

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
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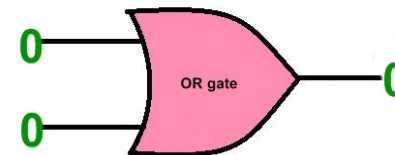
OR GATE

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 :



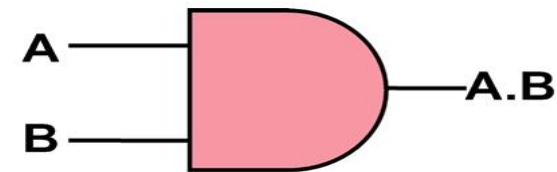
AND GATE

- ▶ 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 :



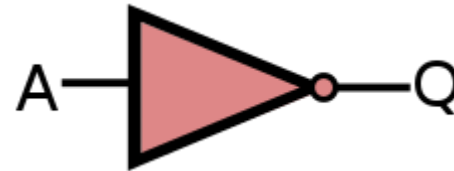
NOT GATE

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

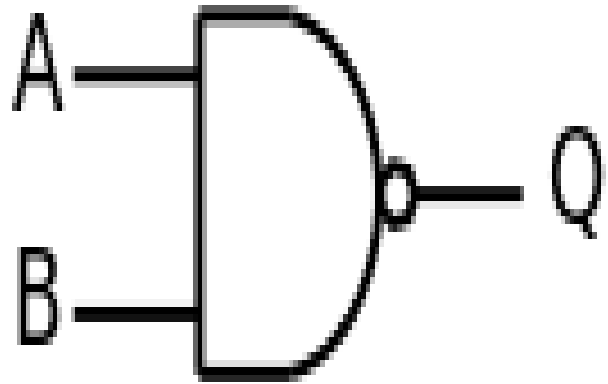
- ▶ A universal gate is a gate which can implement any Boolean function without need to use any other gate type.

Types of Universal Gate

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

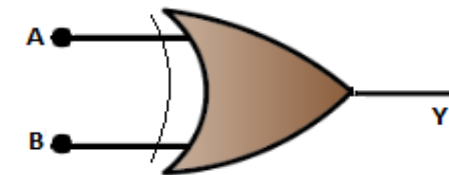
When both inputs are same, it gives low output.

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 -

