CEIS101 Course Project
Smart Home Automation and Security System

Prototype developed by James Garlie
Course - DeVry University: July 2021

Introduction

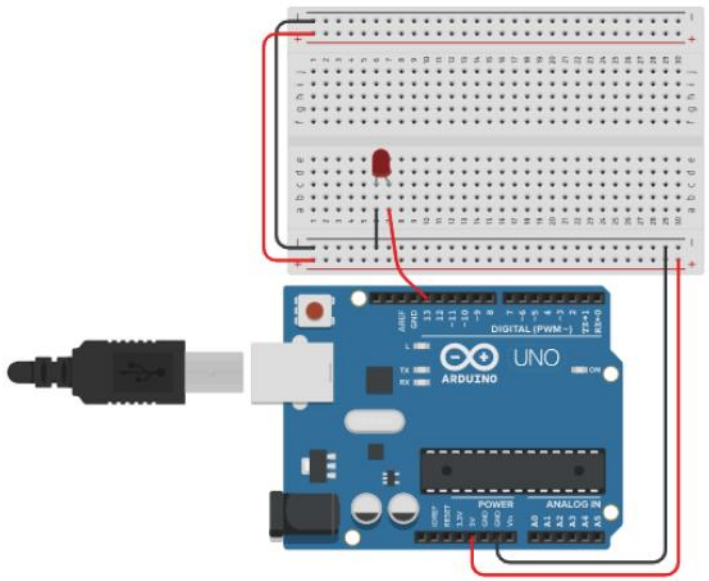
- The following presentation will show you an initial circuit design using Tinkercad and the development of a Smart Home Security System using Arduino.
- Slides three (3) and four (4) will show you the circuit designed using Tinkercad and the Serial Monitor
- Slide five (5) shows the Parts Inventory for the Home Security Prototype using Arduino
- Slides six (6) through seventeen (17) shows the initial and completed circuit created for the Smart Home Security System using Arduino.
- Slide eighteen (18) list the challenges encountered
- Slide nineteen (19) list the skills obtained
- Slide twenty (20) is the Conclusion

Tinkercad Circuit Design

This slide shows a circuit designed using Tinkercad; whereby, the system was built, coded and tested

