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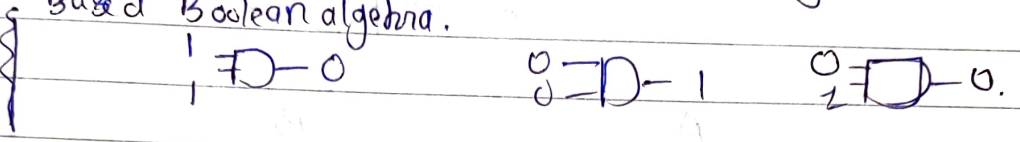
Logic circuit.

An electronic circuit based on some logic and connected b/w input & output, is called logic gate.

Based Boolean algebra.



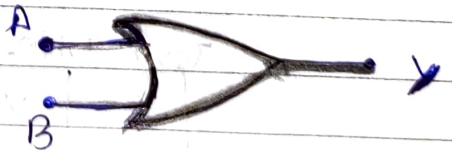
Different names for the two digits. in terms of digital signal.

1	High	up	closed	excited	T	Pulse	ON	Yes
0	low	down	open	unexcited	F	No pulse.	OFF	No

OR operation.	AND operation	NOT operation.
+	.	—
A+B	A·B	$\overline{A}$

OR Gate

two input & one output



Truth table.

A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

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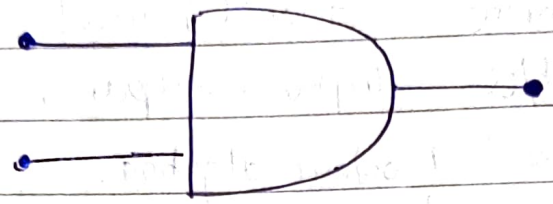
~~AD~~

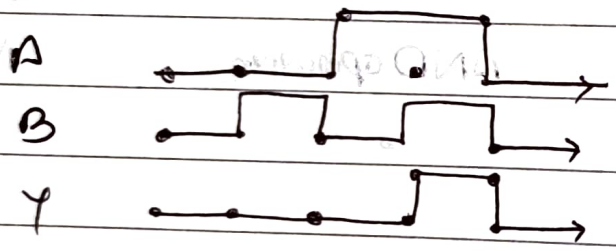
AND GATE: A & B input only one output.



Inters

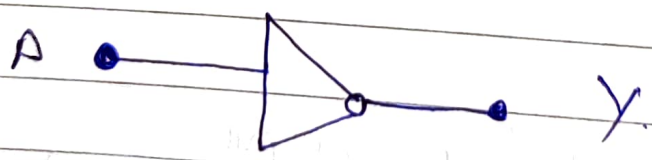
A	B	A.B
0	0	0
1	0	0
0	1	0
1	1	1

ex -



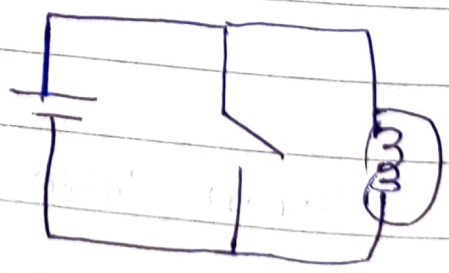
OR gate ~~ex~~

NOT GATE: one input & output.



Truth Table.

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



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Boolean postulates.

P = 0 or 1.

Boolean postulates:

$0 + P = P$

$1 \cdot P = P$ $\qquad 1 \cdot 0 = 0$

$1 + P = 1$

$0 \cdot P = 0$

$P + \bar{P} = 1$.

identity law: $P + P = P$ $\qquad P \cdot P = P$.

negation: $\bar{\bar{P}} = P$

Commutative & Associate:

De Morgan's law

$\overline{A+B} = \bar{A} \cdot \bar{B}$ $\qquad \overline{A \cup B} = A' \cap B'$

$\overline{A \cdot B} = \bar{A} + \bar{B}$ $\qquad (\overline{0+1}) = \bar{0} \cdot \bar{1}$

$= 1 \cdot 0$

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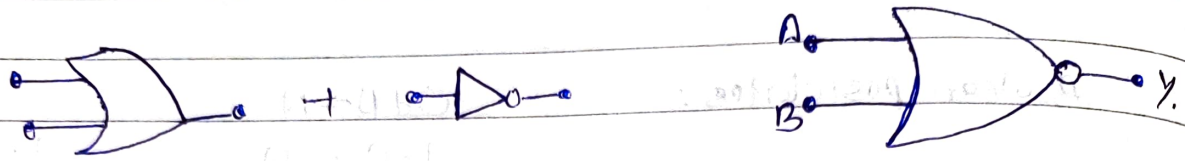
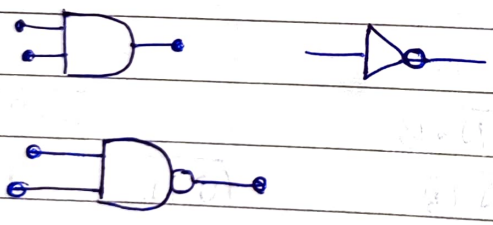
NOR GATE — OR + NOT



