The University of Azad Jammu and Kashmir, Muzaffarabad

Department of Software Engineering

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Procedure to Connect 7408 (AND Gate IC) in EWB

1. Open EWB Software

- Start **Electronic Workbench** on your computer.

2. Place the 7408 IC

- Click on **Place → Component**.
- Go to the **TTL** or **Digital** library.
- Search and select **7408** (it's the Quad 2-input AND gate).
- Place the 7408 IC onto the workspace.

3. Connect the Power Supply

- **Pin 14**: Connect it to **+5V** (power supply).
- **Pin 7**: Connect it to **Ground (GND)**.

This powers up the IC so it works properly.

4. Set up Inputs

- From **Inputs** menu, pick **Logic Switches**.
- Place **two switches** (one for each input).
- Connect:
  - One switch to **Pin 1** (Input A1).
  - One switch to **Pin 2** (Input B1).

5. Set up Output

- From **Indicators** menu, place an **LED**.
- Put a **330Ω resistor** in series with the LED (protects the LED).
- Connect:
  - **Pin 3** (Output Y1) → Resistor → LED → Ground.

6. Start Simulation

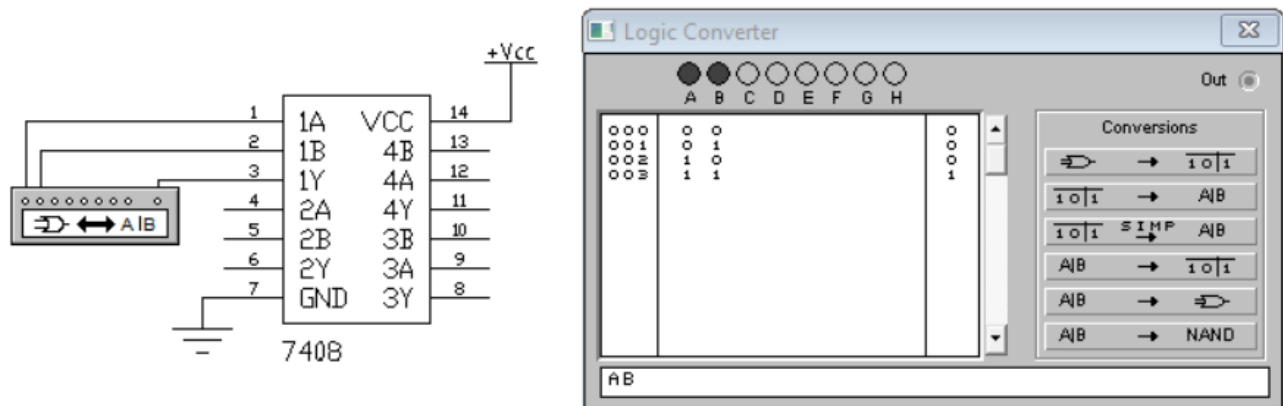- Click **Run** (or Start Simulation button).

