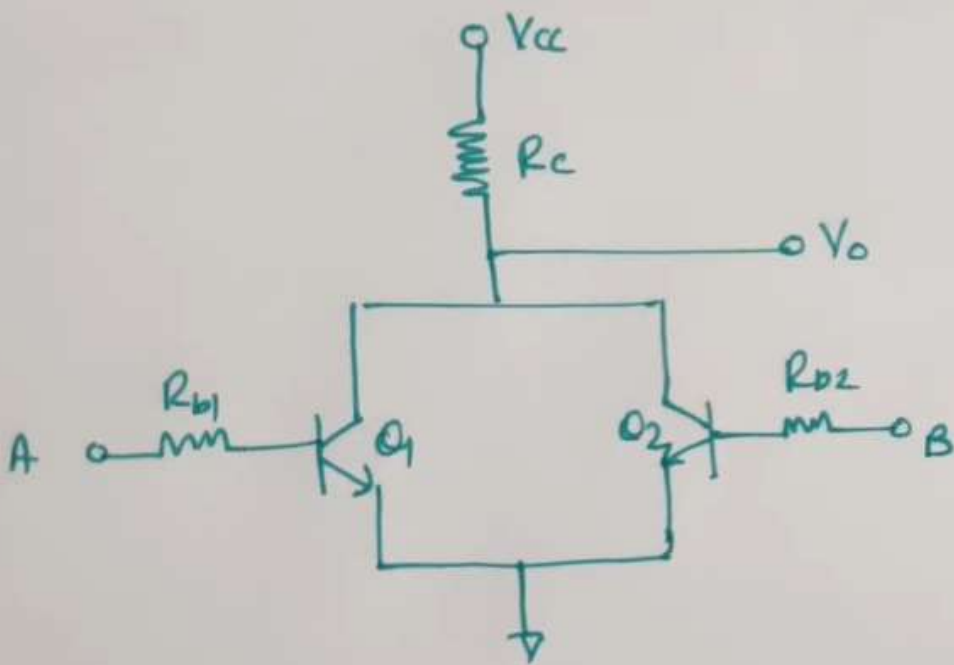
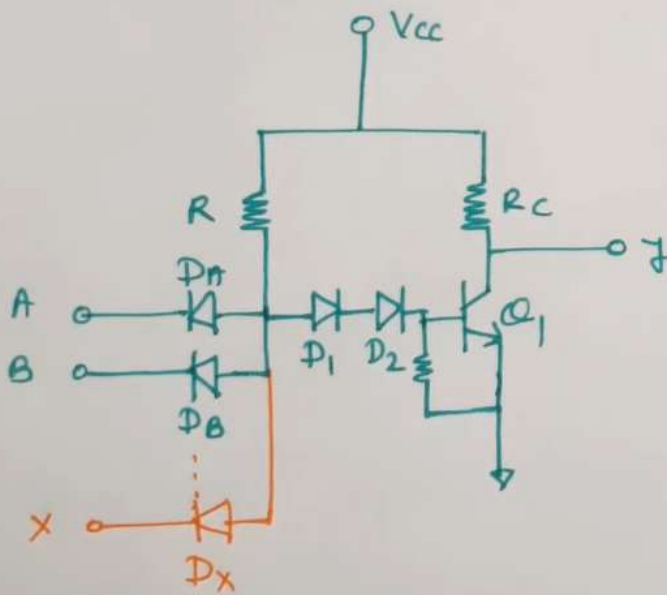


