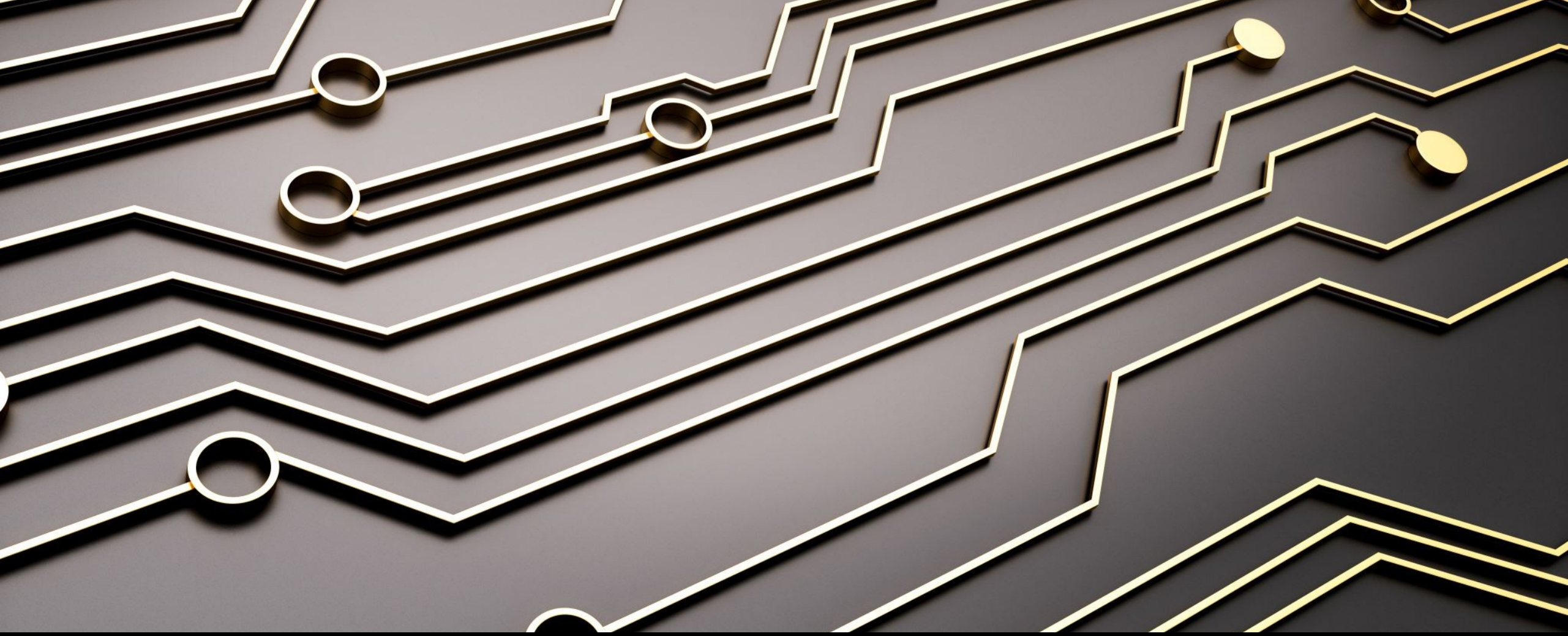


# CEIS 101
# IOT HOME SECURITY SYSTEM

LOUIE VENEGAS

# INTRODUCTION

The IoT is a rapidly growing industry

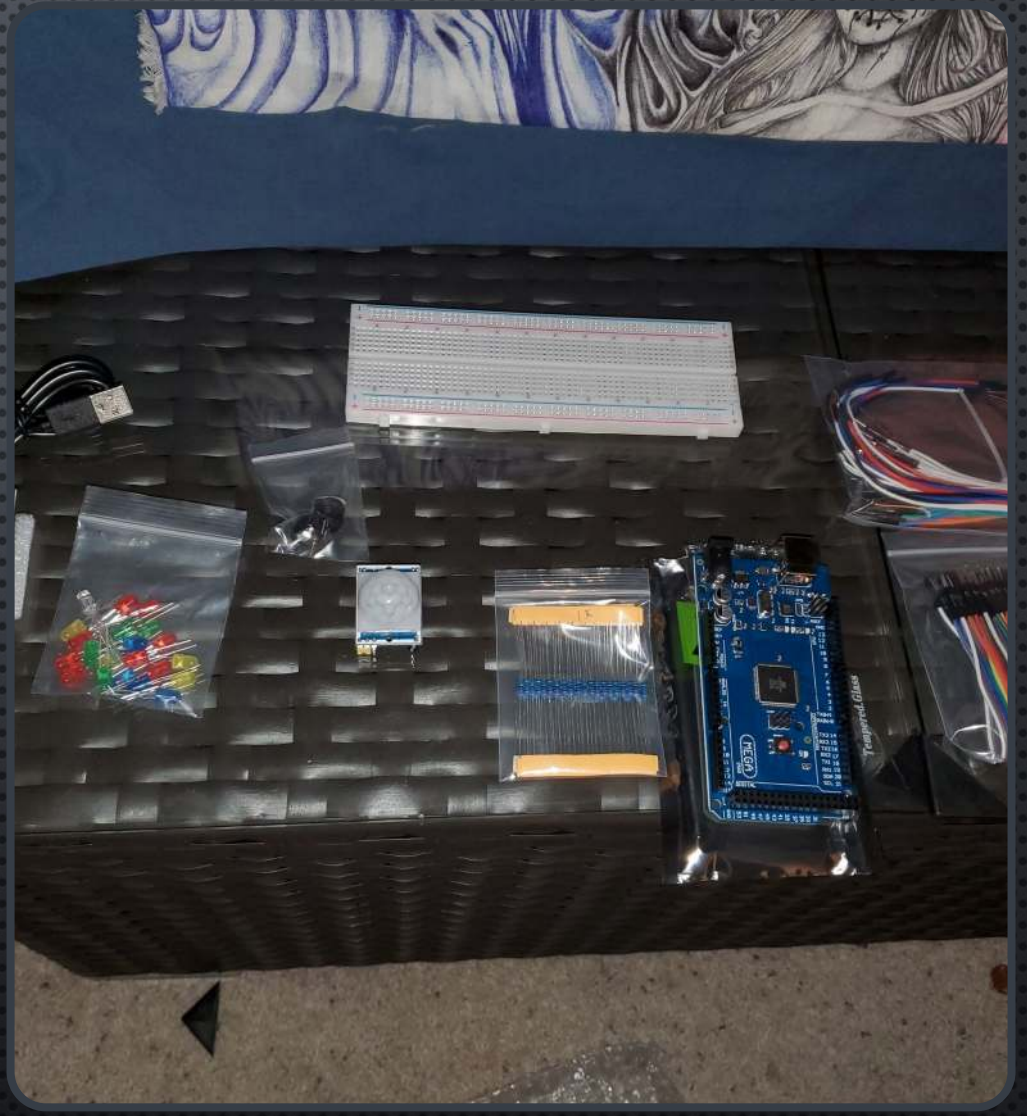
This project is uses various aspects of the Iot to develop a home security system


# ALL PROJECTS MUST BEGIN WITH AN INVENTORY AND ORGANIZATION

- Arduino Starter Kit
- Mini-Smart Router
- USB-microUSB Cable
- Esp32 Board

# PROJECT ORGANIZATION

- ARDUINO MEGABOARD
  - RESISTOR - 220Ω
    - LED
  - BREADBOARD
  - MOTION SENSOR
    - WIRE(S)
    - BUZZER
  - ESP32 BOARD



