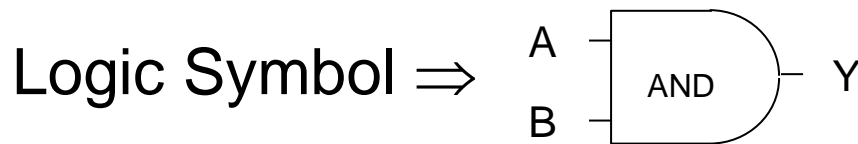


Logic Gates

AND Function

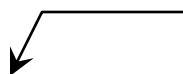
Text Description \Rightarrow Output Y is TRUE if inputs A AND B are TRUE, else it is FALSE.



Truth Table \Rightarrow

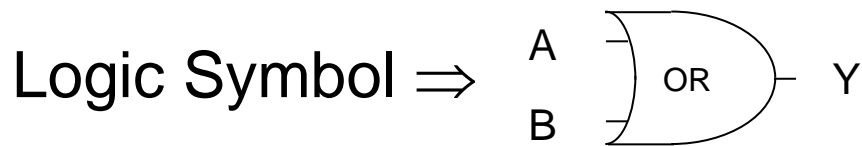
INPUTS		OUTPUT
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1
AND Gate Truth Table		

Boolean Expression \Rightarrow $Y = A \times B = A \cdot B = AB$

 AND Symbol

OR Function

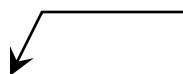
Text Description \Rightarrow Output Y is TRUE if input A OR B is TRUE, else it is FALSE.



Truth Table \Rightarrow

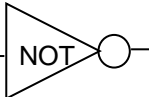
INPUTS		OUTPUT
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1
OR Gate Truth Table		

Boolean Expression $\Rightarrow Y = A + B$

 OR Symbol

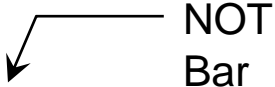
NOT Function (inverter)

Text Description \Rightarrow Output Y is TRUE if input A is FALSE, else it is FALSE. Y is the inverse of A.

Logic Symbol \Rightarrow A  Y

Truth Table \Rightarrow

INPUT A	OUTPUT Y
0	1
1	0
NOT Gate Truth Table	

Boolean Expression \Rightarrow $Y = \overline{A}$ 

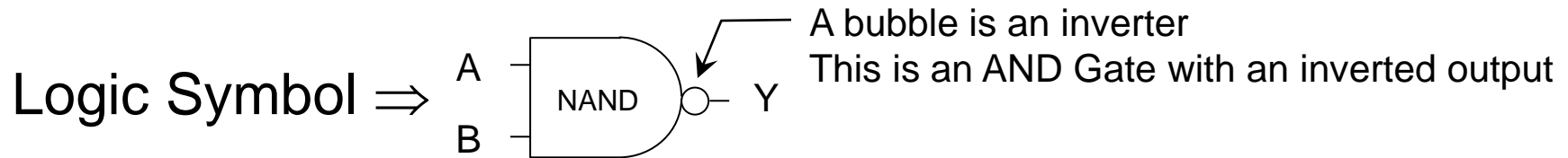
Alternative Notation

$$Y = A'$$

$$Y = !A$$

NAND Function

Text Description \Rightarrow Output Y is FALSE if inputs A AND B are TRUE, else it is TRUE.



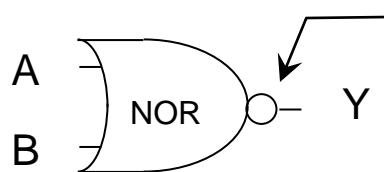
Truth Table \Rightarrow

INPUTS		OUTPUT
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0
NAND Gate Truth Table		

Boolean Expression $\Rightarrow Y = \overline{A \times B} = \overline{AB}$

NOR Function

Text Description \Rightarrow Output Y is FALSE if input A OR B is TRUE, else it is TRUE.

Logic Symbol \Rightarrow  A bubble is an inverter.
This is an OR Gate with its output inverted.

