Experiment No. 1

Aim : Implementation of Boolean expression using AND / OR / NOT gates.

Theory :

① AND gate :

1) An AND gate is a logic gate having two or more inputs and a single output.

2) An AND gate operates on logical multiplication rules.

3) In this gate, if either of the input is low (0), then the output is also low.

4) If all of the inputs are high (1), then the output will also be high.

5) A dot (·) is used to show the AND operation i.e. A·B or can be written as AB.

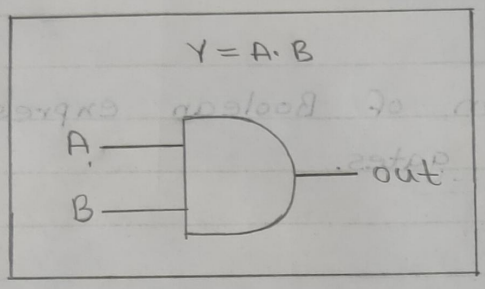


Figure 1: Logic symbol of AND gate

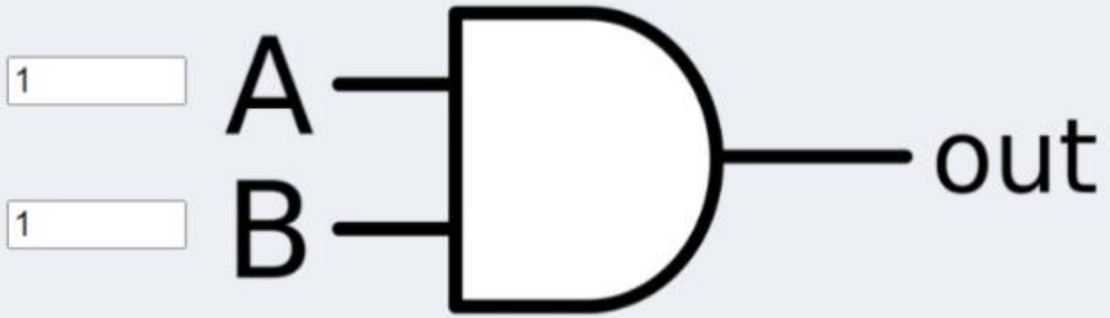
Input		Output
A	B	Y = A · B
0	0	0
0	1	0
1	0	0
1	1	1

figure 2: Truth table of AND gate

INSTRUCTIONS

S1-07-SND

Verification of truth table for AND gate



TRUTH TABLE Print

Serial No.	A	B	Output	Remarks
1	0	0	0	Correct
2	0	1	0	Correct
3	1	0	0	Correct
4	1	1	1	Correct

Reset

(2) OR Gate :-

1) An OR gate is a logic gate that performs logical OR operation.

2) A logical OR operation has a high input (1) if one or both the inputs to the gate are high (1).

3) If neither input is high, a low output (0) results.

4) A plus (+) is used to show the OR operation.

