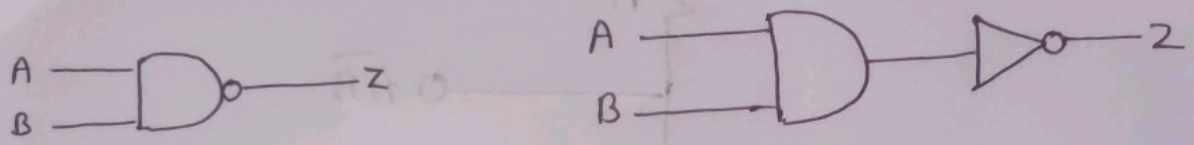
NAND GATE

A NAND Gate is a logical gate which is the opposite of an AND Gate. It is a combination of AND and NOT gate & is a commonly used logic gate. It is considered as a "universal" gate in Boolean algebra as it is capable of producing all other logic gates.



The standard symbol for the nand gate is the same as the AND gate symbol except for small circle on its output. The small circle denotes the inverse operation. The the NAND gate operated like an AND gate followed by an INVERTER, so that the circuit shown in both the figure is equivalent.

The operation of this gate can be described as below:

The output of the AND gate Z' can be written as:

$$Z' = A \cdot B \cdot C \cdots N$$

And the output of the NOT gate can be written as:

$$Z = \bar{Z}' = \overline{A \cdot B \cdot C \cdots N}$$

Truth table of NAND Gate

Truth table for 2 input NAND gate is :

A	B	Z
0	0	1
0	1	1
1	0	1
1	1	0

from the table we found that NAND gate output is the exact inverse of the AND gate for all the possible condition

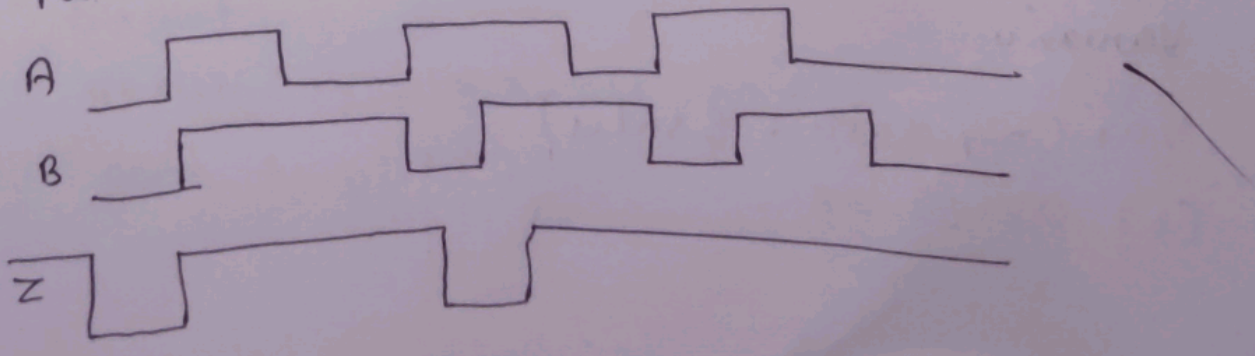
The logic eqn for NAND gate is given as

$$Z = \overline{A \cdot B}$$

Working of NAND gate

The output can be determined in several ways. One way is to draw the output for NAND gate, & then invert it. Another way is by using truth table of NAND gate.

Pulsed operation :



Circuit diagram

A simple two input logic NAND gate can be constructed using transistor connected together as show below with the input connected directly to transistor base.