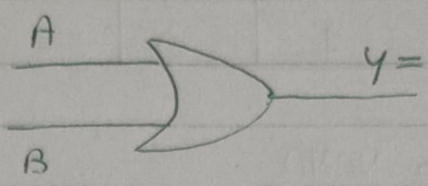
Logic Gates

→ a digital circuit following boolean algebraic expressions.

I OR Gate

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



II AND Gate

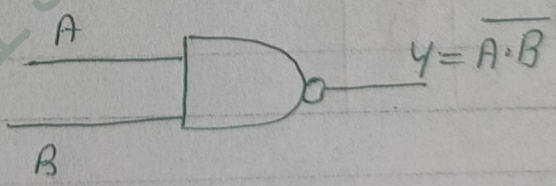
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

III NOT Gate

A	Y
0	1
1	0

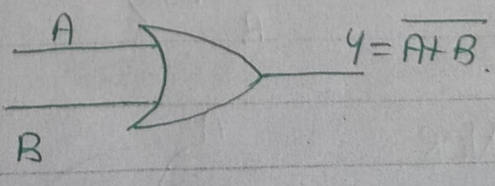
NAND (AND + NOT)

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



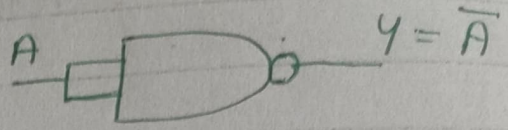
V NOR Gate (OR + NOT)

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



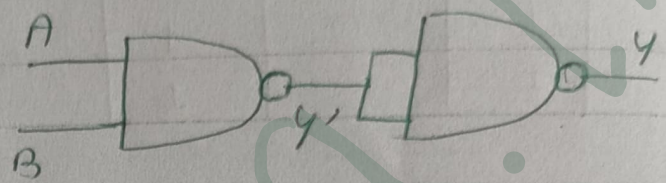
VI NOT from NAND

A	B = (A)	Y
0	0	1
1	1	0



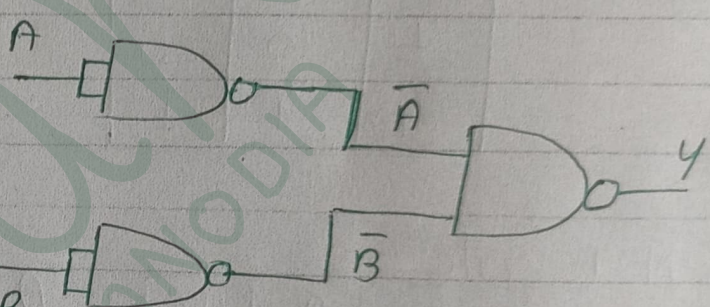
VII AND from NAND

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



VIII OR from NAND

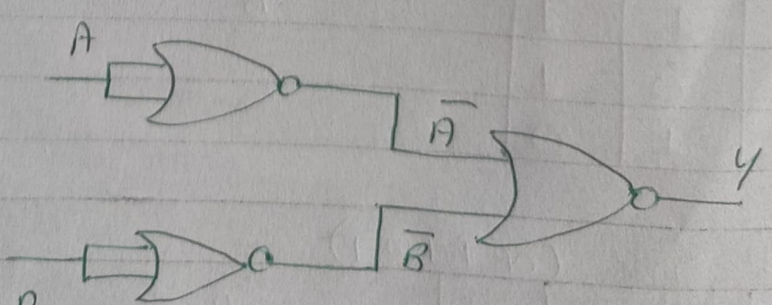
A	B	$\bar{A}$	$\bar{B}$	Y
0	0	1	1	0
0	1	1	0	1
1	0	0	1	1
1	1	0	0	1



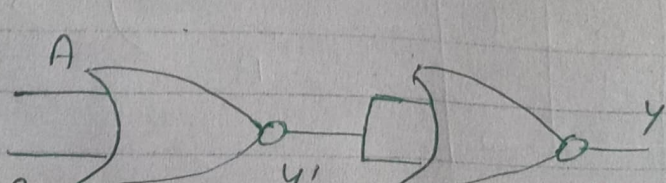
IX NOT from NOR

A	B = (A)	Y
0	0	1
1	1	0

X AND from NOR



XI OR from NOR



Boolean Algebra

OR	AND	NOT
$A+0=A$	$A\cdot 0=0$	$A+\bar{A}=1$
$A+1=1$	$A\cdot 1=A$	$A\cdot\bar{A}=0$
$A+A=A$	$A\cdot A=A$	$\bar{\bar{A}}\cdot A=A$

→ $A+AB=A$

→ $A\cdot(A+B)=A$

→ $A+(\bar{A}B)=A+B$

→ $A\cdot(\bar{A}+B)=A\cdot B$

→ $A+(B\cdot C)=(A+B)\cdot(A+C)$

→ $(\bar{A}+B)\cdot(A+C)=\bar{A}\cdot C+B\cdot A+B\cdot C$

→ **De Morgan's Theorems**

1st Theorem ⇒ $\overline{A+B}=\bar{A}\cdot\bar{B}$

2nd Theorem ⇒ $\overline{A\cdot B}=\bar{A}+\bar{B}$.