CEIS101 July 2021 Garlie

React



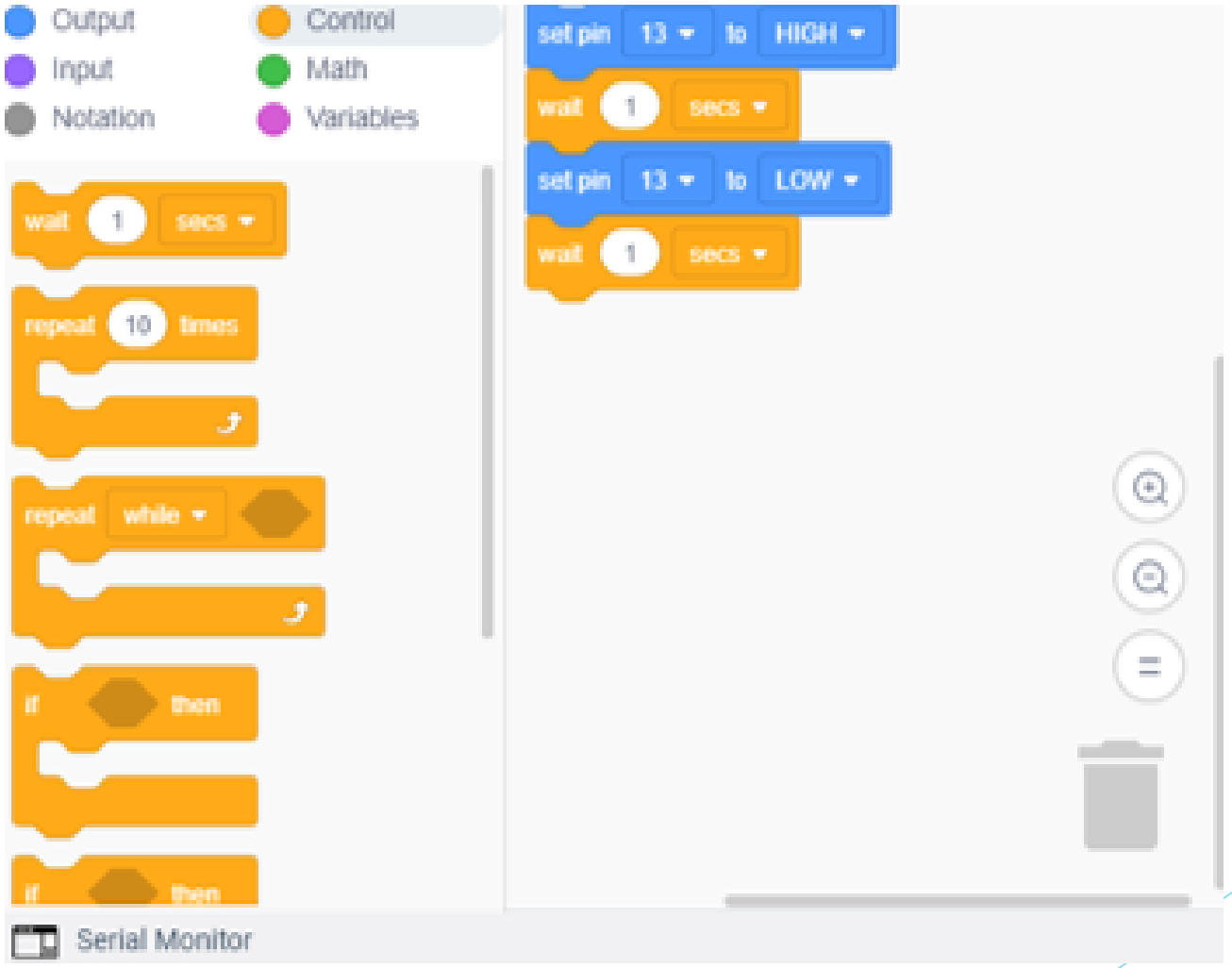
design by:
jimgarlie

Edited 7/11/21, Created 7/5/21

Tinker this

Tinkercad Serial Monitor

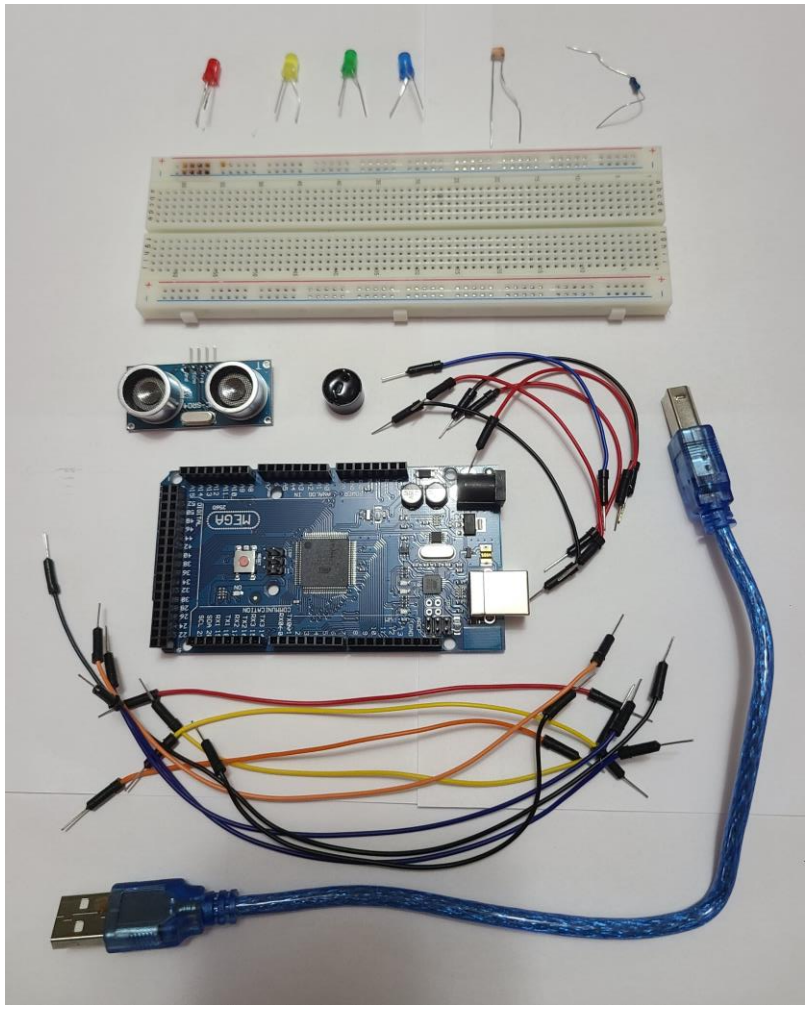
This slide shows the serial monitor and program code used for the Tinkercad circuit



Parts Inventory

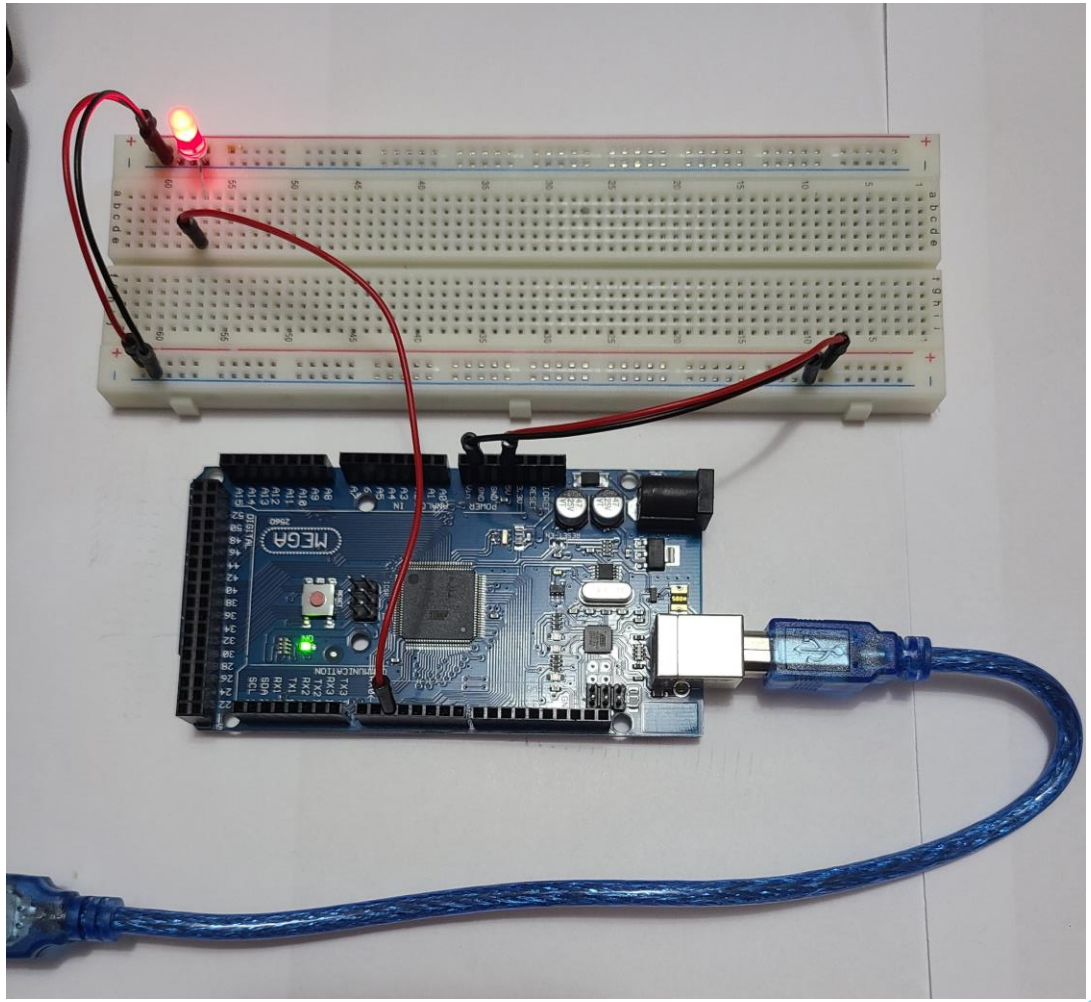
This slide shows an organization of all the components that will be used to build the Smart Home Security System Prototype

- Arduino Mega 2560
- Breadboard
- Resistor 10kΩ
- LEDs
- Ultrasonic Sensor
- Active Buzzer
- Photoresistor
- Wires
- USB Type B cable

