

23. FULL ADDER

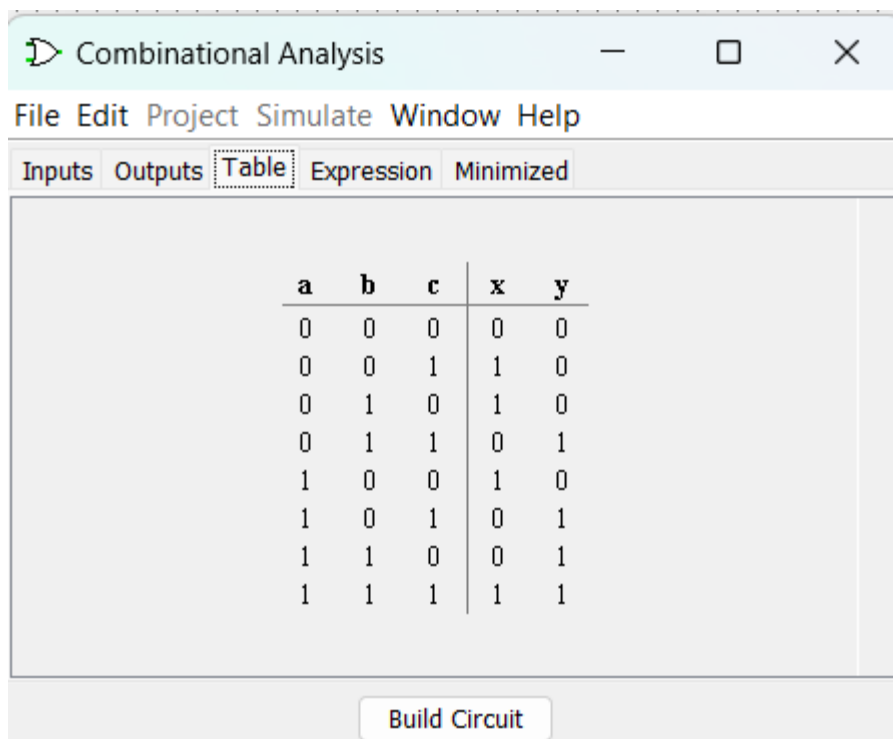
EXP.NO: 23

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:



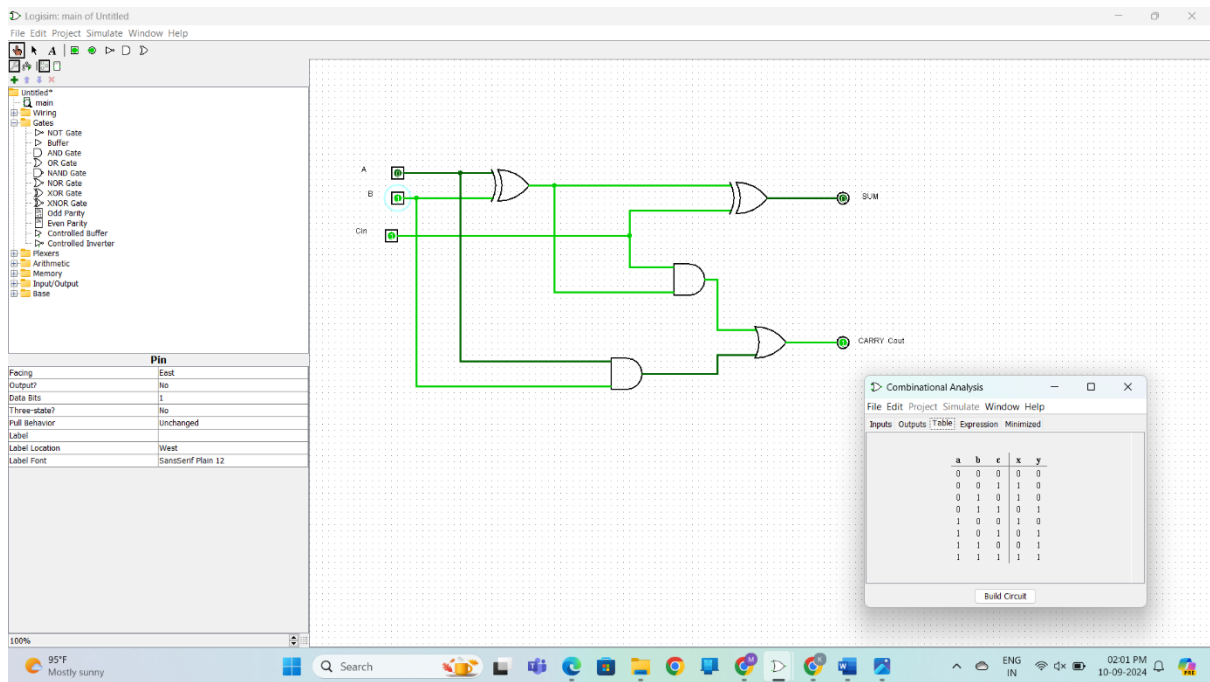
The screenshot shows the 'Combinational Analysis' window in Logisim. It has a menu bar with 'File', 'Edit', 'Project', 'Simulate', 'Window', and 'Help'. Below the menu bar are tabs for 'Inputs', 'Outputs', 'Table', 'Expression', and 'Minimized'. The 'Table' tab is selected, displaying a truth table for a full adder. The table has columns for inputs 'a', 'b', and 'c', and outputs 'x' and 'y'. The inputs 'a' and 'b' range from 0 to 1, and 'c' ranges from 0 to 1. The outputs 'x' and 'y' are calculated based on the inputs. At the bottom of the window is a 'Build Circuit' button.

a	b	c	x	y
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

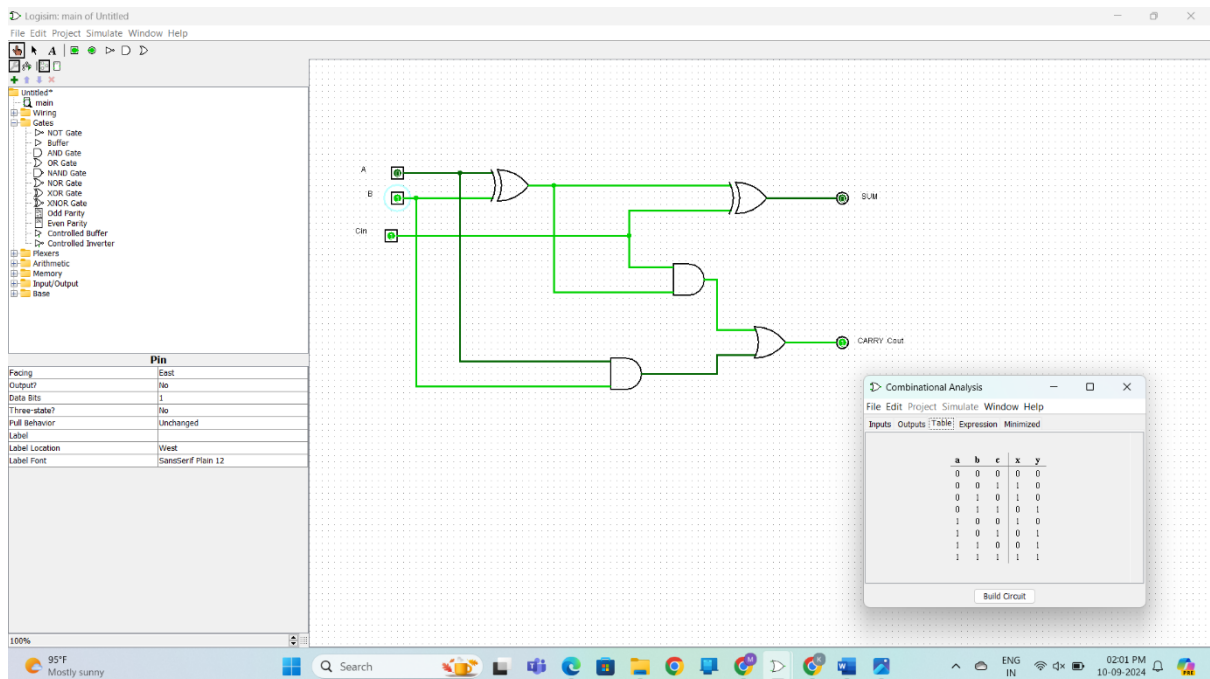
$$\text{Sum} = (A \oplus B) \oplus \text{Cin}$$

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

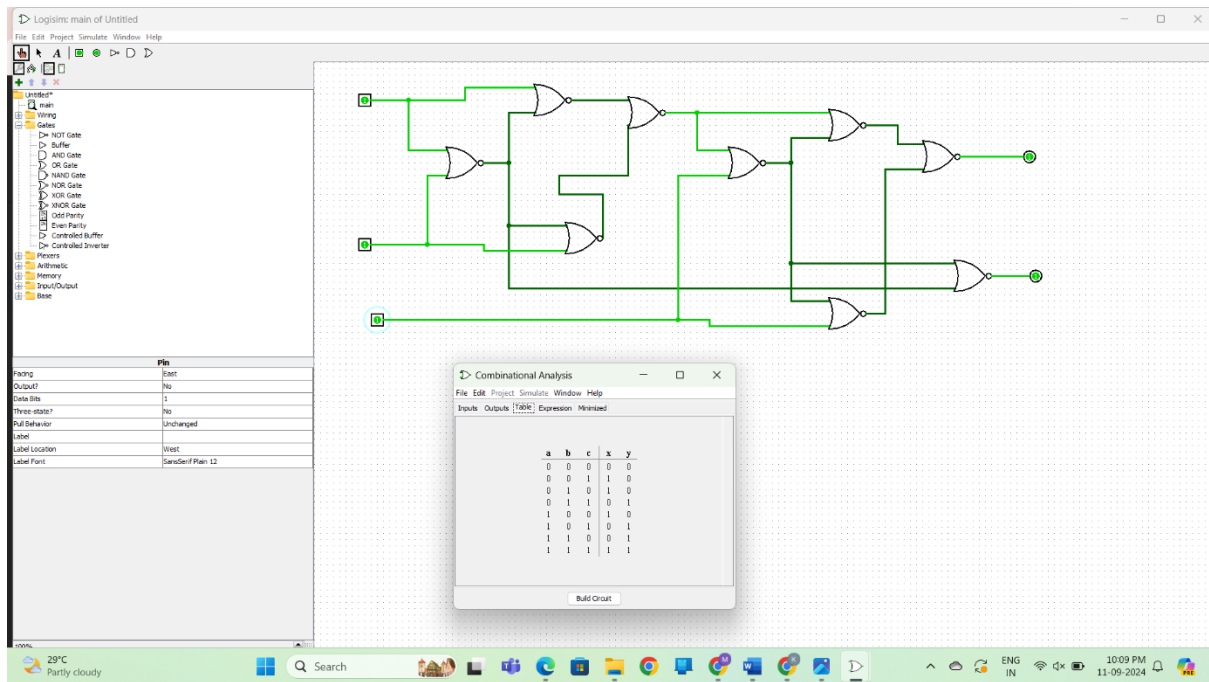
Logical Diagram:



Full adder using NAND Gates:



Full adder using NOR Gates:



OUTPUT

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