

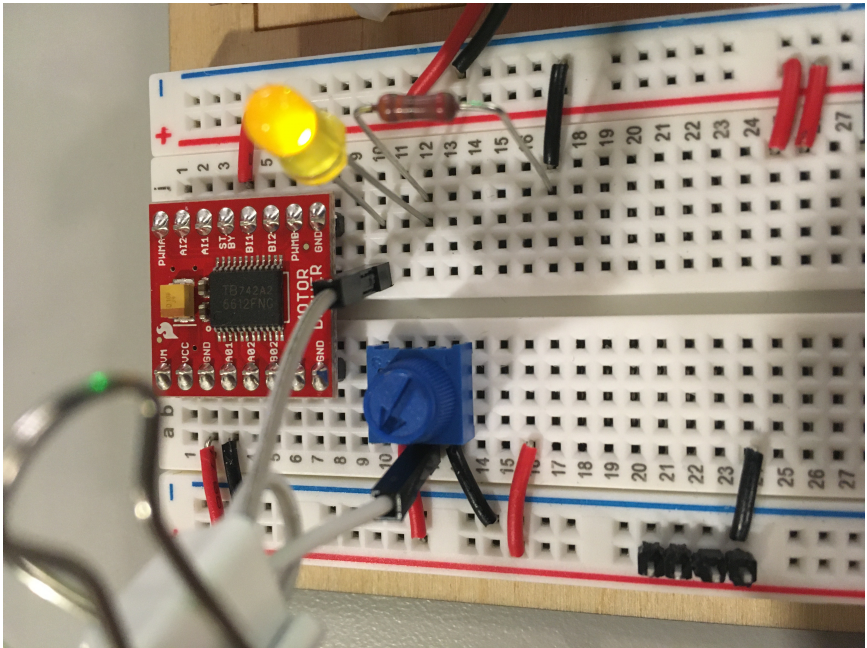
## Problem 2 code

```
// -----  
// ME120, Section 001  
// Homework 4, Problem 2  
// Sean Lai  
// 10/29/19  
//  
// Nightlight:  
// Uses a potentiometer to set the light level reading from a photoresistor  
// at which a nightlight turns on or off.  
// -----  
  
// Setup sensor and output pins  
const int potPin = A0;  
const int photoPin = A1;  
const int LEDPin = 9;  
  
// declare variables for reading and calibration  
int photoVal, potVal;  
  
void setup() {  
    // Setup LED output pin  
    pinMode(LEDPin, OUTPUT);  
  
    // Setup Serial communications for debugging  
    Serial.begin(9600);  
}  
  
void loop() {  
    // Take readings from photoresistor and potentiometer  
    photoVal = analogRead(photoPin);  
    potVal = analogRead(potPin);  
  
    // Test if light reading is less than  
    if(photoVal < potVal) {  
        digitalWrite(LEDPin, HIGH); // Turn LED on  
    }  
    // Otherwise turn it off  
    else {  
        digitalWrite(LEDPin, LOW);  
    }  
}
```

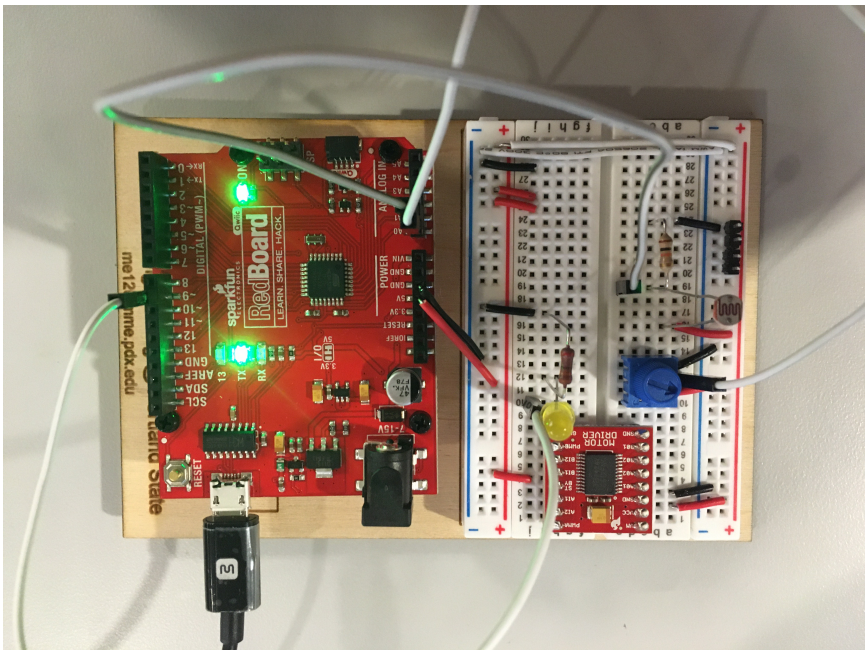
## Problem 3 code

```
//-----  
// ME120, Section 001  
// Homework 4, Problem 3  
// Sean Lai  
// 10/29/19  
//  
// Step Ramp Analog Scaling:  
// Converts an analog input into a step ramp function  
//-----  
  
// Declare constants  
const int xmin = 0, x1 = 400, x2 = 800, xmax = 1023;  
const float y1 = 10.0, y2 = 20.0;  
  
// Delclare pins  
int potPin = A0;  
  
void setup() {  
    // Setup serial communications  
    Serial.begin(9600);  
}  
  
void loop() {  
    // Declare variables and slope of ramp  
    int potReading;  
    float y, slope = (y2-y1)/(x2-x1);  
  
    // Read input from potentiometer  
    potReading = analogRead(potPin);  
  
    // Logic for step ramp function  
    if (potReading >= xmin && potReading < x1) {  
        y = y1;  
    }  
    else if (potReading >= x1 && potReading < x2){  
        y = y1 + slope*(potReading-x1);  
    }  
    else if (potReading >= x2 && potReading <= xmax) {  
        y = y2;  
    }  
    else { Serial.println("Error: potReading outside of expected range"); }  
  
    // Print to serial monitor  
    Serial.print(potReading);  
    Serial.print("  ");  
    Serial.println(y);  
}
```

Problem 1 Circuit Photo



Problem 2 Circuit Photo



## Problem 3 Serial Monitor

The screenshot shows a serial monitor window titled "COM3". At the top, there is a text input field and a "Send" button. The main area displays a list of data points, each consisting of a frequency value (600) and a voltage value (15.00). A vertical scrollbar is on the right side of the list. At the bottom, there are checkboxes for "Autoscroll" (checked) and "Show timestamp" (unchecked). To the right of these are two dropdown menus: "Newline" and "9600 baud". Further right is a "Clear output" button.

Frequency (Hz)	Voltage (V)
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00
600	15.00

☒ Autoscroll ☐ Show timestamp

Newline 9600 baud Clear output