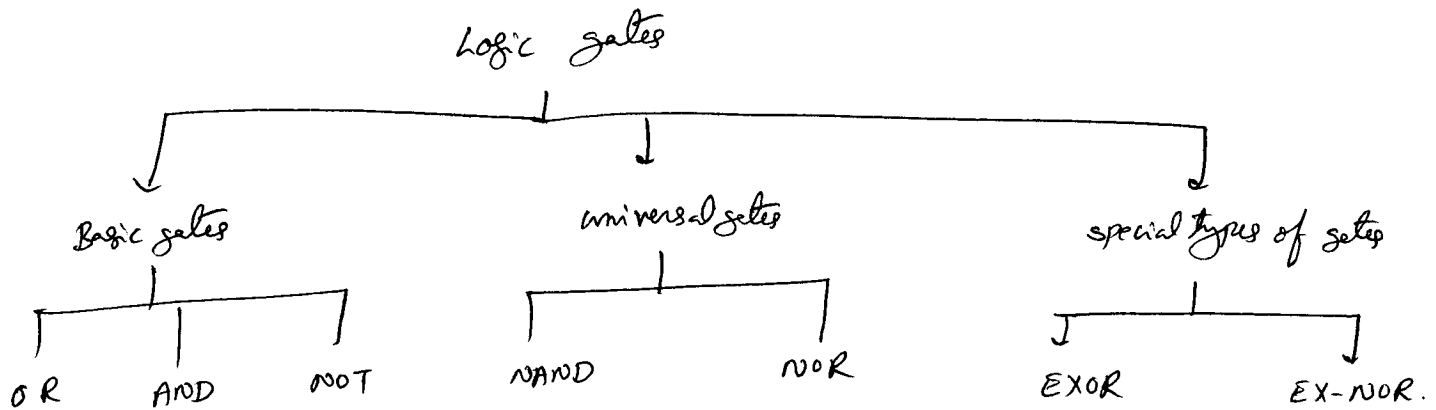


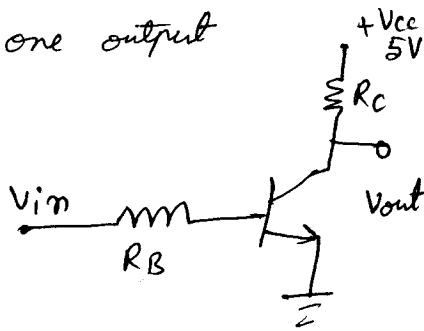
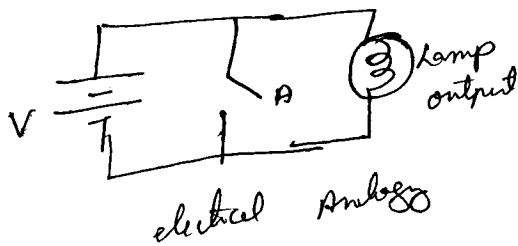
Logic gates

- Computers are made using very large scale Integrated circuits.
- The Logic gate is a simple device used to make digital integrated circuits.
- Diodes and transistors are used to perform switching functions in logic gates.
- Logic gates have one or more inputs and one output.
- Logic gates have 2 states $\left\{ \begin{array}{l} 1 \rightarrow \text{+ve logic high} \\ 0 \rightarrow \text{-ve logic low} \end{array} \right.$

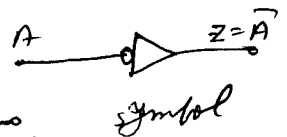
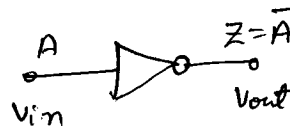


