

HALF ADDER

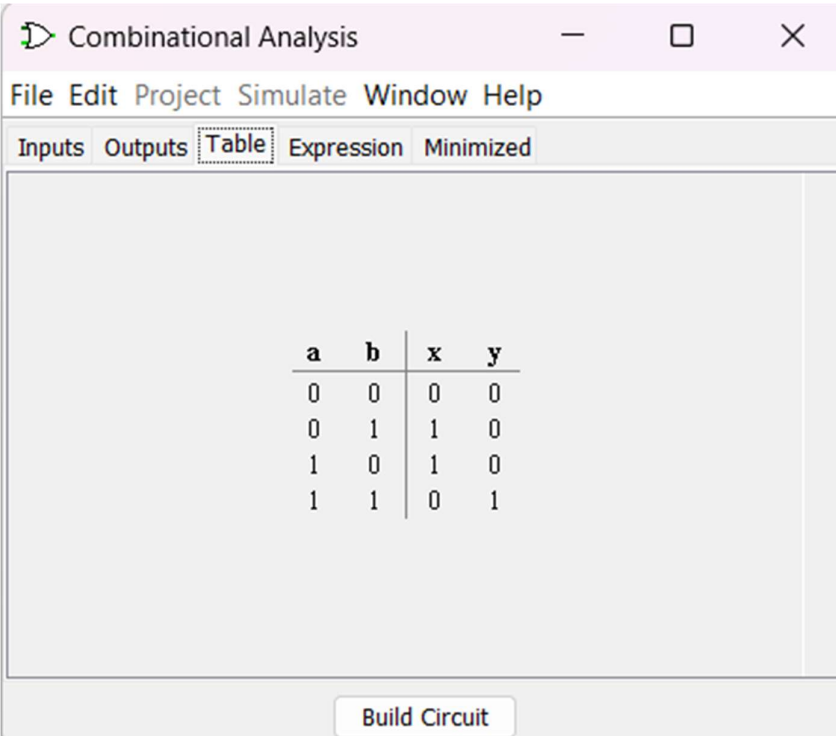
EXP.NO: 21

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:

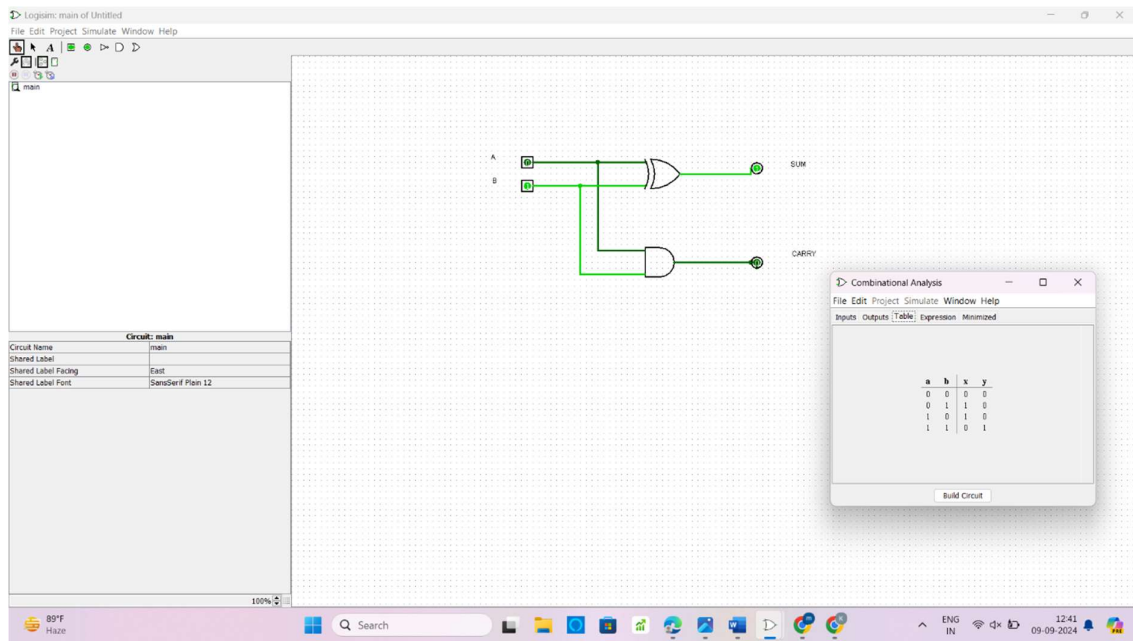


The screenshot shows the 'Combinational Analysis' window in the Logisim simulator. The window has a title bar with a green play button icon, the text 'Combinational Analysis', and standard window controls (minimize, maximize, close). Below the title bar is a menu bar with 'File', 'Edit', 'Project', 'Simulate', 'Window', and 'Help'. Underneath the menu bar are five tabs: 'Inputs', 'Outputs', 'Table', 'Expression', and 'Minimized'. The 'Table' tab is currently selected and highlighted. The main area of the window displays a truth table for a half adder. The table has four columns: 'a', 'b', 'x', and 'y'. The rows represent the four possible combinations of inputs a and b. At the bottom of the window, there is a button labeled 'Build Circuit'.