$Y = \overline{A+B}$

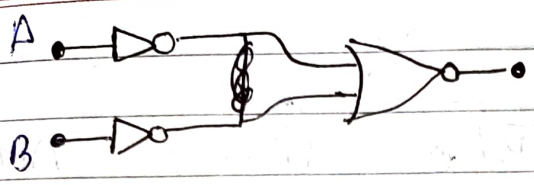
A	B	A+B	$Y = \overline{A+B}$
1	0	1	0
1	1	1	0
0	0	0	1
0	1	1	0

NAND Gate — AND + NOT

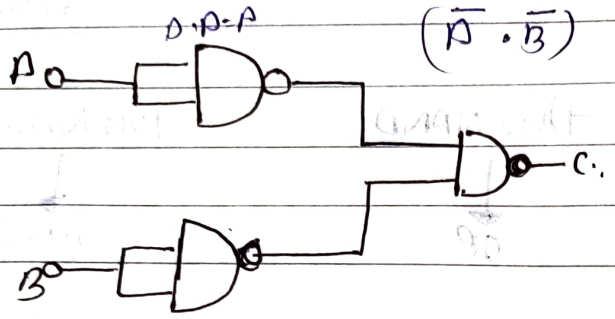


$\overline{A \cdot B}$

A	B	A·B	$Y = \overline{A \cdot B}$
1	1	1	0
1	0	0	1
0	1	0	1
0	0	0	1

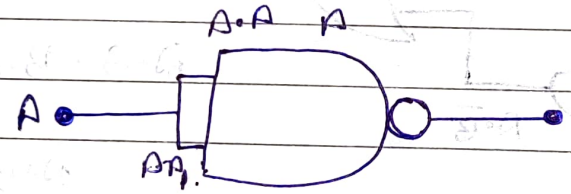
Q 

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

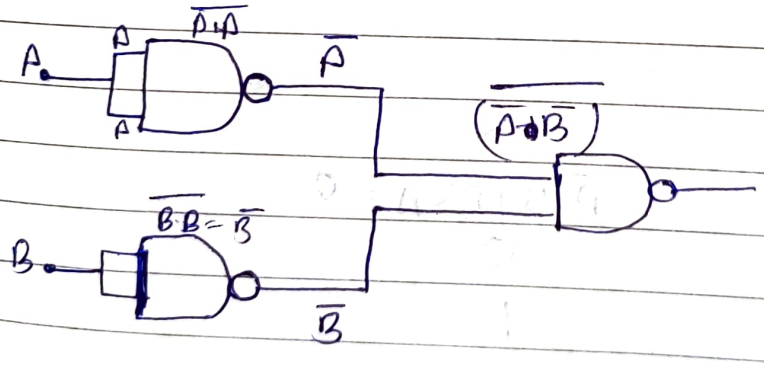
Q 

$(\overline{A \cdot B}) = A+B$ an gate.

Universal GATE : NAND GATE.

- 

$\overline{A}$ NOT Gate.

- 

A+B OR Gate.

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- 

$\left(\overline{A \cdot B} \cdot \overline{A \cdot B}\right) = \overline{A \cdot B}$ ✓ $\left(\overline{A} + \overline{B}\right) = A \cdot B$

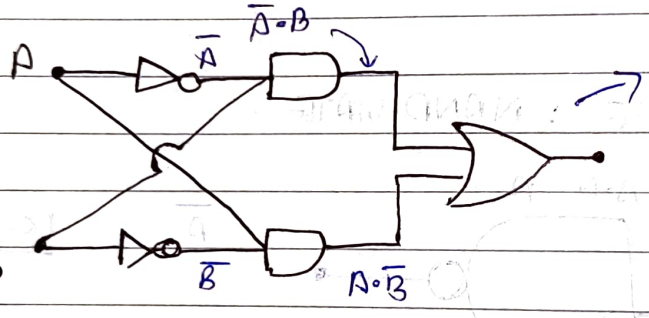
AND GATE

single NAND → NOT

two NAND → AND

thru NAND → OR

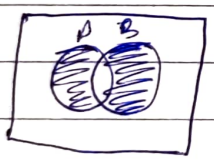
Ex -



→ XOR Gate ही है।

$\overline{A} \cdot B + \overline{B} \cdot A = ?$

$A + B - A \cdot B$



A	B	$\overline{A} \cdot B + \overline{B} \cdot A =$
1	1	0
1	0	1
0	1	1
0	0	0

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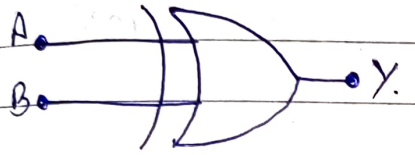
XOR GATE.

From NOT, AND and OR GATE.

known as exclusive OR gate.

Boolean expression: $Y = A \oplus B = \bar{A}B + A\bar{B}$

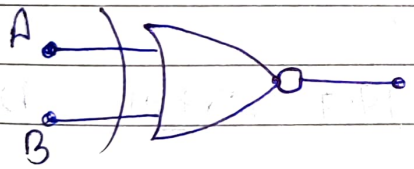


A	B	$Y = A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0.

XNOR.

XOR + NOT → XNOR

exclusive NOR



$Y = A \odot B = \bar{A}\bar{B} + AB.$

A	B	XOR	XNOR
0	0	0	1
1	1	0	1
1	0	1	0
0	1	1	0.