$V_P \rightarrow \text{O/P}$

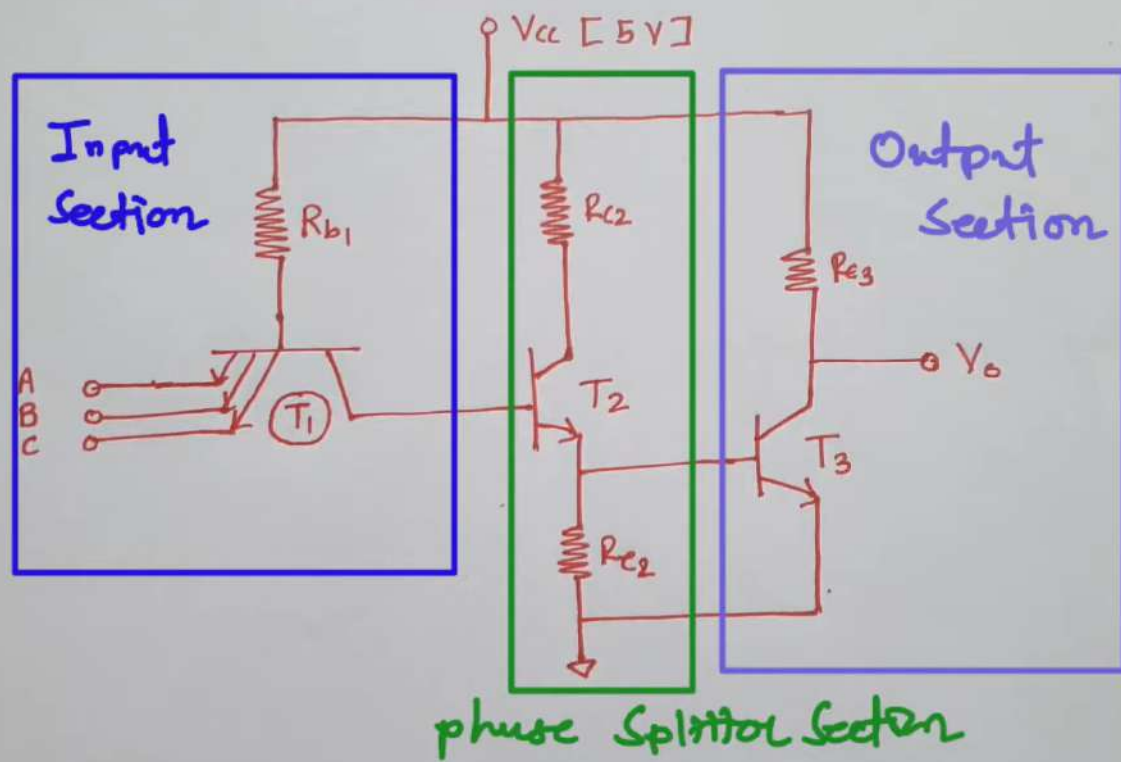


Diode Transistor Logic [DTL]

- RTL families has low NM, Low Fan out, Slow Speed & higher power dissipation. SO, we don't use RTL in recent IC's.
- DTL has Improved NM and Fan out compared to RTL.

