Realization of Gates (Diode Logic)

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  - 2 Input OR Gate
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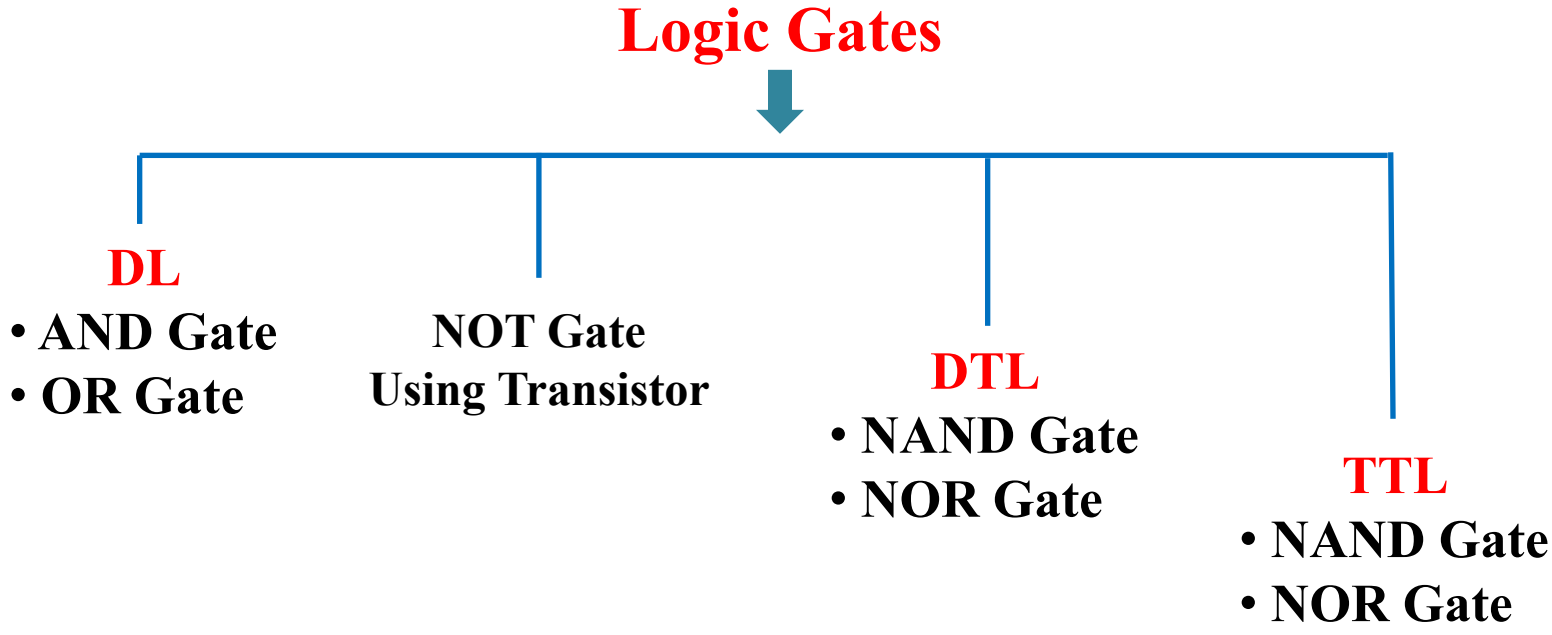
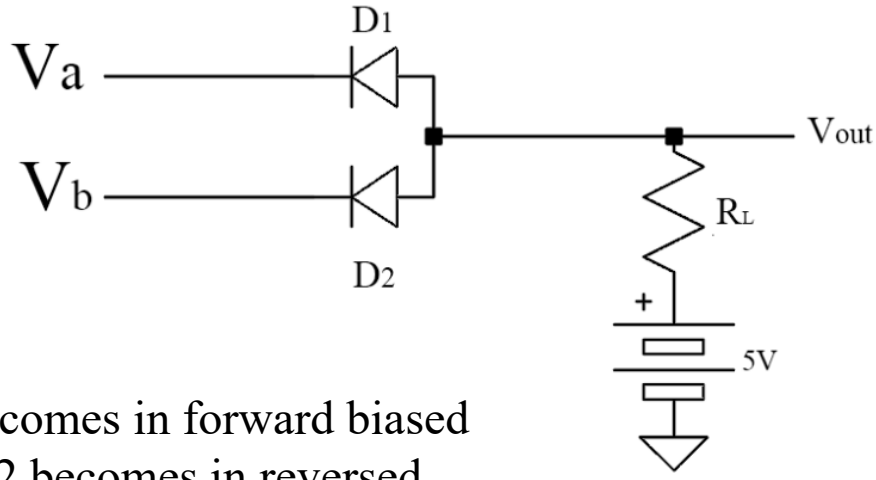
Realization of Gates

As Discussed earlier, the digital logic gates can be made by different combinations of diodes (D) and transistors (T). These may be diode logic gates (DL), diode transistor logic gates (DTL) and transistor transistor logic gates (TTL).
We will first learn following Logic Gates using one by one.



