EECS 16A Touchscreen 1

**Insert your names here**
Semester Outline

- Imaging Module
- Touchscreen Module
- Acoustic Positioning Module
Today’s lab:

- Breadboarding
- Build multiple functional circuits
- Learn how to use Multimeter
Breadboarding basics

- Similar to Imaging 1: Intro to Breadboarding
- Build up breadboarding skills
  - Connect to concepts in lecture, including Voltage Dividers and KVL
- Very important skill: prototype, debug, and translate theoretical ideas into real circuits
Poll time!

Review of breadboarding practices from Imaging 1.

1. Which of the following are good breadboarding practices?
   a. Check the resistor value by its color bands
   b. Plug in component legs in different rows
   c. Use black and red wires for the rails

2. For which of the following components does polarity matter?
   Resistor          LED          Capacitor          Ambient Light Sensor
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TinkerCAD

- Circuit design prototyping software
  - Primary circuit software in this course
  - Useful for many different electrical projects

- Run online using an Autodesk account
Launchpad Review

- Micro-Controller
- Power Supply
- Voltmeter
Multimeter (Circuit Debugger)

- **Voltmeter**
  - Infinite resistance
  - Connect in parallel with component

- **Ammeter**
  - Very low resistance
  - Act as a wire in the circuit
  - Connect in series with component

- **Ohmmeter**
  - Remove resistor from circuit before use
  - Connect in parallel with resistor
Circuit Elements

LED

Potentiometer
Circuit Elements: Terminology Update

- Moving forward, we’ll be using “pin” and “socket” to replace “male” and “female” (respectively) in the context of wiring and components.
- Note that the terms “male” and “female” remain the industry standard, so keep that in mind when ordering parts or reading documentation!
LED Fader Circuit
Voltage Divider Circuit

What is the voltage value $u_2$ at Node 2?

\[ I_y = I_z = \frac{V_s}{(R_1 + R_2)} \text{ (Ohm’s Law)} \]

\[ u_2 - u_0 = R_2 \times I_z \]

\[ u_2 - 0 = R_2 \times \frac{V_s}{(R_1 + R_2)} \]

\[ u_2 = \frac{V_s \times R_2}{(R_1 + R_2)} \]

What is the voltage value $u_2$ if $R_1$ equals to $R_2$?
Pointers

- Try to debug your circuit by yourself before you ask the TAs
  - However, don't spend too long, after 5 minutes or so ask for help
- Current Limit = 0.1 A
- Voltage = 3.3V