NOT GATE (or) Inverter

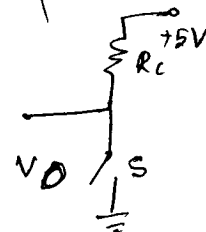
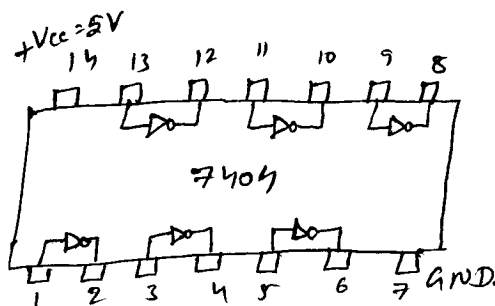
- It performs inversion or complementation.
- This gate has one input & one output



using transistor

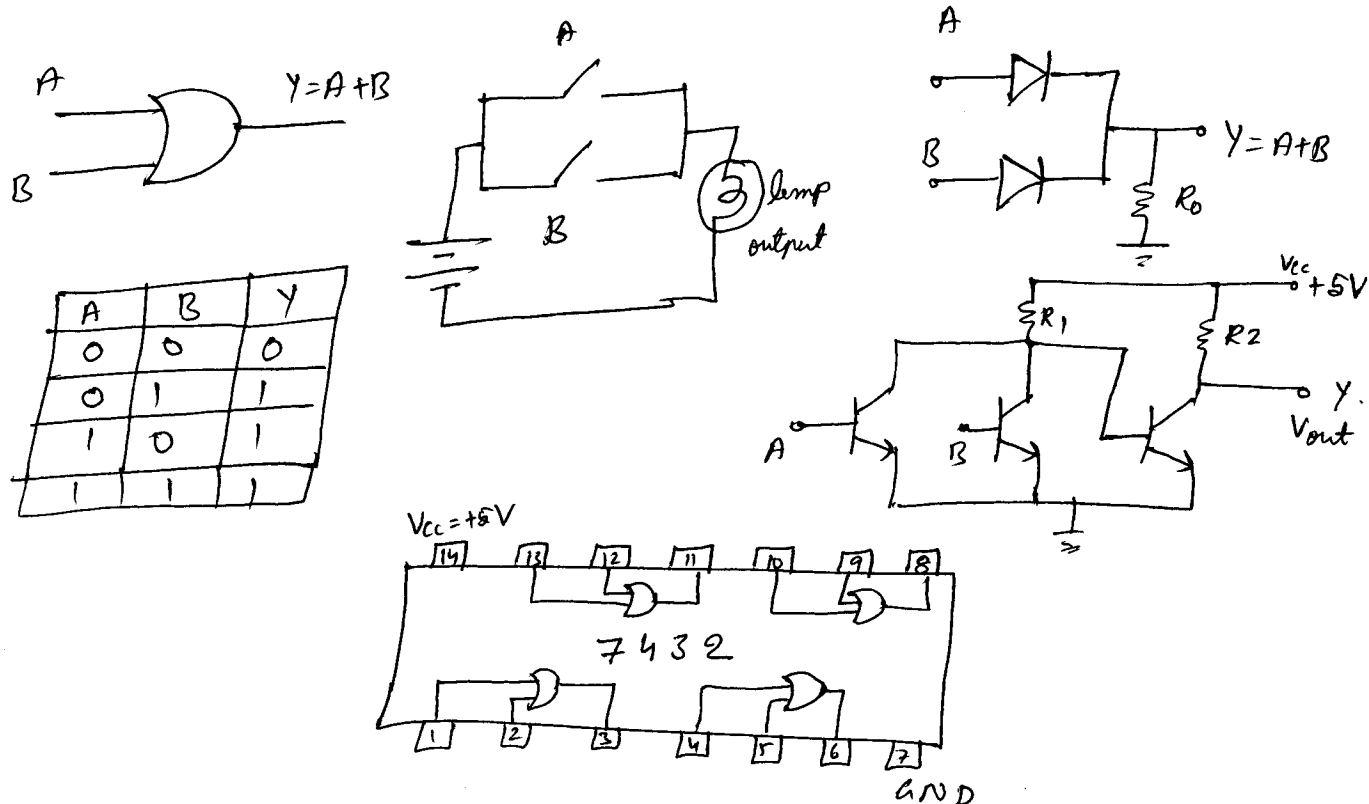


A	Y
0	1
1	0



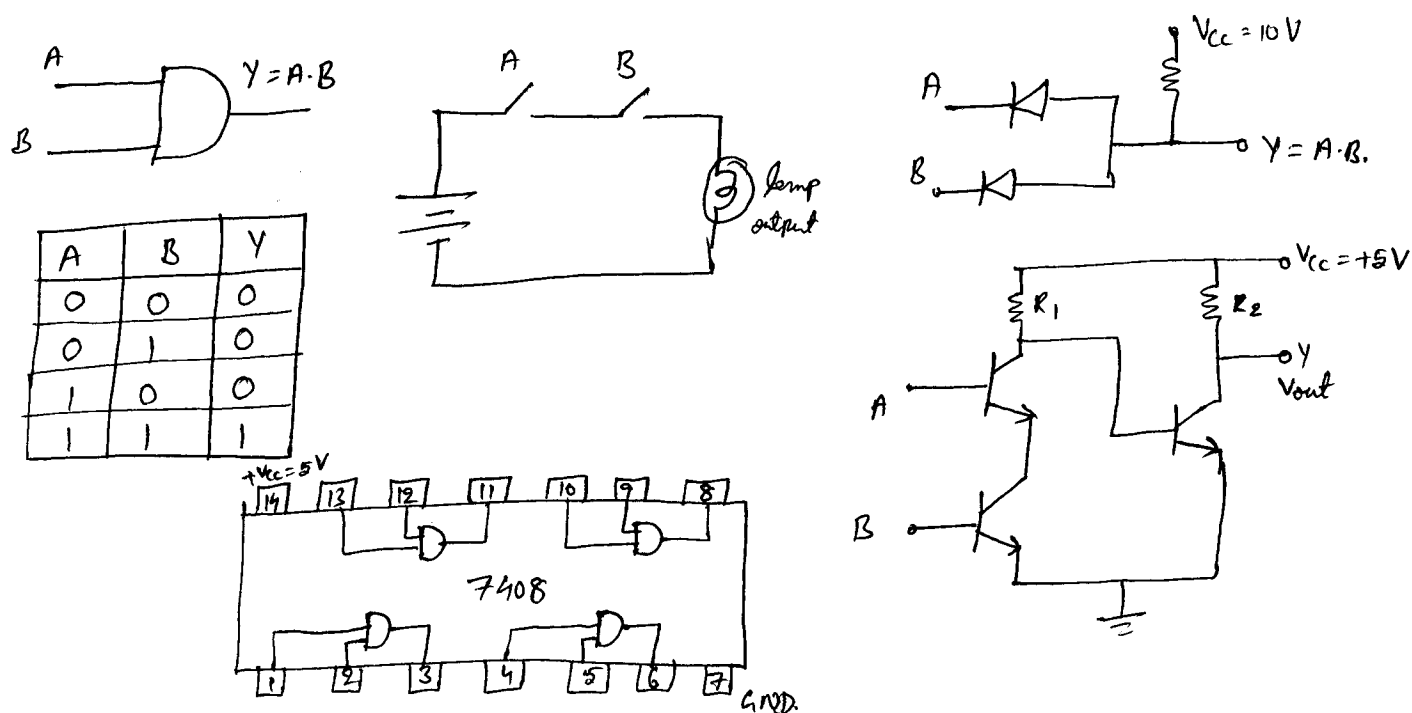
OR Gate

- It performs logical addition
- 2 or more inputs and one output



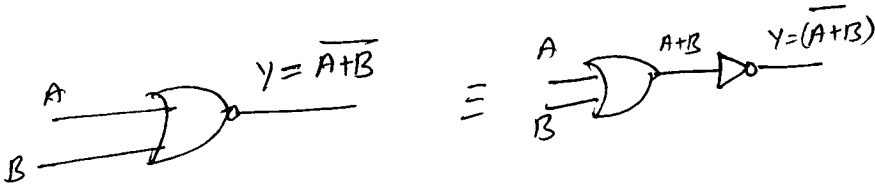
AND gate

- performs logical multiplication.
- 2 or more inputs and one output.
- It gives high output only when all the inputs are high.

