

Answer 1 A NAND gate is a logic gate that performs the reverse operation of an AND logic gate. It is a blend of AND and NOT gates and is a commonly used logic gate.

The NAND gate has an output that is normally at logic high and only goes to logic low when all of its inputs are at logic high. The logic NAND gate is the ~~reverse~~ reverse or Complementary design of the AND gate.

NAND Gate Truth Table :-

The output of the NAND gate is always logic high / "1" and only goes to logic low / "0" when all the inputs to the NAND gate are at logic 1.

In other words, we can say that the output of the NAND gate always continues true if at least one of its inputs remains false or logic low.

The Boolean expression for a logic NAND gate is represented by a single DOT or full stop symbol (\cdot) followed by a line or overline ($-$) over the expression to imply the NOT or logical negation of the NAND gate.

NAND gate Boolean Expression for 2 inputs:-

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

The logic or Boolean expression of the NAND gate is the logical multiplication of the inputs followed by the complement of the obtained output or the logical addition of the complemented inputs -

Below is the Truth table for the 2 input NAND gate:-

Input		Output
0	0	1
0	1	1
1	0	1
1	1	0

NAND gate Circuit diagram:-

A Simple two-input logic NAND gate can be constructed using transistors connected together as

Shown below with the inputs connected directly to the transistor bases. Either of the transistors must be cut-off for output to be logic high. This means that if both the inputs are at logic high making both the transistors "On" the resultant output is low / "0".

The basic logical construction of
NAND gate:

