Lab 5: Capacitance Touch Sensors and Sound

Objectives:

1. Experiment with a capacitive touch sensor as an input device.
2. Run a calibration routine that detects minimum and maximum values.
3. Send an output signal to a piezo buzzer (or LED) that is proportional to the input from the sensor input.

Required Equipment:

- Computer with Arduino IDE & Teensy extensions installed and working
- Capacitive sensor, such as aluminum foil, copper, etc. Note: you're to supply the aluminum foil, copper wire, etc.
- Piezo buzzer (or LED)
- Teensy board and USB cable
- A variety of resistors (one for the output device (~220Ω), and one in series with the cap sensor (~MΩ)

References and Resources:

- Calibration tutorial: http://arduino.cc/en/Tutorial/Calibration
- Several good demo videos by Internet search: teensyduino touchread

Basic Setup

1. Install the capacitive touch sensor. Only one connection to the microcontroller is required, but only a few microcontroller pins are capable of sourcing the touchRead() function.
2. Run a preliminary sketch that issues the touchRead() function and observe the return value output on the serial monitor.
3. For this lab, we need a setup where sensing will occur when your hand is near the tin foil; it should not be necessary to actually touch the tin foil to get a reading. To get reliable results, you **will** need to perform some sort of **auto-calibration** and **scaling.** Code a calibration routine in the setup() function, and note the max/min points obtained so that they can be used to define output levels for the frequency argument of the tone() function (or PWM levels of the LED).
4. Demonstrate your working circuit.