

Exp 13

Title : Realization of Truth table of Different Logic Gates and Verification of De Morgan's Theorem

Objective: To realize Truth table of Different Logic Gates and Verification of De Morgan's Theorem

Theory:

The truth table of different logic gates are

AND gate			NAND gate			OR gate		
Input A	Input B	Output	Input A	Input B	Output	Input A	Input B	Output
0	0	0	0	0	1	0	0	0
1	0	0	1	0	1	1	0	1
0	1	0	0	1	1	0	1	1
1	1	1	1	1	0	1	1	1

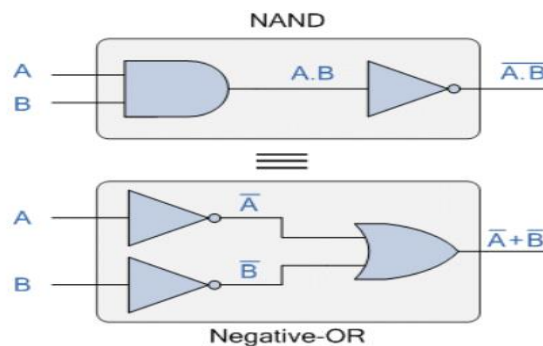
NOR gate			EX-OR gate			EX-NOR gate		
Input A	Input B	Output	Input A	Input B	Output	Input A	Input B	Output
0	0	1	0	0	0	0	0	1
1	0	0	1	0	1	1	0	0
0	1	0	0	1	1	0	1	0
1	1	0	1	1	0	1	1	1

De Morgan's Theorem and Laws can be used to find the equivalency of the NAND and NOR gates

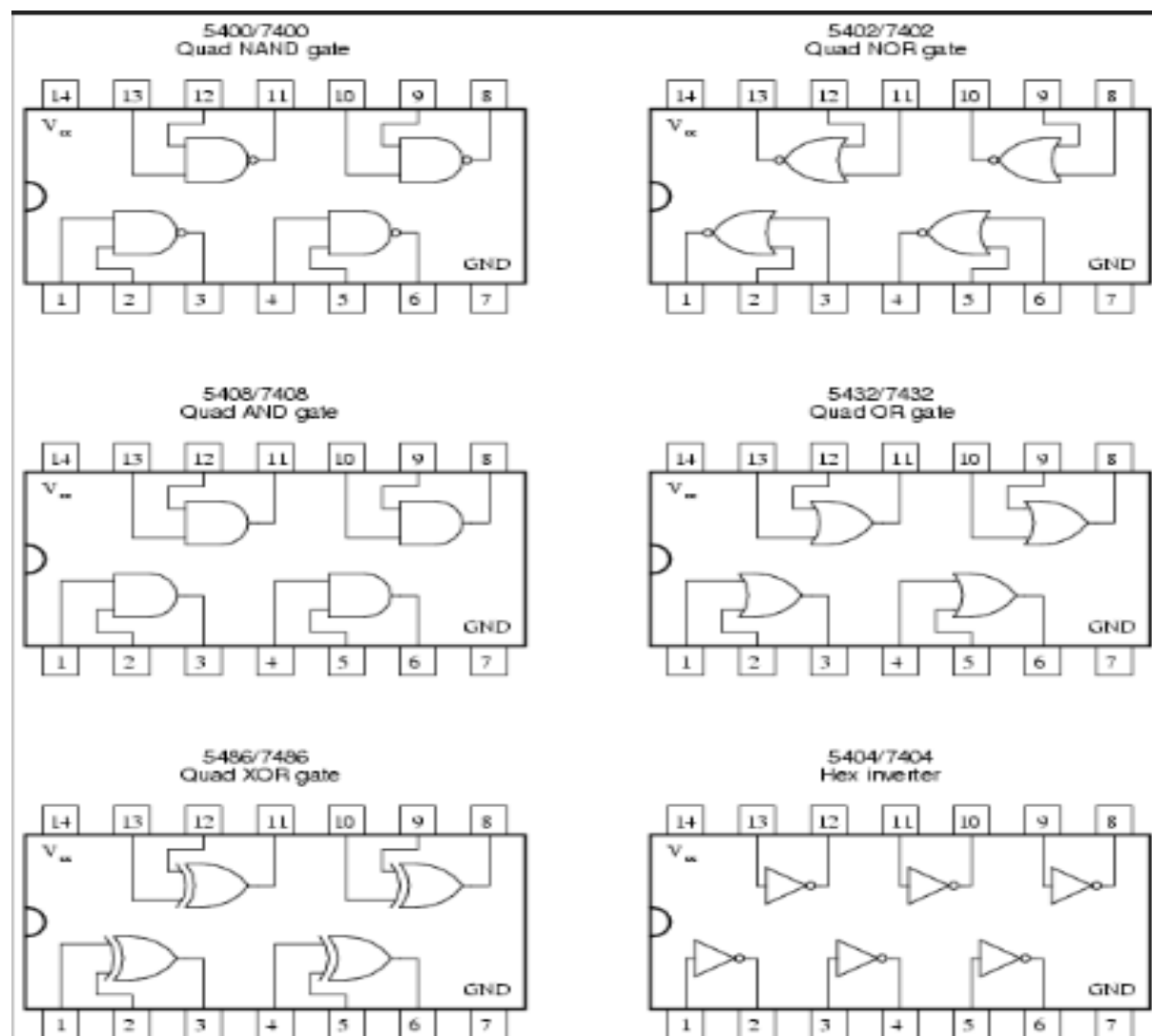
DeMorgan's Theorem:-

$$\overline{A \cdot B} = \overline{A} + \overline{B} \quad (\text{Rule-1})$$

$$\overline{A + B} = \overline{A} \cdot \overline{B} \quad (\text{Rule-2})$$



Pin Diagram :



Observation Table :

We can find the LED Status of each input and output which represents the binary logic level such as

AND gate			NAND gate			OR gate		
Input A	Input B	Output	Input A	Input B	Output	Input A	Input B	Output
0	0	0	0	0	1	0	0	0
1	0	0	1	0	1	1	0	1
0	1	0	0	1	1	0	1	1
1	1	1	1	1	0	1	1	1

NOR gate			EX-OR gate			EX-NOR gate		
Input A	Input B	Output	Input A	Input B	Output	Input A	Input B	Output
0	0	1	0	0	0	0	0	1
1	0	0	1	0	1	1	0	0
0	1	0	0	1	1	0	1	0
1	1	0	1	1	0	1	1	1

$$\overline{A \cdot B} = \overline{A} + \overline{B}$$

ON.
CN.

A	B	A · B	$\overline{A \cdot B}$		A	B	$\overline{A} + \overline{B}$
0	0	0	1		0	0	1
0	1	0	1		0	1	1
1	0	0	1		1	0	1
1	1	1	0		1	1	0

↑
EQUAL
↑

Conclusion