LOGIC GATES

- A logic gate is a device that acts as a building block for digital circuits . They perform basic logical functions that are fundamental to digital circuits. In a circuit, logic gates will make decisions based on a combination of digital signals coming from its inputs .

TYPES OF LOGIC GATES

There are Three types of basic Logic Gates

- **OR Gate**
- **AND Gate**
- **NOT Gate**

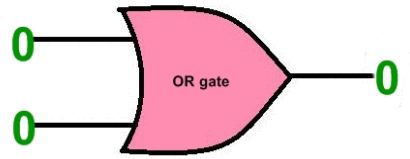
OR GATE

The OR gate is a digital logic that implements logical disjunction. An OR gate produces a high output when any one of the input is high .It produces a low output when all the inputs are low. (X=A+B)

2 Input OR gate Truth Table

INPUTS		OUTPUTS
A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

Symbol :



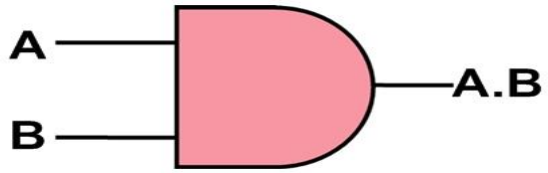
AND GATE

- It will produce a high output when all the inputs are high otherwise the output is low . (X=A.B)

Truth Table of 2 input AND gate

Inputs		Outputs
A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

Symbol :



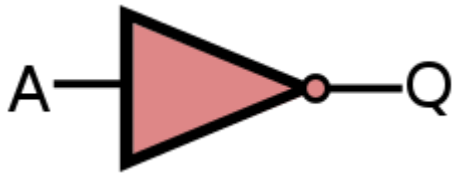
NOT GATE

It produces high output when the input is low and vice versa. The NOT gate is also called as an inverter. (Q=A’)

Truth Table

Input	Output
A	Y
0	1
1	0

Symbol :



Universal Gates

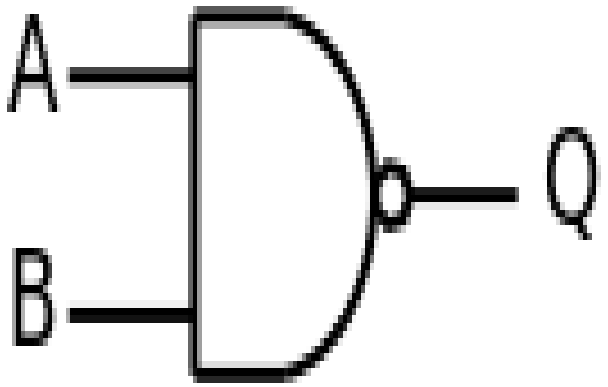
- A universal gate is a gate which can implement any Boolean function without need to use any other gate type.

Types of Universal Gate

- **NAND Gate**
- **NOR Gate**

NAND GATE

NAND gate is AND gate followed by NOT gate. (Q=(A.B)')



NAND Gate

A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

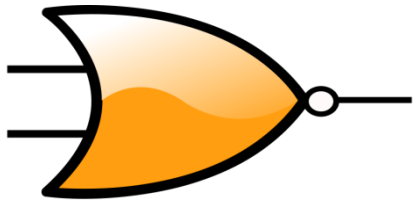
NOR GATE

NOR gate is OR gate followed by NOT gate. (X=(A+B)')

2 input NOR gate truth table

INPUTS		OUTPUTS
A	B	X
0	0	1
0	1	0
1	0	0
1	1	0

Symbol :



Exclusive-OR Gate

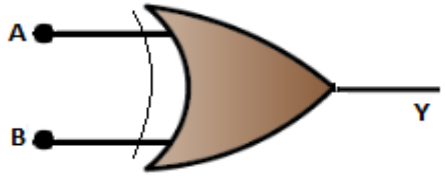
When both inputs are same, it gives low output.

Output Equation $Y = (A \oplus B) = A'.B + A.B'$

Truth Table

INPUTS		OUTPUT
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

Symbol -



Exclusive-NOR Gate

The Ex NOR gate gives high output when all the inputs are at same logic level.

Truth Table

INPUTS		OUTPUT
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

Symbol -