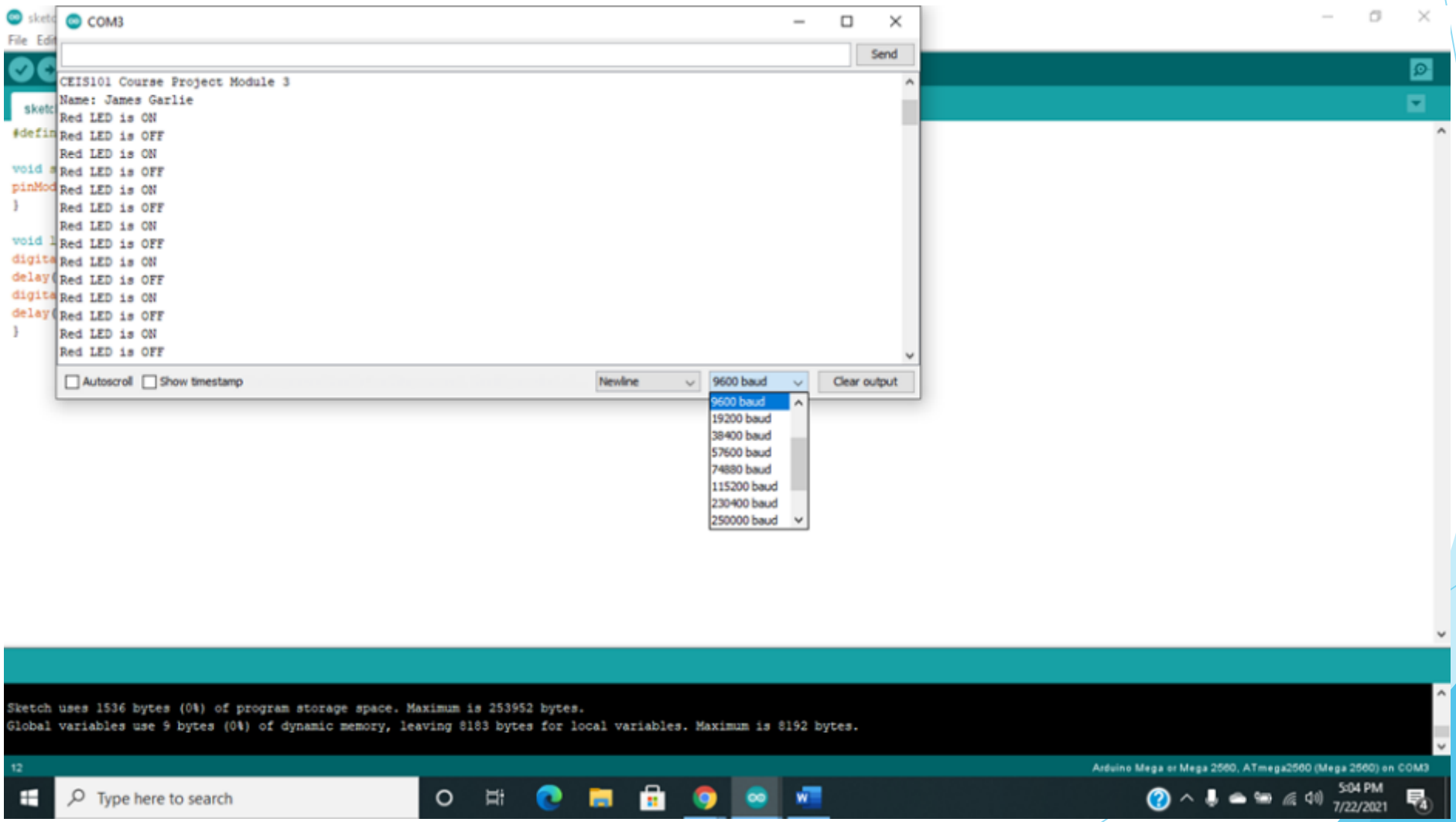


Initial Circuit Setup Using Arduino

Here is the Arduino circuit connected to the breadboard with the red LED flashing. This will also display the message on the next slide in the Serial Monitor that the LED is flashing on and off



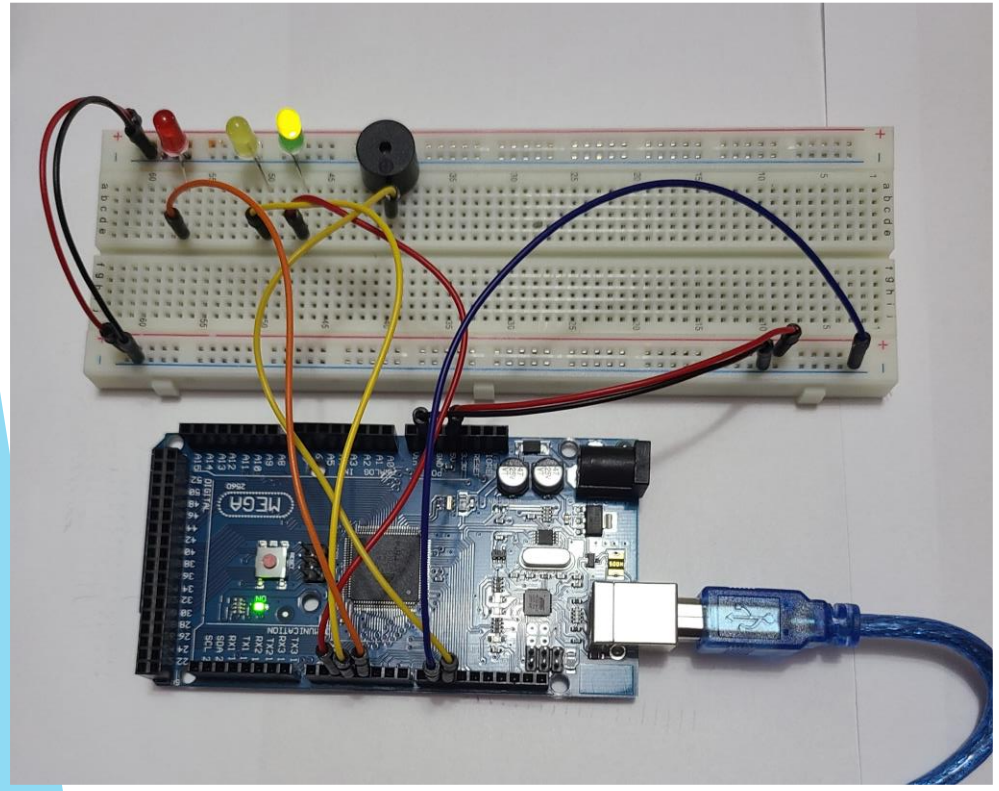
Uploaded Arduino Program Code and Serial Monitor Showing the Red LED is Flashing On and Off



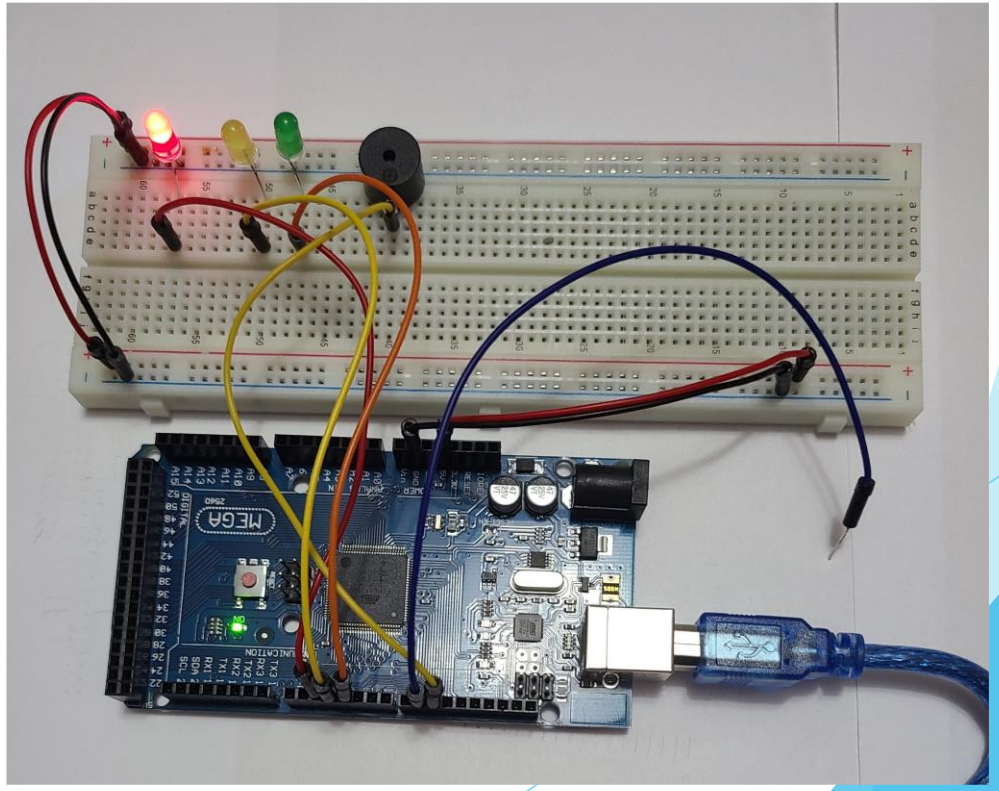
Adding a Door Sensor to the Smart Home Security System

