ECE 321 - Homework #1
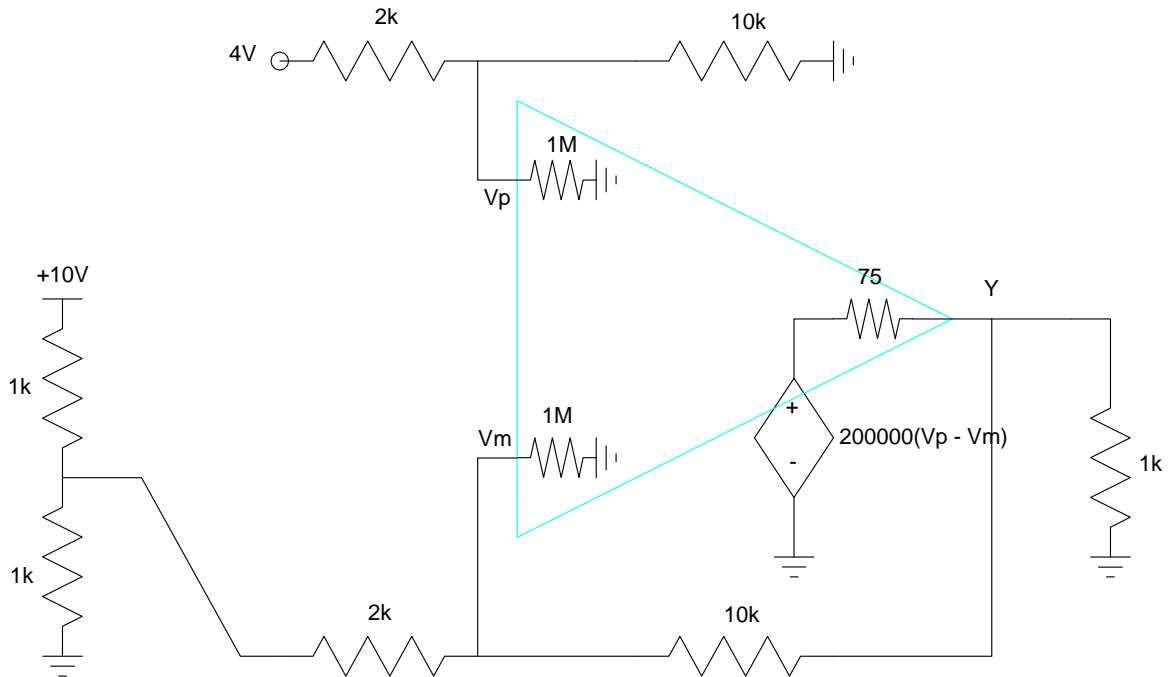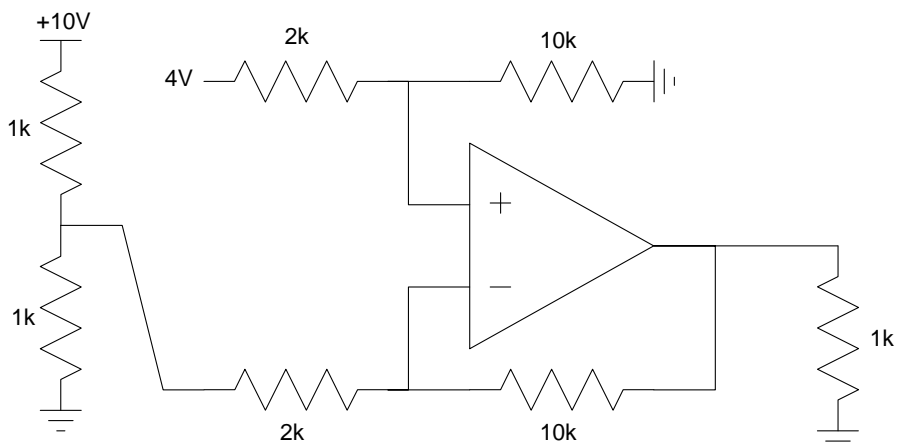
Op-Amps, Instrumentation Amplifiers, Push-Pull Amplifiers. Due Monday, April 4th

1) Assume non-ideal op-amps. Write the voltage node equations for the following circuit.

2) Find the nodal voltages.

Problem 1 - 2

3) Assume ideal op-amps. Write the voltage node equations for the following circuit.

4) Find the nodal voltages.

Problem 3 - 4

5) Assume a thermistor has the following resistance - temperature relationship.

$$R \approx 1000 \cdot \exp(-0.04(T - 25)) \ \Omega$$

Design a circuit which outputs

- -10V for T = -20C
- +10V for T = +20C
- Voltage proportional for -20V < T < +20C

6) Design a circuit with a push-pull amplifier

Input: -10V to +10V, capable of driving 10mA

Output: Red LED (I > 0) and Blue LED (I < 0)

Relationship:

I = -100mA to +100mA, proportional to V:

I = V/100