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CEIS 101 Final Course Project Presentation

CEIS101 Final Course Project

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Introduction

- This project is a home automation and security system circuit that includes distance sensors, door sensors and light sensors.
- The circuit was designed using TinkerCad and specifically, the tools that are involved in the final design of the circuit are:
  - Arduino Uno R3
  - Wires (19 Total)
  - LEDs (4 Total)
  - Piezo
  - Resistor (10 kΩ)
  - PhotoResistor
  - UltraSonic Distance Sensor (4-pin)

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Module 2

Circuit Simulation

The aim for this project was to create a simple circuit with a blinking LED.

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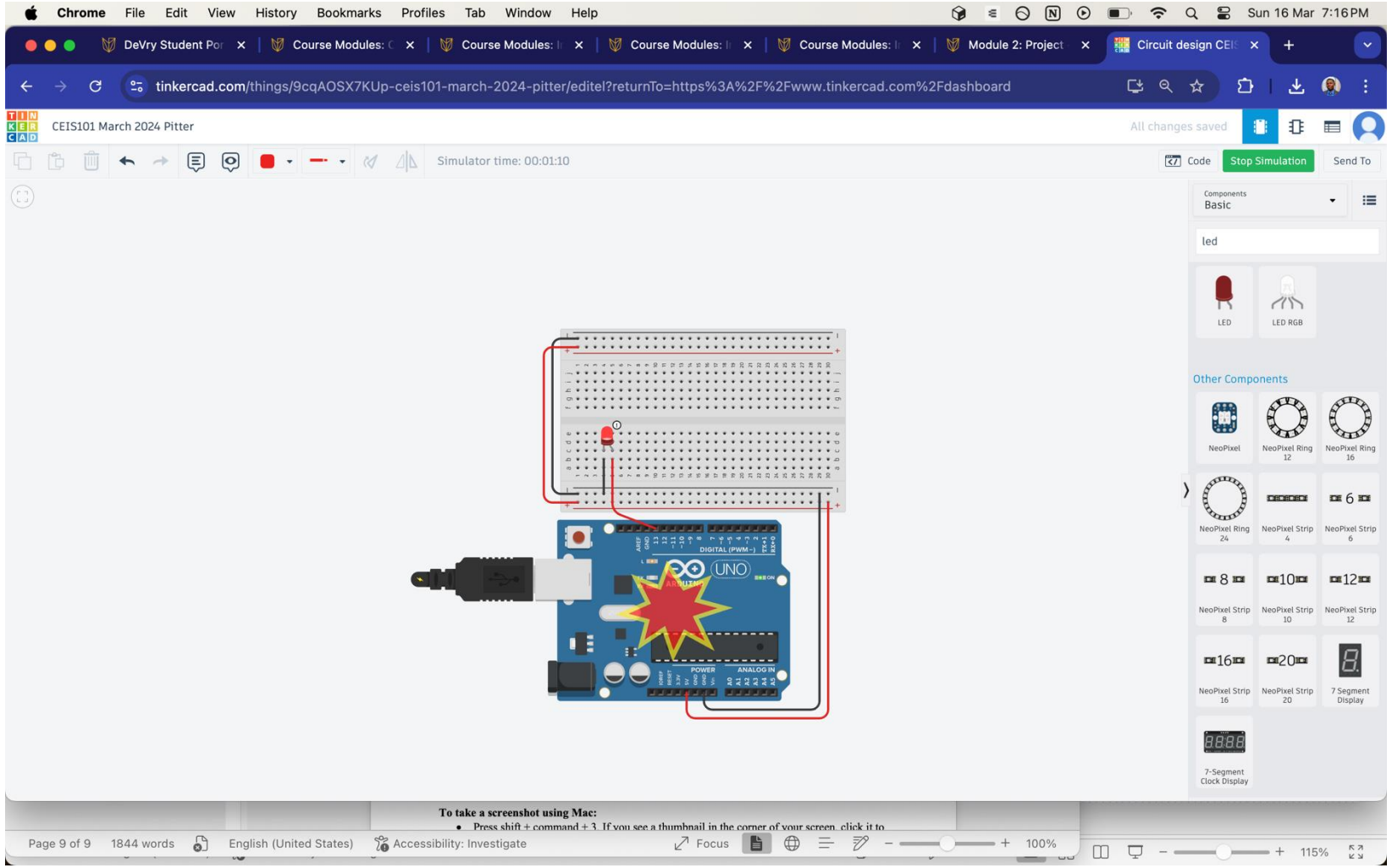
Circuit (screenshot)



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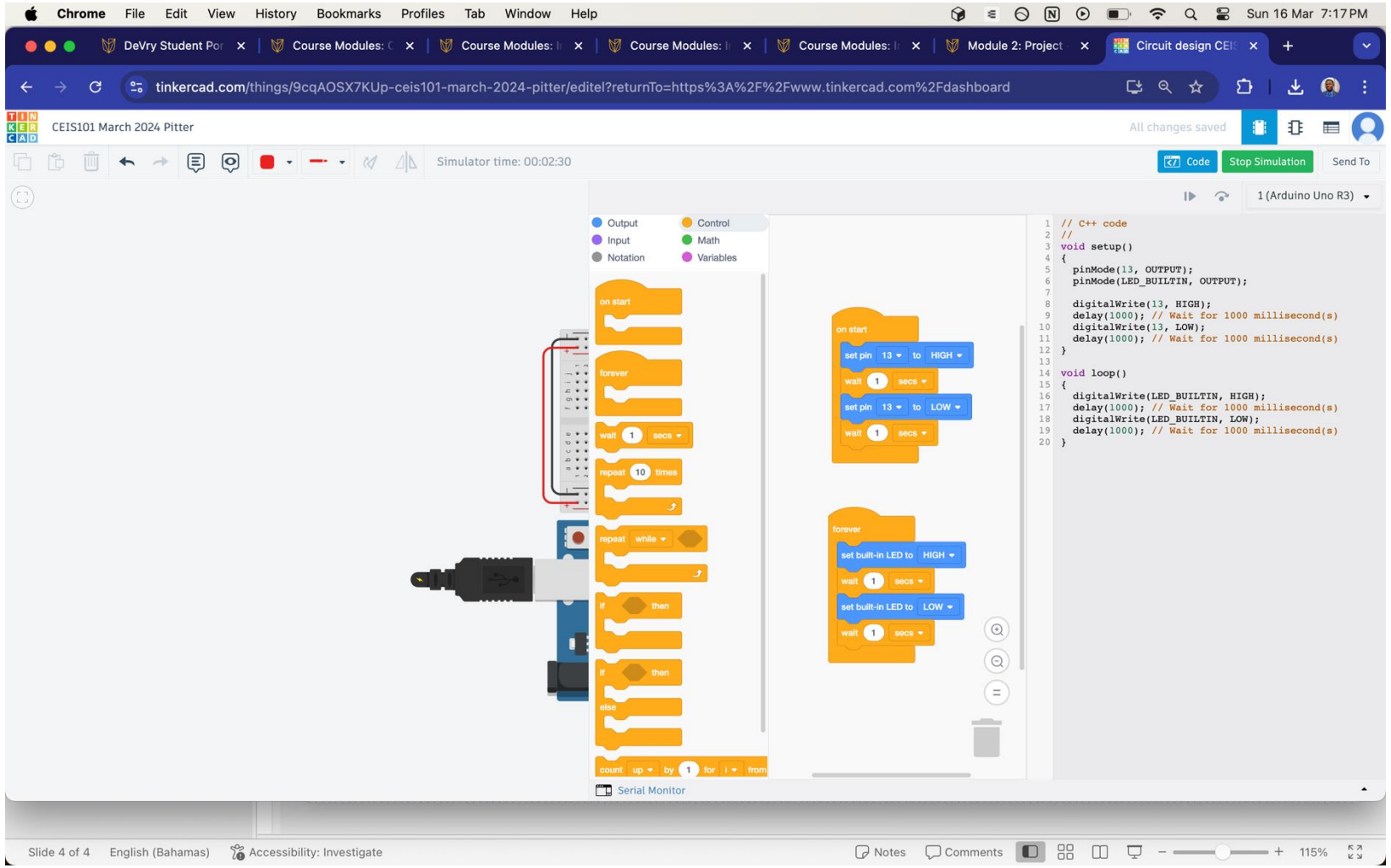
Code (screenshot)



