SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

19ECB231 – DIGITAL ELECTRONICS

II YEAR/ III SEMESTER

UNIT 1 – **MINIMIZATION TECHNIQUES AND LOGIC GATES**

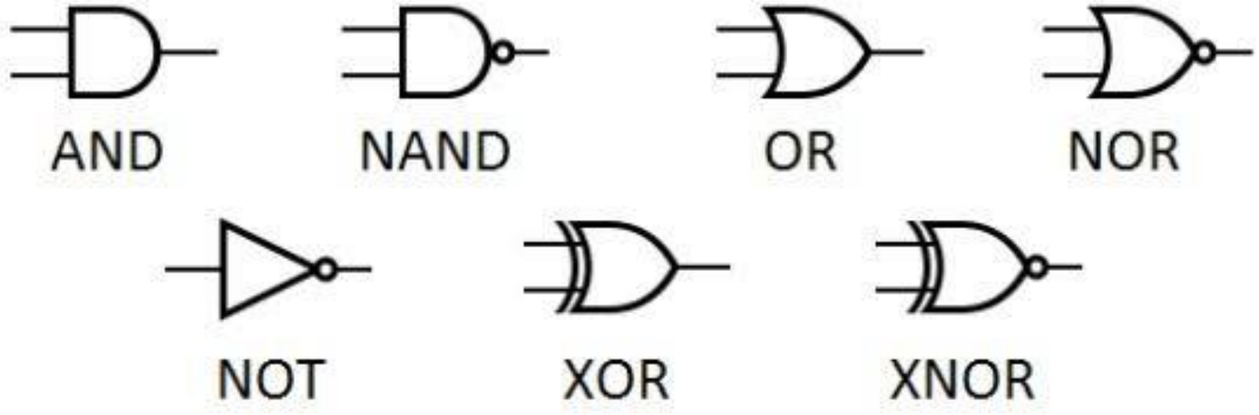
TOPIC –LOGIC GATES

LOGIC GATES

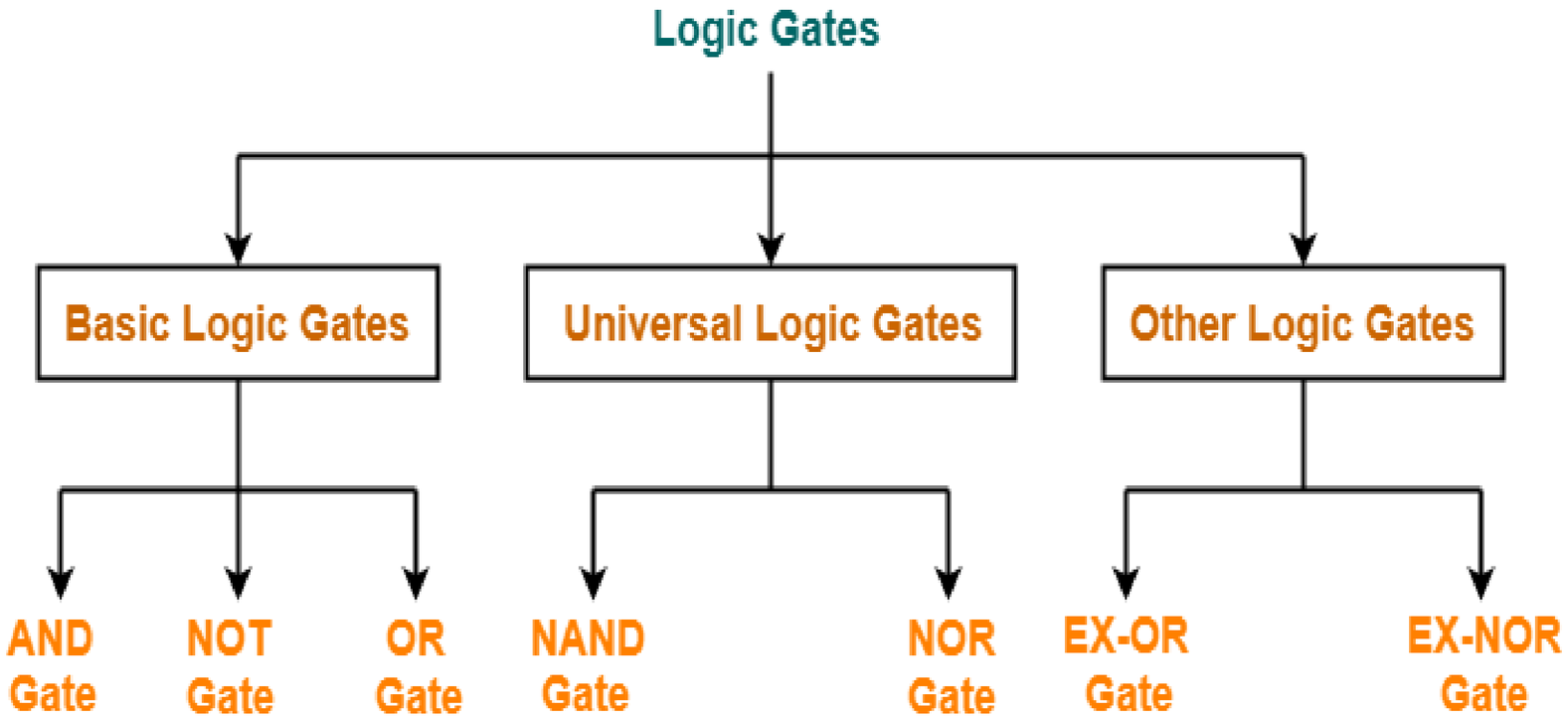
- AND
- OR
- NOT
- NAND
- NOR
- XOR
- XNOR

