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Roll No	2024-SE-03
Course	CALD
Semester	SE_2nd Semester
Lab No	02
Title	Verification of Basic Logic Gates
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Submission Date	28th April ,2025

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Digital Logic Gates Lab Task

Title: Implementation of Basic Logic Gates in EWB

Aim:

To design, simulate, and verify the outputs of basic logic gates (AND, OR, NOT, NAND, NOR, XOR) using Electronics Workbench (EWB).

Components Required:

- Logic Gates (ICs)
- Logic Switches
- LEDs
- Resistors
- Power Source (+5V)
- Ground

Procedure for Each Gate:

1. AND Gate

- I placed the AND Gate IC (e.g., 7408) on the EWB workspace.
- I connected two logic switches to the two inputs (A and B).
- I connected the output to an LED through a resistor.
- I attached the power supply (+5V) and ground to the IC.
- I simulated by toggling the switches and observed the output LED.

Truth Table:

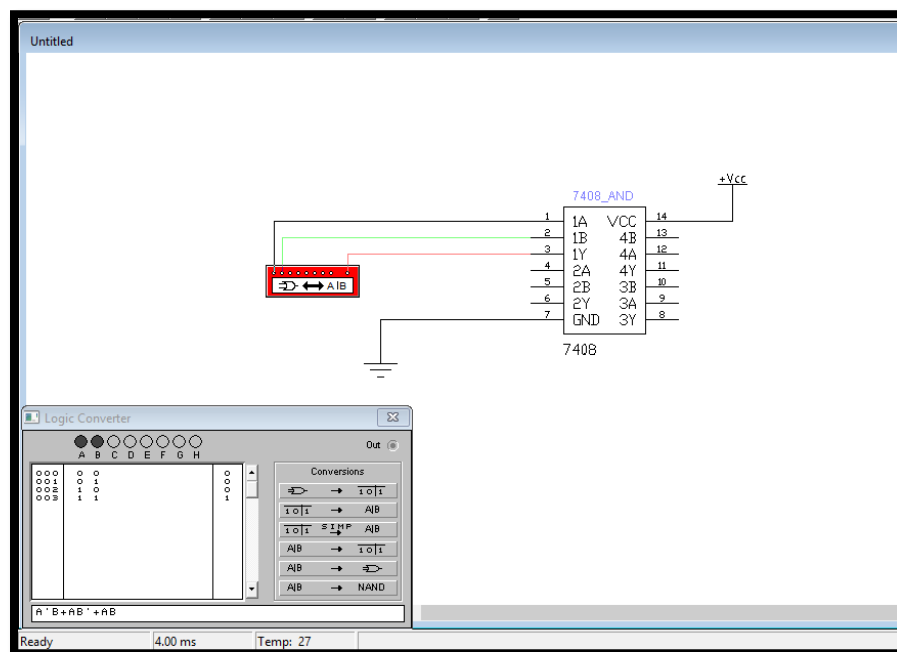| Input 1	Input 2	Output
0	0	0
0	1	0
1	0	0
1	1	1

Implementation:

Figure 1: circuit diagram & truth table of AND gate

2. OR Gate

- I placed the OR Gate IC (e.g., 7432) on the EWB workspace.

- I connected two switches to the two inputs.

- I connected the output to an LED via a resistor.

- I provided +5V to VCC and ground to GND pins.

- I simulated by changing switch inputs and checked the LED.

Truth Table:

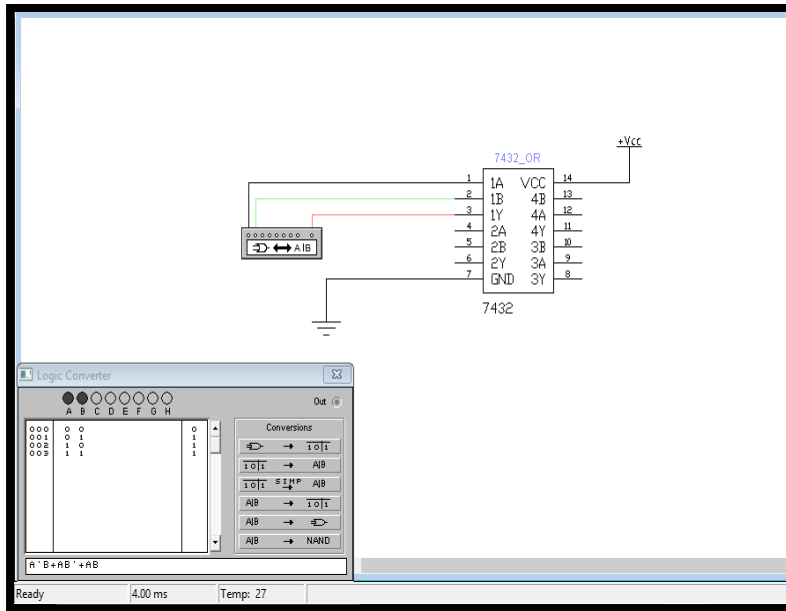| Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	1

Implementation:

Figure 2: circuit diagram & truth table of OR gate

3. NOT Gate

- I placed the NOT Gate IC (e.g., 7404) in the workspace.
- I connected a single switch to the input.
- I connected the output to an LED using a resistor.
- I properly powered the IC with +5V and ground connections.
- I simulated and observed the inverted output on the LED.