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Module 3

Adding Door Sensor to Smart Home System

The aim for this project was to showcase all the components used in the project

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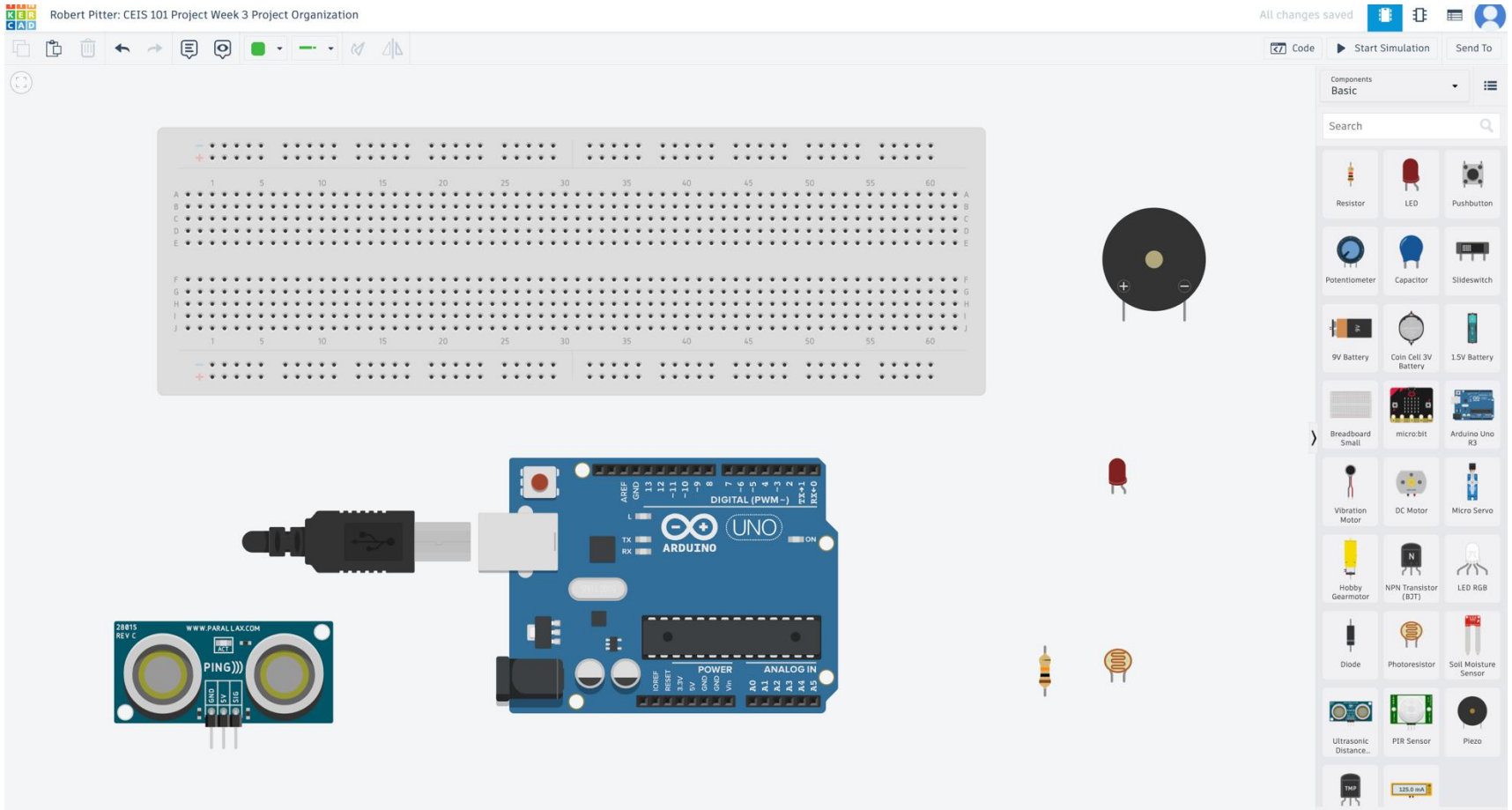
Organization of Project Components (picture)

- Arduino Uno
- Breadboard
- Resistor 10kΩ
- LEDs
- Ultrasonic Sensor
- Piezo
- Photoresistor



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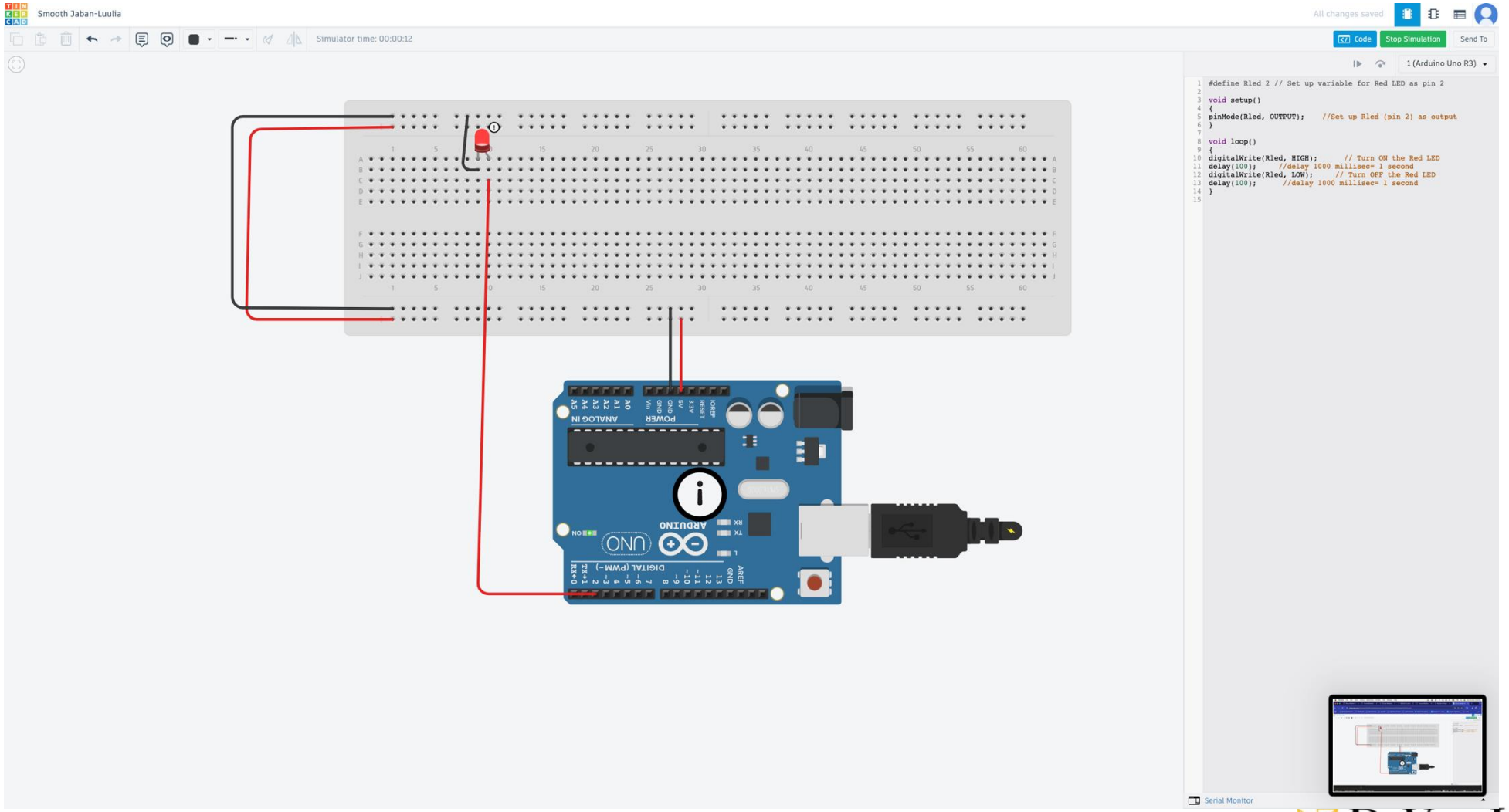
Project 3 Circuit with red LED on (picture)



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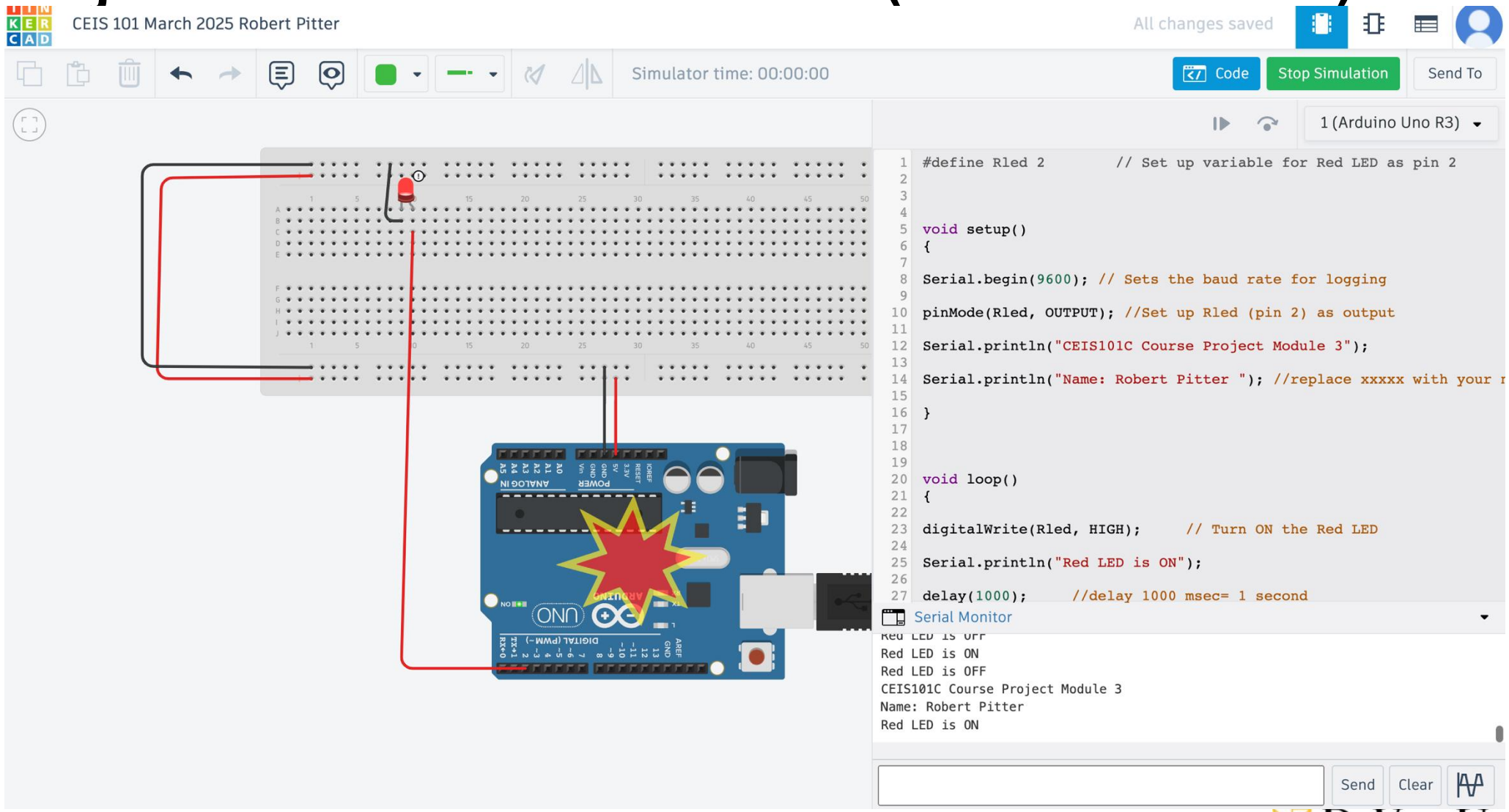
Project 3 Serial Monitor (screenshot)