Truth Table \Rightarrow

INPUTS		OUTPUT
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0
NOR Gate Truth Table		

Boolean Expression $\Rightarrow Y = \overline{A + B}$



Example 1

$$Y = (A+B).(A.B)$$

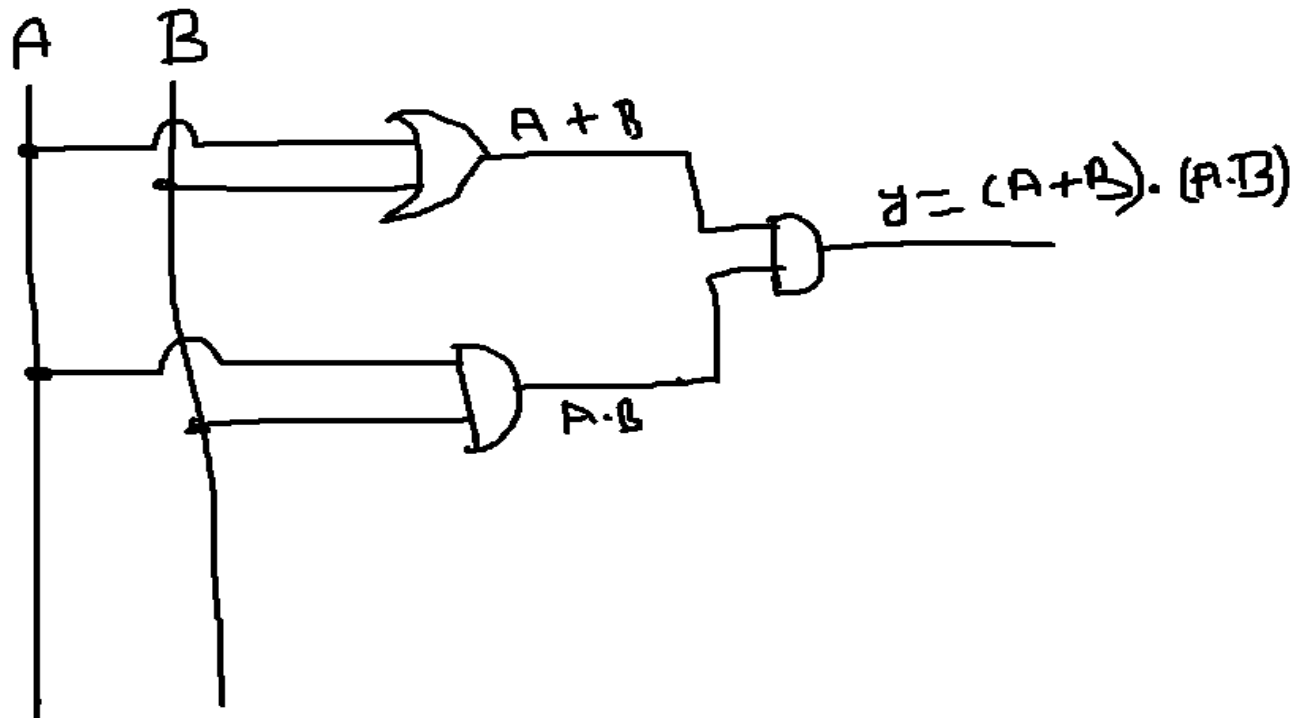
Truth Table:

A	B	A+B	A.B	(A+B). (A.B)
0	0	0	0	0
0	1	1	0	0
1	0	1	0	0
1	1	1	1	1

Example 1

$$Y = (A+B).(A.B)$$

Circuit Diagram:





Example 2

$$Y = \overline{(A+B)+(A.B)}$$

Truth Table:

A	B	A+B	A.B	(A+B)+(A.B)	$\overline{(A+B)+(A.B)}$
0	0	0	0	0	1
0	1	1	0	1	0
1	0	1	0	1	0
1	1	1	1	1	0

Example 1

$$Y = \overline{(A+B)} + (A \cdot B)$$

Circuit Diagram:

