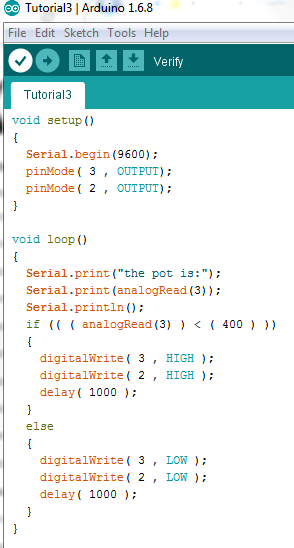
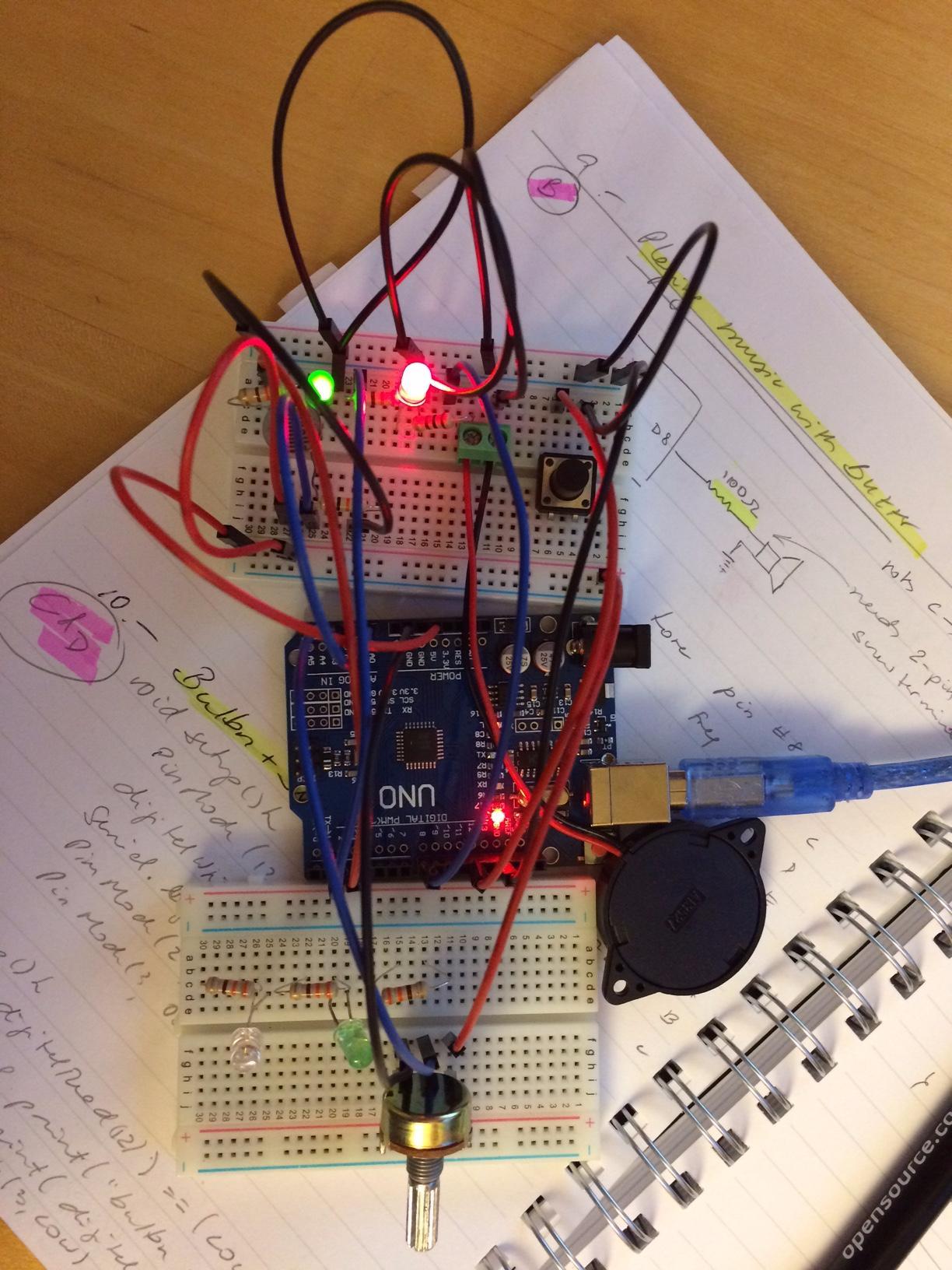
**iCREAT I: Module 4 - LAB 1 -**