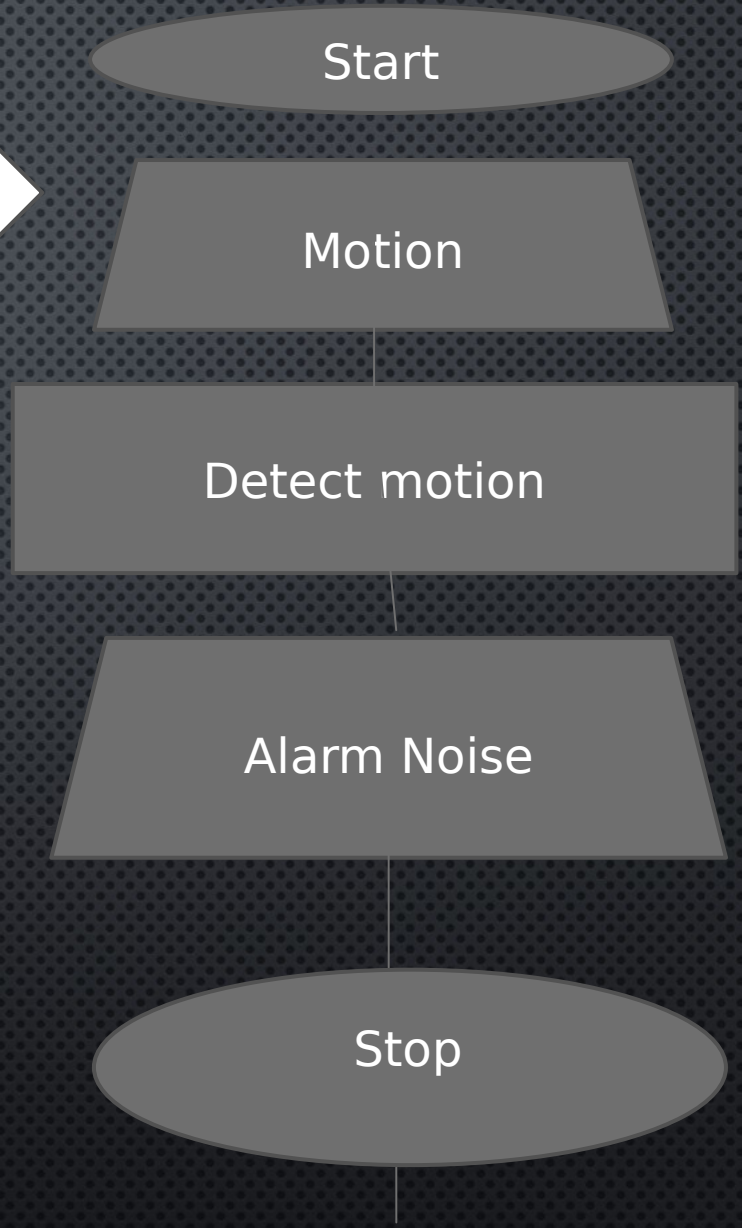
# PLANNING AND DESIGN

- WHEN PLANNING AND DESIGNING ANY TYPE OF IOT SYSTEM YOU HAVE TO GET DOWN TO THE SIMPLE NUTS AND BOLTS IF YOU WOULD.
- FIRST YOU NEED TO PLAN WHAT THE INPUT, PROCESS AND OUTPUT OF THE SYSTEM WILL BE,
- SECOND YOU WILL NEED TO DRAW UP A FLOWCHART TO SHOW THE DESIGN YOUR PLAN WILL TAKE.

## My Flow Chart

## My input process and output plan

| Input | Process | Output |
| --- | --- | --- |
| motion | Detect motion | Alarm noise |



