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ASSIGNMENT NO - 3

Title :
Study of different gates (AND, OR, NOT), sensors and basic Binary operations

Objective :
To study different gates, sensors and basic operations such as addition, substraction etc

Hardware Requirement :
Logic Gates, Sensors etc

Software Requirement :
Raspbian OS

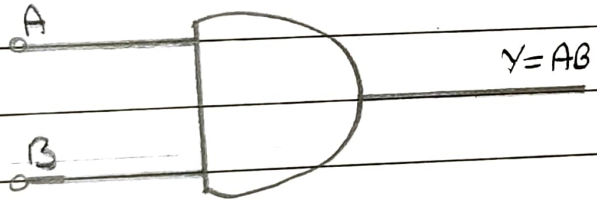
Theory :
Logic gates are an important concept if you are studing electronics. These are important digital devices that are mainly based on the Boolean function. Logic gates are used to carry out logic operations on single or multiple binary ~~output~~ inputs and gave one binary output.

Types of Basic logic Gates :
There are several basic logic gates and used in performing operations in digital

The Boolean expression of AND Gate is $Y = A \cdot B$
truth table of a two-input AND Gate is given as:

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

Symbol of AND Gate:



NOT Gate:
In NOT Gate the output of NOT gate attain state if and only if the input data does not attain the state

The Boolean expression of NOT gate is $Y = \bar{A}$

Truth table of NOT gate is given as:

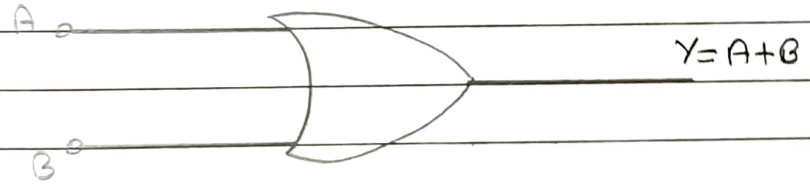
A	Y
0	1
1	0

The Boolean operation of OR gate is Y = A+B, read as Y equals A 'OR' B.

- The truth table of a two-input OR basic gate is given as:

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

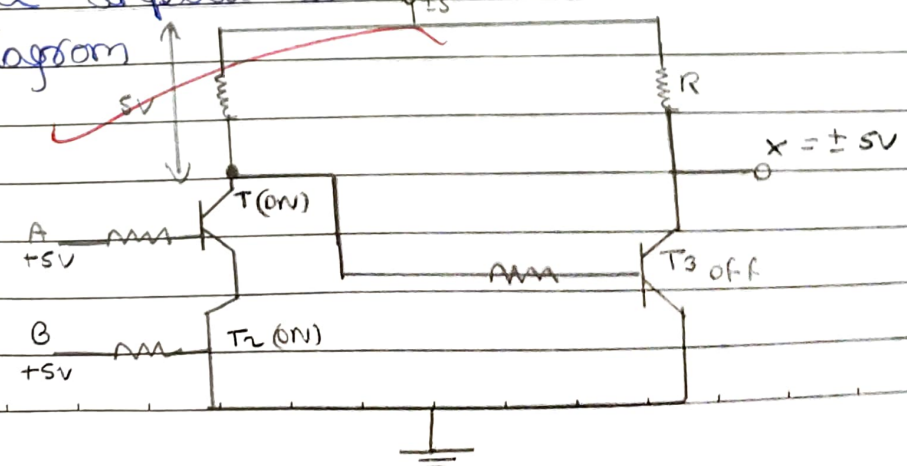
OR gate Symbol :-



2) AND Gate:

In AND gate the output of an AND gate attains state if and only if all the inputs are in state.