7. Test the Circuit
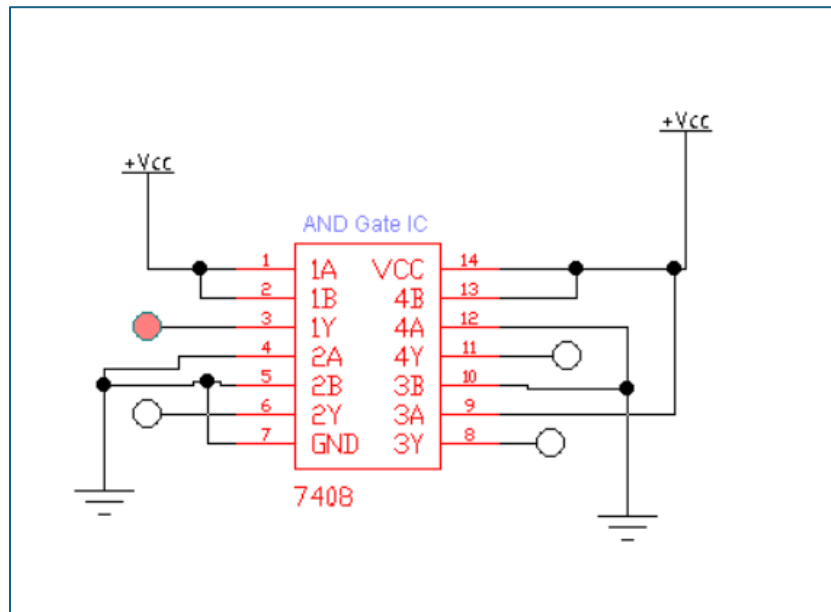
- Use the switches to turn inputs ON or OFF.

- Observe the LED:
  - LED **ON** = Output is HIGH (1).
  - LED **OFF** = Output is LOW (0).
- Try all combinations (00, 01, 10, 11) and record the results.

AND GATE

Truth Table

Output

Procedure to Connect 7432 (OR Gate IC) in EWB

1. Open EWB Software

- Start **Electronic Workbench** on your computer.

2. Place the 7432 IC

- Click **Place → Component**.
- Find the **TTL** or **Digital** family.
- Search for **7432** (Quad 2-input OR gates).
- Place the **7432 IC** on your workspace.

3. Connect Power to the IC

- **Pin 14**: Connect to **+5V** (positive supply).
- **Pin 7**: Connect to **Ground (GND)**.

⚡ This step powers the IC so it can work correctly during simulation.

4. Set Up Inputs

- From the **Inputs** menu, place **two logic switches**.
- Connect:
    - First switch to **Pin 1** (Input A1).
    - Second switch to **Pin 2** (Input B1).

5. Set Up Output

- From the **Indicators** menu, place an **LED**.
- Add a **330Ω resistor** between the output and the LED.
- Connect:
    - **Pin 3** (Output Y1) → **Resistor → LED → Ground**.

6. Start the Simulation

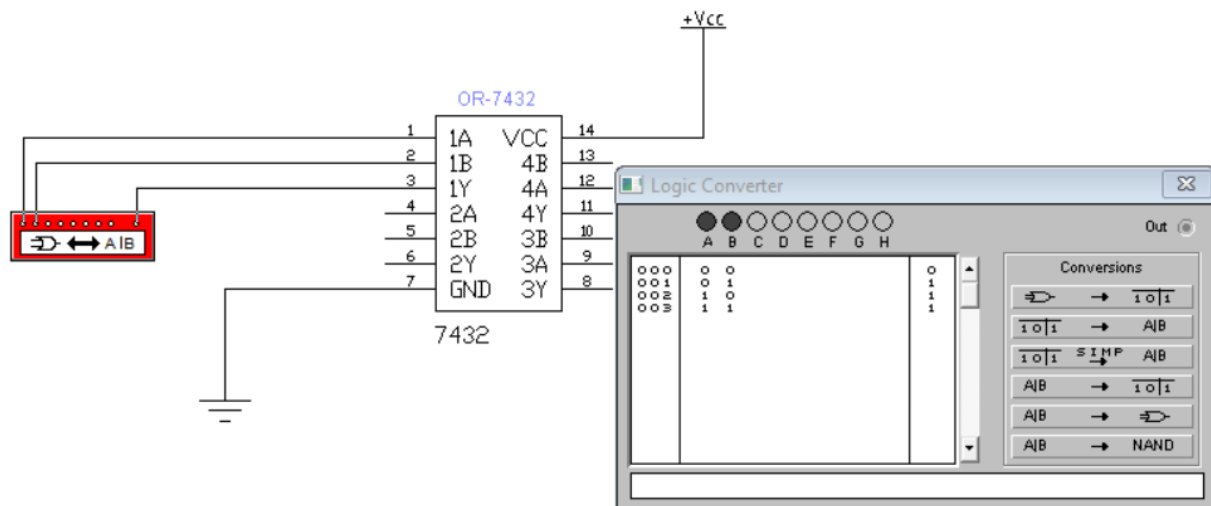- Click **Run** to start the simulation.