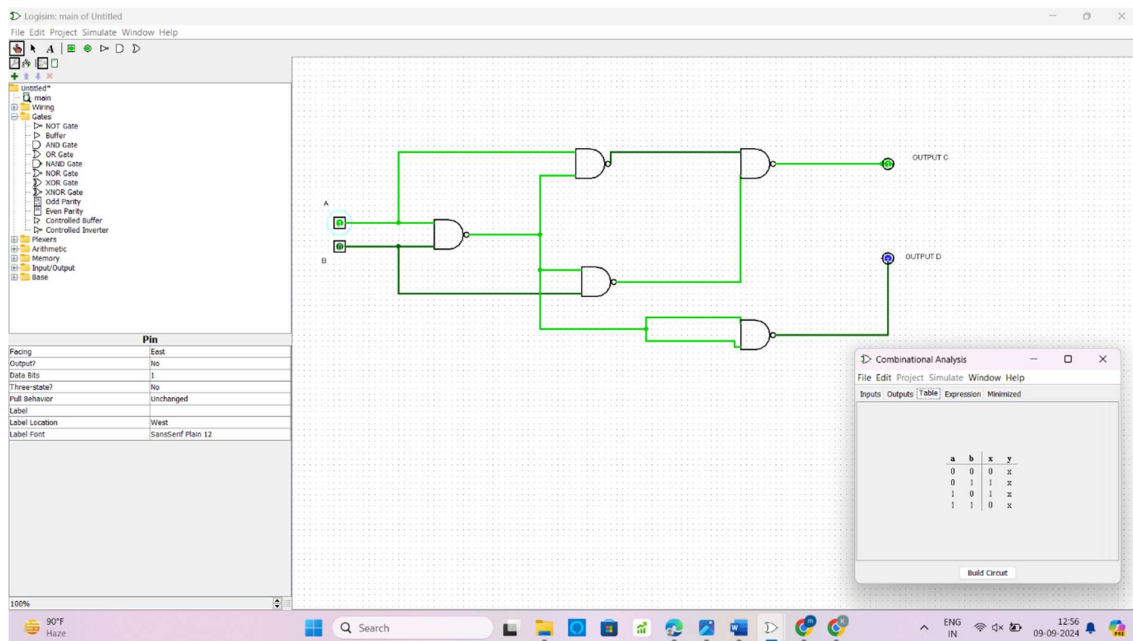
a	b	x	y
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

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

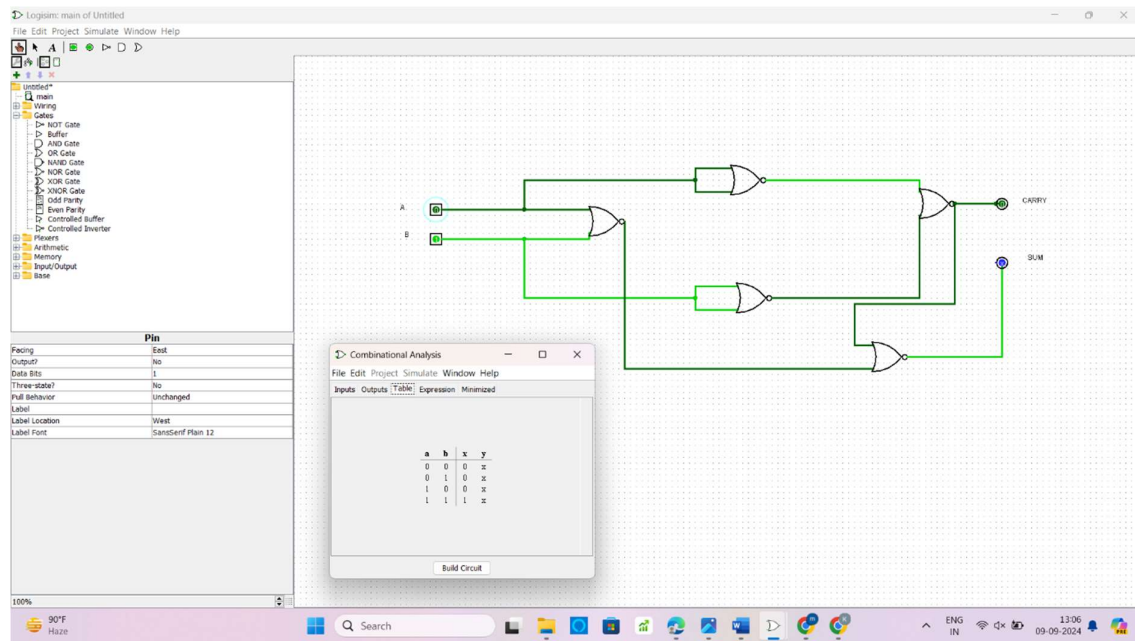
Logical Diagram:



Half Adder using NAND Gates OUTPUT



Half Adder using NOR Gates OUTPUT



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