- Circuit Diagram

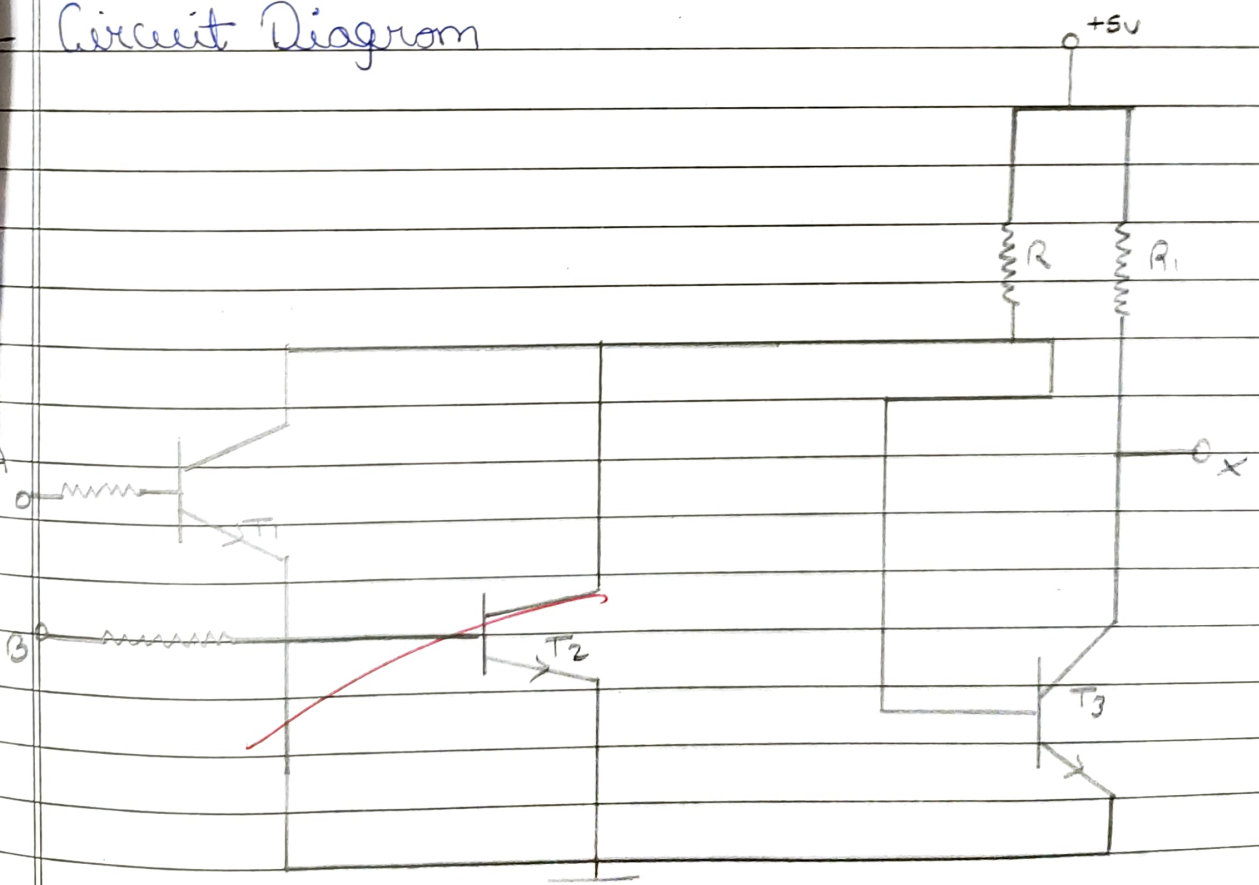


systems. The common ones are :-

- OR Gate
- AND Gate
- NOT Gate
- XOR Gate

OR Gate :
In OR gate the output of on OR gate attain the 1 if one are more inputs attain the state.

Circuit Diagram



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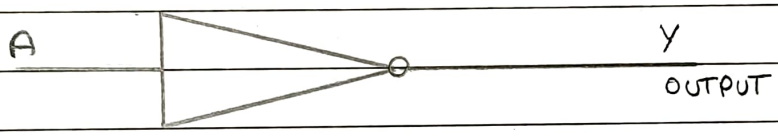
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