7. Test and Observe

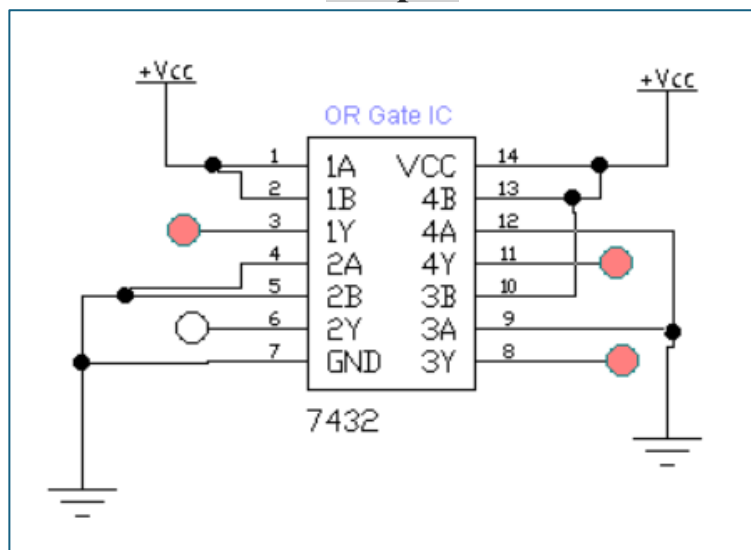- Toggle the switches through different combinations (00, 01, 10, 11).
- Watch the LED:

- LED **ON** = Output is HIGH (1).
- LED **OFF** = Output is LOW (0).
- Record the output to make your **truth table**.

OR GATE

Truth table

Output

Procedure to Connect 7400 (NAND Gate IC) in EWB

1. Open EWB Software

- Start **Electronic Workbench** on your computer.

2. Place the 7400 IC

- Go to **Place → Component**.
- Find the **TTL** or **Digital** library.
- Search for **7400** (Quad 2-input NAND gate).
- Drag and place the IC on your workspace.

3. Connect Power to the IC

- **Pin 14**: Connect it to **+5V** (positive supply).
- **Pin 7**: Connect it to **Ground (GND)**.

⚡ This powers up the IC so it works properly in the simulation.

4. Setup Input Connections

- From the **Inputs** menu, place **two logic switches**.
- Connect:
  - First switch to **Pin 1** (Input A1).
  - Second switch to **Pin 2** (Input B1).

5. Setup Output Connection

- From the **Indicators** menu, place an **LED**.
- Add a **330Ω resistor** in series with the LED.
- Connect:
  - **Pin 3** (Output Y1) → **Resistor → LED → Ground**.
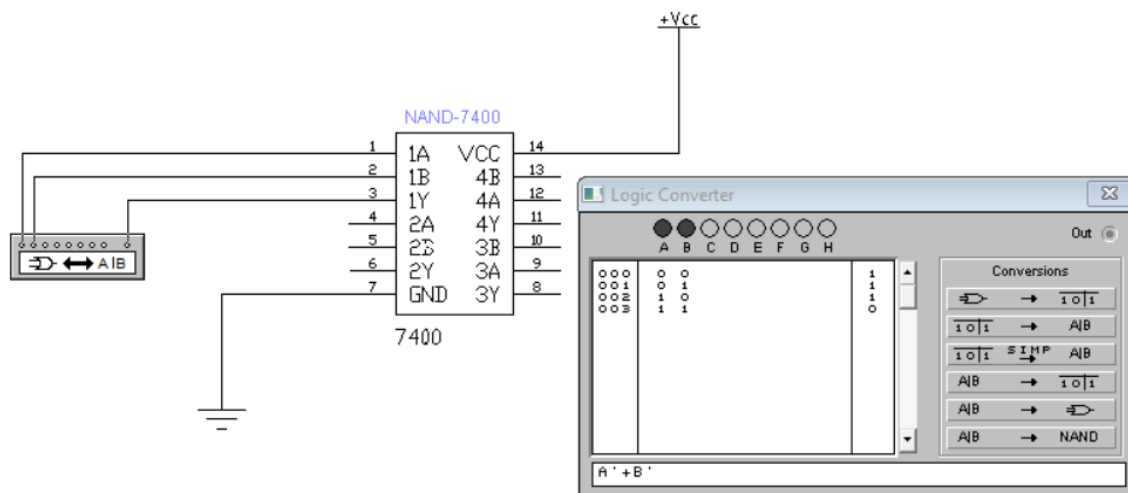
6. Start the Simulation