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Module 4

Adding Door Sensor to Smart Home System

The aim for this project was to build and simulate a door sensor in a Smart Home System

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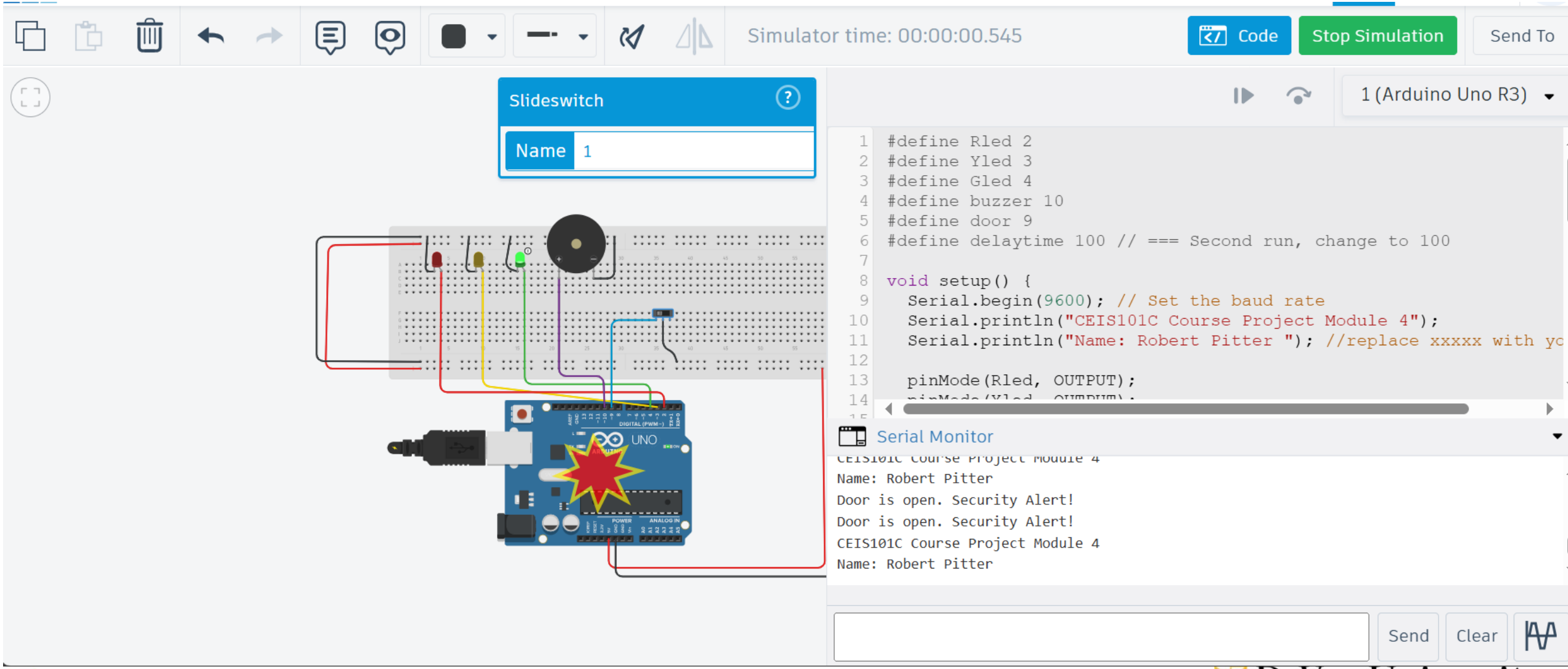
Circuit of door closed with Green LED ON (picture)



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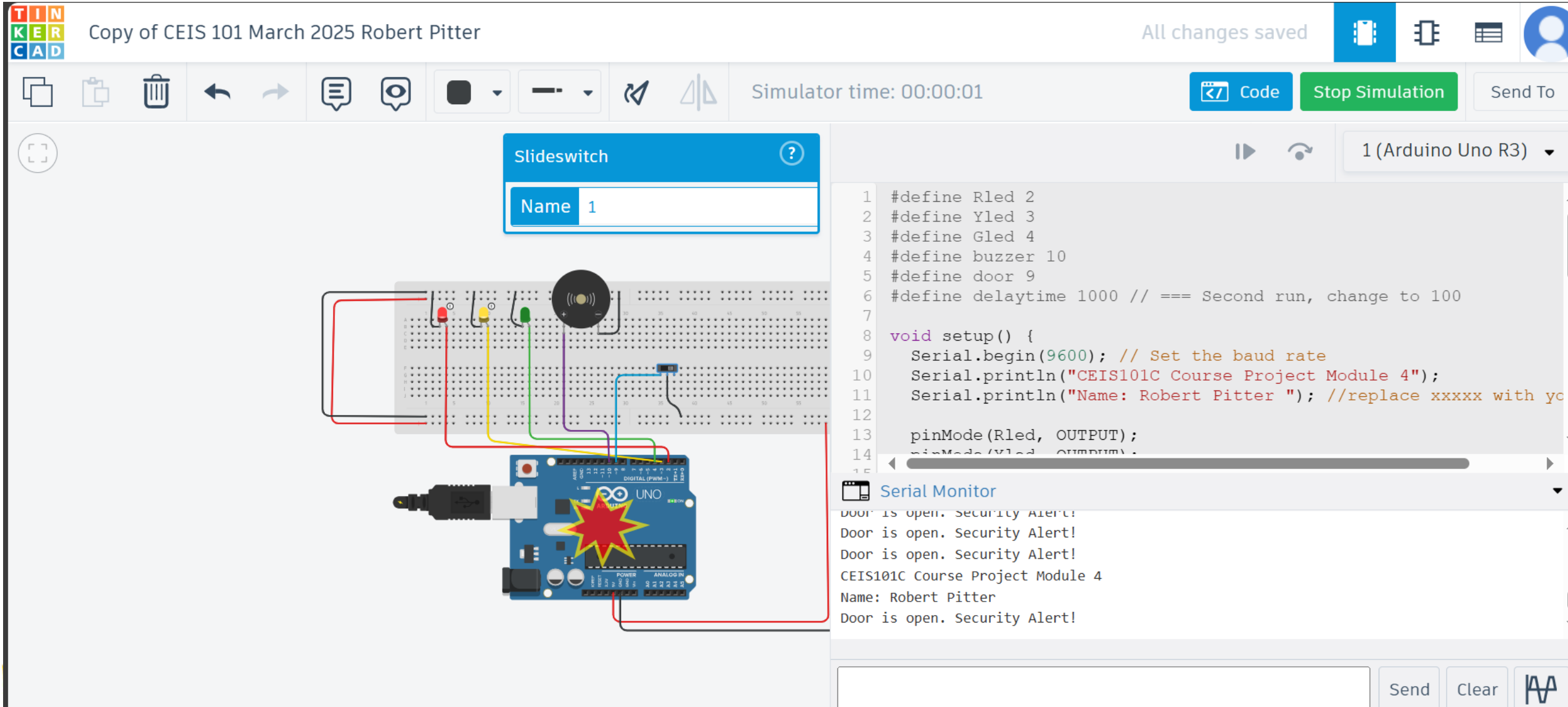
Circuit of door open with Green LED OFF (picture)



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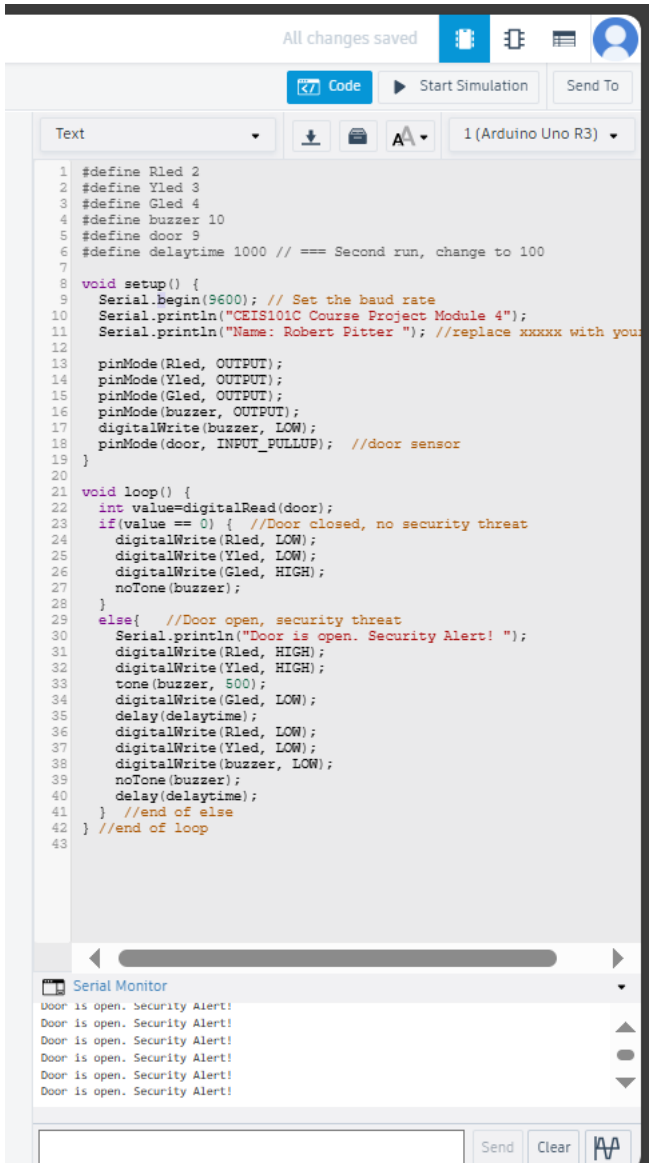
Arduino Code (screenshot)



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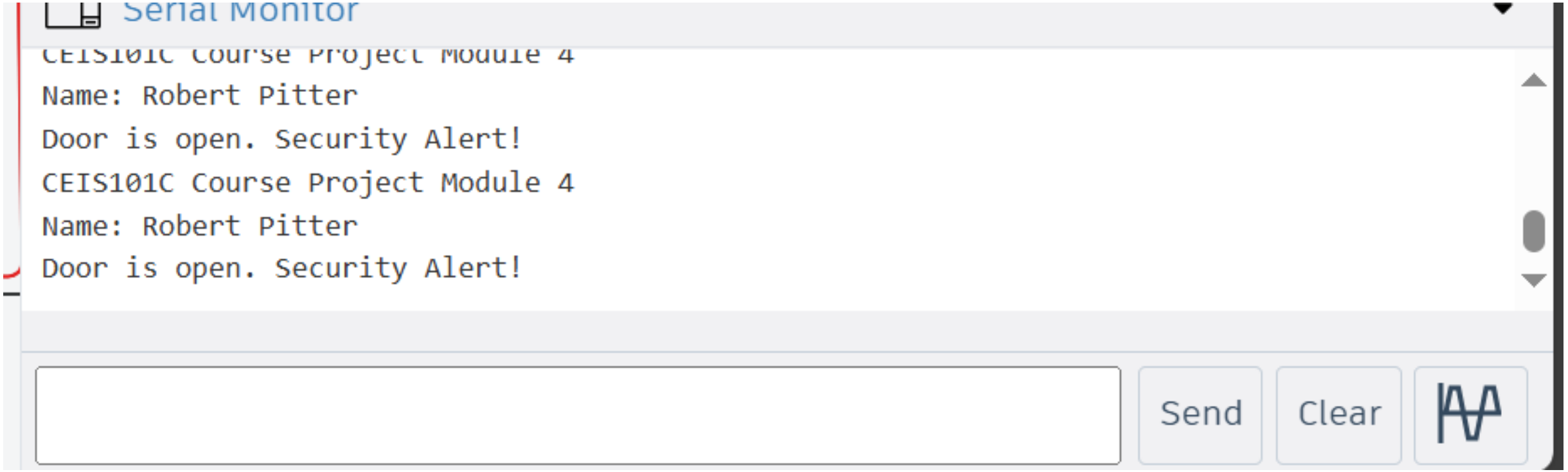
Serial Monitor (screenshot)



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Module 5

Adding Distance Sensor to Smart Home System and Conducting Data Analysis

The goal of this project was to not only add the distance sensor but also record the data from the readings and plot the results in a graph. An additional chart was added which shows the distribution of results.

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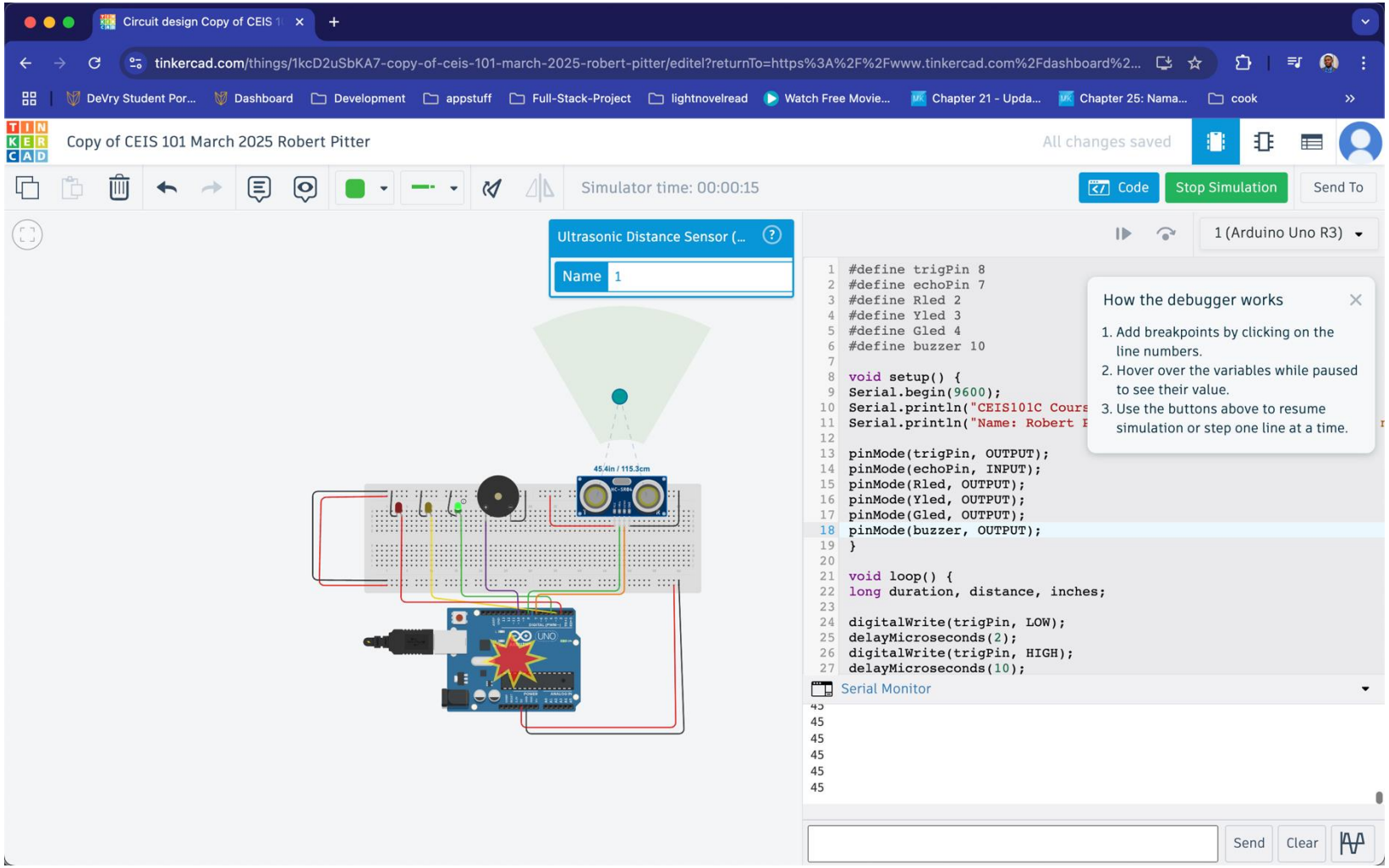
Circuit with green LED on (picture)



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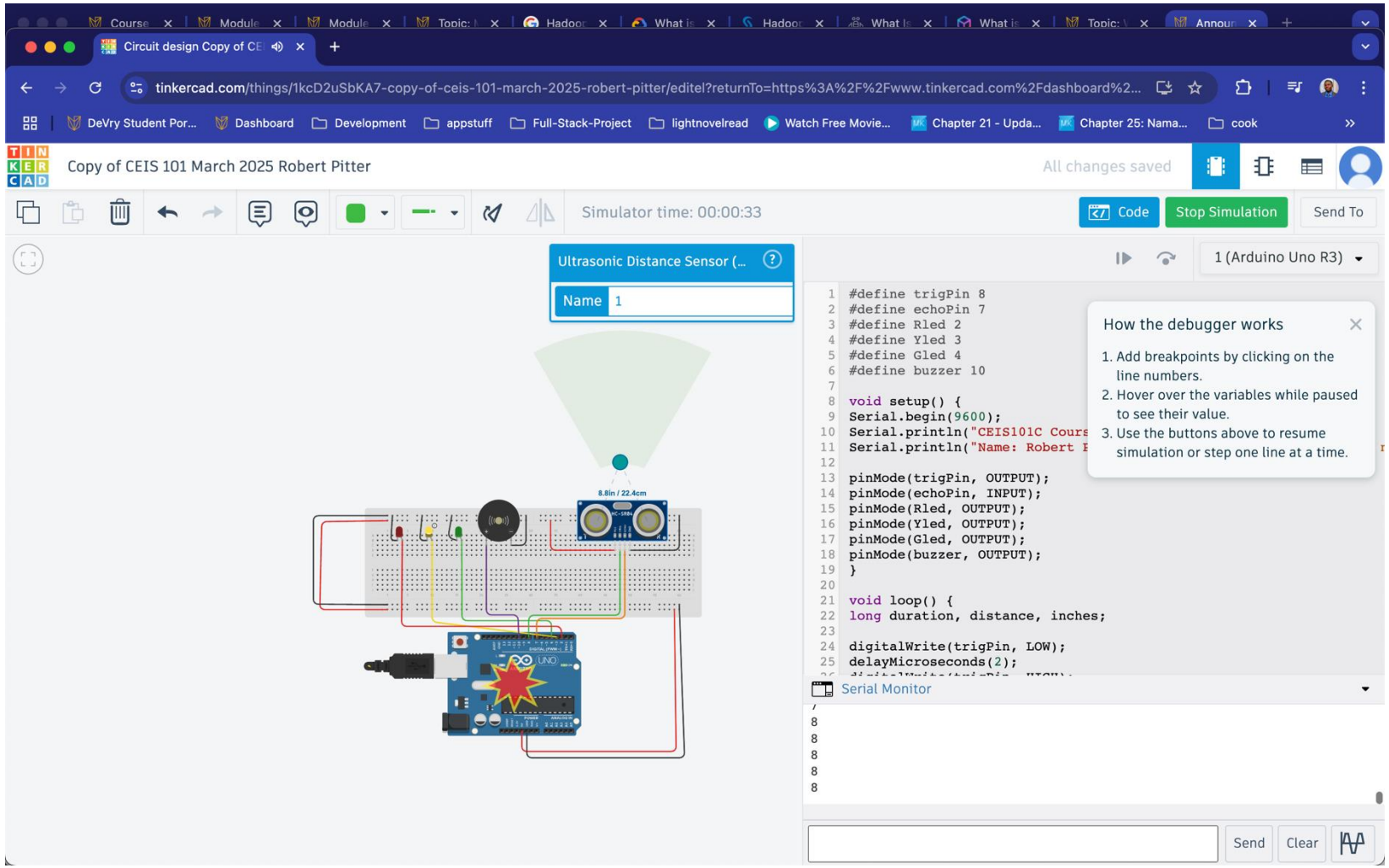
Circuit with yellow LED on (picture)