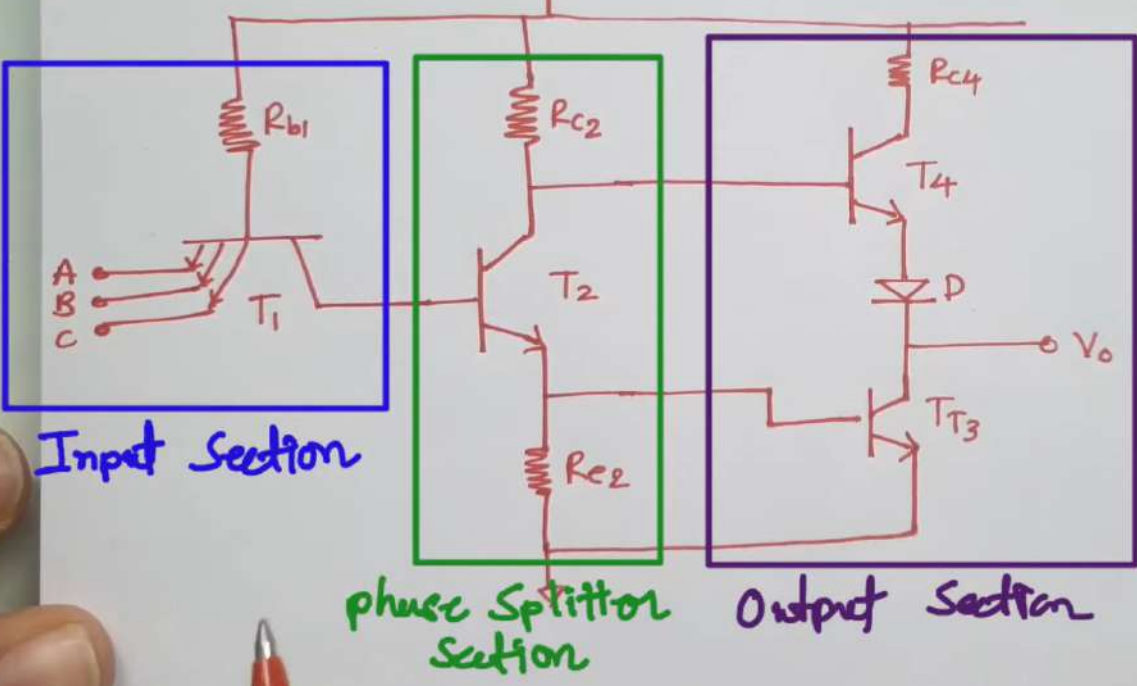


TTL NAND Circuit



TTL NAND gate with Totem pole Output

$V_{cc} [5V]$

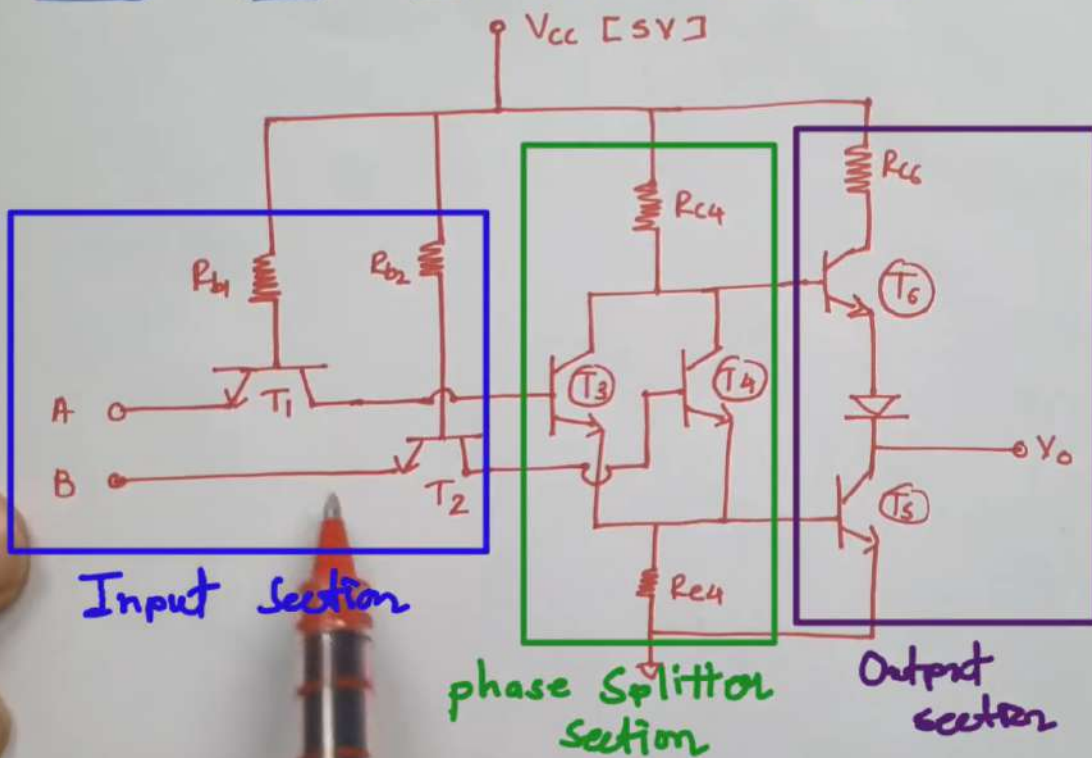