**The Arduino and Sensors**



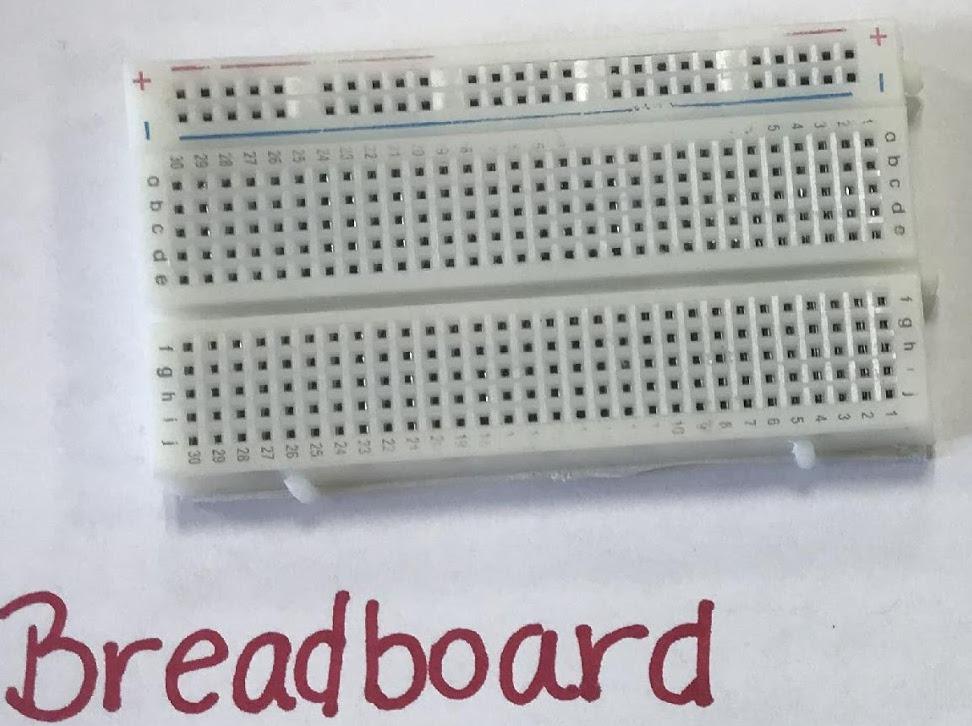