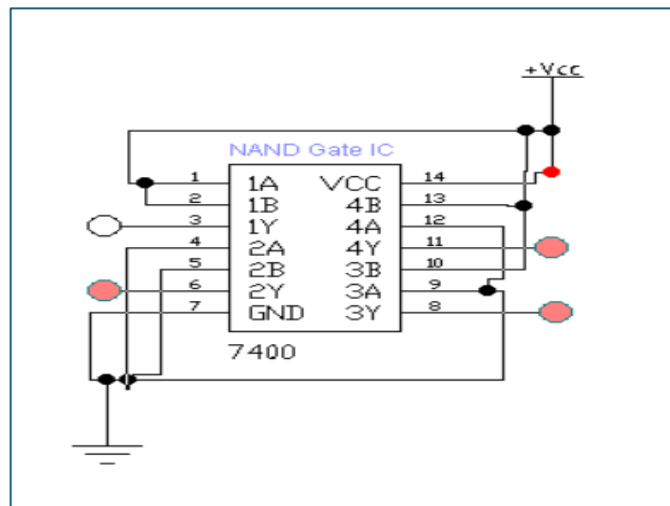- Press the **Run** button to start the simulation.

7. Test and Observe

- Turn ON and OFF the switches in different combinations (00, 01, 10, 11).
- Watch the LED:
  - LED **ON** = Output is HIGH (1).
  - LED **OFF** = Output is LOW (0).
- Record the results for each combination to create the **truth table**.

NAND GATE

Truth table

Output

Procedure to Connect 7402 (NOR Gate IC) in EWB

1. Open EWB Software

- Start **Electronic Workbench** on your computer.

2. Place the 7402 IC

- Click **Place → Component**.
- Go to **TTL** or **Digital** library.
- Search for **7402** (Quad 2-input NOR gates).
- Place the **7402 IC** onto your workspace.

3. Connect Power to the IC

- **Pin 14**: Connect to **+5V** (positive power supply).
- **Pin 7**: Connect to **Ground (GND)**.

⚡ Powering the IC is necessary to make it work properly.

4. Set Up Inputs

- From the **Inputs** section, place **two logic switches**.
- Connect:
    - First switch to **Pin 1** (Input A1).
    - Second switch to **Pin 2** (Input B1).

5. Set Up Output

- From the **Indicators** section, place an **LED**.
- Add a **330Ω resistor** between the output and LED.
- Connect:
    - **Pin 3** (Output Y1) → **Resistor → LED → Ground**.

6. Start the Simulation

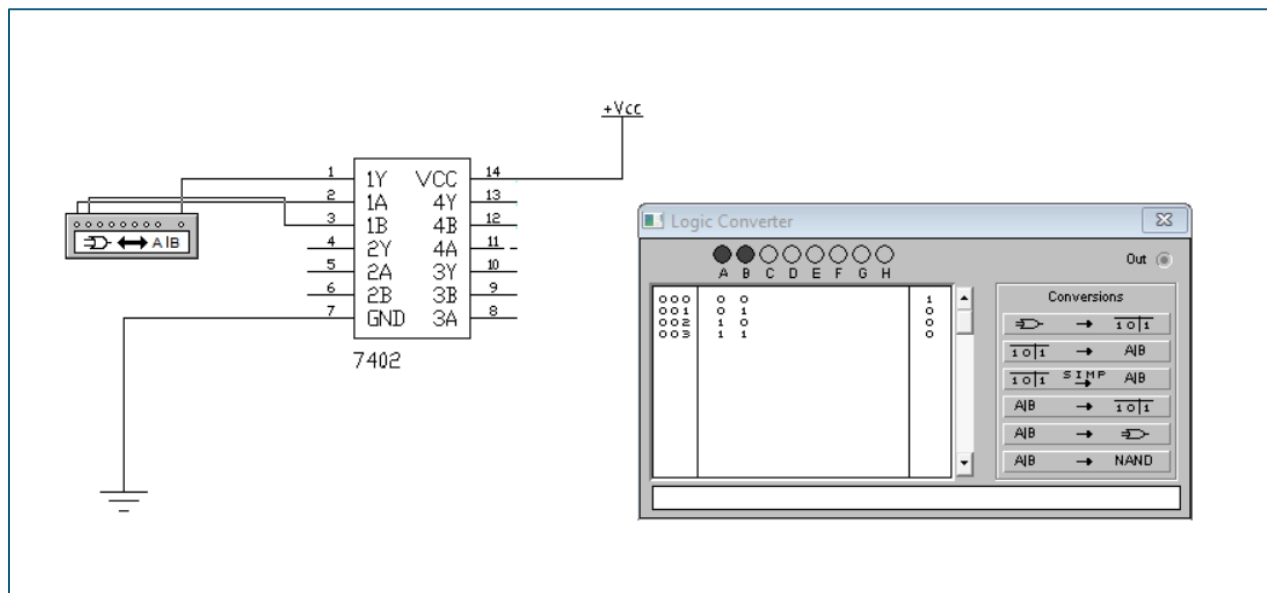- Click **Run** to start the simulation.