Truth Table:

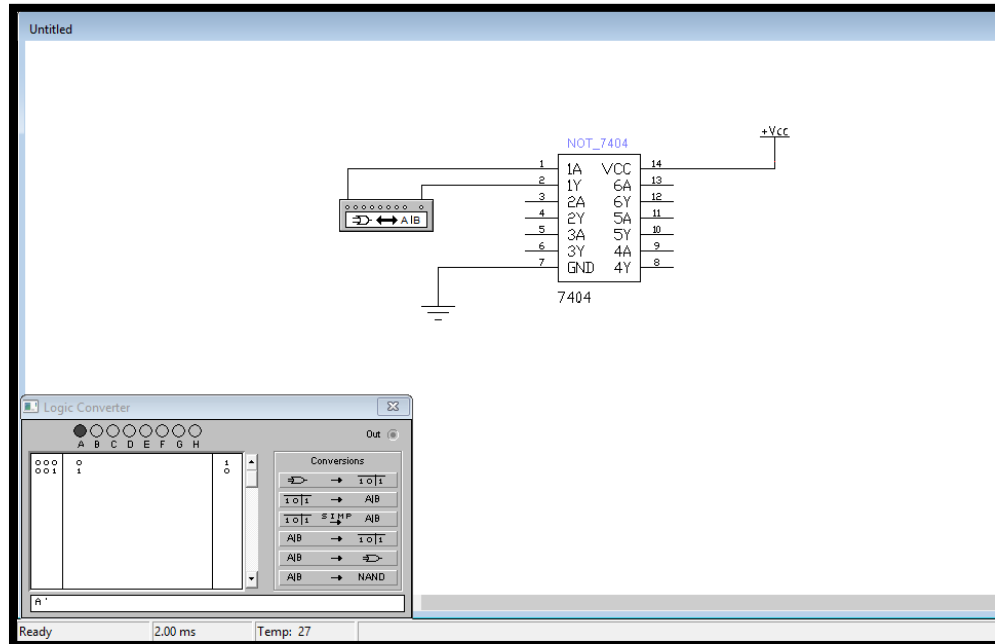| Input	Output
0	1
1	0

Implementation:

Figure 3: circuit diagram & truth table of NOT gate

4. NAND Gate

- I placed the NAND Gate IC (e.g., 7400) in the workspace.

- I connected two switches to the input pins.

- I connected the output to an LED through a resistor.

- I connected VCC and GND to the IC.

- I simulated different inputs and checked the output LED.

Truth Table:

Input 1	Input 2	Output

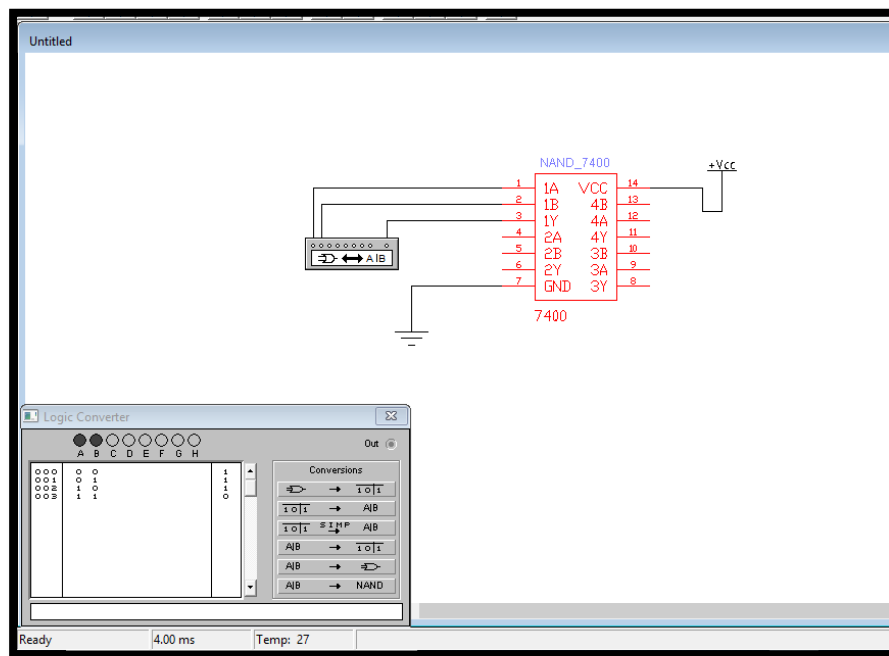| 0	0	1
0	1	1
1	0	1
1	1	0

Implementation:

Figure 4: circuit diagram & truth table of NAND gat

5. NOR Gate

- I placed the NOR Gate IC (e.g., 7402) on the workspace.
- I attached two switches to the input terminals.
- I connected the output to an LED with a resistor.