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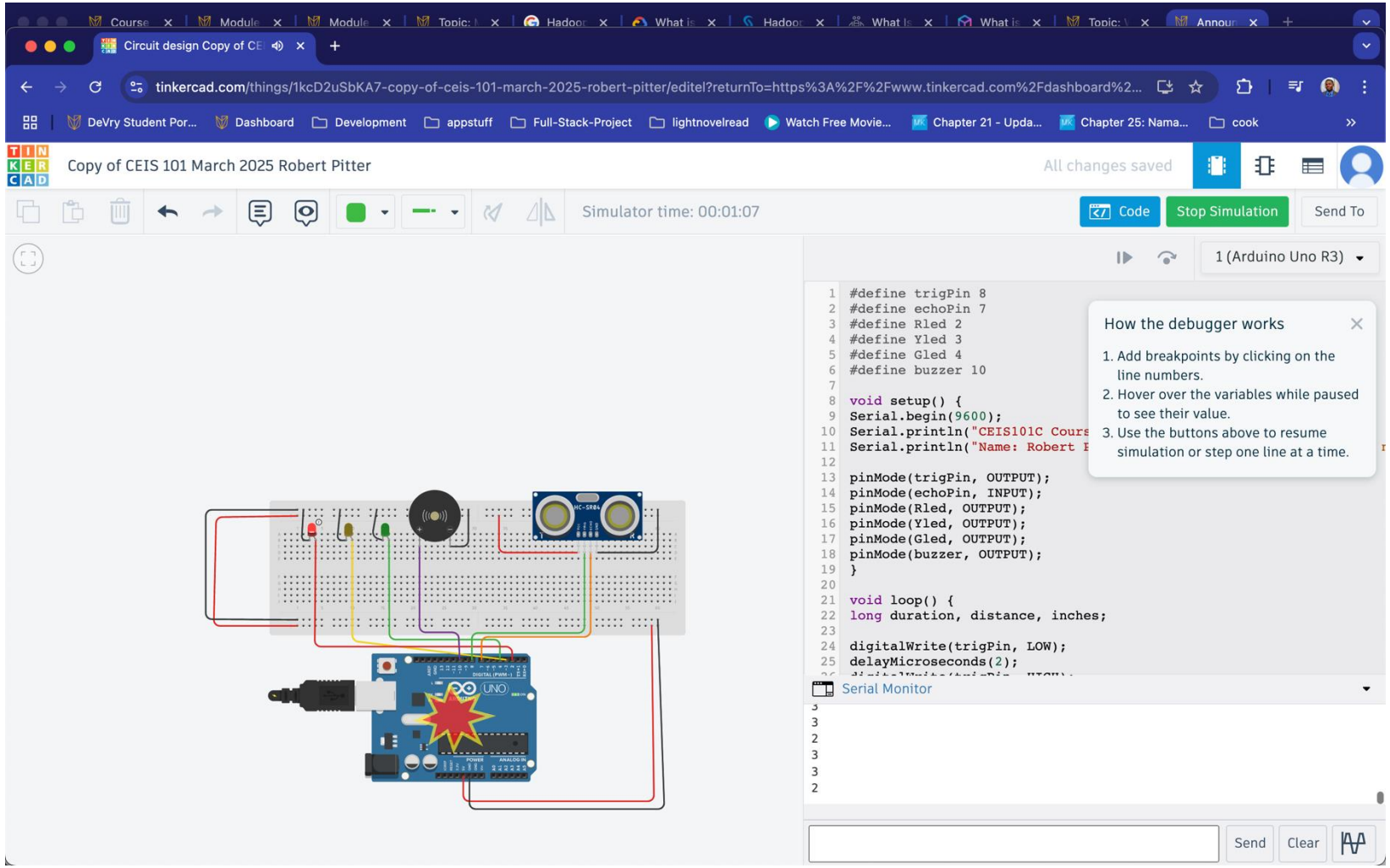
Circuit with red LED on (picture)



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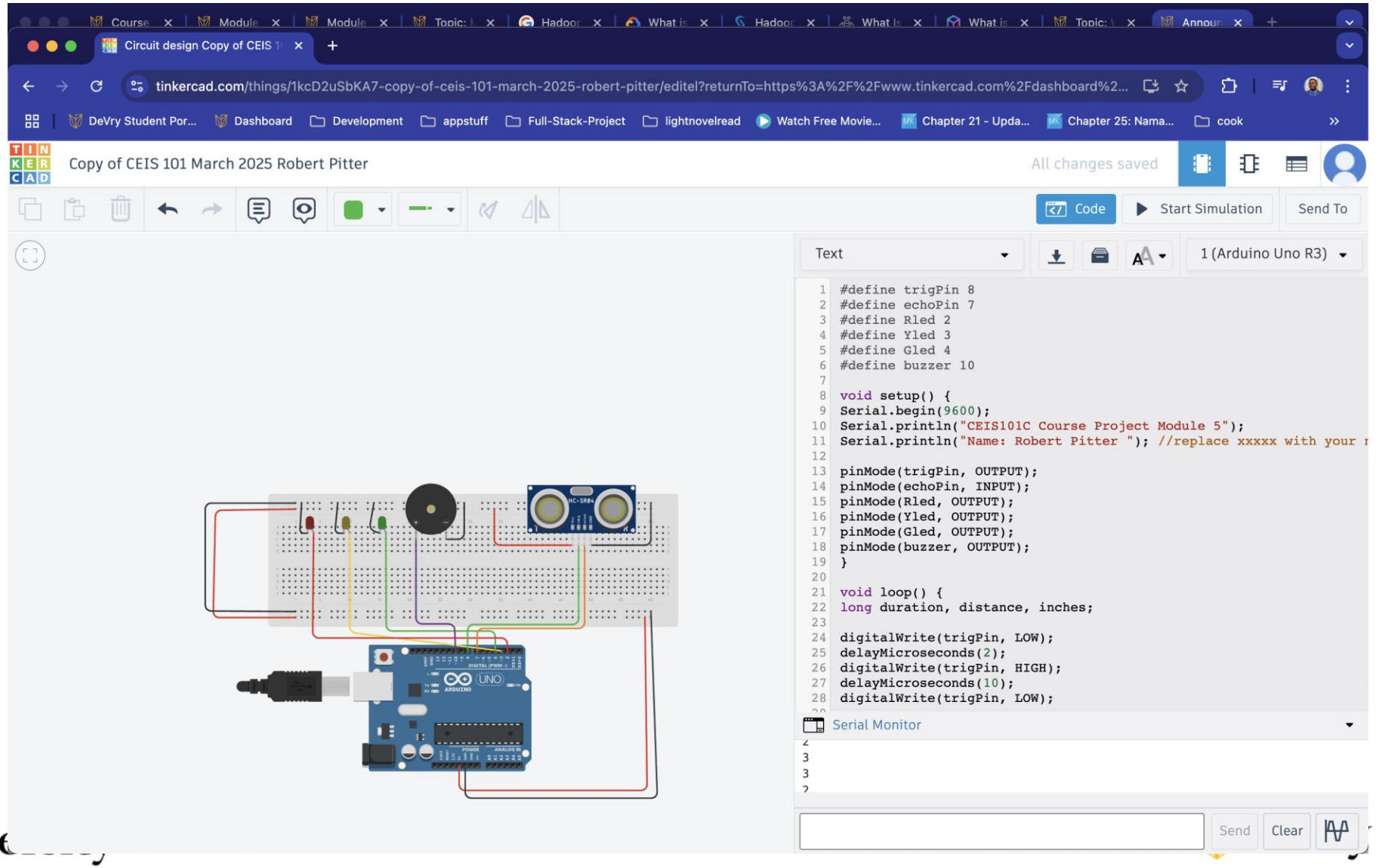
Arduino Code (screenshot)



