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Lab 4: Photoresitor

Introduction

A photoresistor or photocell is a light-controlled variable resistor. The resistance of a photoresistor decreases with increasing incident light intensity; in other words, it exhibits photoconductivity. A photoresistor can be applied in light-sensitive detector circuits, and light- and dark-activated switching circuits.

Components list: Arduino uno board, usb cable, photoresistor module, 1 resistor (10KΩ), 8 resistors (220Ω), breadboard, 8 LEDs, and jumper wires.

Experiment

By connecting the components as shown in the picture diagram below we can begin uploading code to the arduino and test the leds and the photoresistor.
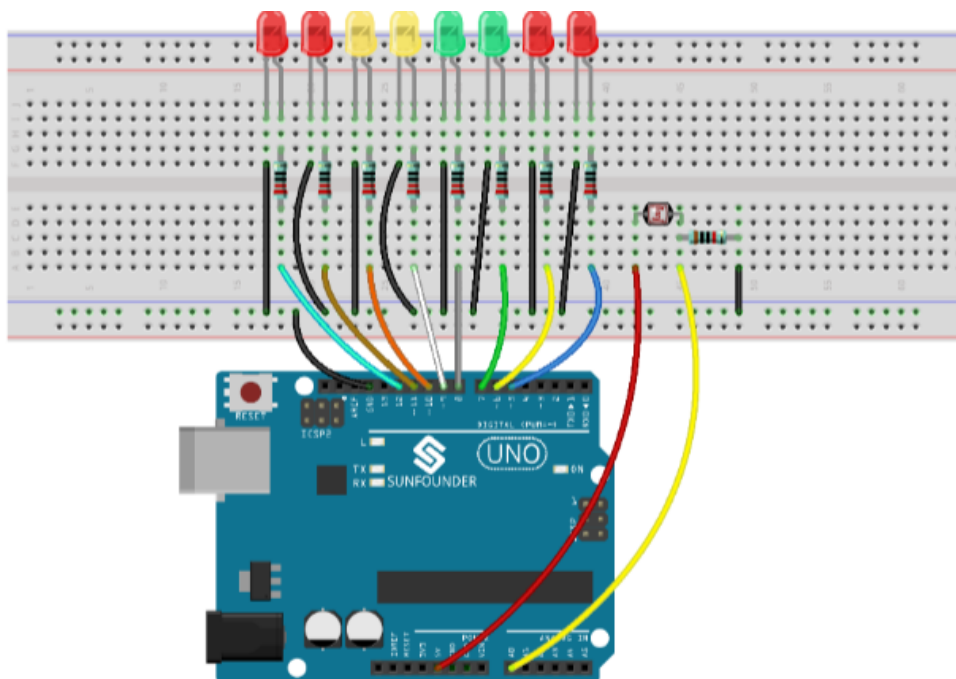
Test

Original Program:

Using the code below, The leds light up if light is shined onto the photoresistor.

```
const int NbrLEDs = 8;//8 leds
const int ledPins[] = {5, 6, 7, 8, 9, 10, 11, 12};//8 leds attach to pin 5-12 respectively
const int photocellPin = A0; //photoresistor attach to A0
int sensorValue = 0; // value read from the sensor
int ledLevel = 0; // sensor value converted into LED 'bars'

void setup()
{
for (int led = 0; led < NbrLEDs; led++)
{
pinMode(ledPins[led], OUTPUT);// make all the LED pins outputs
}
}
void loop()
{
sensorValue = analogRead(photocellPin); //read the value of A0
ledLevel = map(sensorValue, 300, 1023, 0, NbrLEDs); // map to the number of LEDs
for (int led = 0; led < NbrLEDs; led++)//
{
if (led < ledLevel ) //When led is smaller than ledLevel, run the following code.
{
digitalWrite(ledPins[led], HIGH); // turn on pins less than the level
}
else
{
digitalWrite(ledPins[led],LOW); // turn off pins higher than

}
}
}
```

Modified Program:

Using the code below, The leds light up if no light is shined on the photoresistor.

```
const int NbrLEDs = 8;//8 leds
const int ledPins[] = {5, 6, 7, 8, 9, 10, 11, 12};//8 leds attach to pin 5-12 respectively
const int photocellPin = A0; //photoresistor attach to A0
int sensorValue = 0; // value read from the sensor
int ledLevel = 0; // sensor value converted into LED 'bars'

void setup()
{
for (int led = 0; led < NbrLEDs; led++)
{
pinMode(ledPins[led], OUTPUT);// make all the LED pins outputs
}
}
void loop()
{
sensorValue = analogRead(photocellPin); //read the value of A0
ledLevel = map(sensorValue, 300, 1023, 0, NbrLEDs); // map to the number of LEDs
for (int led = 0; led < NbrLEDs; led++)//
{
if (led < ledLevel ) //When led is smaller than ledLevel, run the following code.
{
digitalWrite(ledPins[led], LOW); // turn off pins less than the level
}
else
{
digitalWrite(ledPins[led],HIGH); // turn on pins higher than

}
}
}
```
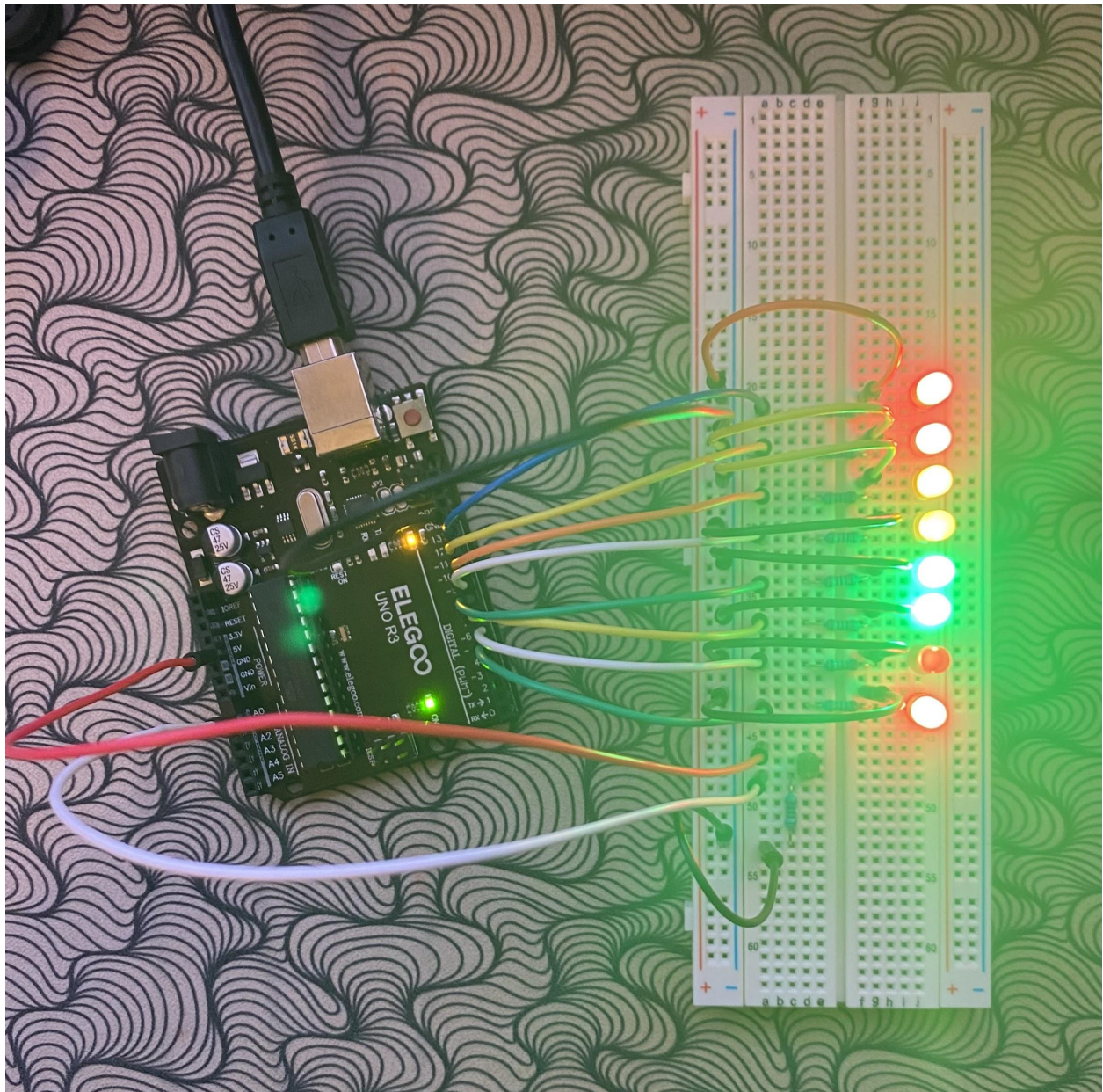
LEDs turned off
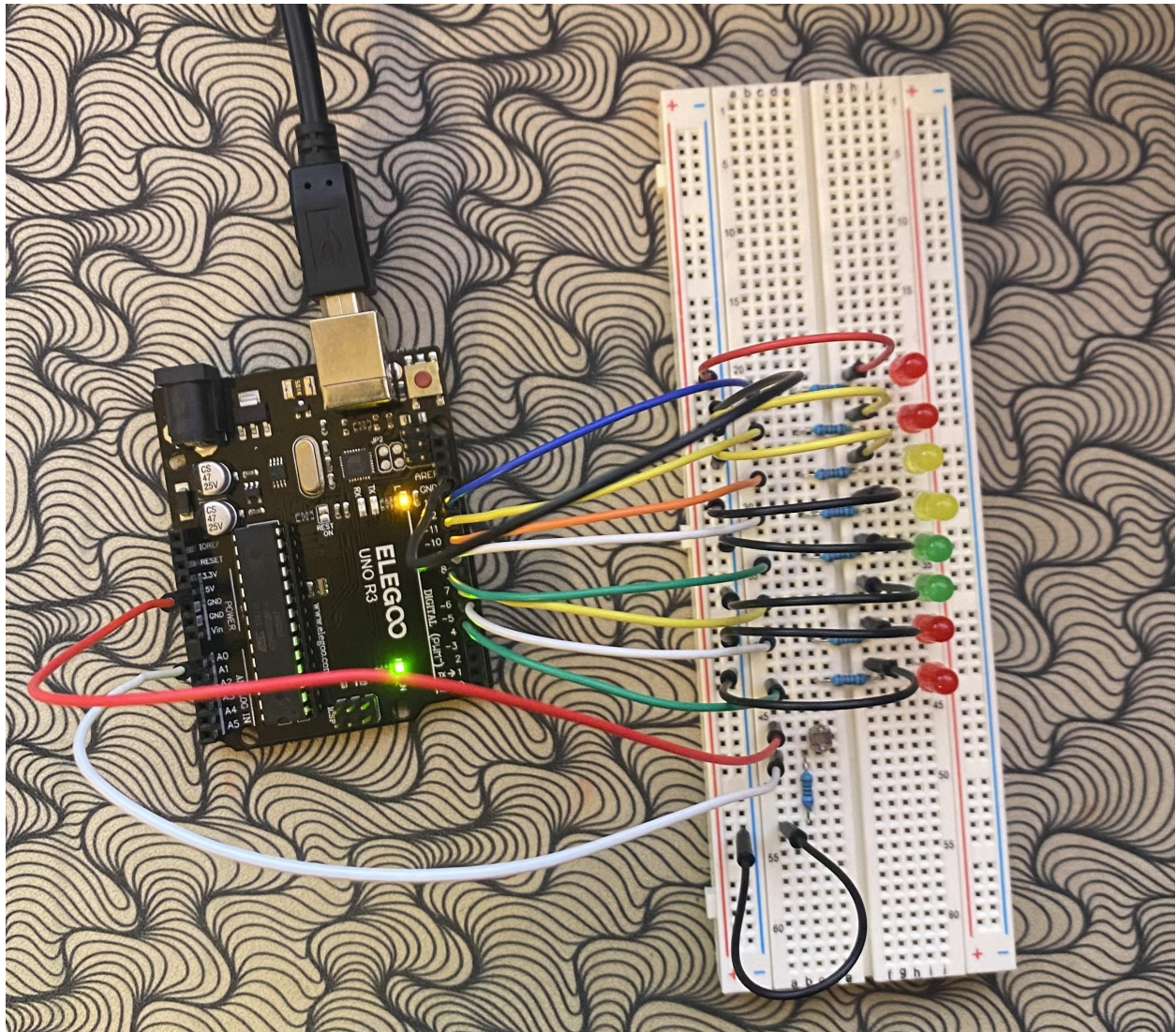
LEDs turned on

Conclusion

In this lab, I learned about photoresistors and how they can be used to activate something using light. Using the arduino IDE, we can make a code that sets the leds to turn on on or off depending on what we upload to arduino.