Here we transitioned to adding the sensor and LEDs to show the effects of an intruder breaking into a home. As shown below when the door is opened, the red LED flashes and the Serial Monitor on slide ten (10) will show “Security Alert”

When the door is closed, the green LED is lit up

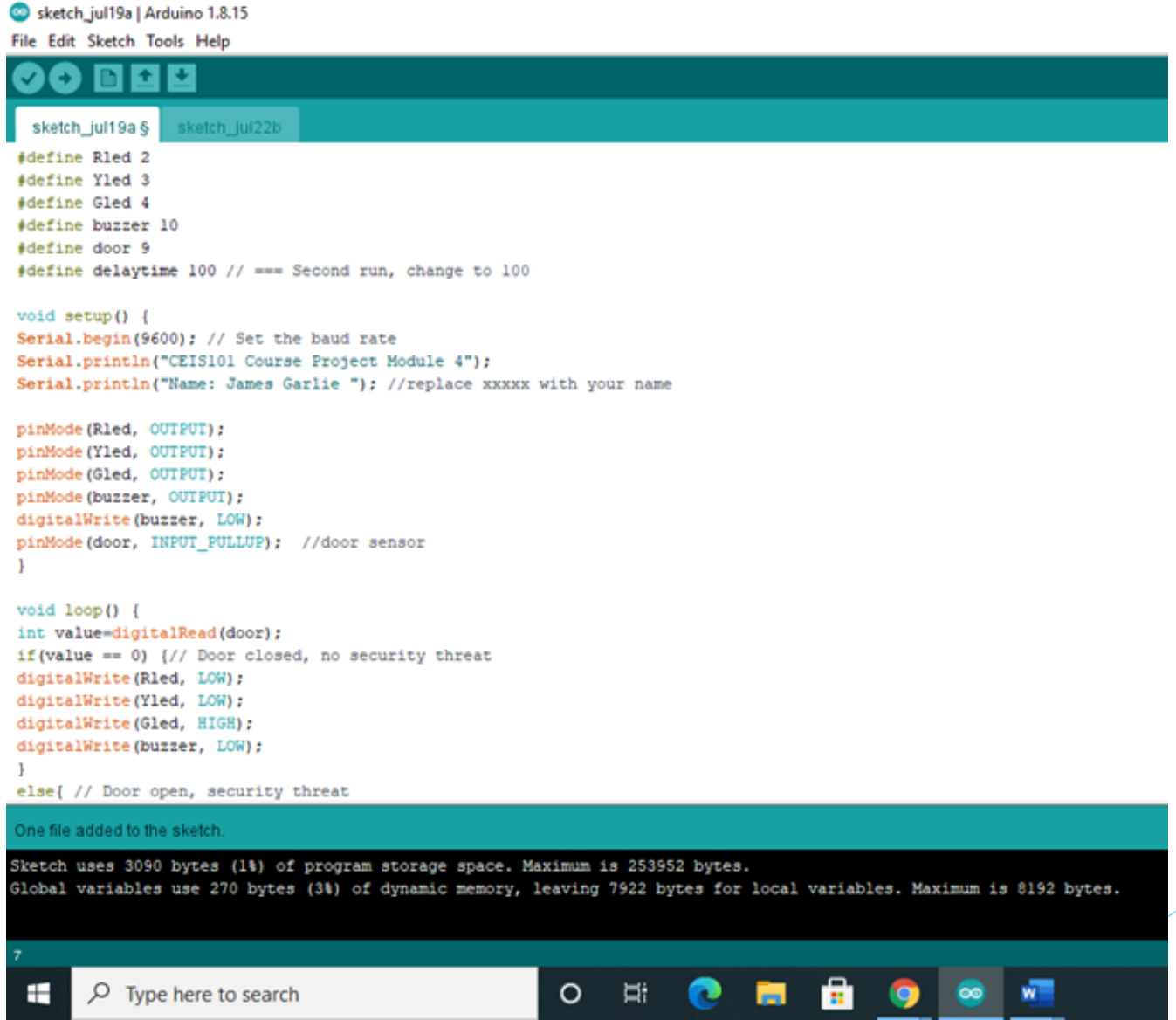


When the door is open, the red LED is flashes on and off



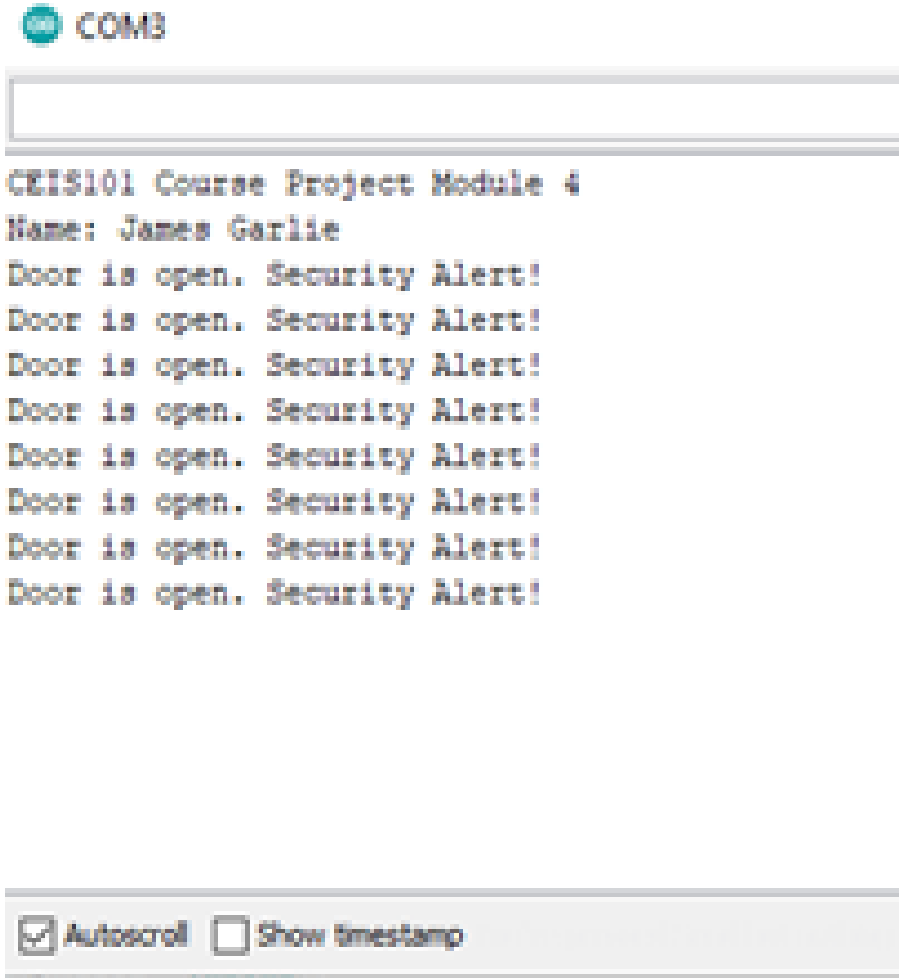
Uploaded Arduino Program Code