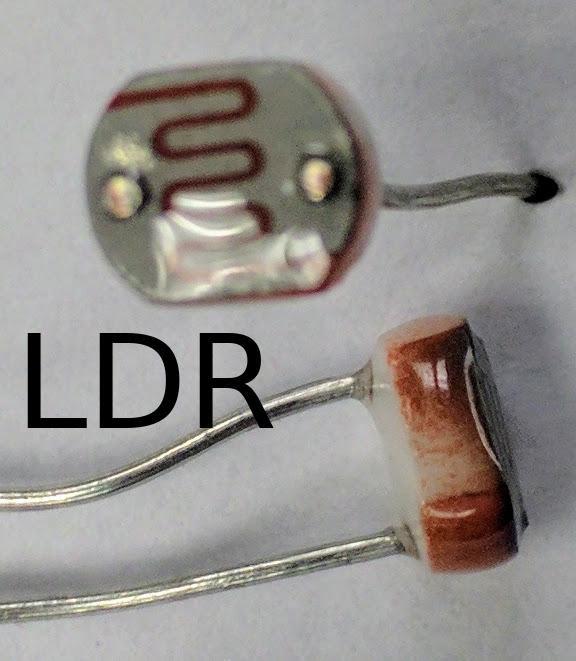
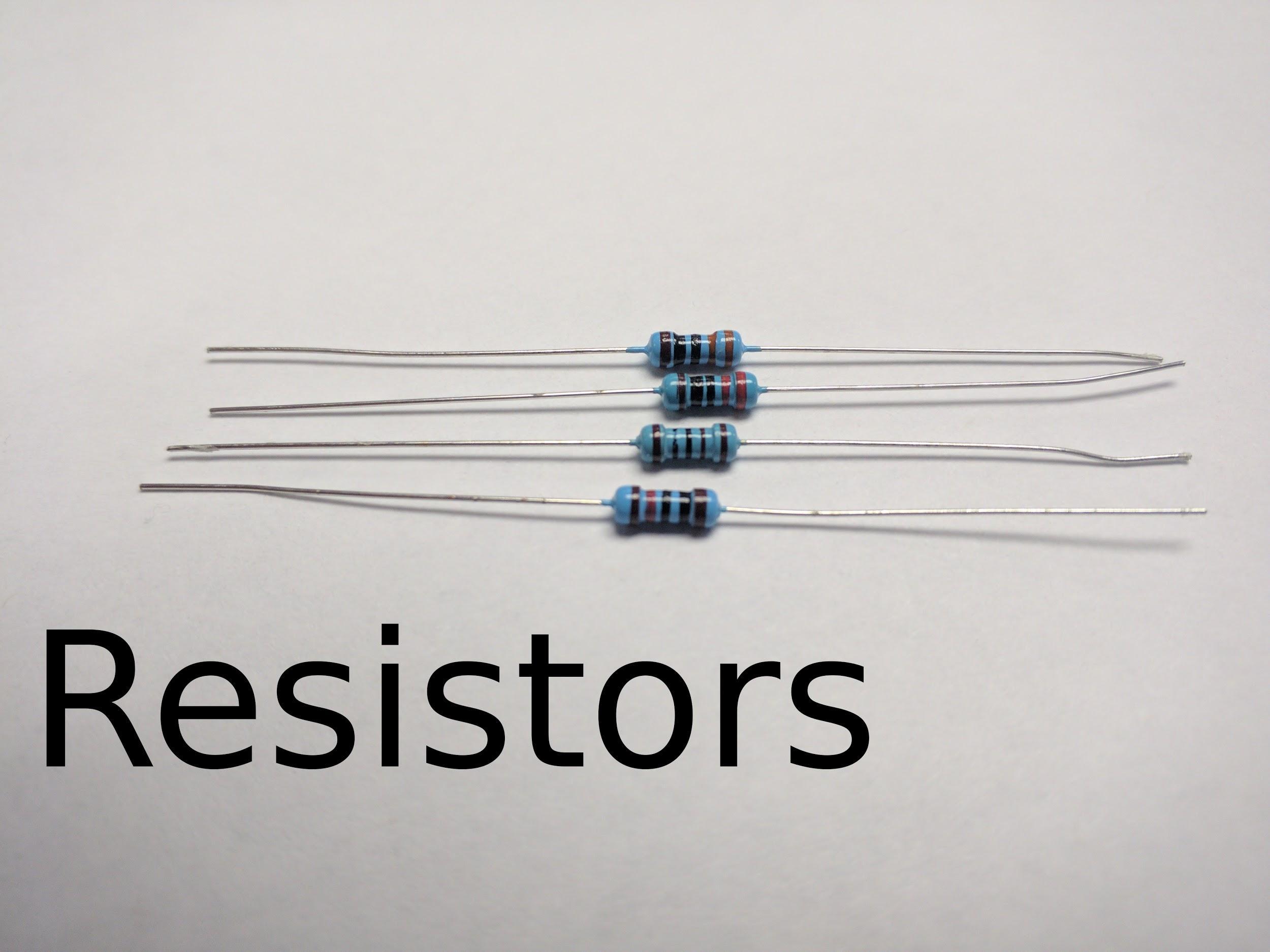