Input Section

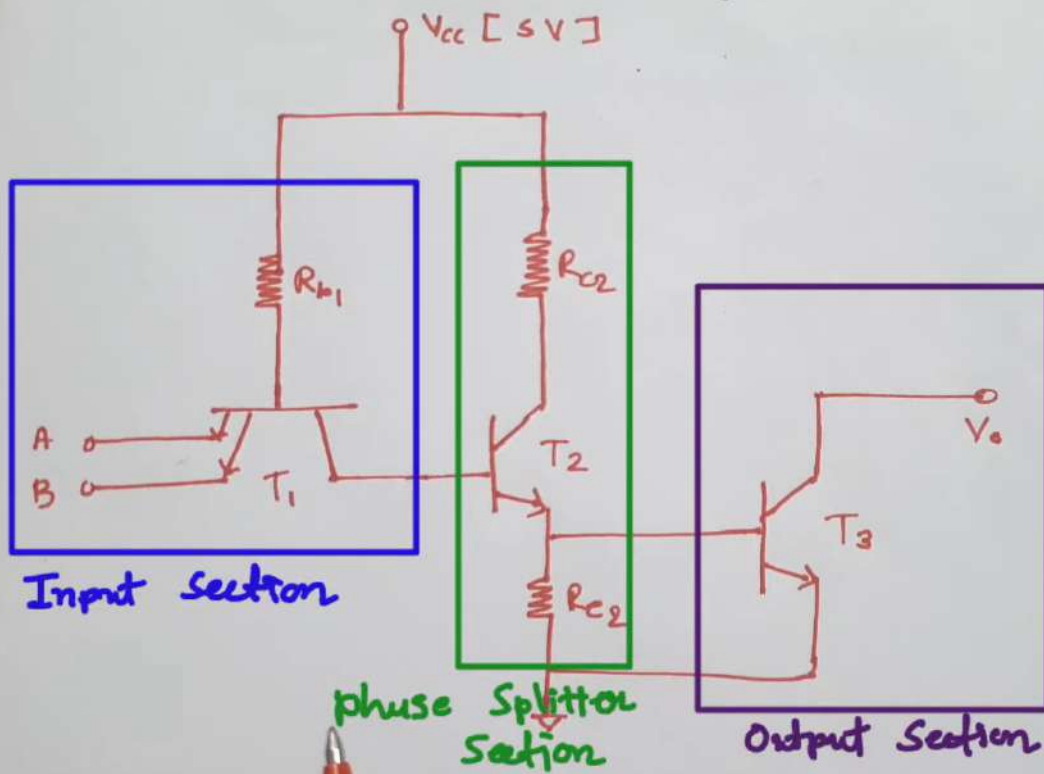
Phase Splitter Section

Output Section

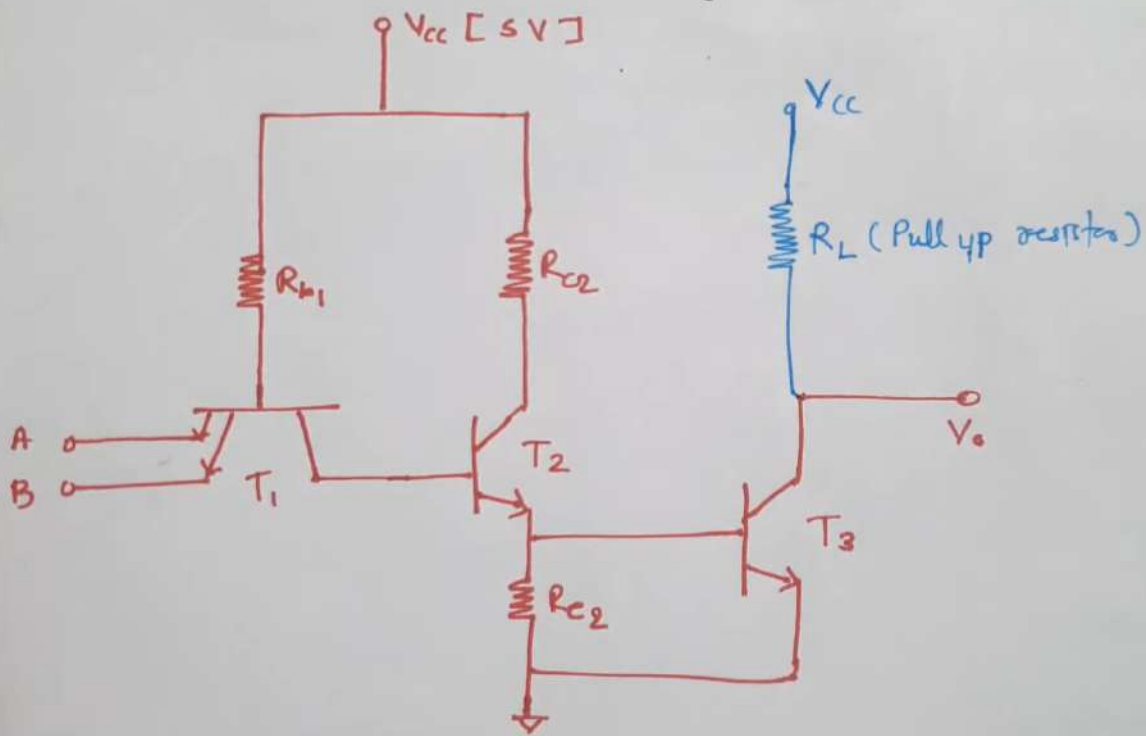
TTL NOR gate using Totem pole.