# SETTING UP THE ARDUINO

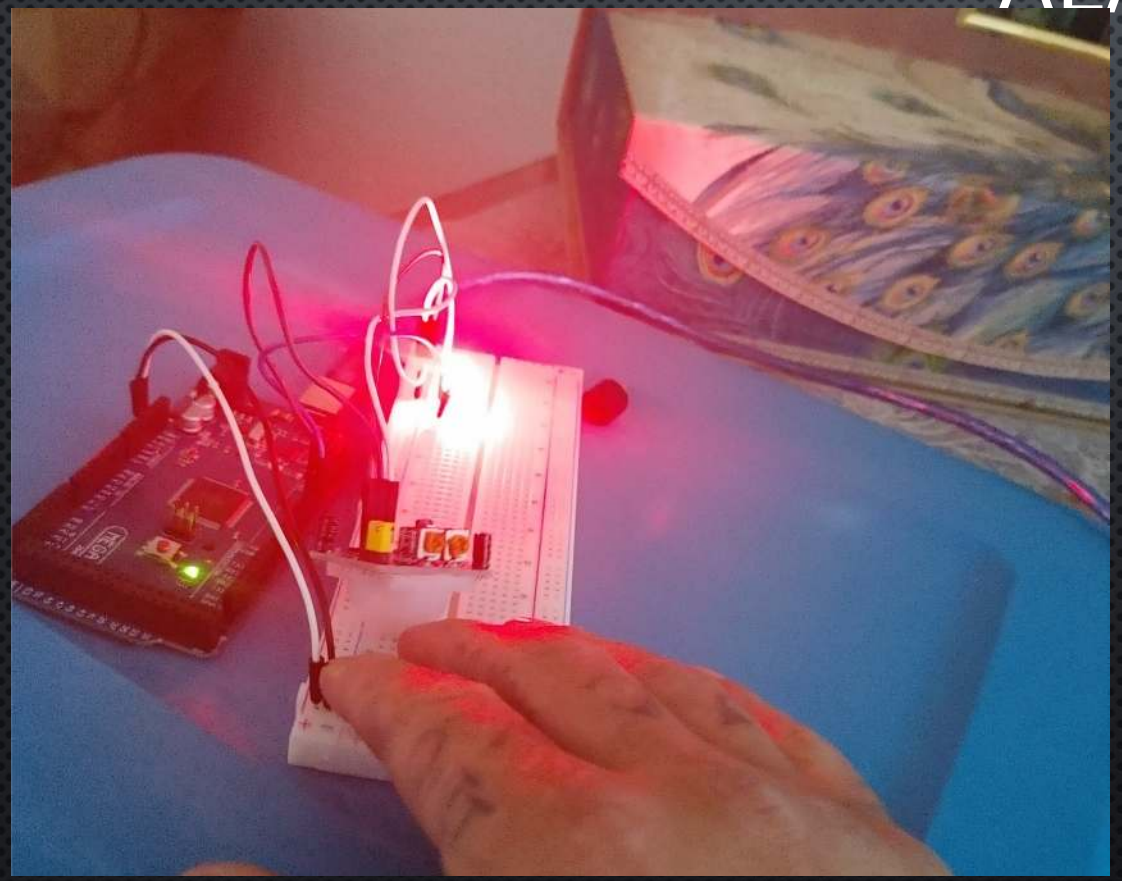
- BEFORE YOU CAN USE AN ARDUINO BOARD IN A IOT PROJECT YOU FIRST MUST DOWNLOAD THE ARDUINO IDE AND RUN A BLINK TEST ON YOUR BOARD TO MAKE SURE ITS FUNCTIONING PROPERLY.
- THE ARDUINO IDE OR INTEGRATED DEVELOPMENT ENVIRONMENT WHICH IS BASICALLY THE PROGRAM YOU USE TO WRITE CODE TO THE MICROPROCESSOR. VISIT ARDUINO.CC AND DOWNLOAD THE PROGRAM AND ALL THE DRIVERS.
- ONCE I HAD THE ARDUINO IDE INSTALLED I CREATED A SIMPLE CIRCUIT AND WROTE A BLINK CODE TO MY ARDUINO BOARD TO TEST IT.
- THE FOLLOWING PHOTOS ARE PICTURES OF THE PROCESS I JUST DESCRIBED.

