FUNDAMENTALS OF DIGITALELECTRONICS - LOGIC GATES

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Subject :Digital Electronics

Logic Circuits

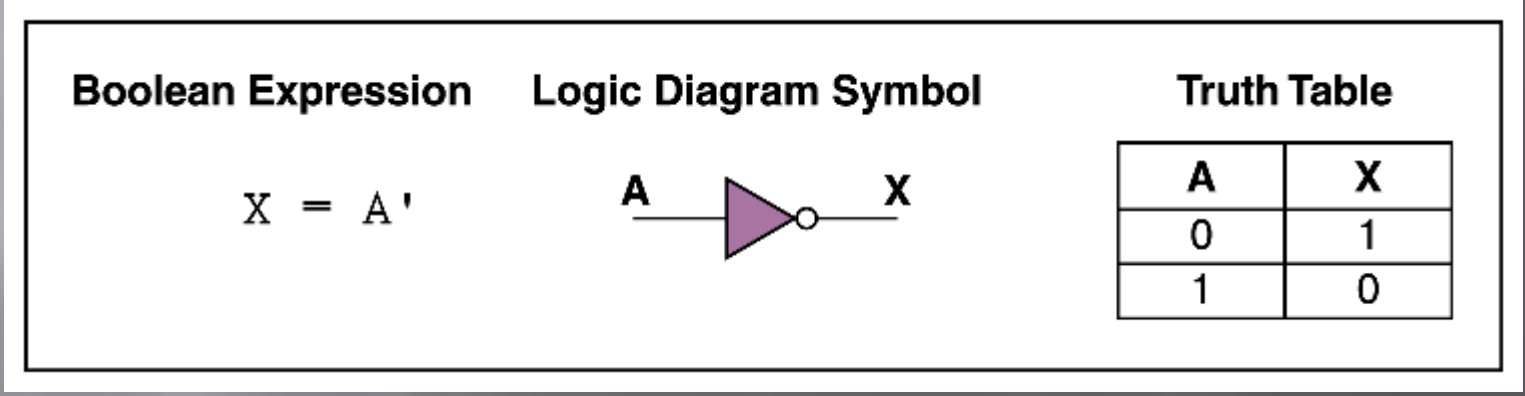
- Gate
  - A device that performs a basic operation on electrical signals
- Circuits
  - Gates combined to perform more complicated tasks

Types of gates

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

NOT Gate

- A NOT gate accepts one input signal (0 or 1) and returns the opposite signal as output



A	X
0	1
1	0

Fig: Representations of a NOT gate

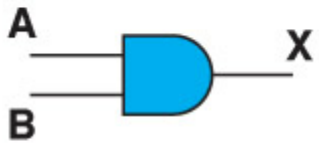
AND Gate

- An AND gate accepts two input signals
- If both are 1, the output is 1; otherwise , the output is 0

Boolean Expression

$X = A \cdot B$

Logic Diagram Symbol



Truth Table

A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

Fig: Representation of an AND gate

OR Gate

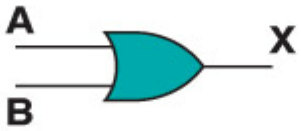
- An OR gate accepts two input signals

If both are 0, the output is 0; otherwise, the output is 1

Boolean Expression

$$X = A + B$$

Logic Diagram Symbol



Truth Table

A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

Fig:Representation of a OR gate

XOR Gate

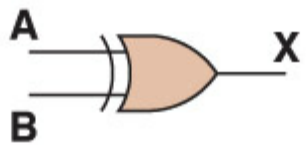
- An XOR gate accepts two input signals

If both are the same, the output is 0; otherwise, the output is 1

Boolean Expression

$X = A \oplus B$

Logic Diagram Symbol



Truth Table

A	B	X
0	0	0
0	1	1
1	0	1
1	1	0

Fig:Representation of an XOR gate

NAND Gate

- The NAND gate accepts two input signals

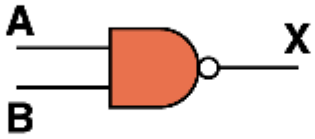
If both are 1, the output is 0; otherwise,

the output is 1

Boolean Expression

$X = (A \cdot B)'$

Logic Diagram Symbol



Truth Table

A	B	X
0	0	1
0	1	1
1	0	1
1	1	0

Fig: Representation of a NAND gate

NOR Gate

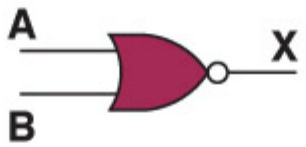
- The NOR gate accepts two input signals

If both are 0, the output the output is 0

Boolean Expression

$$X = (A + B)'$$

Logic Diagram Symbol



Truth Table

A	B	X
0	0	1
0	1	0
1	0	0
1	1	0

Fig: Representation of a NOR gate

Thankyou