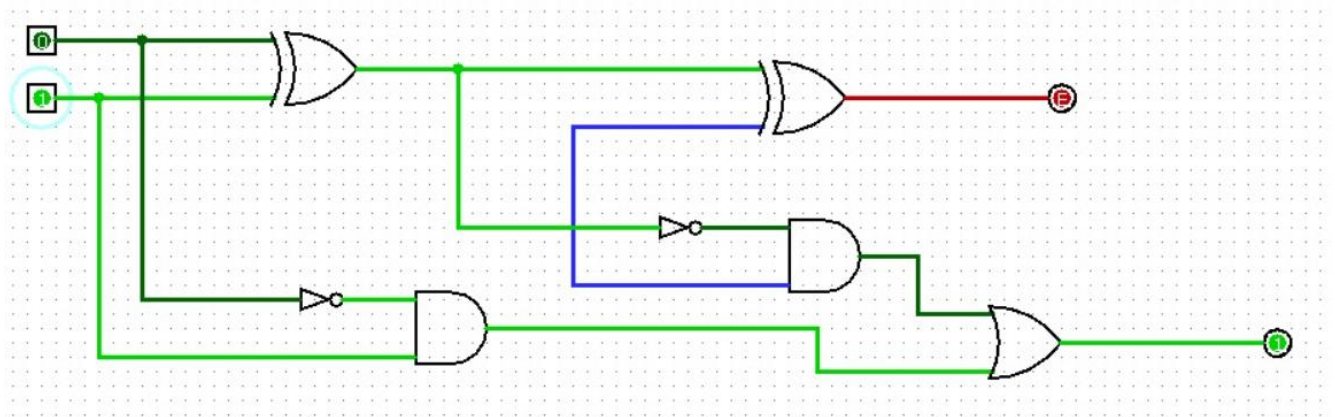
TRUTH TABLE:

Inputs			Outputs	
A	B	Borrow _{in}	Diff	Borrow
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

$$\text{Diff} = (A \oplus B) \oplus \text{'Borrow}_{in}'$$

$$\text{Borrow} = A'.B + (A \oplus B)'$$

OUTPUT



RESULT: Thus full subtractor has been designed and implemented successfully using logisim simulator.