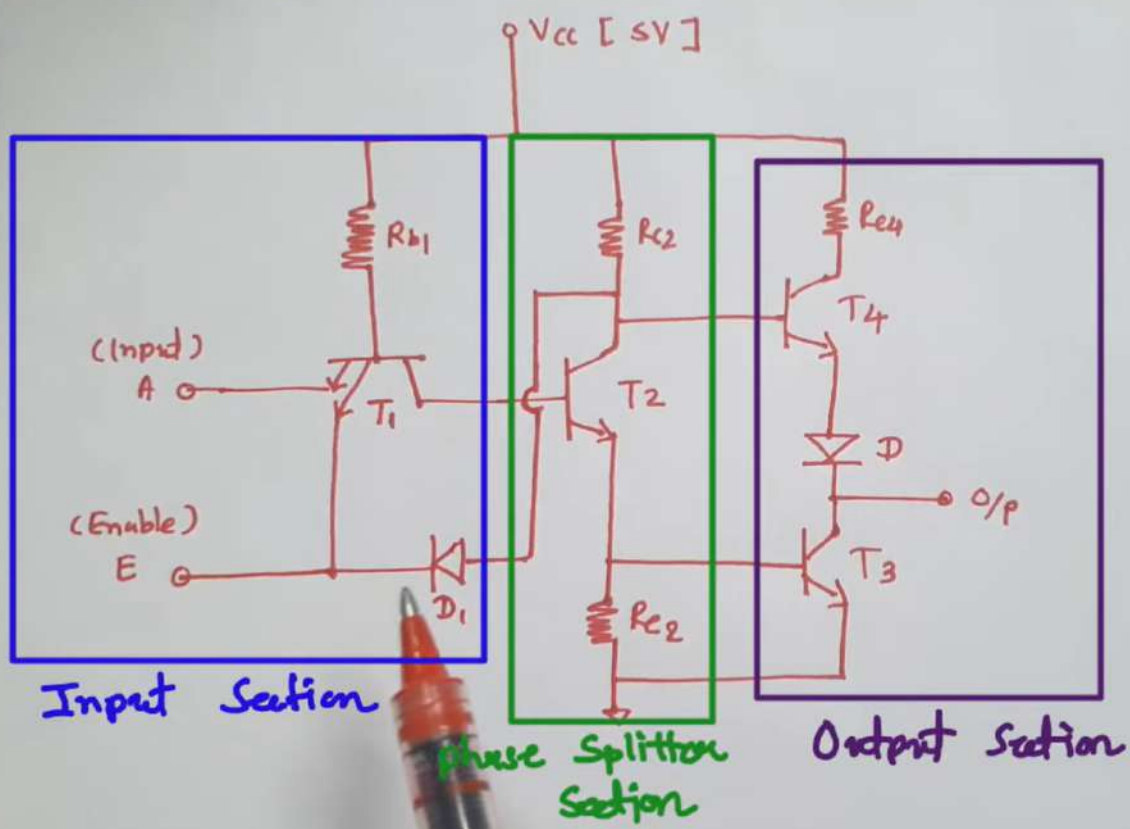


TTL Open Collector NAND gate

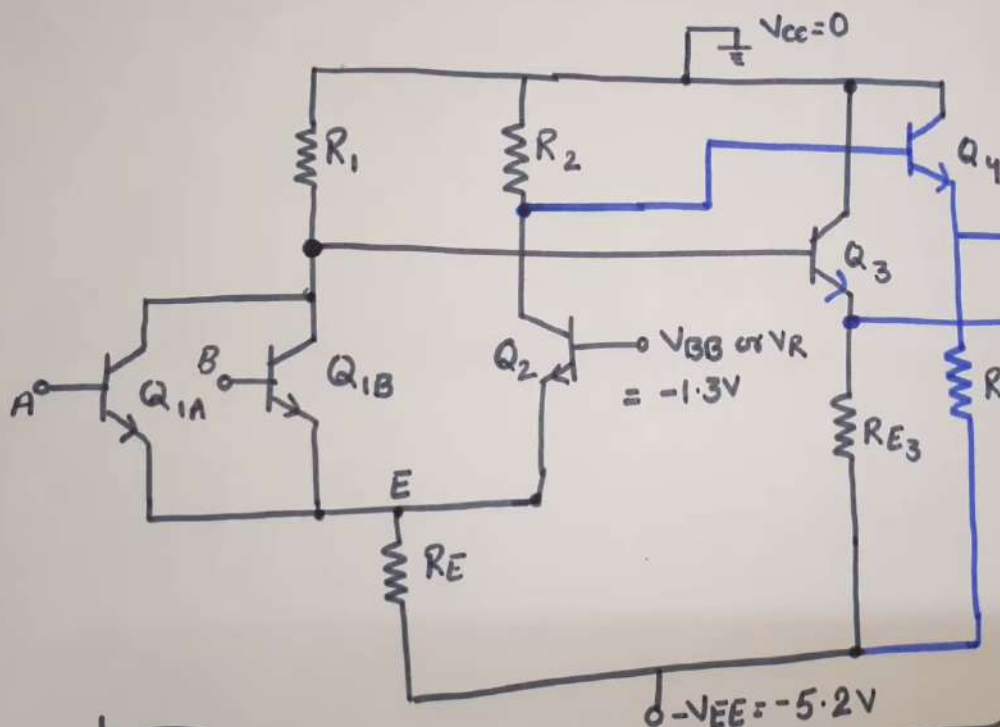


TTL Open Collector NAND gate





EMITTER COUPLED LOGIC ECL



