Lab Report

Experiment #1

Topic: Familiarization of Fundamental Logic Gate

Course: CSE260

Group : 04

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1. Name of Experiment: Familianization of Fundamental Logic Gates

2. Objective:

The goal of this experiment is to learn is to learn about basic logic gates and how they work, we will test the following gates:

- AND (IC-7408)
- OR (IC-7432)
- NOT (IC-7404)
- NAND (IC-7400)
- NOR (IC-7402)
- XOR (IC-7486)
- XNOR (IC-4077)

By doing this, we will see how they process inputs and create a truth table for each gates.

3. Required Components and Equipment:

1) A digital trainer board
2) Logic gate ICs (7408, 7432, 7404, 7400, 7402, 7486, 4077)
3) Power supply (+5V and GND)
4) Data Switches to give inputs
5) LED display to see outputs
6) Connecting wires

Experiment Setup

i) Placing the ICs - we carefully place each logic gate IC into the digital trainer board.

ii) Power Connections - We connect pin 14 of each IC to +5V and pin 7 to GND. This powers the ICs.

iii) Connecting Inputs and Outputs:

↳ we connect input pins to data switches

↳ we connect output pins to an LED

display to see the results.

iv) Testing different inputs - We turn the switches on and off to give different it input values (0 or 1) and check how the LED responds.

v) Recording the results:- we write down the outputs for each input combination and create a truth table.

5) Discussion:

This experiment helped us understand how logic gates work. By testing each gate, we saw how to take inputs and produce outputs. The truth tables matched what we expected, which means circuit worked correctly.

Key observation:

→ AND gives output 1 only when both inputs are 1

→ OR gives output 1 if at least one input is 1.

→ Not flips the input (0 becomes 1, 1 becomes 0)

→ NAND and NOR special gate, because we can make any other gate by using them

→ XOR and XNOR are useful for checking if inputs are different or the same.

Problem we faced:

For all gates (except Not gate) the inputs are from pin 1 and 2 form IC's. but for NOR gate the inputs are from pin 2 and 3 and outputs is from pin 1. So, we have check that and have to change the connections.

Overall, this experiment made logic gates easier to understand and showed how they are used in digital circuits.

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Results:

NAND

A	B	output
0	0	1
1	0	1
0	1	1
1	1	0

XOR

A	B	output
0	0	0
1	0	1
0	1	1
1	1	0

XNOR

A	B	output
0	0	1
1	0	0
0	1	0
1	1	1

OR

A	B	output
0	0	0
1	0	1
0	1	1
1	1	1

AND

A	B	output
0	0	0
1	0	0
0	1	0
1	1	1

NOT

A	B	out
0		1
1		0

NOR

A	B	output
0	0	1
1	0	0
0	1	0
1	1	0