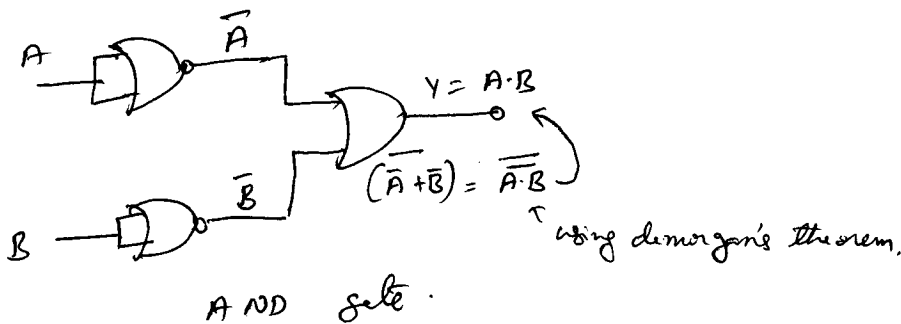
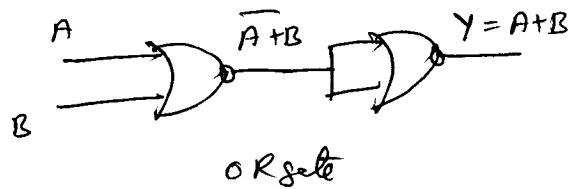
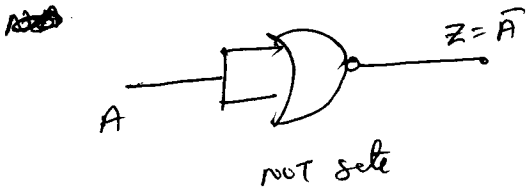
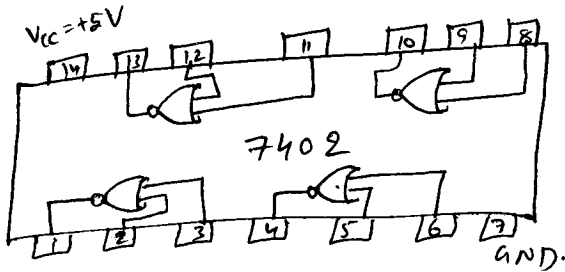
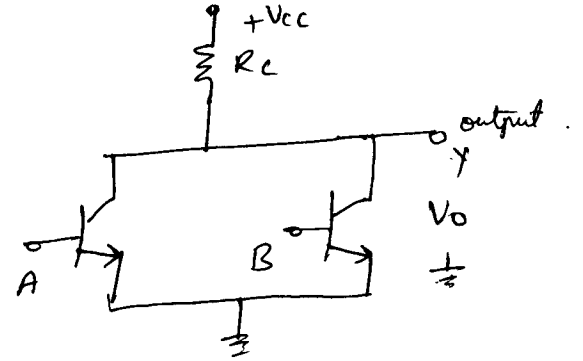
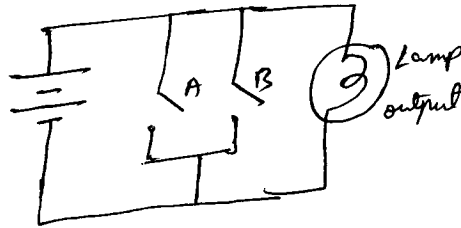


NOR gate

→ NOT OR operation \Rightarrow OR gate + NOT gate.