The program code adding the “Door Sensor” to the Smart Home Security System



Serial Monitor Indicating a Security Alert

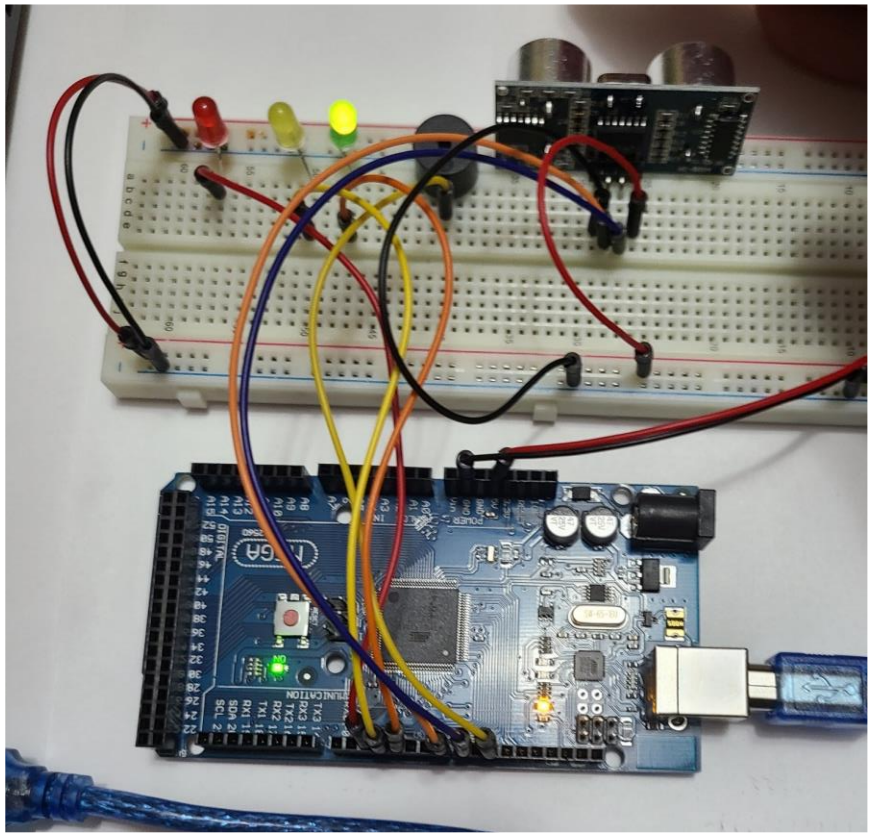
As mentioned on slide eight (8), when an intruder breaks in a home and the red LED flashes, as shown below, the Serial Monitor will signify the door is open and that there is a “Security Alert”



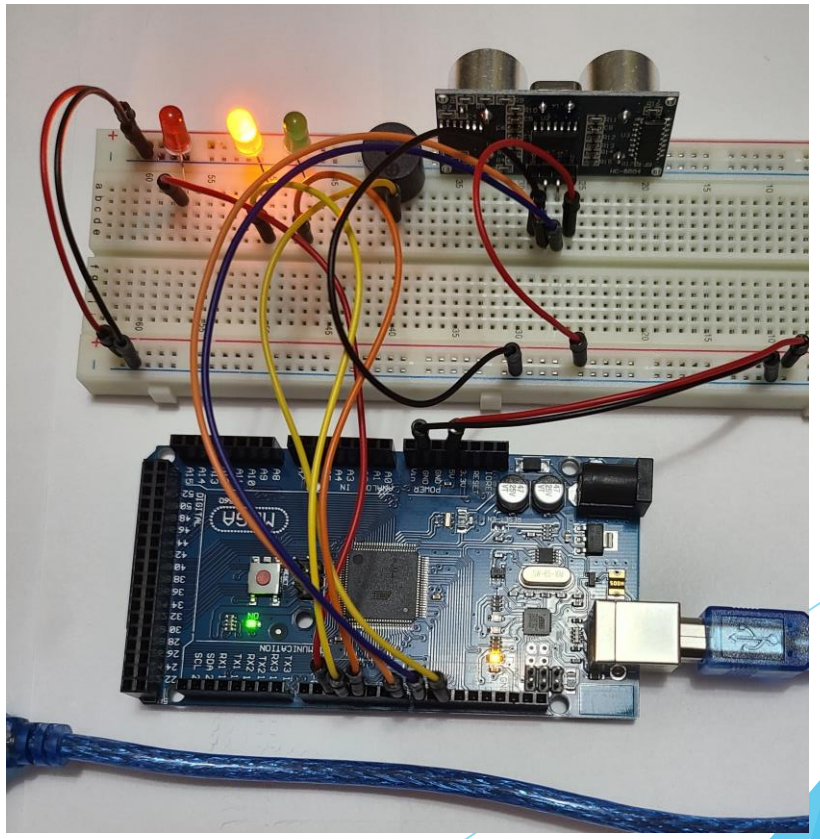
Adding a Distance Sensor to the Smart Home Security System