Symbol of NOT Gate



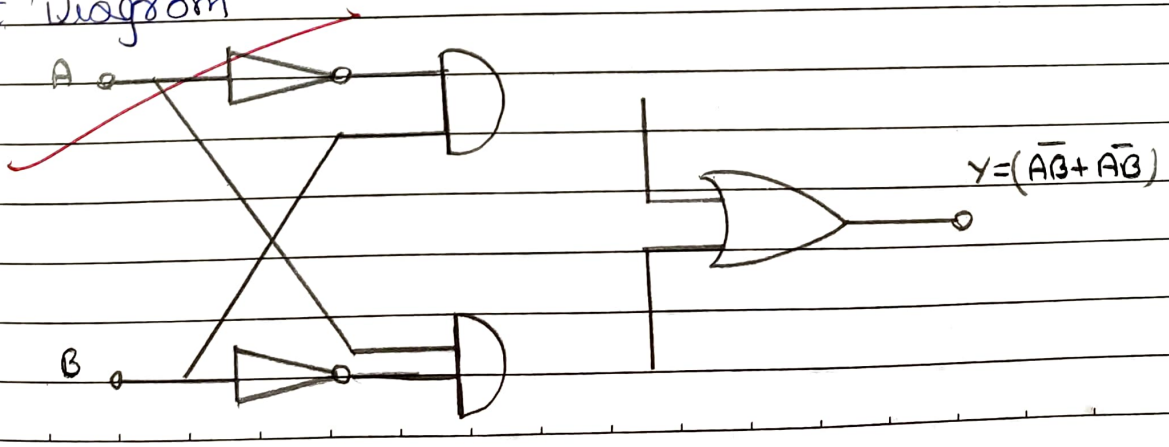
XOR Gate :

In XOR gate the input of two-input XOR gate attains the state if and only if one adds only input attains the state

Expression is given as : ~~$\bar{A} \cdot \bar{B} + A$~~

$(A + B) \cdot (\bar{A} + \bar{B})$ OR $Y = A \oplus B$

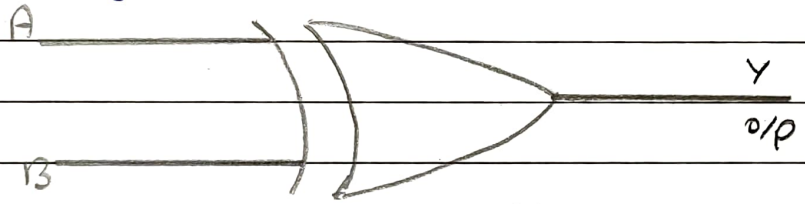
Circuit Diagram



The truth table of an XOR gate is

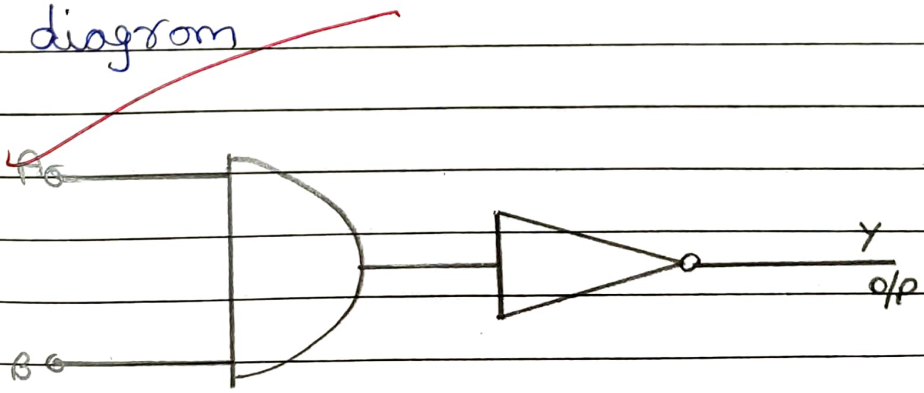
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

- XOR Gate symbol:



NAND Gate :
NAND Gate is the combination of AND and NOT Gate
The Boolean expression of NAND gate is
$Y = \bar{A} \cdot \bar{B}$

- Circuit diagram



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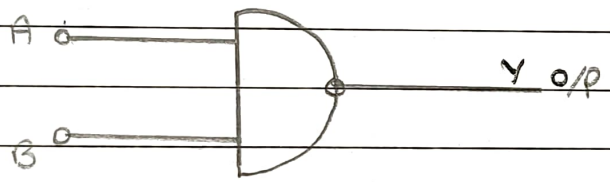
Truth table of NAND gate

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

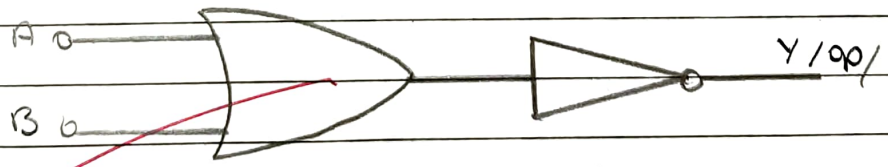
NAND Gate Symbol



NOR Gate :

NOR Gate is the combination of OR and NOT gate

Circuit Diagram



Truth table of NOR Gate

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0