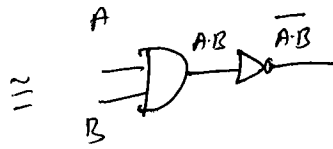
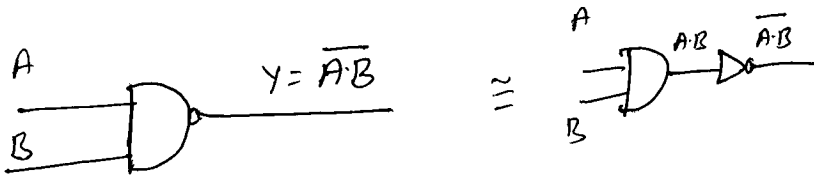
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0



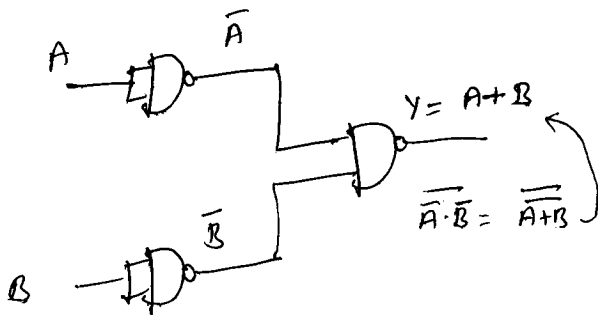
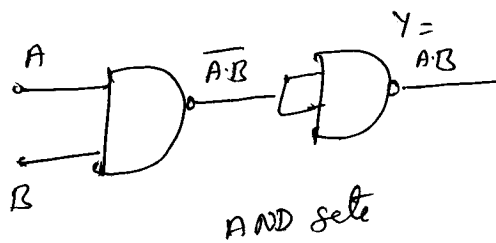
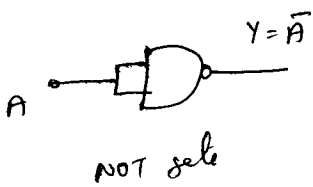
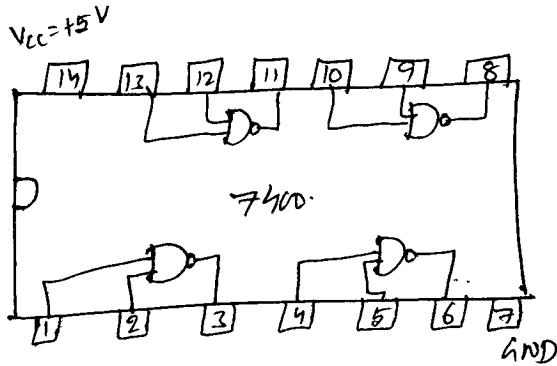
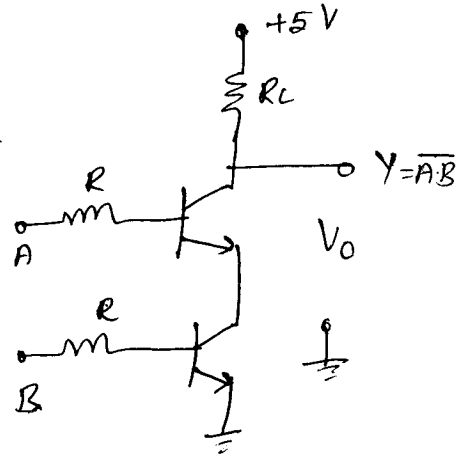
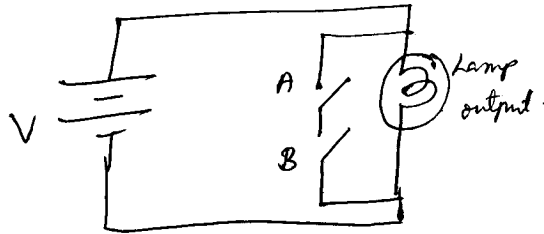
→ This gate is called universal gate as all gates can be implemented using this gate.

NAND gate:-

- AND + NOT gate.
- universal gate.