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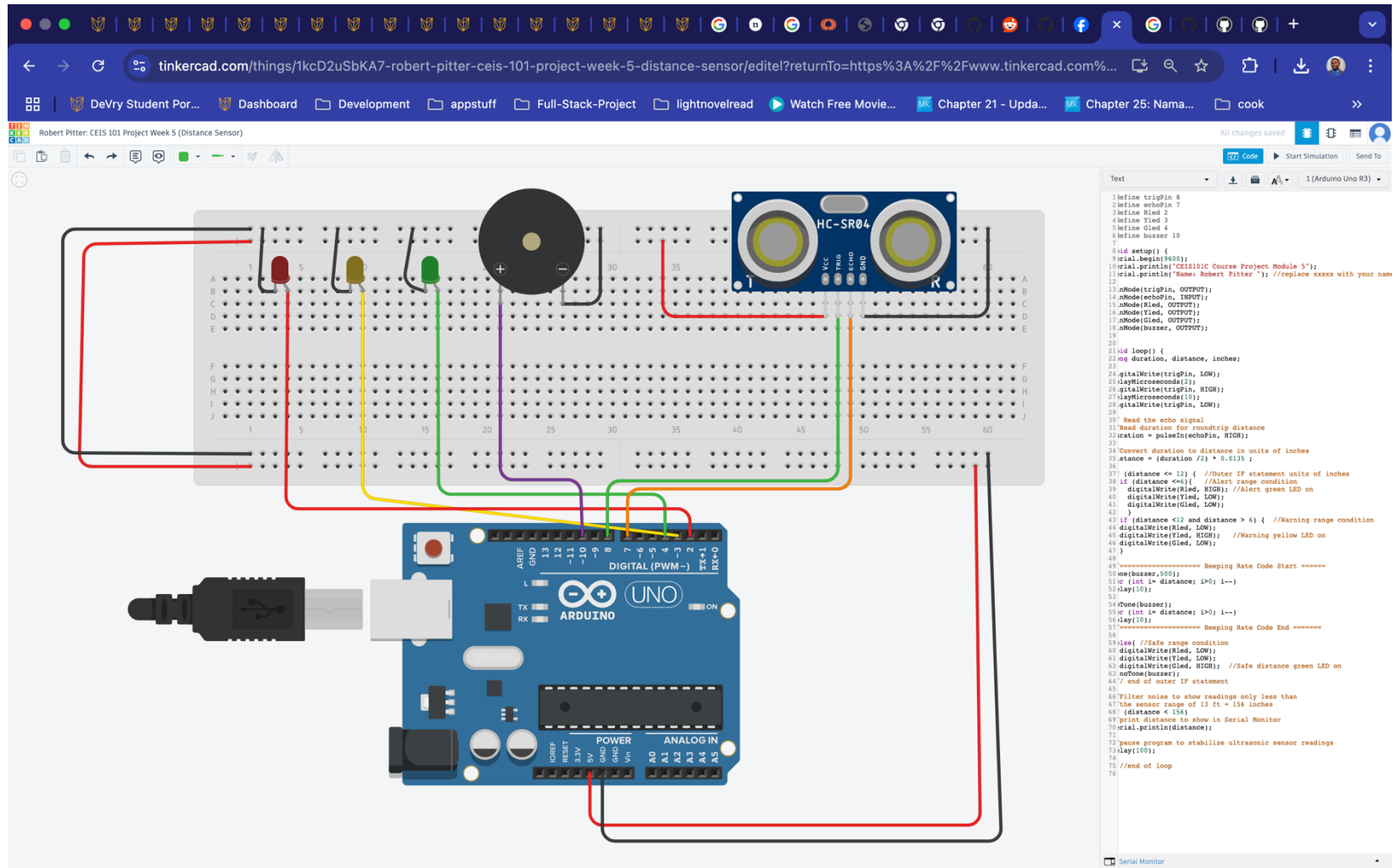

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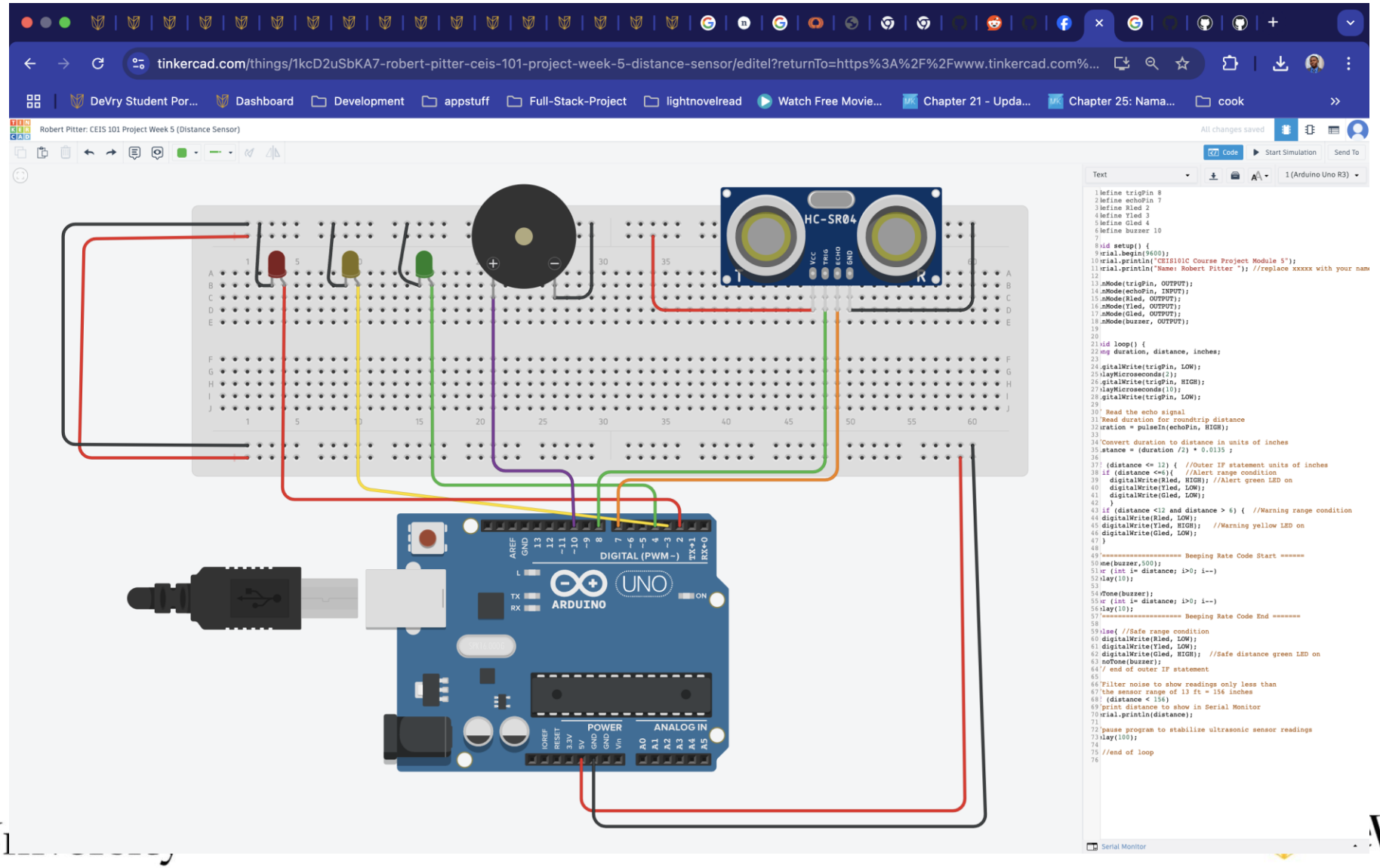
Arduino Code (screenshot)