This and the next slide will demonstrate an Ultrasonic Sensor

The green LED on the right indicates there is no security risk

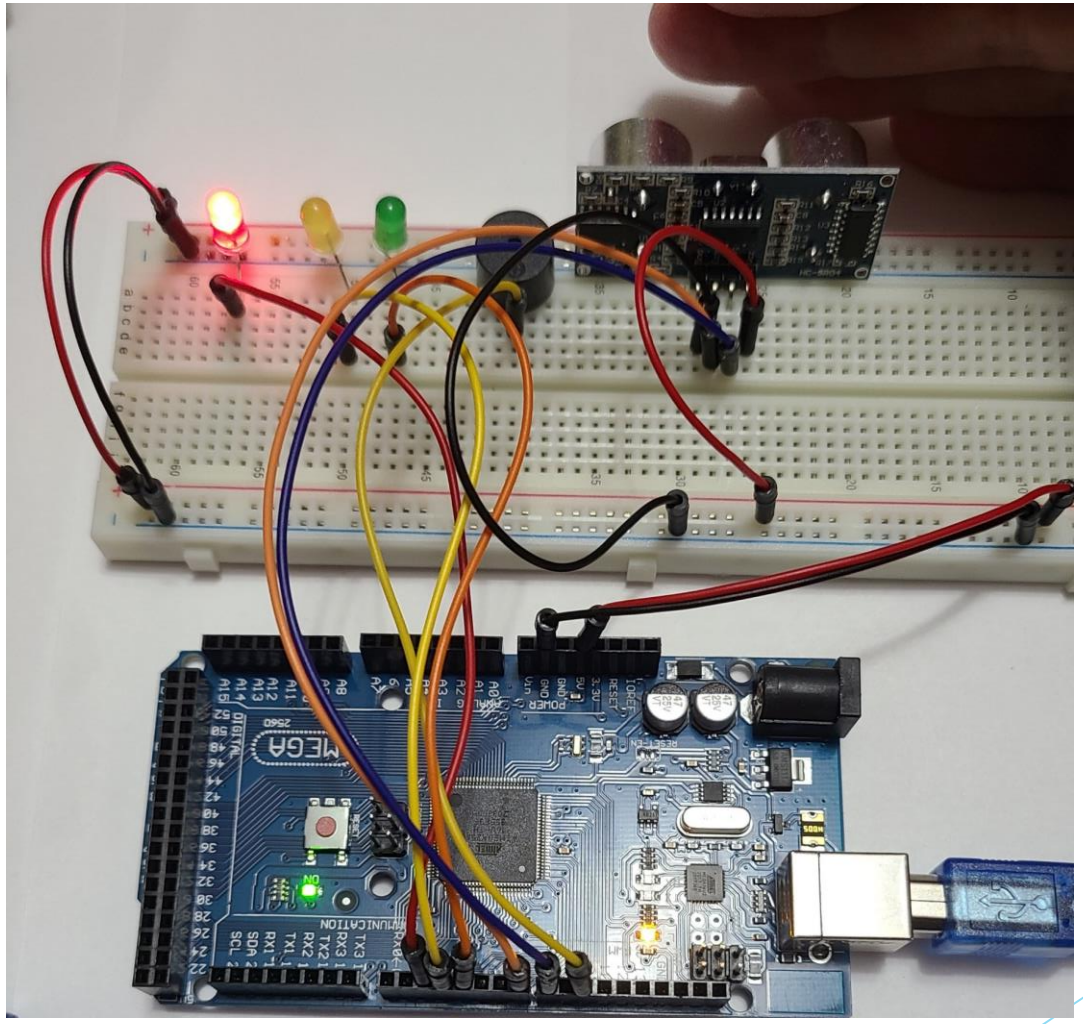


The yellow LED in the middle indicates a warning

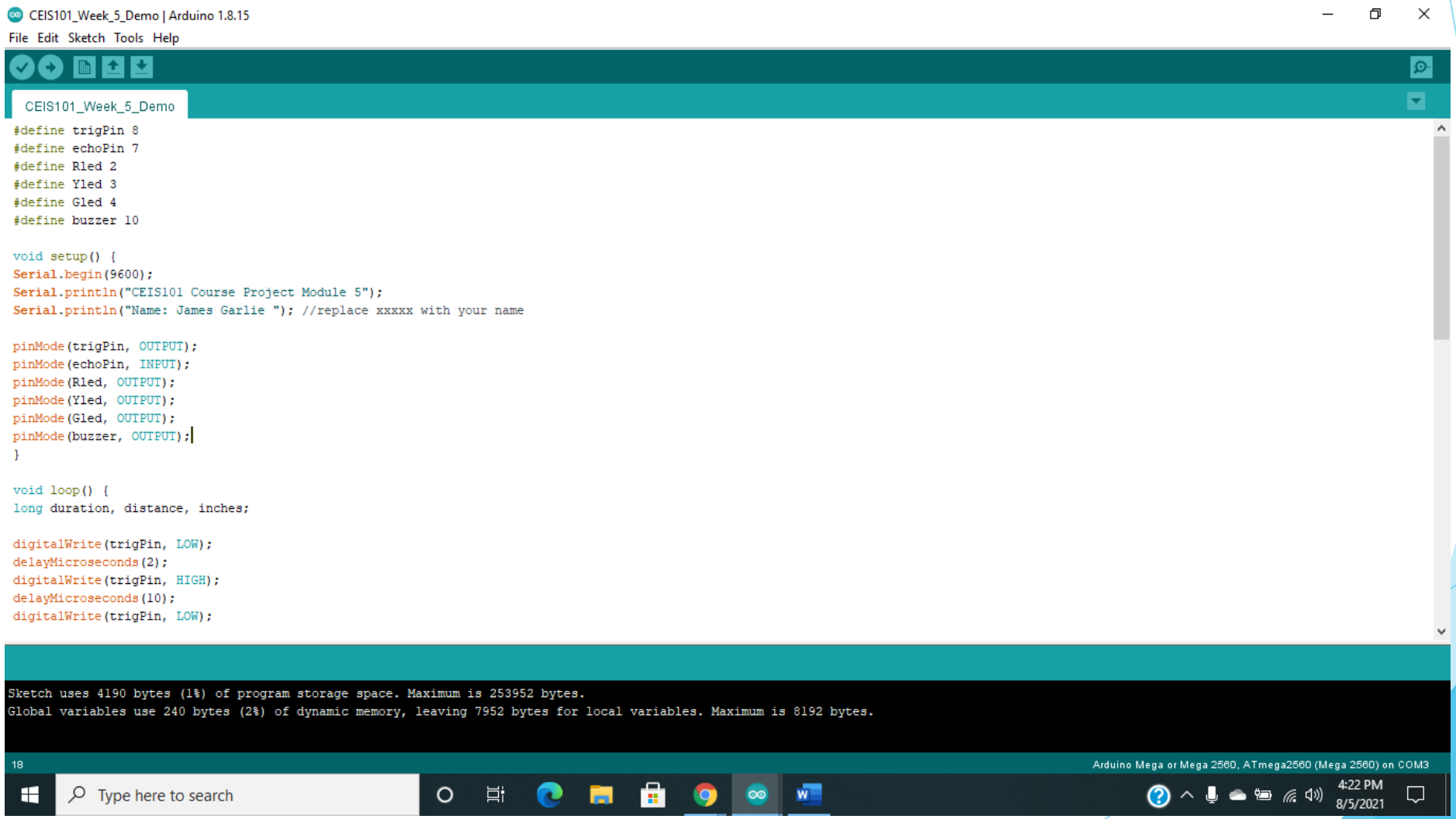


Red LED on Left Indicates High Security Risk

By placing my hand over the sensor, indicating motion, as shown below, the red LED flashes and the “Plot of Data” on slide fourteen (14) will show the variations