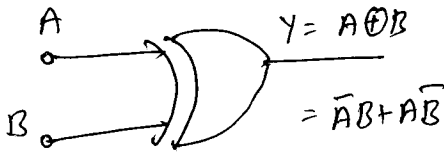
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0



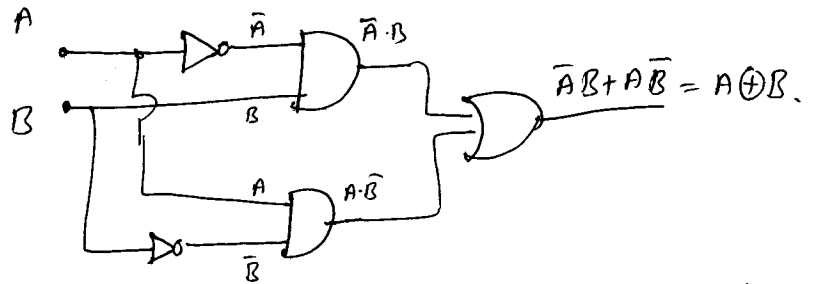
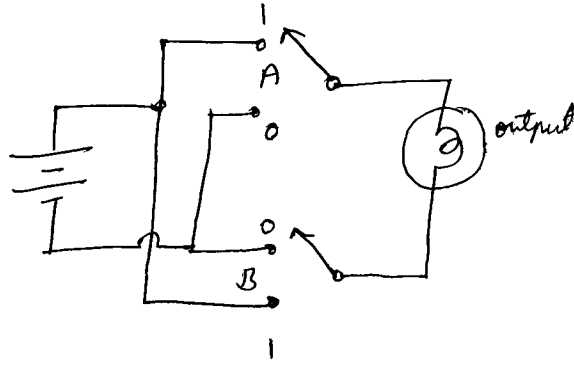
Exclusive - OR Gate (EX-OR Gate):

→ 2 special logic circuits that occur quite often in digital systems are EX-OR & EX-NOR gates.

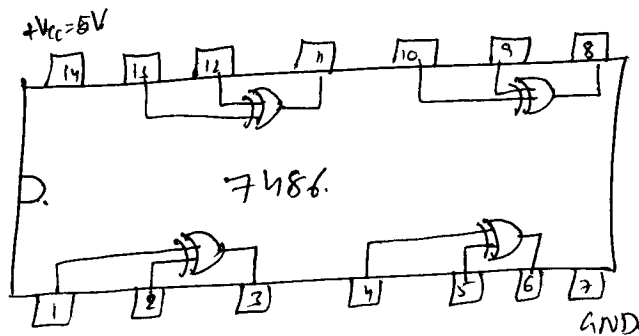
→ This is also called modulo-2-adder (or) half adder.



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



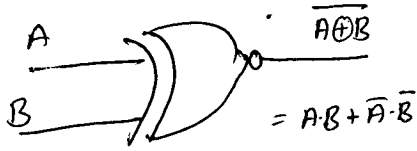
→ This can be used as a controlled inverter. i.e. one input will decide whether the second input should be ~~inverted~~ inverted at the output or not.



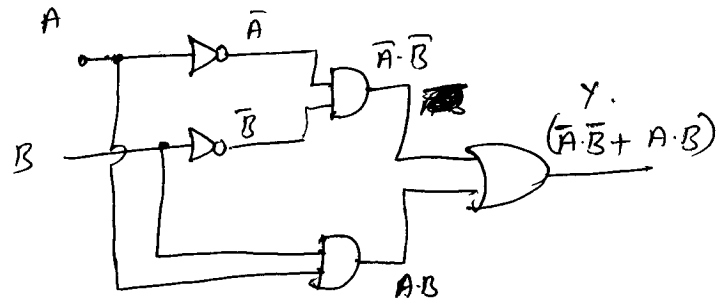
→ EX-OR of number of variables assumes a 1 state only when odd number of input variables assumes a 1 state.

EX-NOR gate

- output is opposite to EX-OR gate.
- ~~output will be one when all the inputs are same.~~



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



- EX-NOR of number of variables assumes a 1 state only when even number (including 0) of inputs variables assumes a 0 state.
- This can be used as an inverter by connecting one of the inputs to '0'.
- EX-NOR gate can be used as comparator also.