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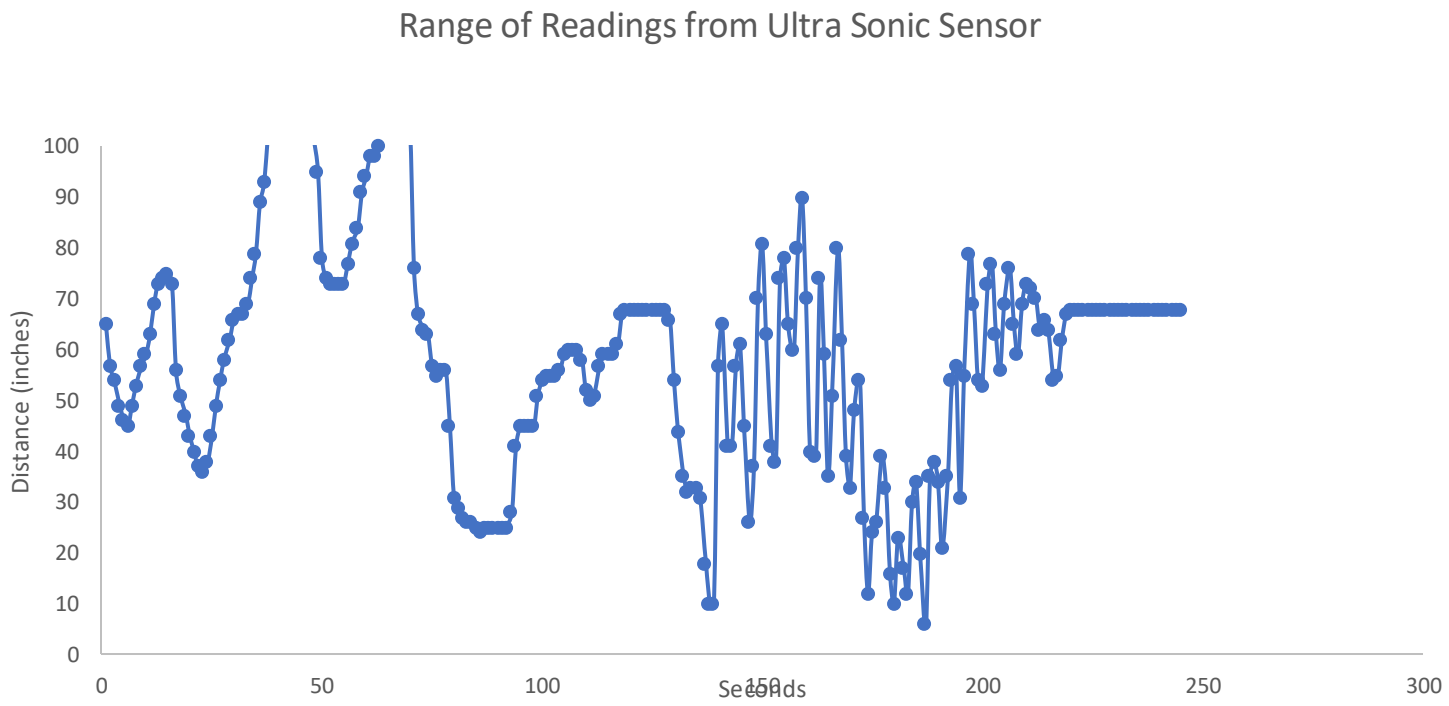
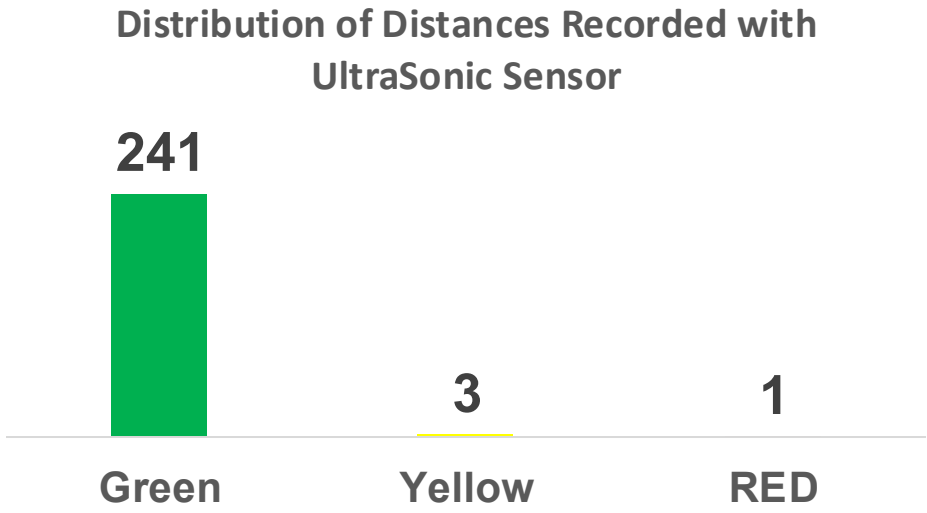
Plot of data (graph from Excel)





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Module 6

Adding Automated Light to Smart Home System

The goal of the project was to add a light sensor as an add-on to the circuit built in module 5. With this, the home automation system can now also detect if there is light (indicating daytime) or not. Combining those results along with the distance detection can help determine if there is a threat present or not.

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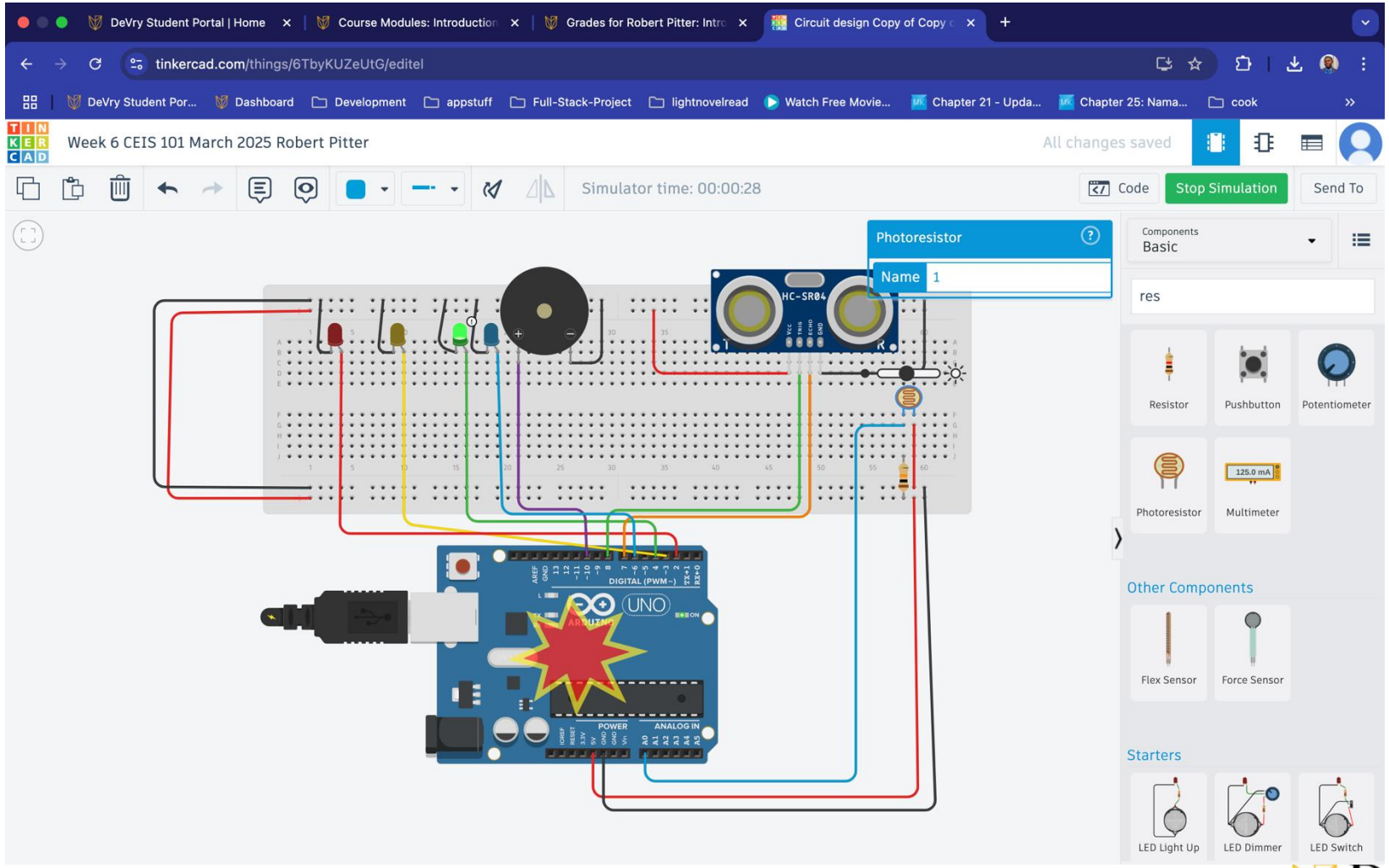
Circuit with automated LED off (picture)



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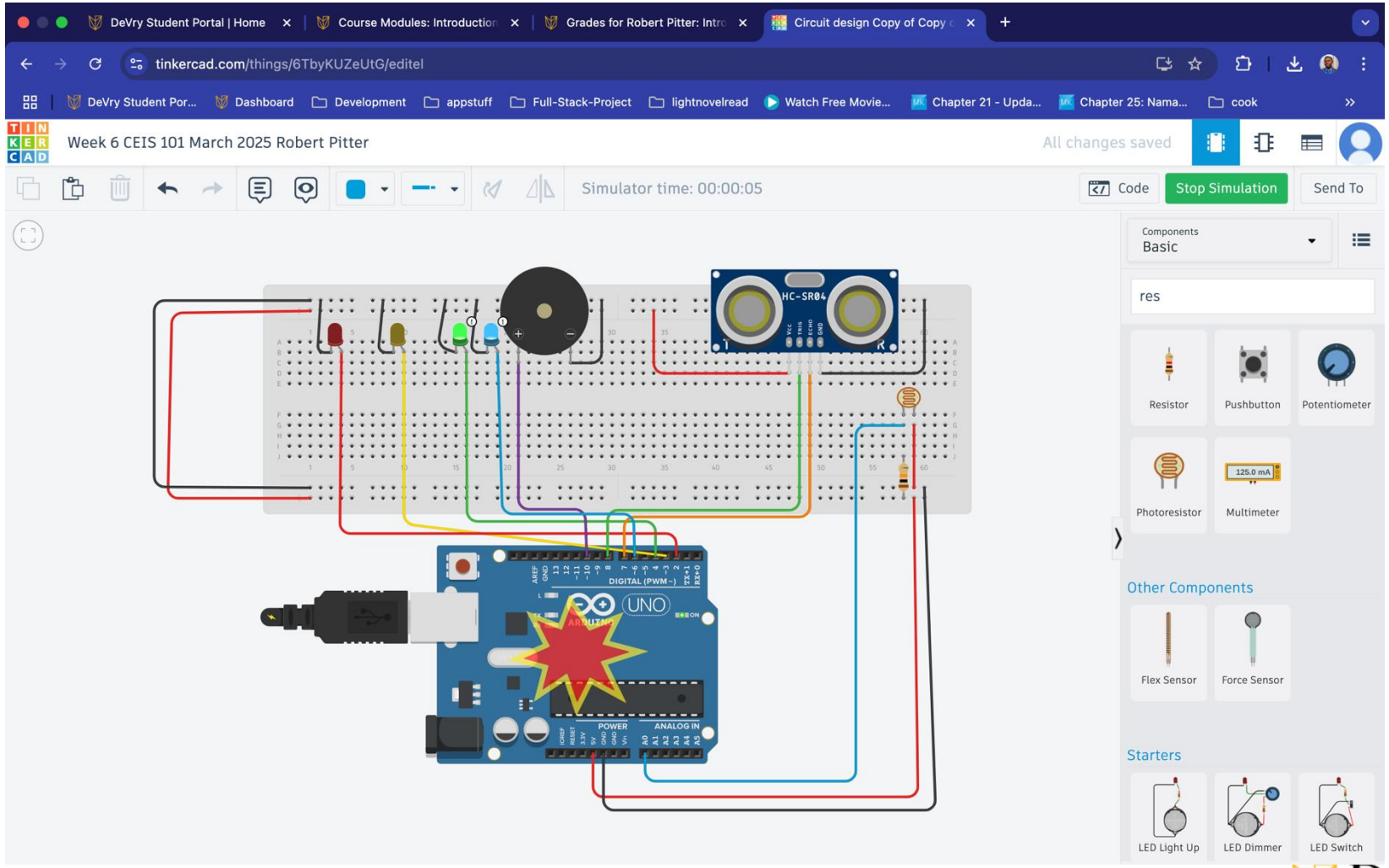
Circuit with automated LED on (picture)



