

Pre-Lab #1: Circuit Analysis Review

(1) Carry out a "paper-and-pencil" analysis of the voltage divider circuit given in Figure 1.

(i) What would be the value of V_{out} when

(a) $R_1 \ll R_0$ eg: $R_1 = 10\Omega$

(b) $R_1 \gg R_0$ eg: $R_1 = 10M\Omega$

(ii) If V_{out} needs to be close in value to ground which condition (a) or (b) is suitable?

(iii) If V_{out} needs to be close to V_{dd} which condition (a) or (b) is suitable?

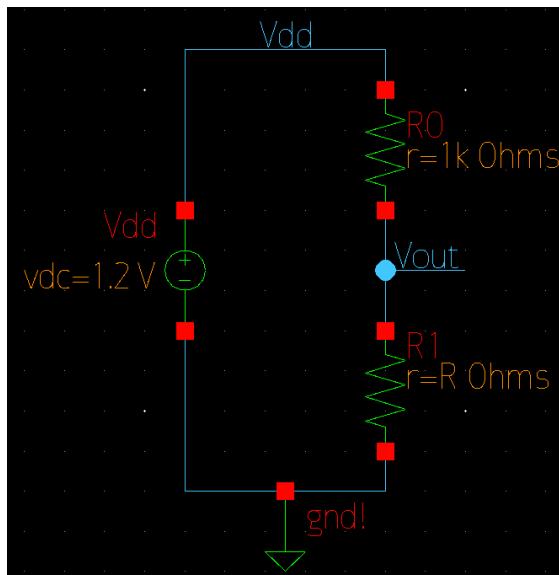


Figure 1



Figure 2

(2) Carry out a "paper-and-pencil" analysis of the RC circuit given in Figure 2.

Assume that V_{in} switches instantaneously from 0 to V_{dd} .

- Write the equation and draw the waveform with respect to time for $v_c(t)$ for the circuit. Assume the initial capacitor voltage is 0V.
- Draw the a rough sketch for $v_c(t)$ with respect to time.
- What is the final value for $v_c(t)$?
- Given $R_0 = 1K\Omega$, and $C_1 = 1\mu F$ how long will it take to reach 63% of its final value.