→ Transistor Never saturate, so it is fastest among all logic families.

→ Transistor work in cutoff or Active Region

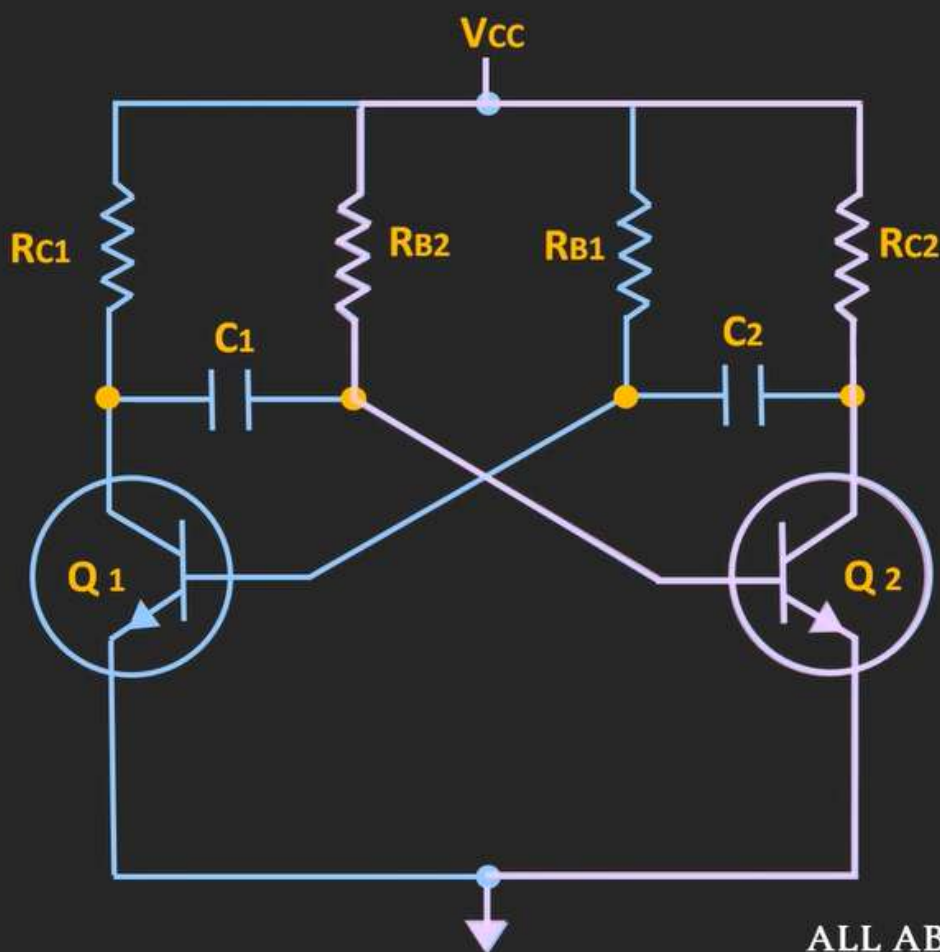
→ propagation delays are low as 1 to 2ns.