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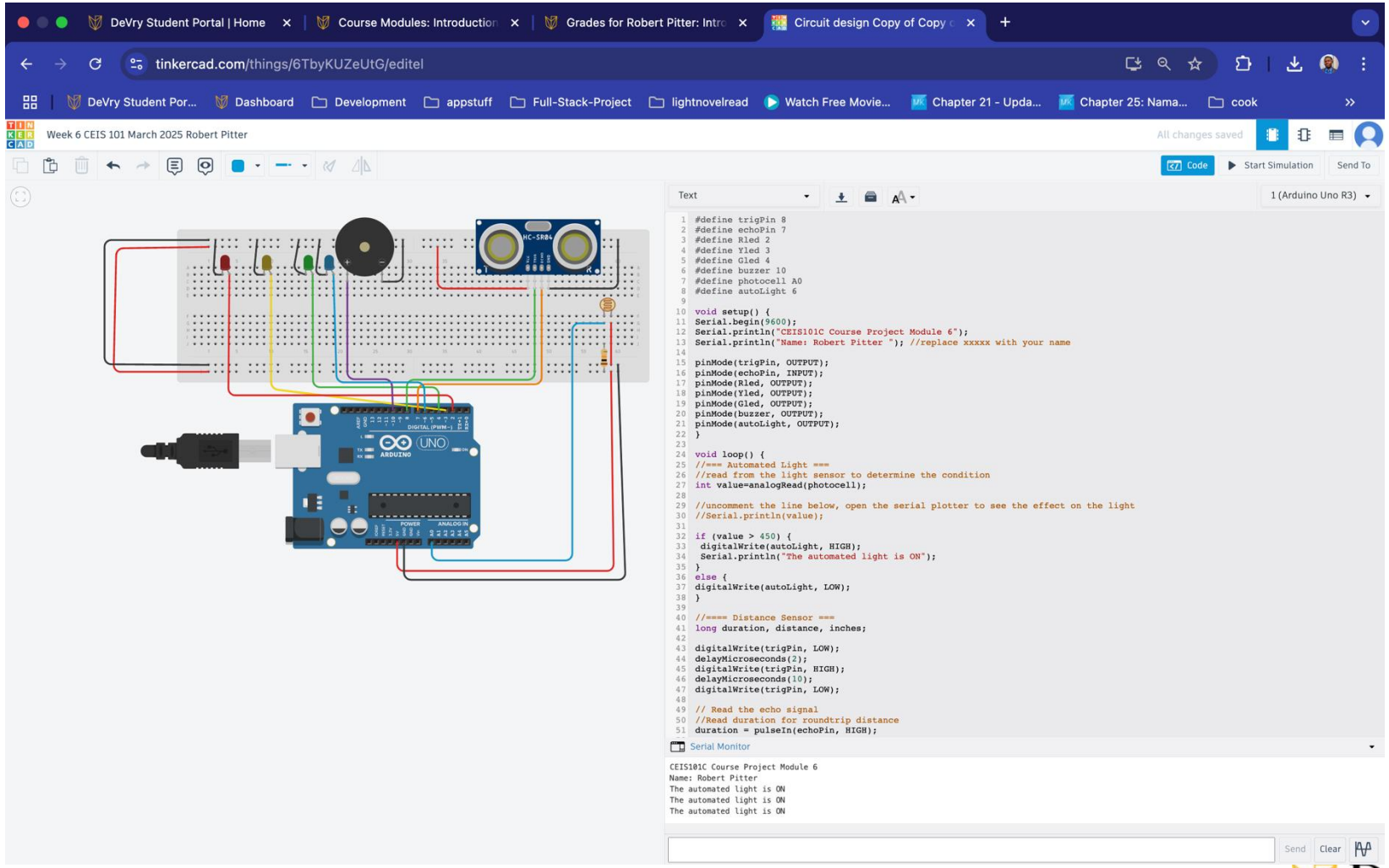
Arduino Code (screenshot)



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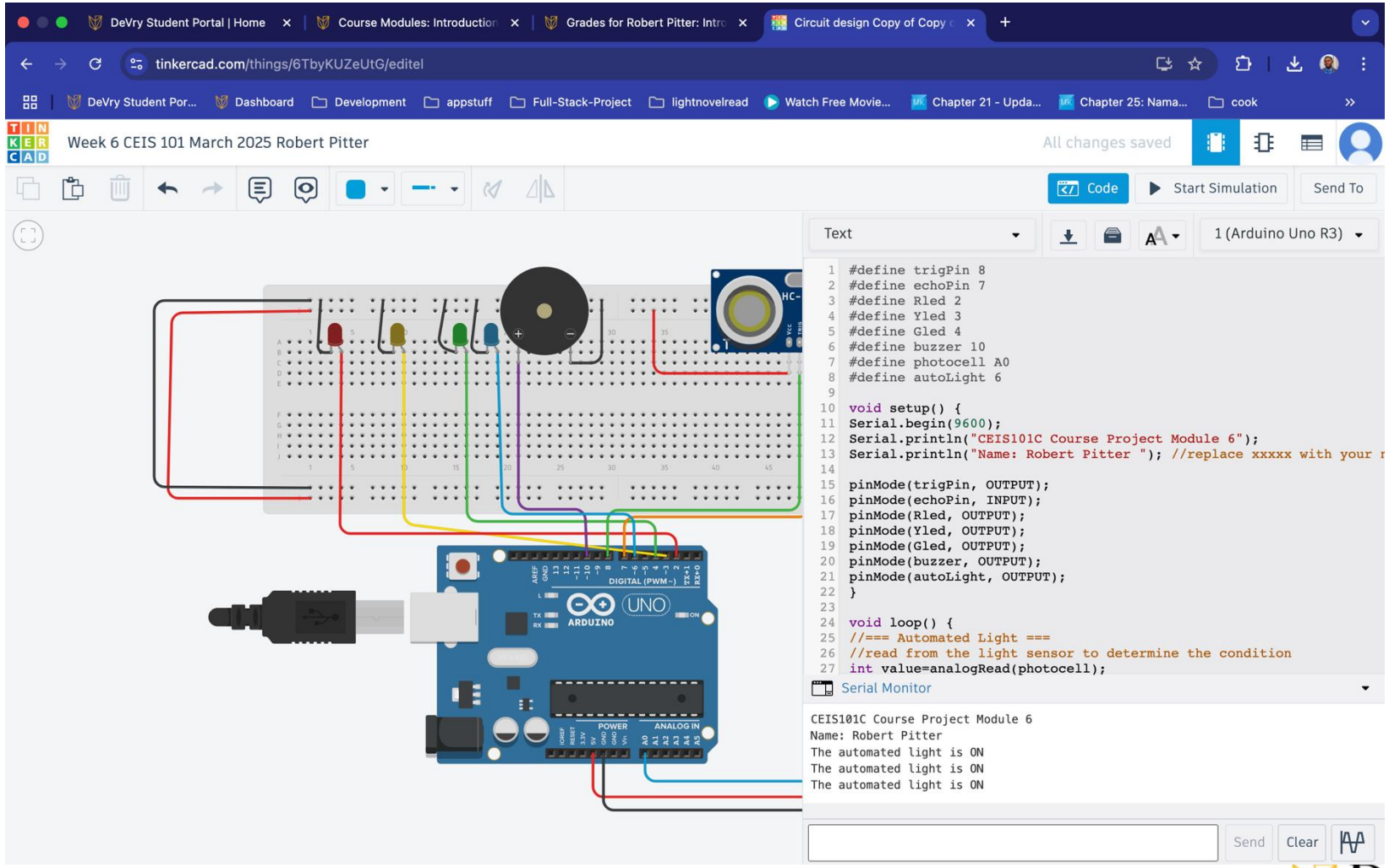
Serial Monitor (screenshot)



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Challenges/Lessons Learned

- The biggest challenges I faced were really just making sure I read and understood the project requirements and instructions. In one case, the circuit wasn't behaving as expected and I started added some logging to see what the issue was. It turns out I had a wire in a different spot than it should be so the component I was interested in was never live. I discovered after I went back and reviewed the instructions again.
- Outside of that, throughout this project I learned that it isn't so difficult to experiment with IOT projects without necessarily buying the components. Thus, I will do more experimentation in the future.

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Career Skills

- During the course of this project I developed circuit design and development skills, wiring skills and IOT programming skills.
- Overall, I believe the IOT programming skills will help me to advance my career since my field (data analysis) benefits from such skills.

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Conclusion

Overall, I enjoyed the course and will definitely revisit not only TinkerCad but also do some more IOT projects in the future.

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