WHAT IS LOGIC GATE?

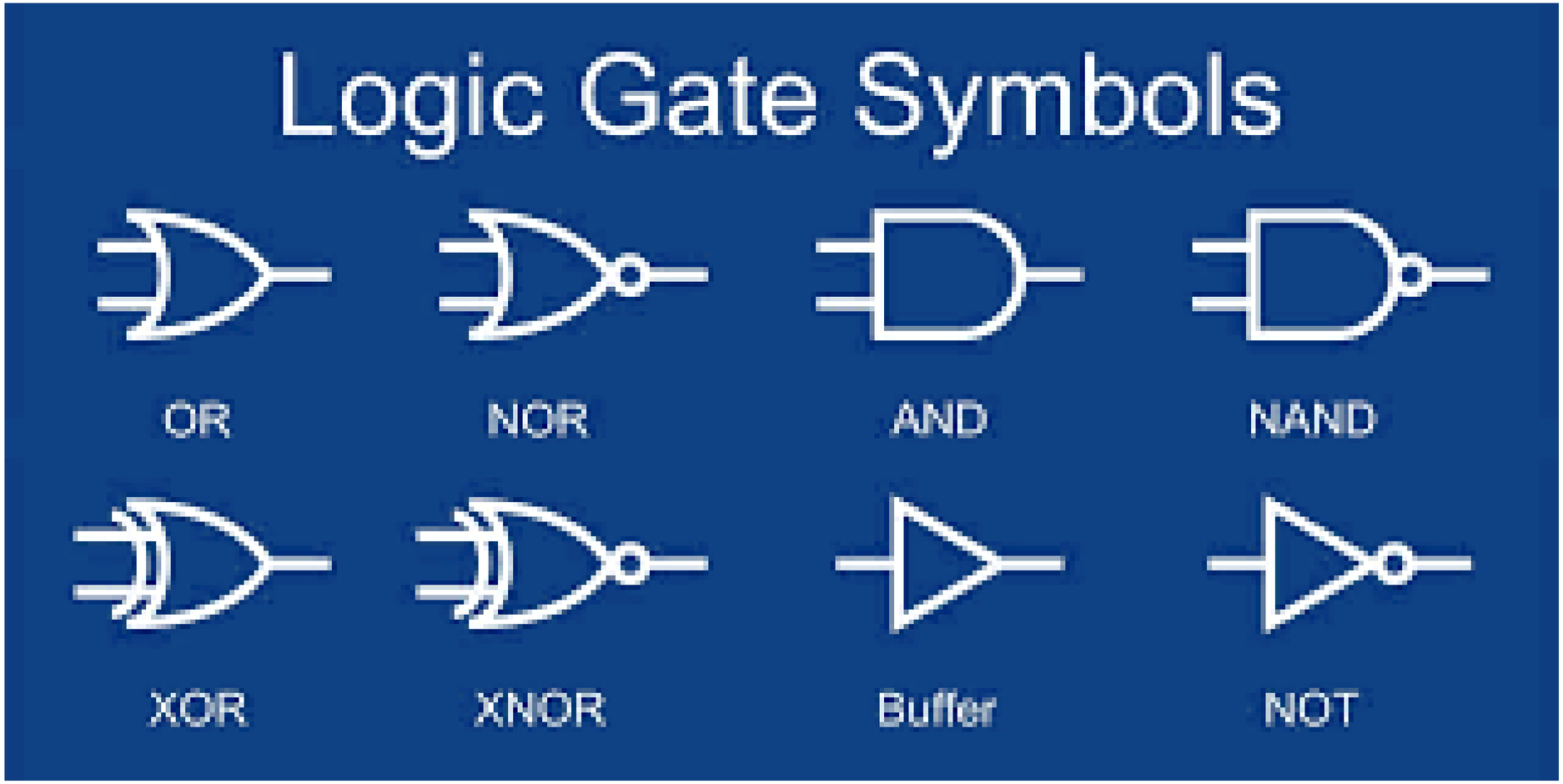
- A Logic Gate is an idealized or physical electronic device implementing a boolean function, a logical operation performed on one or more binary inputs that produce a single binary output.