→ Logic gate → OR NOR

→ Voltage levels are about -0.8V for High -1.0V for Low

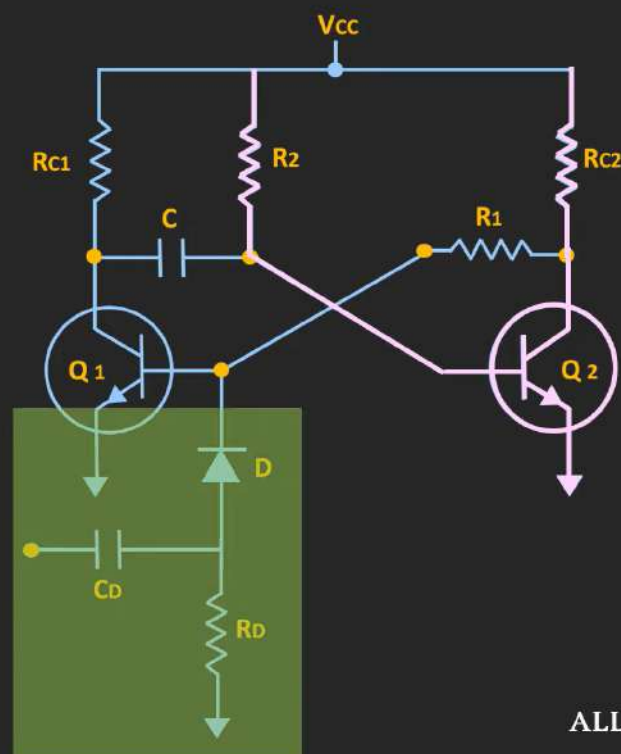
→ The circuit consist of Differential amplifier and emitter follower output.

BJT : Astable Multivibrator



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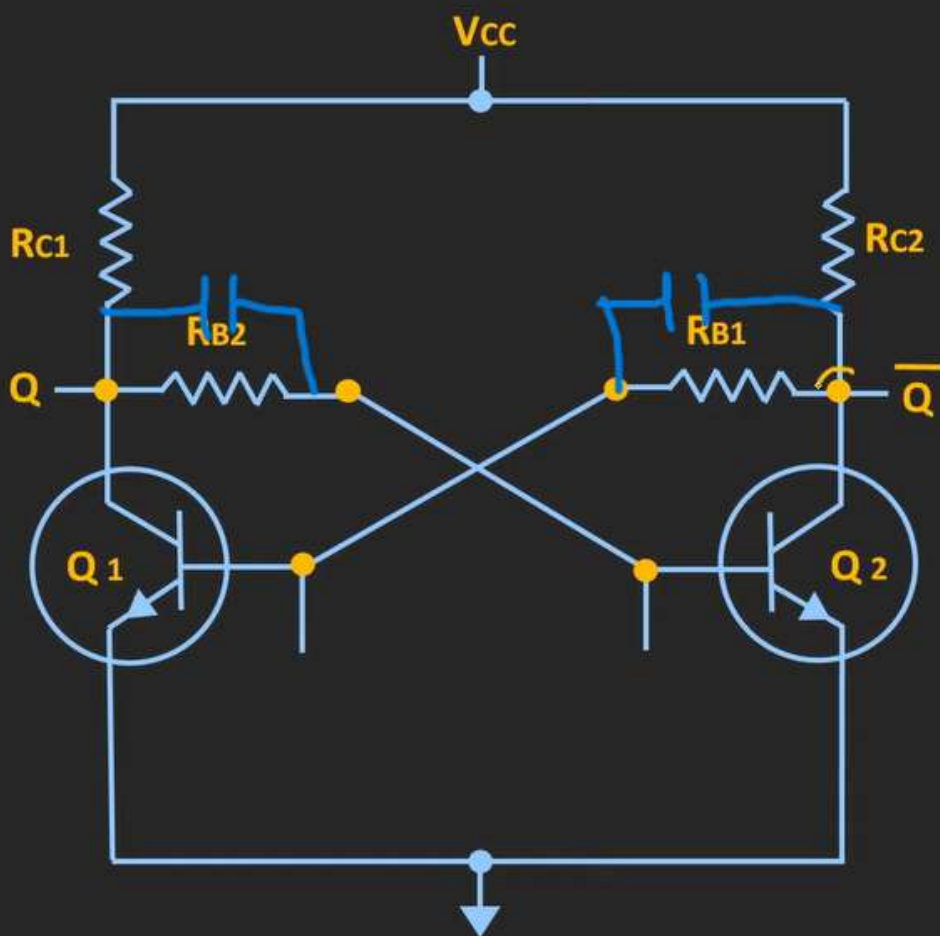
BJT : Monostable Multivibrator