Diode Logic AND Gate

If A is HIGN and B is LOW, the diode D1 becomes in reversed biased hence act as an open switch. Also, diode D2 becomes in forward biased hence act as the closed switch. Hence the output is LOW.



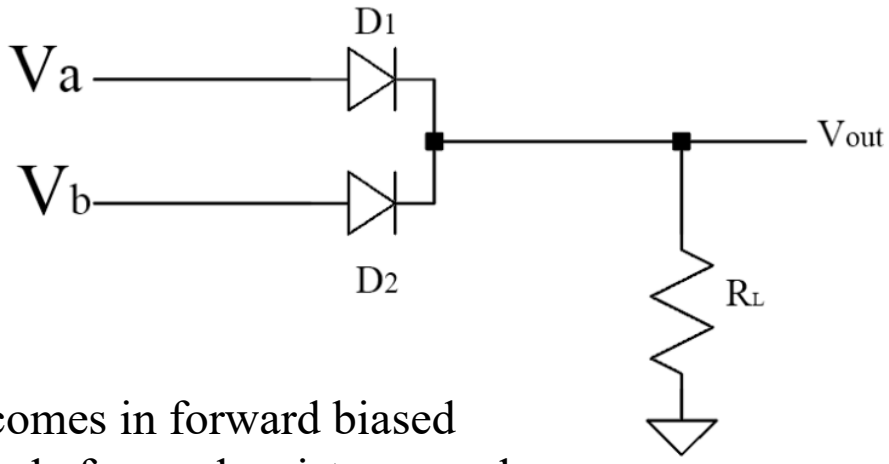
If A is LOW and B is HIGH, the diode D1 becomes in forward biased hence act as the closed switch. Also, diode D2 becomes in reversed biased hence act as an open switch. The output is LOW.

If all inputs are 0 then all diode becomes in forward biased and act as an open switch. Hence the output is LOW.

When all inputs are HIGH then all diodes becomes in the reversed biased hence act as an open switch. Hence the output is HIGH.

Diode Logic OR Gate

If all inputs are in LOW, both the diode becomes in reverse biased hence acts as an open switch. Hence the output voltage is 0V.

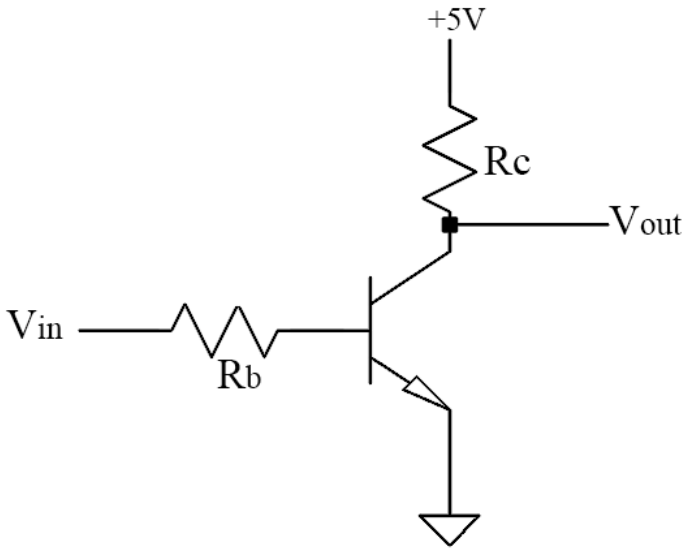


If A is HIGH and B is LOW, the diode D1 becomes in forward biased hence act as the closed switch. (Neglecting diode forward resistance and voltage drop across the diode) Hence the output is HIGH.

Also, If A is LOW and B is HIGH. Diode D2 becomes in forward biased and act as an open switch. Hence the output is HIGH.

If both the input is in HIGH then the output is equal to the more positive value of the input.

NOT Gate Using Transistor



If the input is LOW, the parameter is chosen so that the output is V(sat). Also, if the input is HIGH, the parameter is chosen so that the output is LOW.

If the input is LOW, the transistor act as an open switch. Hence the output is LOW.

If the input is HIGH, the transistor act as the closed switch. Hence the output is HIGH (Neglecting voltage drop).