7. Test and Observe

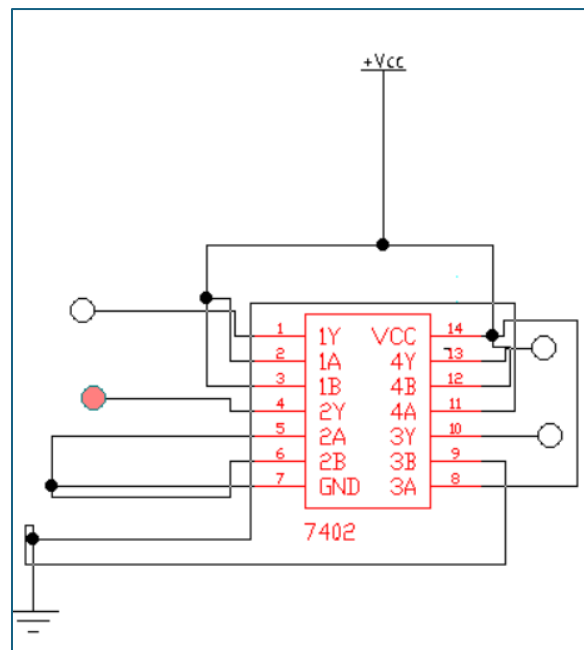- Change the switches to different combinations (00, 01, 10, 11).
- Watch the LED:

- o LED **ON** = Output is HIGH (1).
- o LED **OFF** = Output is LOW (0).
- Write down the results to create the **truth table**.

NOR GATE

Truth table

Output

Procedure to Connect 7404 (NOT Gate/Inverter IC) in EWB

1. Open EWB Software

- Start **Electronic Workbench** on your computer

2. Place the 7404 IC

- Click on **Place → Component**.
- Find the **TTL** or **Digital** library.
- Search for **7404** (Hex Inverter/NOT gates).
- Place the **7404 IC** onto your workspace.

3. Connect Power to the IC

- **Pin 14**: Connect to **+5V** (positive power).
- **Pin 7**: Connect to **Ground (GND)**.

⚡ This step powers the IC so it works properly.

4. Set Up Input

- From the **Inputs** menu, place **one logic switch**.
- Connect the switch to **Pin 1** (Input A1).

