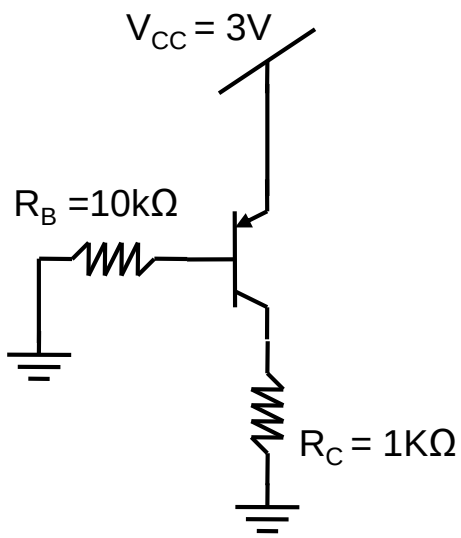
Last Lecture → BJTs – Large Signal Analysis

Procedure

1) When applicable, simplify the circuit
2) Determine if BE/EB junction is forward (transistor = "on")
   - If reverse, transistor → cut off
   - If forward, transistor → active / saturation

     ∴ Make an educated guess of the region of operation
3) Substitute the appropriate model and or assumptions
4) Solve fot the transistor operating point (I_C & V_{CE})
5) Verify proper operation @ the assumed region
   - If cut off → $V_{BE} < 0.5V$
   - If active → $V_{CE} > 0.3V$
   - If saturation → $I_C / I_B < \beta$

Problem 6.51



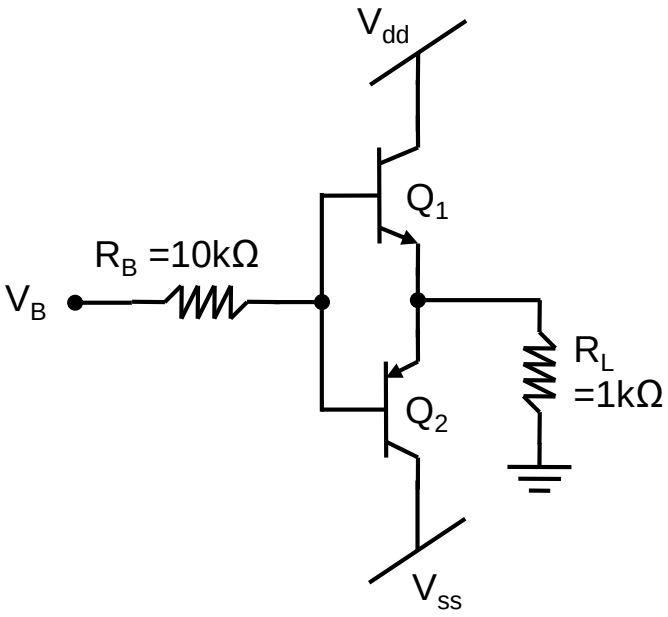
For the following circuit, assuming β=50 and V_{EB}=0.7V for all currents, determine the voltage V_c at the collector terminal. To what value should R_B be increased or decreased in order for the transistor to change operating modes.

Example 6.12

For the following circuit determine the voltages at all nodes and the current through all branches assuming:

a) V_{BE}=0.7V, β=100, V_{dd} = -V_{ss} =5V, and V_B =5V

b) V_{BE}=0.7V, β=100, V_{dd} = -V_{ss} =5V, and V_B =0.3V



Example 6.11

For the following circuit determine the voltages at every node and the bias currents of transistors Q_1 and Q_2. Assume $V_{BE}=|V_{EB}|=0.7$ and $\beta=100$.