- I supplied +5V and ground properly to the IC.
- I simulated by toggling the switches and verified the output.

Truth Table:

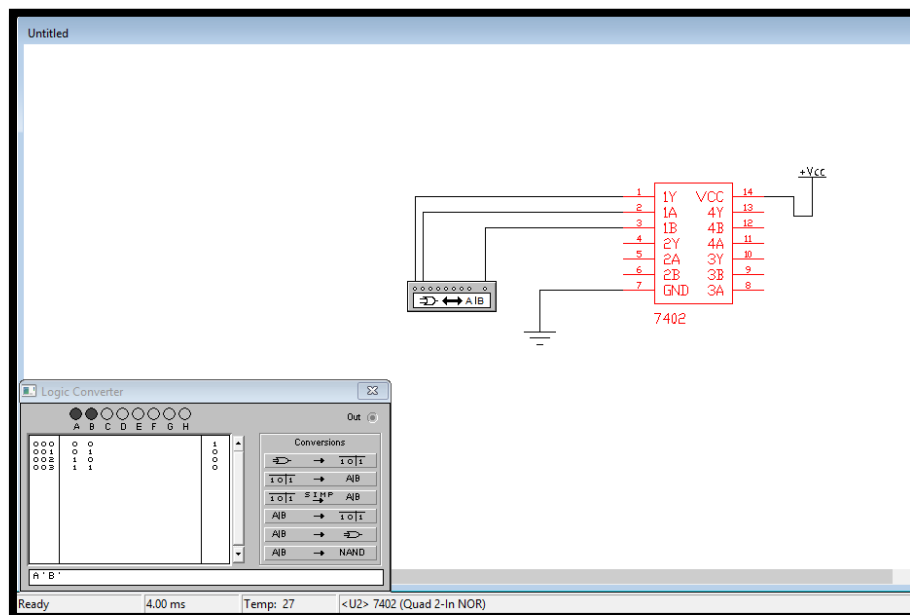| Input 1	Input 2	Output
0	0	1
0	1	0
1	0	0
1	1	0

Implementation:

Figure 5: circuit diagram & truth table of NOR gate

6. XOR Gate

- I placed the XOR Gate IC (e.g., 7486) on the EWB workspace.

- I connected two logic switches to the two input terminals.

- I connected the output to an LED through a resistor.

- I connected VCC (+5V) and GND.

- I toggled switches and checked the LED output accordingly.

Truth Table:

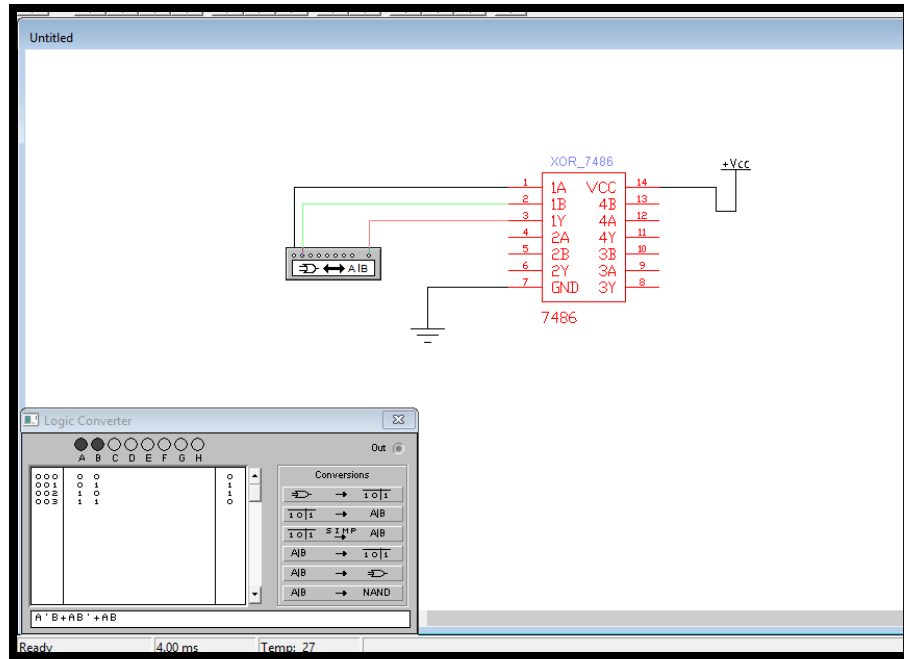| Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	0

Implementation:

Figure 6: circuit diagram & truth table of XOR gate