5. Set Up Output

- From the **Indicators** menu, place an **LED**.
- Add a **330Ω resistor** between the output and LED.
- Connect:
    - **Pin 2** (Output Y1) → **Resistor → LED → Ground**.
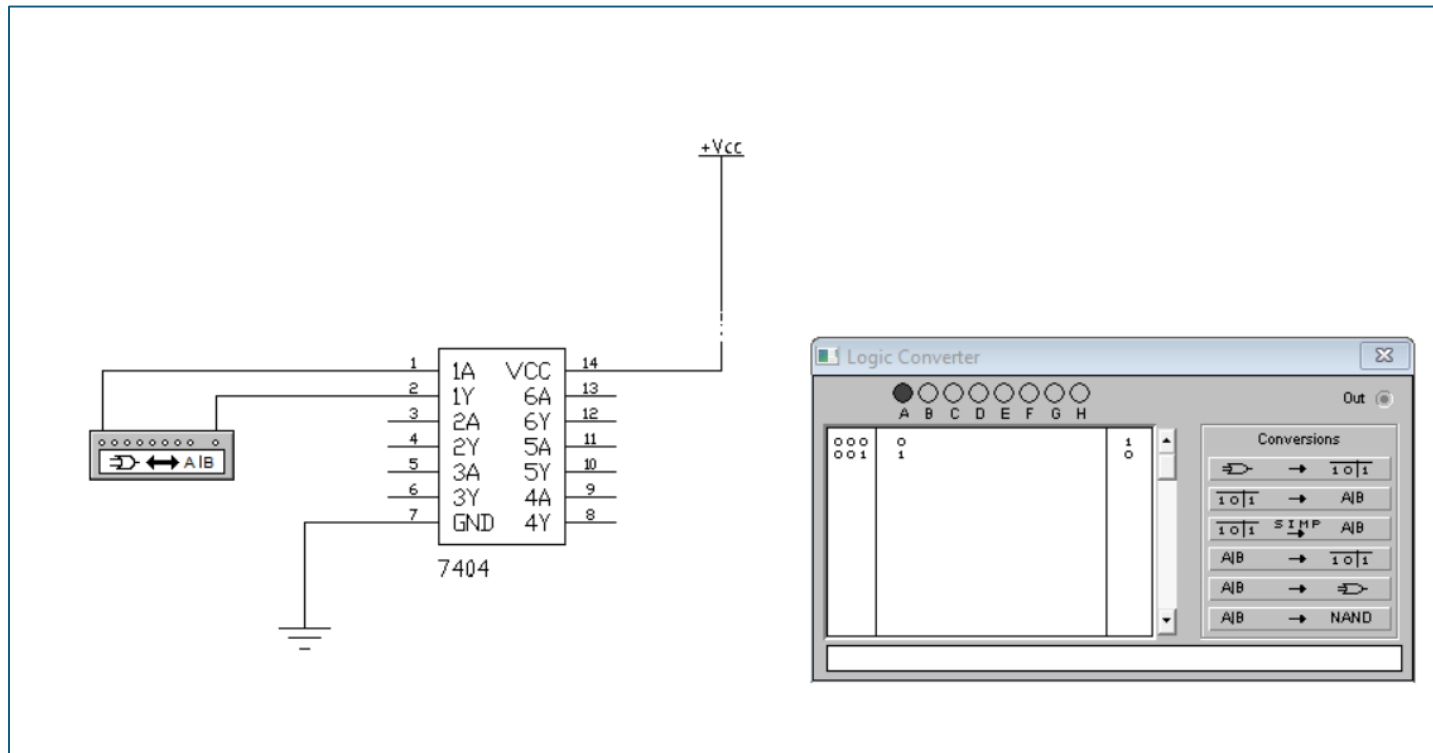
6. Start the Simulation

- Click **Run** to start simulation.