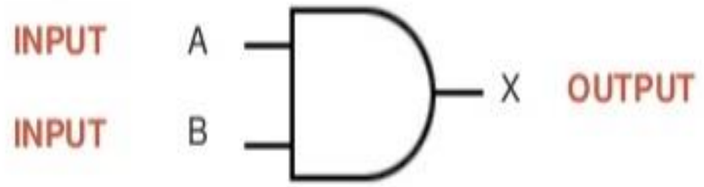
CLASSIFICATION OF LOGIC GATES



LOGIC GATE-SYMBOLS



AND GATE



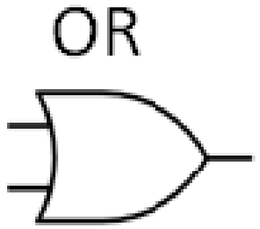
The output will be positive (true) when both inputs (the input one AND the input two) are positive (true).

X = A AND B

AND

INPUT		OUTPUT
A	B	
0	0	0
1	0	0
0	1	0
1	1	1

OR GATE



INPUT		OUTPUT
A	B	
0	0	0
1	0	1
0	1	1
1	1	1

In Boolean Algebra the OR function is the equivalent of addition so its output state represents the addition of its inputs.

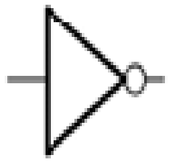
In Boolean Algebra the OR function is represented by a “plus” sign (+) so for a two input OR gate the Boolean equation is given as:

Q = A+B,

that is Q equals either A OR B.

NOT GATE

NOT



INPUT	OUTPUT
A	
0	1
1	0

The NOT function is not a decision making logic gate like the AND, or OR gates, but instead is used to invert or complement a digital signal. In other words, its output state will always be the opposite of its input state.

NAND GATE

NAND

INPUT		OUTPUT
A	B	
0	0	1
1	0	1
0	1	1
1	1	0

The NAND function is the Inverse of AND gate

NOR GATE

NOR

INPUT		OUTPUT
A	B	
0	0	1
1	0	0
0	1	0
1	1	0

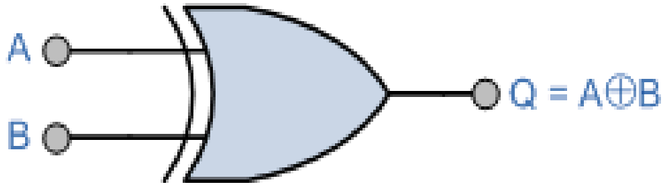
The NOR function is the Inverse of OR gate