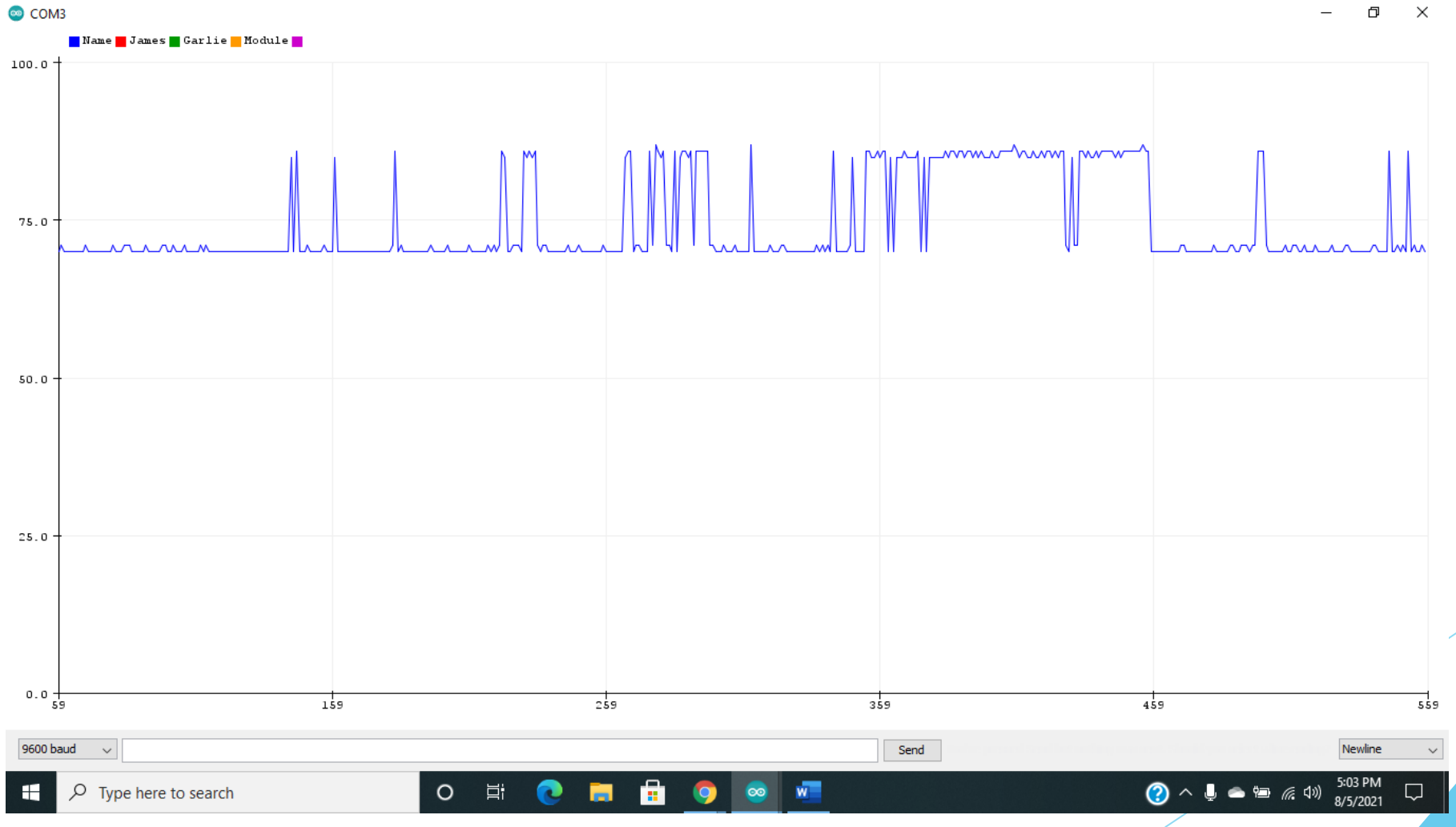


Uploaded Arduino Program Code for Distance Sensor



Plot of Data Using Excel

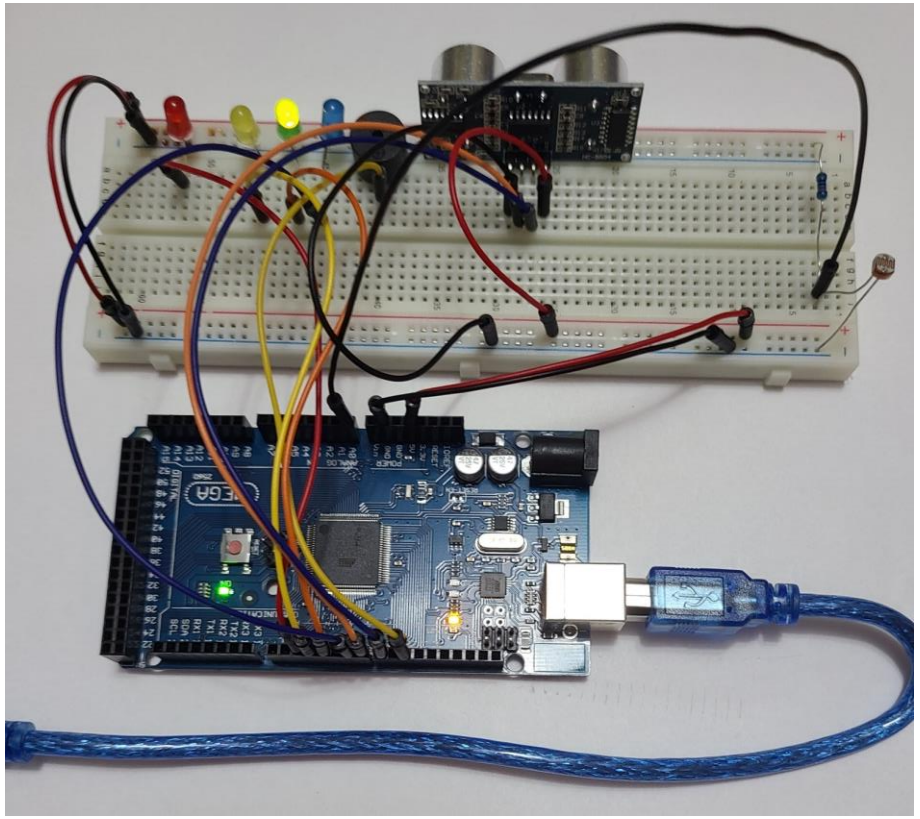
This slide shows the activity from moving my hand back and forth over the sensor shown on slides eleven (11) and twelve (12)



