Project: Introduction to op-amps

1. Record the resistance of the photoresistor in light and dark

    Light: 1.00 kOmh
    Dark: 2.50 kOmh
    Geometric mean: 1.75 kOmh

2. Your choice for R in Figure 2.

    I.5 kOmh resistor

3. Output voltage and ADC value in the light:

    Before LED is connected:
        Output Voltage: 1.4V
        ADC Value: 1765

    After LED is connected:
        Output Voltage: .43V
        ADC Value: 510

4. Output voltage and ADC value in the dark:

    Before LED is connected:
        Output Voltage: 2.15V
        ADC Value: 2673

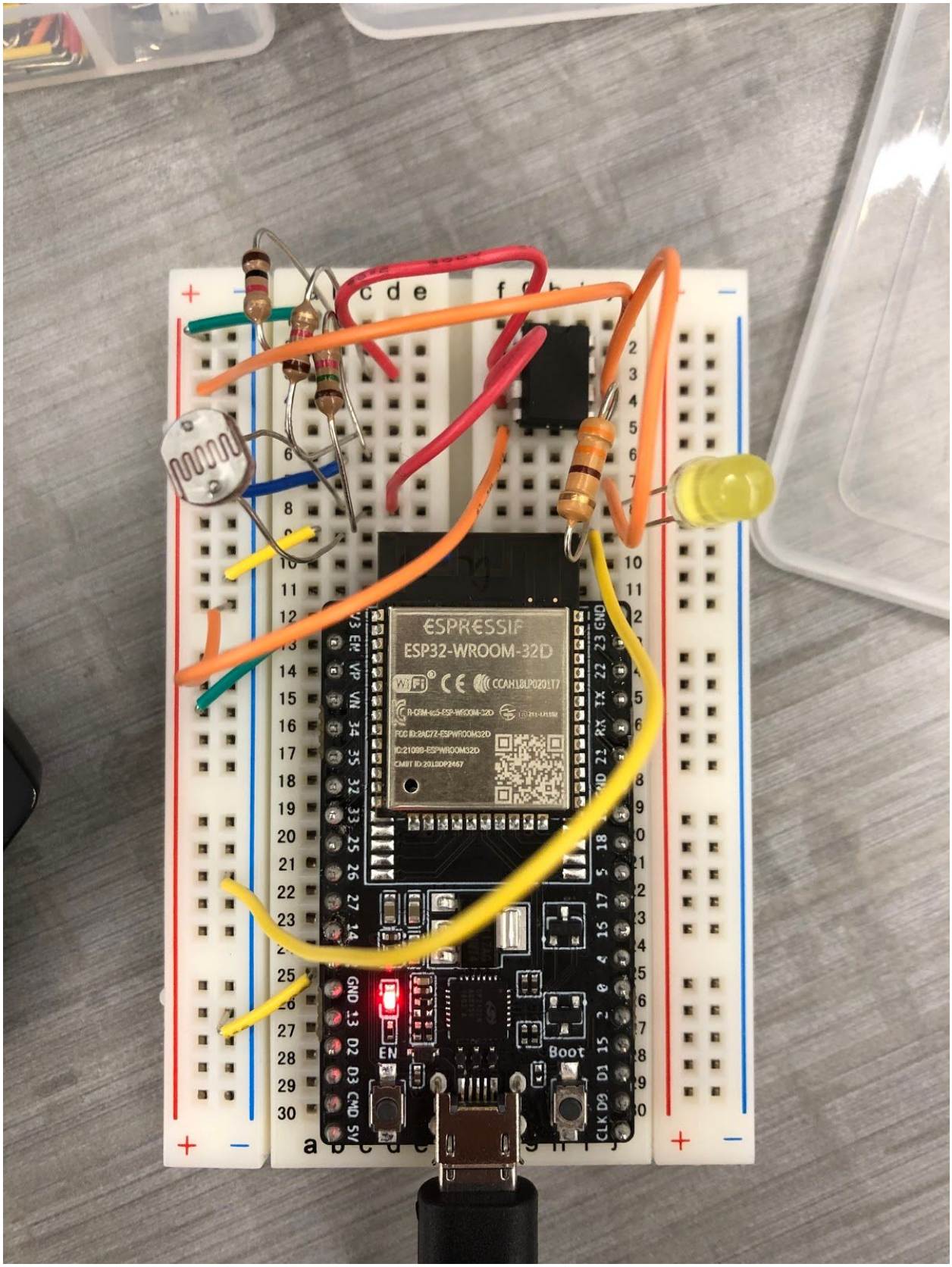
    After LED is connected:
        Output Voltage: .47V
        ADC Value: 582

5. The motor will spin when the photoresistor is in the light, as the voltage is higher in the dark. The motor will not spin when the photoresistor is in the dark, as the voltage is lower in the light

6. To reverse the behavior of the motor I would move the photoresistor voltage divider to the negative op-amp.

```
//declare a pin to use for the ADC
const int adcPin = 26;
const int ledPin = 13;

void setup()
{
  pinMode(adcPin, INPUT);

  //this sets up the ESP32 to communicate with the Serial Monitor or console on your computer
  //115200 is the buad rate: bits per second
  Serial.begin(115200);

  pinMode(ledPin, OUTPUT);         // initialize the digital pin as an output.
}

void loop()
{
  //read the ADC
  int adcValue = analogRead(adcPin);

  float voltage = (3.3 * adcValue) / 4096.0;  // formula for voltage

  Serial.print(adcValue); //prints ADC Value
  Serial.print('\t'); //TAB character

  Serial.print(voltage); // prints the voltage
  Serial.print('\n'); //newline

  if(voltage <= .47){
    digitalWrite(ledPin, LOW);   // turn the LED off (LOW is the voltage level)
      Serial.print("DARK "); //prints dark
  }

  else if(voltage > .47){
    digitalWrite(ledPin, HIGH);   // turn the LED on (HIGH is the voltage level)
    Serial.print("LIGHT "); //prints light
  }



  delay(250);
```

```
}
```


ESPRESSIF
ESP32-WROOM-32D
Boot
EN