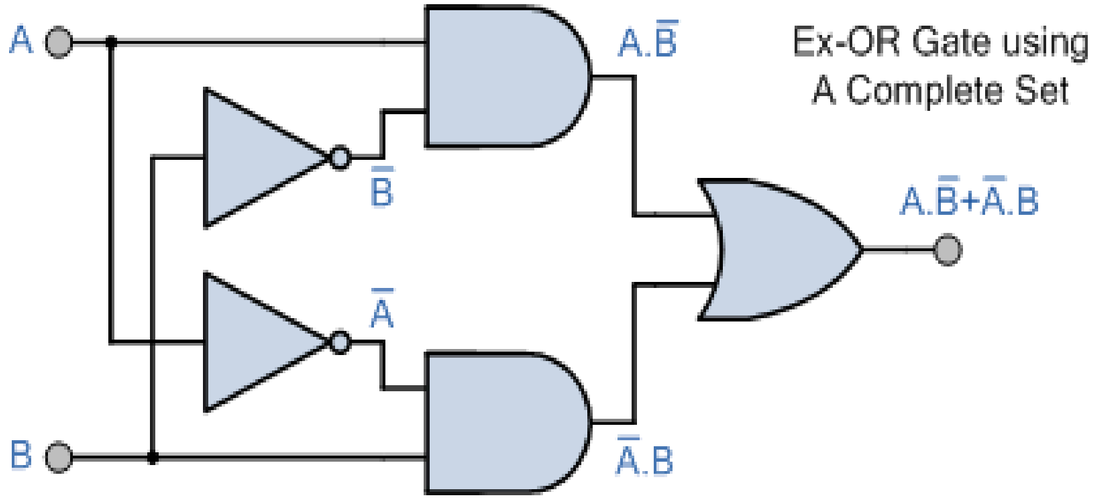
EX-OR GATE

XOR

INPUT		OUTPUT
A	B	
0	0	0
1	0	1
0	1	1
1	1	0

Exclusive-OR Symbol





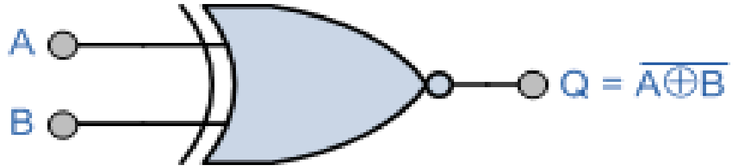
Ex-OR Gate using
A Complete Set

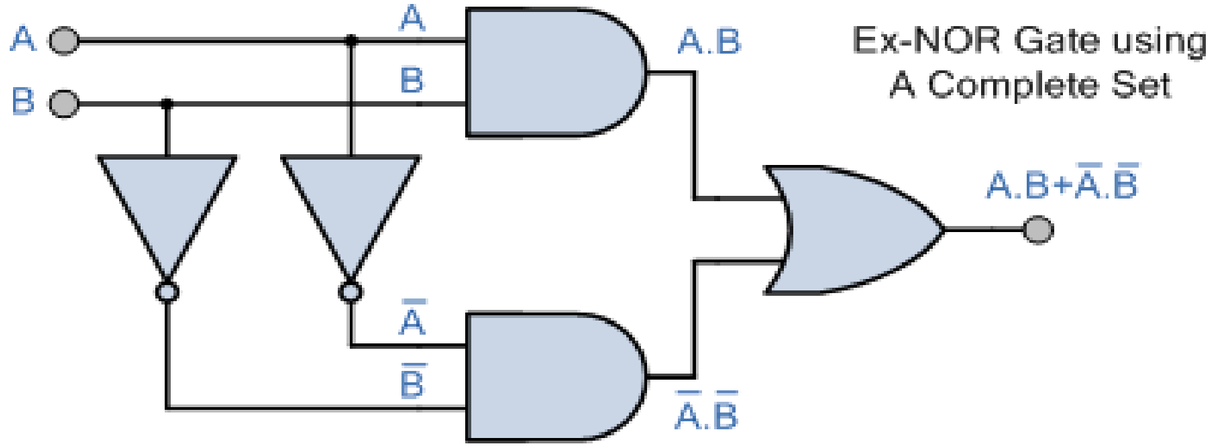
EX-NOR GATE

XNOR

INPUT		OUTPUT
A	B	
0	0	1
1	0	0
0	1	0
1	1	1