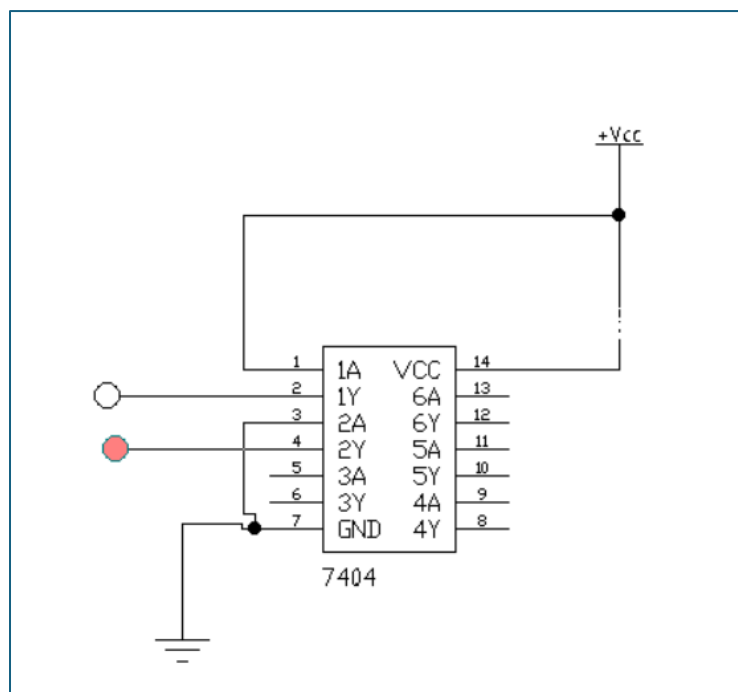## 7. Test and Observe

- Turn the switch ON and OFF (0 or 1).
- Observe the LED:
    - If input is **0** → LED turns **ON** (Output 1).
    - If input is **1** → LED turns **OFF** (Output 0).

NOT GATE

Truth table

Output

Procedure to Connect 7486 (XOR Gate IC) in EWB

1. Open EWB Software

- Launch **Electronic Workbench** on your computer.

2. Place the 7486 IC

- Go to **Place → Component**.
- Find the **TTL** or **Digital** section.
- Search for **7486** (Quad 2-input XOR gates).
- Drag and place the **7486 IC** onto your workspace.

3. Connect Power to the IC

- **Pin 14**: Connect to **+5V** (positive supply).
- **Pin 7**: Connect to **Ground (GND)**.

⚡ This is needed to power the IC so it works during simulation.

4. Set Up Inputs

- From the **Inputs** menu, place **two logic switches**.
- Connect:
  - One switch to **Pin 1** (Input A1).
  - One switch to **Pin 2** (Input B1).

5. Set Up Output

- From the **Indicators** menu, place an **LED**.
- Add a **330Ω resistor** in series with the LED.
- Connect:
  - **Pin 3** (Output Y1) **→ Resistor → LED → Ground**.

6. Start the Simulation

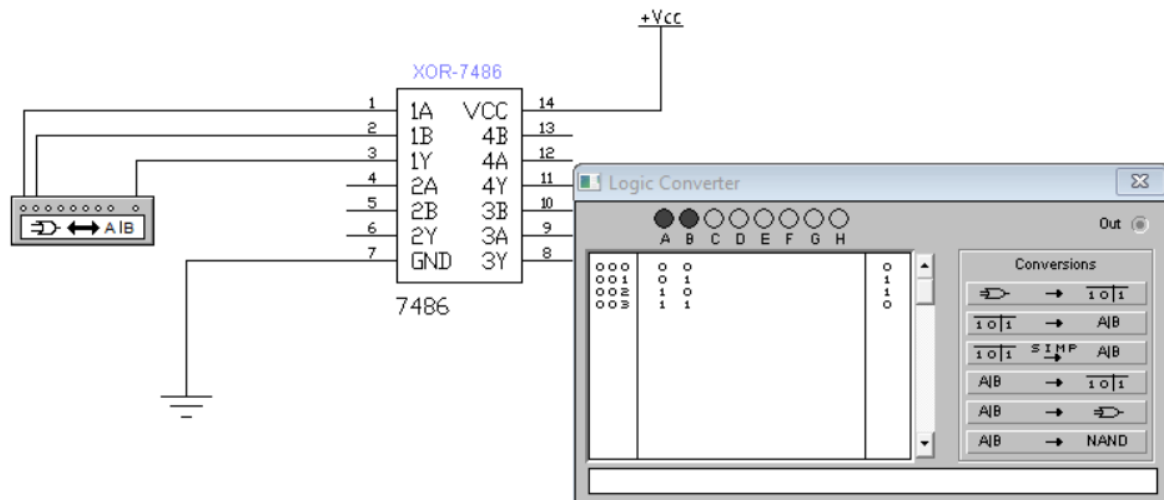- Click the **Run** button to begin simulation.

7. Test and Observe

- Use the switches to test all input combinations (00, 01, 10, 11).
- Observe the LED:

- o   LED **ON** = Output is HIGH (1).
- o   LED **OFF** = Output is LOW (0).
- Record results to build the **truth table**.s

XOR GATE

Truth table

Output