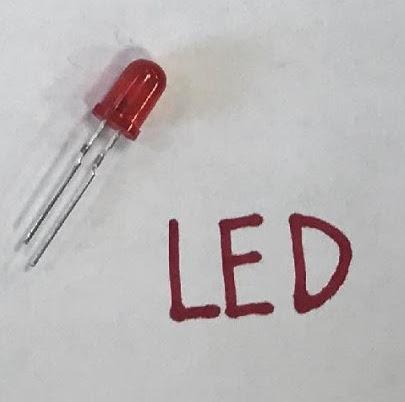
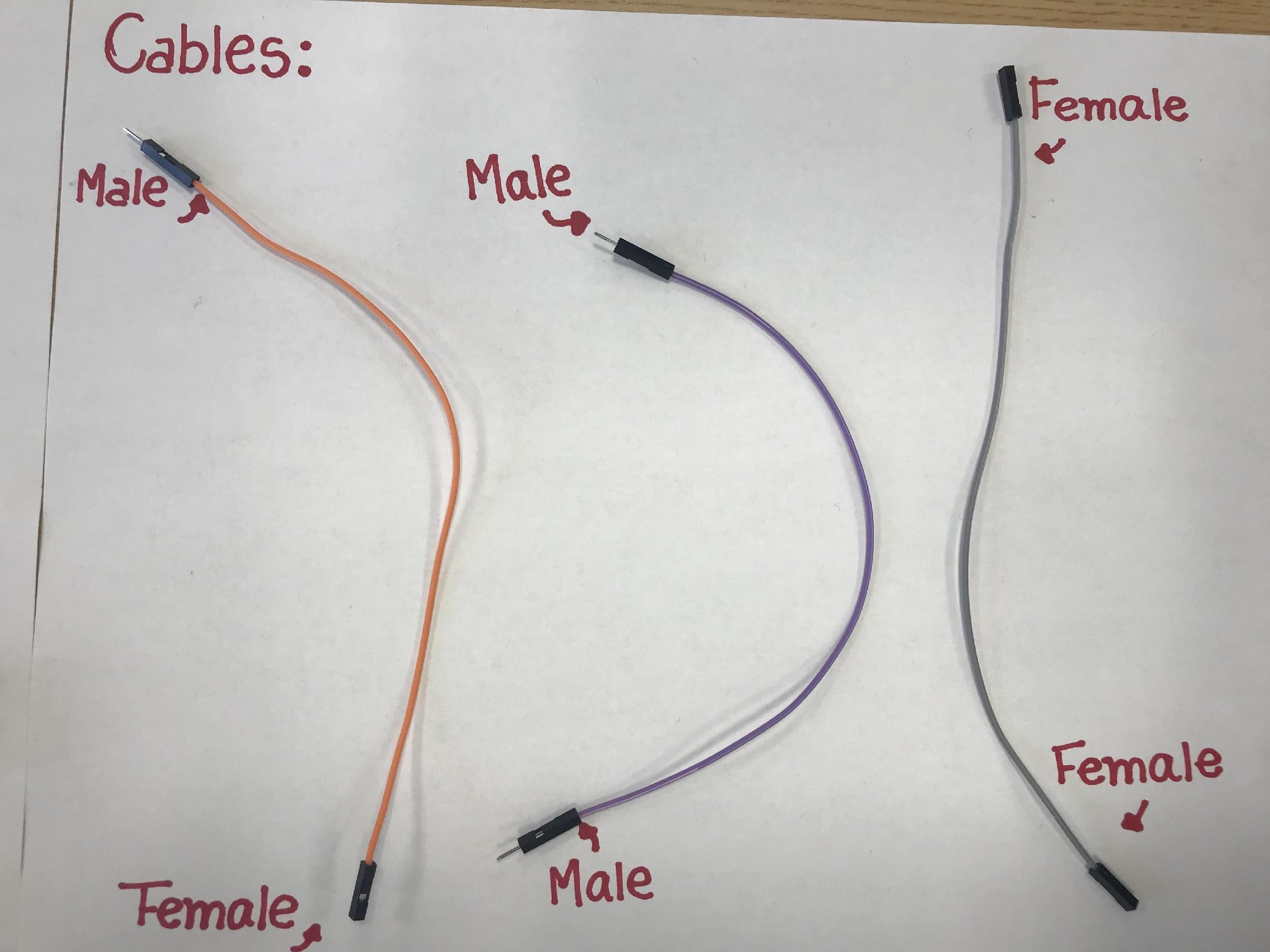
horizontal line