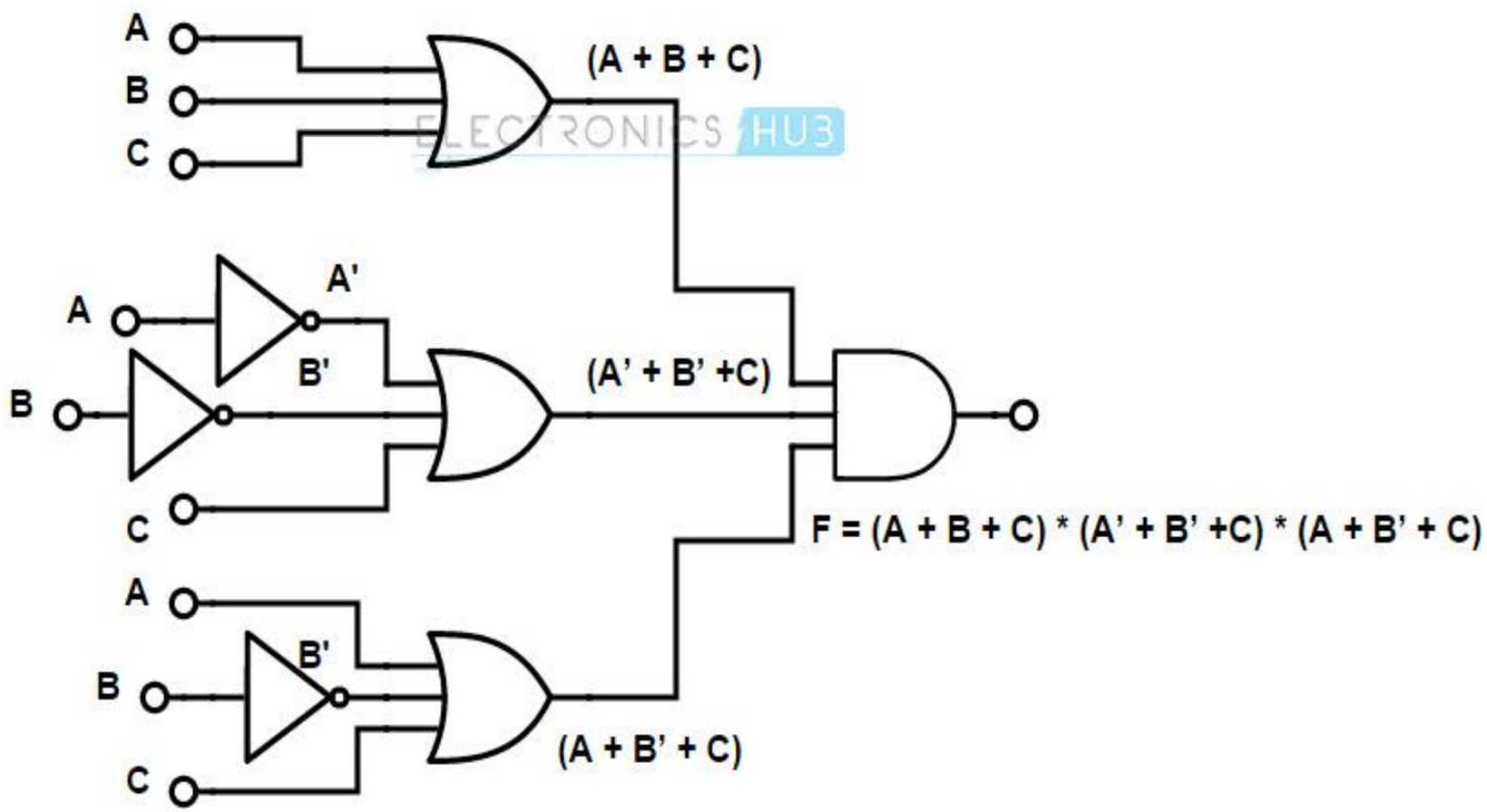
Exclusive-NOR Symbol





Ex-NOR Gate using A Complete Set

BOOLEAN EXPRESSION USING LOGIC GATES



ASSESSMENTS

1.What are universal gates?Why it is called so?

2.Draw the symbols and truth tablr of NOT gate and AND gate?

3.Draw the symbols of EXOR gate and explain its truth table.

THANK YOU