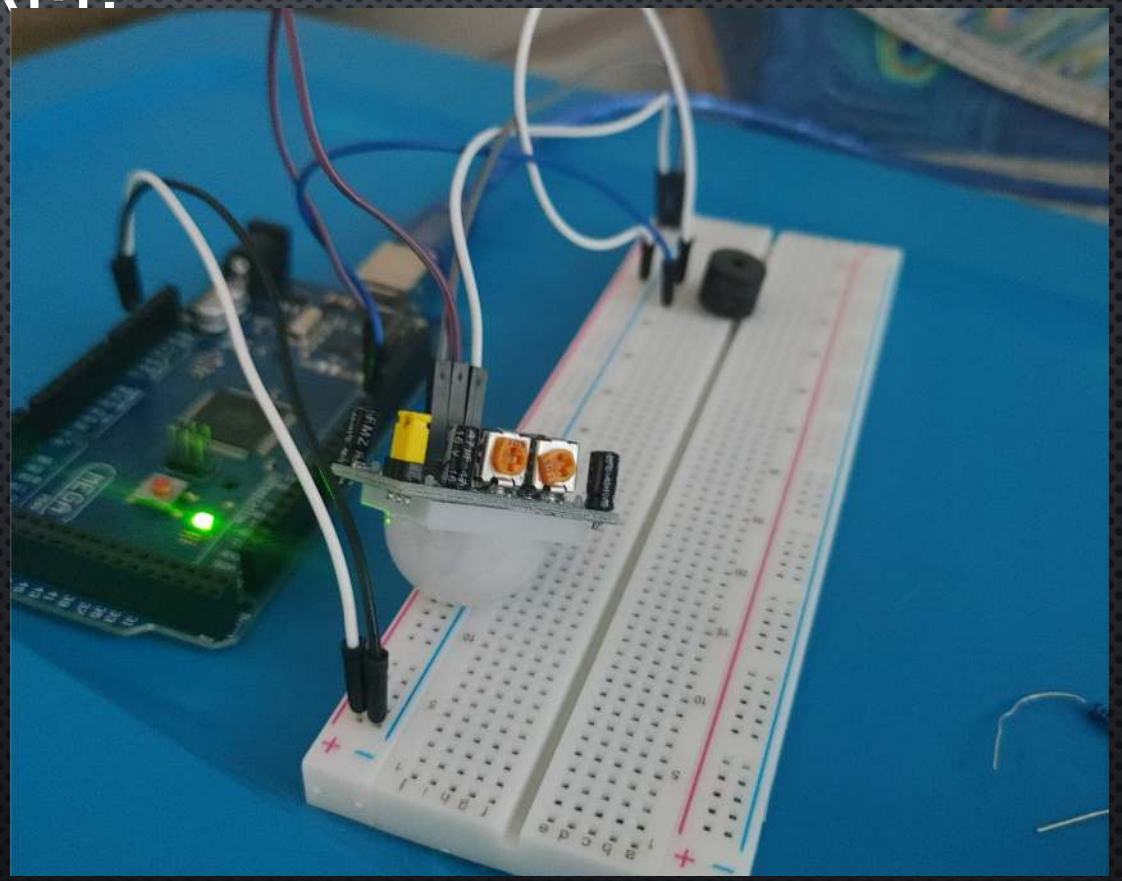
```
//Name:
//CEIS 101 Module 3
//LED blink code

// the setup function runs once
void setup() {
  pinMode(13, OUTPUT); // configure pin 13 as an output
}

// the loop function runs repeatedly
void loop() {
digitalWrite(13, HIGH);       // turn the LED on (HIGH is the voltag
  delay(1000);                // wait for a second
  digitalWrite(13, LOW);      // turn the LED off
  delay(1000);                // wait for a second
}
```

# ADDING A MOTION SENSOR AND BUZZER TO THE CIRCUIT.

- IN THE NEXT PHASE OF THE PROJECT I BUILT ON THE EXISTING CIRCUIT I BUILT FOR THE BLINK TEST BY ADDING TWO NEW COMPONENTS …
- FIRST I ADDED A MOTION SENSOR THROUGH PIN 8 THEN ADDED A BUZZER THROUGH PIN 7.
- ONCE THE CIRCUIT WAS SETUP I UPLOADED A CODE THROUGH THE ARDUINO INTEGRATED DEVELOPMENT ENVIRONMENT.

# PHOTOS OF MY CIRCUIT ON THE LEFT MOTION SENSOR IS SETUP WITH LED, ON THE RIGHT MOTION SENSOR IS SETUP WITH BUZZER AS ALARM.





