

Name:

GTID:

CS 3651 Skill Demo 1 - Voltage Dividers & Multimeters & Connections

Skill Demo 1 should result in

- Understanding voltage dividers
- Understanding multimeters and their limitations
- Construction of a simple circuit on a breadboard
- Construction of a simple circuit on a protoboard
- Understanding of using crimp connectors and heat shrink/soldering

Tools/supplies:

breadboard

protoboard

multimeter

crimping tool

heat gun

heat shrink tube

various resistors

LED

batteries

battery holder

solid wire for breadboard

2 male and 2 female crimp-on snap connectors (or a male and female 2 prong crimp connector)

Background:

CS 3651 videos that should have been watched by this time:

CS3651 - Intro to Multimeters

CS3651 - Using Multimeter in a Circuit

CS 3651 Introduction to Circuit Schematics

CS 3651 Introduction to Resistors

CS 3651 Introduction to Capacitors

IntroToLED.mov

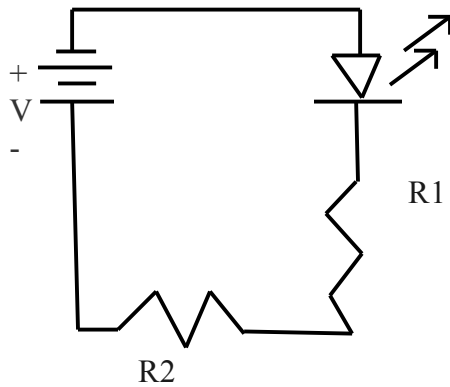
pullupdown1.mov

How and WHY to Solder Correctly (if did not attend class)

[Introduction to Breadboard \(Protoboards\)](#) (if don't remember from ECE2031)

Relevant section of book (Practical Electronics for Inventors 2000 edition): pages 1-14

Problem 1: Using your breadboard, create a circuit that lights a LED and has two resistors labeled with the same resistance.



What is the battery voltage you used?

What was the voltage drop over R1?

What percentage of the battery voltage was it?

What was the voltage drop over R2?

What percentage of the battery voltage was it?

The voltage drops over R1 and R2 should be identical. Why are they not? How close are they?

Why doesn't the voltage drop across R1 and R2 sum to equal the battery voltage?

Sign-off initials: _____ Date: _____ Time: _____

Problem 2: Replace R2 with a resistor (or a combination of parallel and series resistors – do NOT use a potentiometer) that causes the voltage drop across R2 to be exactly 50% that of the battery voltage (or, at least, much closer than your original circuit above). Draw your circuit and label your resistances below. Now would be a good time to have your circuit checked by one of the class staff.

Sign-off initials: _____ Date: _____ Time: _____

Problem 3: Solder this circuit into a protoboard. Try to use a minimum of the protoboard because you will be using it for other circuits later. To connect to the battery, crimp a female connector to the battery leads and a male connector to leads coming from the protoboard. Why is it a good idea to always have connectors on batteries be female? Show your work to the staff for check-off.

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Problem 4: Repeat the circuit from problem one, but with equal resistors of 1 mega-ohm or more and without the LED. Use the circuit to calculate the resistance of your multimeter. How did you do it? Show your work below.

Sign-off initials: _____ Date: _____ Time: _____

Problem 5: Using some stranded wire, create a loop of wire that is as circular as possible (i.e., no pigtailed) where the soldered connection between the two ends is protected by heat shrink tubing.

Sign-off initials: _____ Date: _____ Time: _____