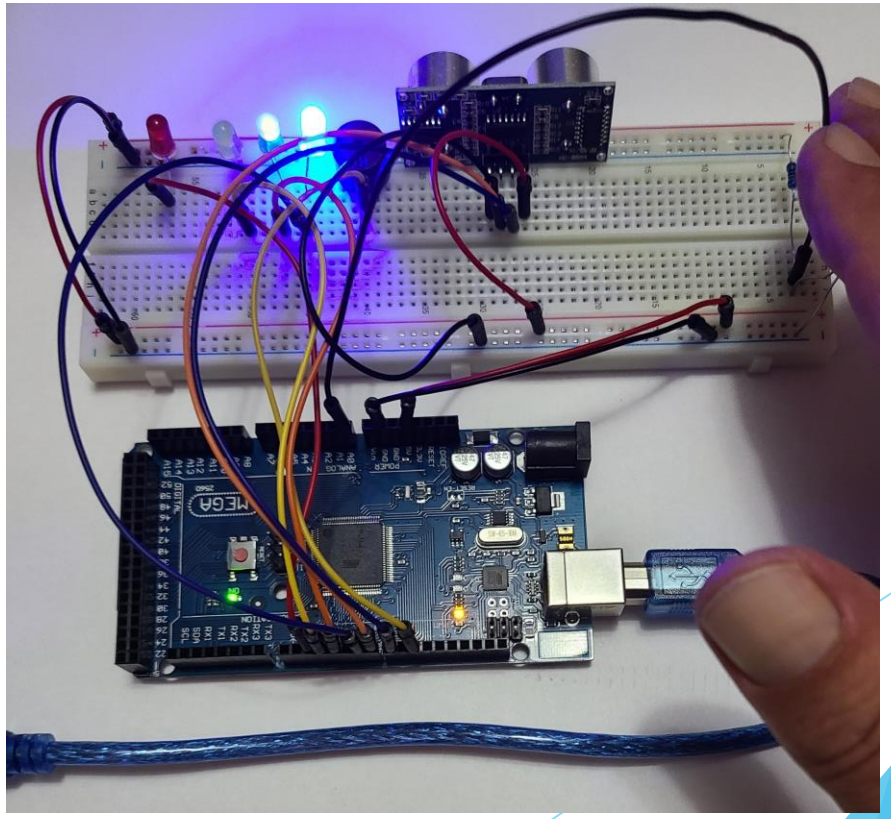
Automated Light for Smart Home Security System

This demonstrates that when an intruder breaks in your home and turns the lights on, the alarm will go off

Yellow light showing the light within the home is normal



Blue light showing that the light within the home has changed



Uploaded Arduino Program Code For Completed Circuit

CEIS101_Week_6_Demo | Arduino 1.8.15

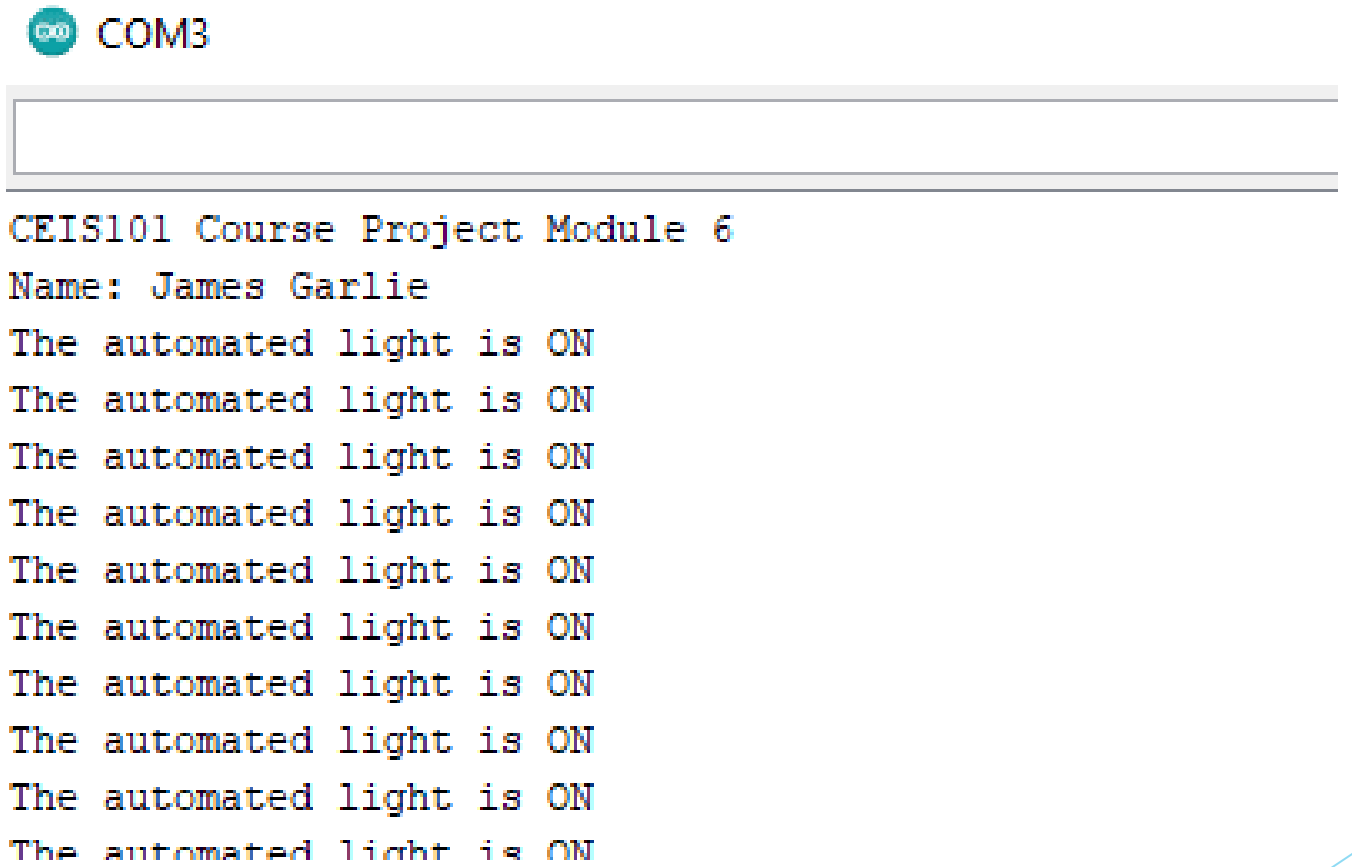
File Edit Sketch Tools Help

CEIS101_Week_6_Demo

```
#define photocell A0
#define autoLight 6

void setup() {
Serial.begin(9600);
Serial.println("CEIS101 Course Project Module 6");
Serial.println("Name: James Garlie "); //replace xxxxx with your name

pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
pinMode(Rled, OUTPUT);
pinMode(Yled, OUTPUT);
pinMode(Gled, OUTPUT);
pinMode(buzzer, OUTPUT);
pinMode(autoLight, OUTPUT);
}

void loop() {
//=== Automated Light ===
int value=analogRead(photocell); // Read the value from the light sensor to determine condition

//Serial.println(value); //uncomment this line and open serial plotter to see the effect of light intensity on the sensor

if (value > 450) {
 digitalWrite(autoLight, HIGH);
 Serial.println("The automated light is ON");
}
else {
digitalWrite(autoLight, LOW);
```

Serial Monitor For Completed Circuit

This slide shows the automated light is on



Challenges

- Challenges included:
  - Identifying the parts needed
  - Learning how to work with Arduino
  - Uploading the program code at the each stage
  - Testing the additions at each stage

Career Skills

- I learned how to:
  - Create a circuit using Tinkercad
  - Create a circuit with Arduino
  - Work with Sensors
  - How to upload program code from Arduino
  - Further developed basic and advanced computer skills

Conclusion

- I found this class: learning how to use both Tinkercad and Arduino, and the building of the Smart Home Security System to be fascinating. Tinkercad can be very useful when designing a system without physical parts. Arduino is a great program for designing a system when you do have the physical parts. With respect to actually developing the Home Security System, it was both educational and inspirational at each stage of the development. I feel this project will help me in the future.