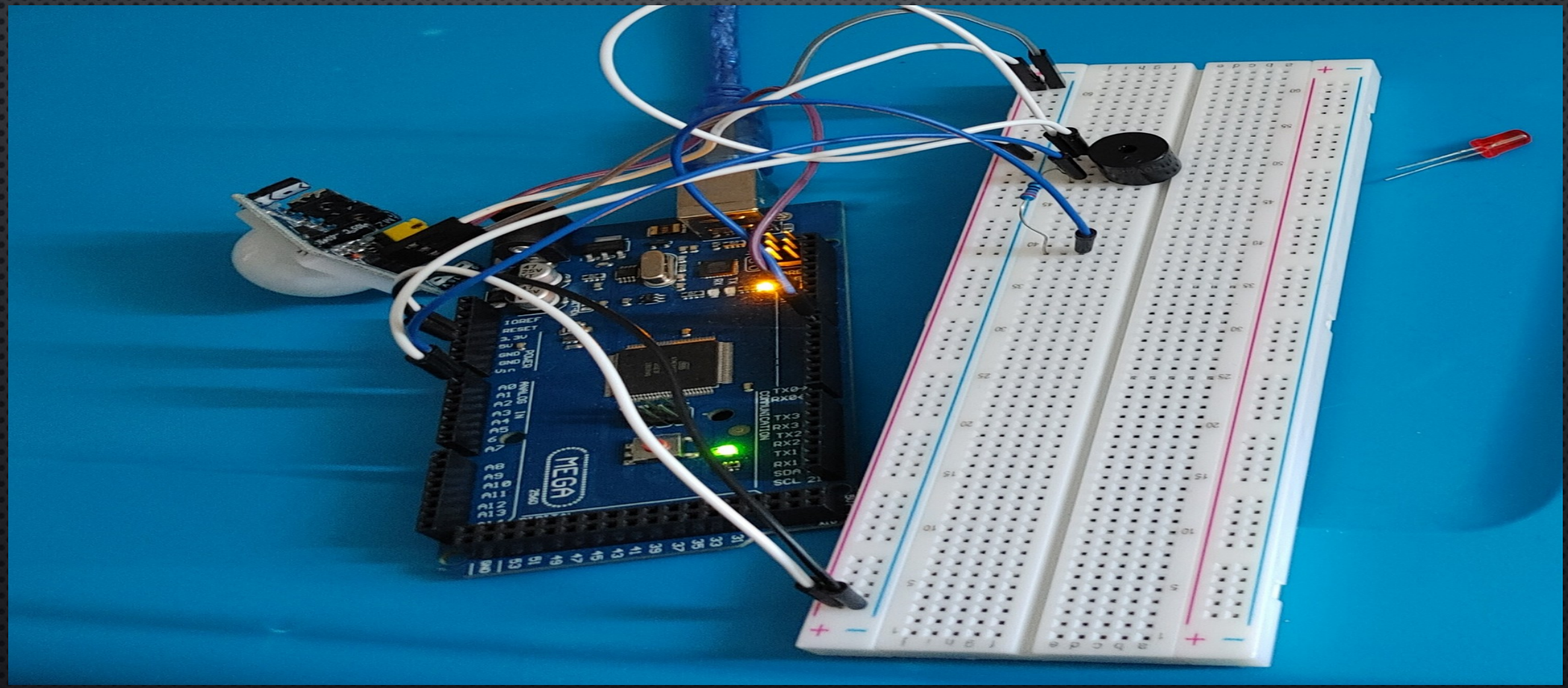
```
/Name:
/CEIS 101 Module 4 Part 2
/Turn buzzer on when motion is sensed by the PIR sensor

/declare variables
nt buzzerPin = 7;              // choose the pin for the buzzer
nt inputPin = 8;               // choose the input pin (for PIR sensor)
nt val = 0;                    // variable for reading the input pin status

/ setup pins for input or output
oid setup() {
 pinMode(buzzerPin, OUTPUT);   // declare buzzer as output
 pinMode(inputPin, INPUT);     // declare sensor as input


/ loop function to run repeatedly
oid loop(){
  val = digitalRead(inputPin);  // read input value
  if (val == HIGH)              // check if the input is HIGH
   digitalWrite(buzzerPin, HIGH);  // turn LED ON
  else
    digitalWrite(buzzerPin, LOW); // turn LED OFF
```