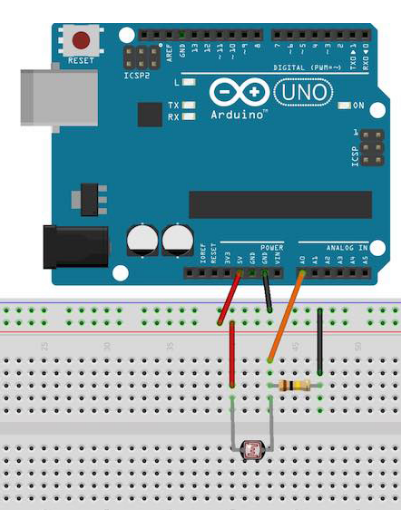
# Objectives

* Use digital and analog inputs
* Control behavior using the light sensor and the potentiometer
* Test data received by the input pins (Digital and Analog)
* Use If/Else statements to control components based on input values
* Display data using the serial monitor
* Observe the text-based sketches generated by Tinkercad

# Required Resources:

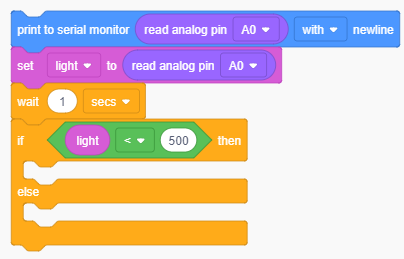
* Access to the Arduino IDE
* Access to the simulation tool in [Tinkercad](https://www.tinkercad.com/#/?type=circuits&collection=designs)
* An Arduino UNO connected to a computer
* LEDs, resistors (330Ω, 100Ω, 10KΩ), a piezo buzzer, jumper cables, a breadboard, LDR (light sensor), a potentiometer.
* Access to the iCREAT course in Blackboard
* Enough time to have fun!



**Part 1. Using a Light Sensor (LDR, light dependent resistor)** 

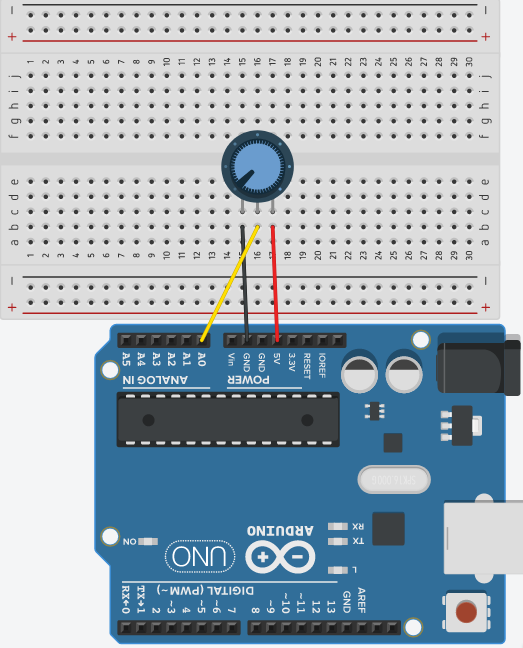
For this exercise you will use the LDR, jumper cables, a 10K ohm resistor, and a breadboard. We will read the amount of light that hits the photocell and display it on the serial monitor.

The light sensor is an analog component that must be connected to an **analog pin**. We will connect the resistor in series.

1. **Follow** this diagram to create a circuit that uses the **LDR on pin A0** in the simulation tool.
2. **Use the code below** to have the Arduino display the values generated by the LDR on the serial monitor. Simulate it to test it.
3. Implement it.
4. **Change your circuit** to add an LED that is turned on when the LDR receives little or no light.
5. **Show us your** completed simulation and programs before you move to the next section.

**Part 2. Using a Potentiometer**

For this exercise you will use a potentiometer, jumper cables and a breadboard. A potentiometer is a simple knob that provides a variable resistance, which we can read into the Arduino board as an analog value. We will read the values generated and display it on the serial monitor. The pins on the sides of the potentiometer must be connected to ground and the 5V pins. The center pin provides the data to read and must be connected to an analog pin.

By turning the shaft of the potentiometer, we change the amount of resistance on either side of the wiper which is connected to the center pin of the potentiometer. When the shaft is turned all the way in one direction, there are 0 volts going to the pin, and we read 0. When the shaft is turned all the way in the other direction, there are 5 volts going to the pin and we read the value 1023.

1. **Follow** this diagram to create a circuit that uses the potentiometer. 
2. **Use serial println** to display the values generated by the potentiometer.
3. **Simulate it first** and then implement it.
4. **Change your circuit** to add an LED that is controlled by the potentiometer.
5. **Show us your** completed simulation and programs before you move to the next exercise.

Tutorials, Examples and help at <https://www.arduino.cc/en/Tutorial/BuiltInExamples>