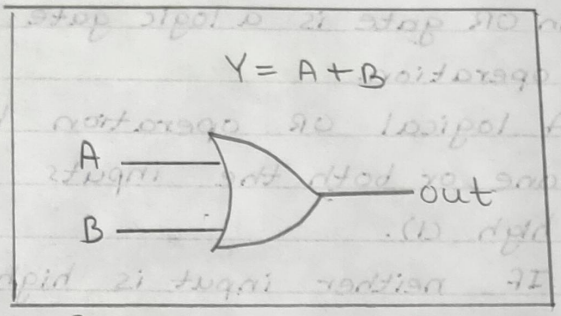


Figure 3: Logic symbol of OR gate

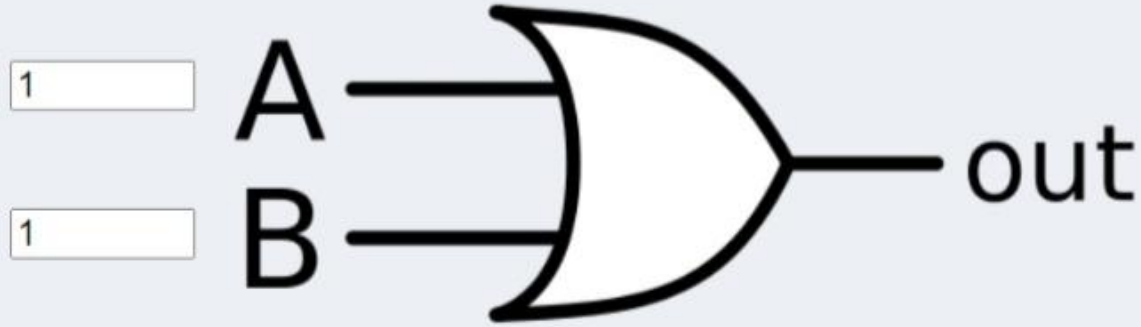
Input		Output
A	B	Y = A + B
0	0	0
0	1	1
1	0	1
1	1	1

Figure 4: Truth Table of OR gate

INSTRUCTIONS

S1-07-SND

Verification of truth table for OR gate



TRUTH TABLE Print

Serial No.	A	B	Output	Remarks
1	0	0	0	Correct
2	0	1	1	Correct
3	1	0	1	Correct
4	1	1	1	Correct

Reset

Date : / / 20

③ NOT gate :

1) The NOT gate is an electronic circuit that produces an inverted version of the input at its output.

2) It is also known as inverter.

3) If the input variable is A, the inverted output is known as NOT A.

4) This is also known as A' or A with a bar over the top, as shown in the outputs.

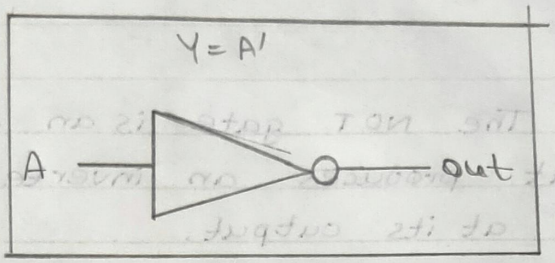


Figure 5 : logic symbol of NOT gate

Input	Output
A	Y
0	1
1	0

Figure 6 : Truth table of NOT gate

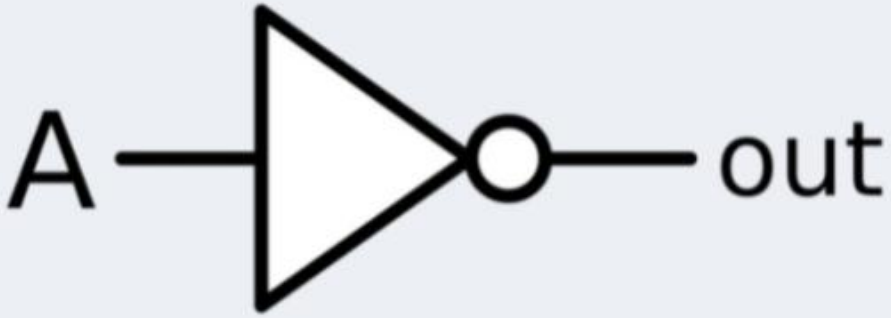
Conclusion :- Now we can implement the Boolean expression using AND, OR, NOT gate.

INSTRUCTIONS

S1-07-SND

Verification of truth table for NOT gate

1



0

Check

TRUTH TABLE

Print

Serial No.	A	Output	Remarks
1	0	1	Correct
2	1	0	Correct

Reset

Date : / / 20

Q. Implementation of Boolean expression using AND|OR| NOT for

$F(x,y,z) = x'y'z + x(y'+z) + xyz'$

Soln.

$F = xy'z + x'y'z + xyz$

$= y'z + xyz$

$= (y'+xy)z$

$= (y'+x)(y'+y)z$

$= y'z + xz$

Truth table :

x	y	z	y'	y'z	xz	y'z+xz
T	T	T	F	F	T	T
T	T	F	F	F	F	F
T	F	T	T	T	T	T
T	F	F	T	F	F	F
F	T	T	F	F	F	F
F	T	F	F	F	F	F
F	F	T	T	T	F	T
F	F	F	T	F	F	F

Diagram :