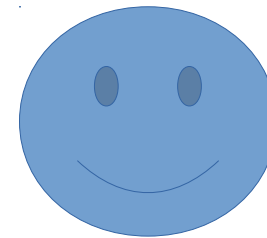
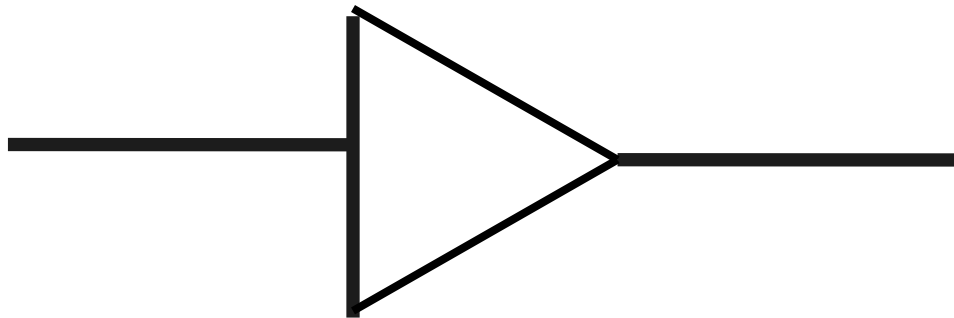


LOGIC GATES

Subject Name – Digital Electronics

Subject Code – BPHY-601

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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

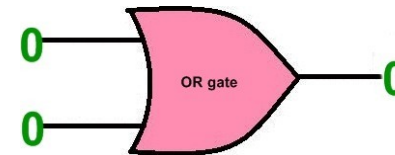
The OR gate is a digital logic that implements logical disjunction. An OR gate produces a high output when any one of the input is high. It produces a low output when all the inputs are low.

$$(X=A+B)$$

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

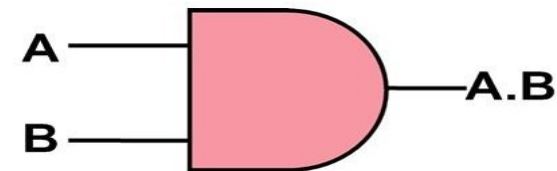
It will produce a high output when all the inputs are high otherwise the output is low.

$$(X=A.B)$$

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

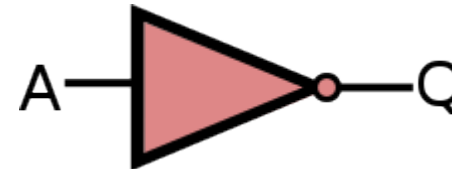
It produces high output when the input is low and vice versa. The NOT gate is also called as an inverter.

$(Q=A')$

Truth Table

Input	Output
A	Y
0	1
1	0

Symbol :



Universal Gates

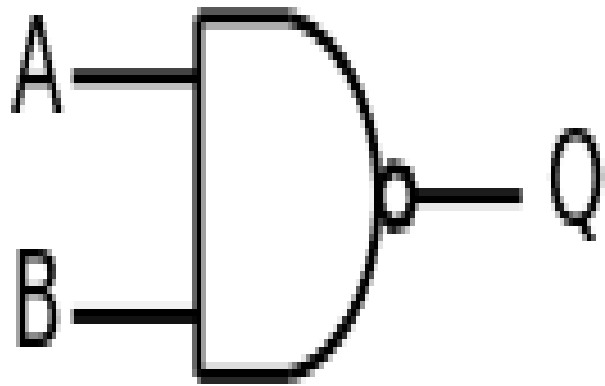
A universal gate is a gate which can implement any Boolean function without need to use any other gate type.

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.

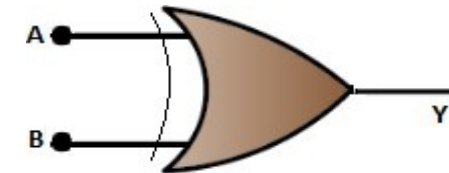
Output Equation

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

Truth Table

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

Symbol -



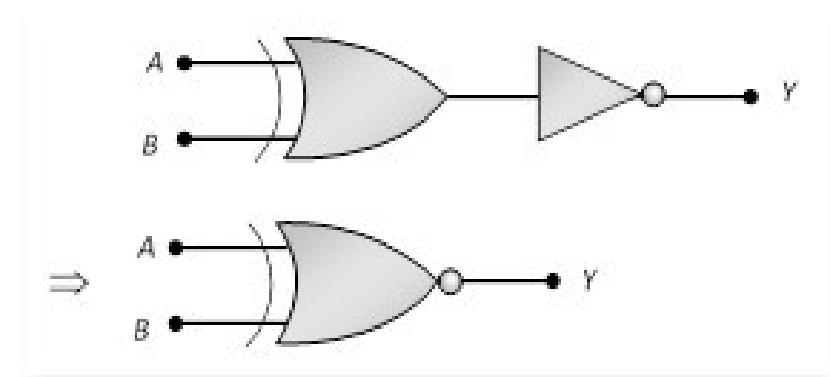
Exclusive-NOR Gate

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-



Thank you

