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Sheet No. ①

NAND Gate

The NAND gate is a special type of logic gate. The NAND gate is the universal gate. It means all the basic gates such as AND, OR, NOT gate can be constructed using a NAND gate.

The NAND gate is the combination of the NOT-AND gate.

The output state of the NAND gate will be low only when all the inputs are high. Simply, this gate returns the complement result of the AND gate.

The logic or Boolean expression for the NAND gate is the complement of logical multiplication of input denoted by a full stop or a sink dot as

$$(A \cdot B)' = Y$$

The value of Y will be true when any one of the input is set to 0.

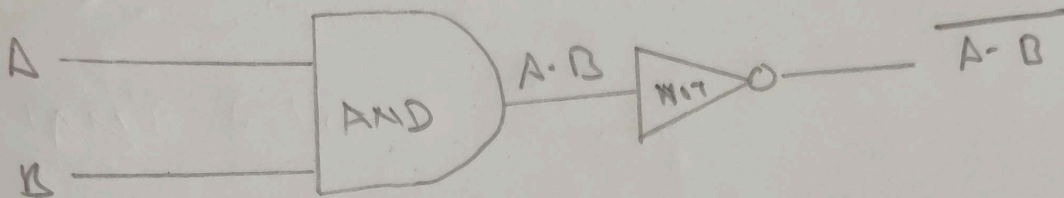
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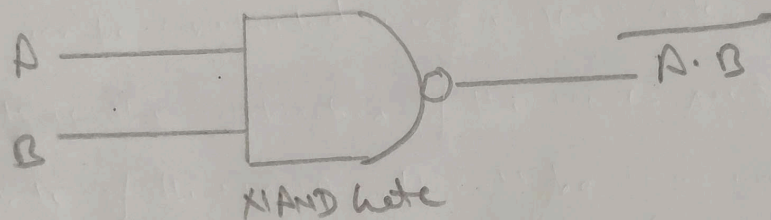
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The basic logical construction of the NAND gate is



The symbol of NAND gate is



Truth Table of 2 input ~~AND~~ NAND gate

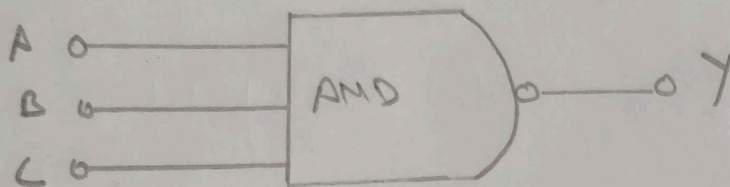
Input		Output
A	B	$Y = \overline{A \cdot B}$
0	0	1
0	1	1
1	0	1
1	1	0

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3 input NAND gate

The Boolean expression of the logic NAND gate is defined as the binary operation dot (\cdot). There are $2^3 = 8$ possible combination of inputs.

Logic Design



Truth Table of 3 input NAND gate

Input			Output
A	B	C	Y
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

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