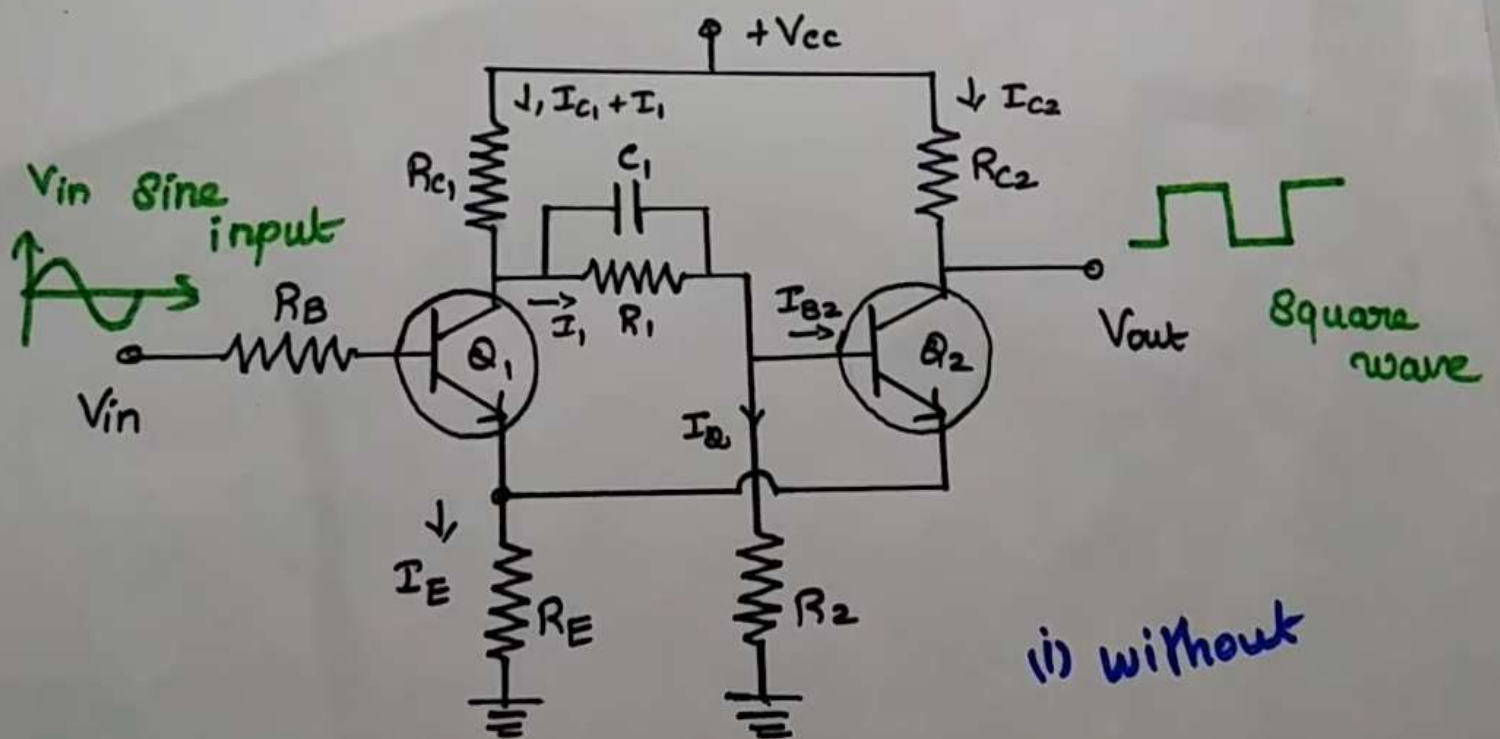
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BJT : Bistable Multivibrator



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(i) without

ii