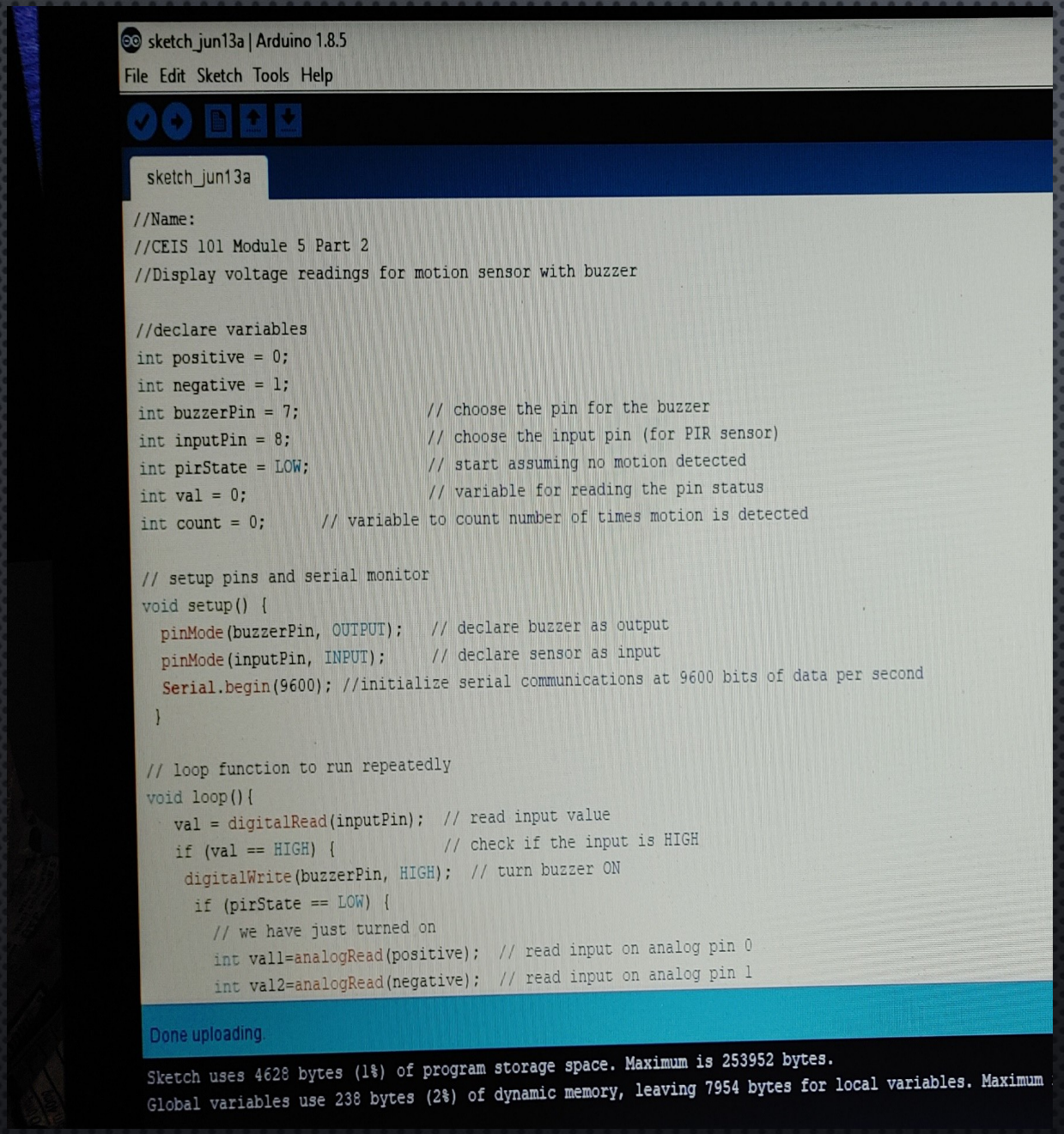
**THIS IS THE CODE THAT I UPLOADED TO THE ARDUINO MEGABOARD VIA THE ARDUINO IDE. THE CODE TELLS THE MICROPROCESSOR THAT WHEN THE SENSOR IN PIN 8 IS TRIGGERED THEN TRIGGER THE BUZZER IN PIN 7.**

# ADDING SERIAL MONITOR FOR DATA OUTPUT TO SYSTEM

ıN THE NEXT PORTION OF THIS COURSE I ADDED A DATA OUTPUT THROUGH A SERIAL MONITOR IN THE ARDUINO IDE. THE DATA OUTPUT RECORDS EACH TIME THE MOTION SENSOR IS TRIGGERED. THIS IS AN IMPORTANT ASPECT BECAUSE IT ALLOWS FOR MONITORING AND KEEPING TRACK OF EACH TIME THE SYSTEM IS TRIGGERED.

# THE CIRCUIT HAD TO BE REARRANGED AND RESISTORS HAD TO BE ADDED TO THE BREADBOARD IN ORDER TO ALLOW THE SERIAL MONITOR TO KEEP TRACK OF THE TRIGGERS.






THIS IS A PHOTO OF THE SERIAL MONITOR AND AS YOU CAN SEE IT KEEPS TRACK OF EACH TIME THE SYSTEM IS TRIGGERED AS WELL AS THE AMOUNT OF VOLTAGE THAT PASSES THROUGH THE SYSTEM EACH TIME THE SYSTEM IS TRIGGERED.

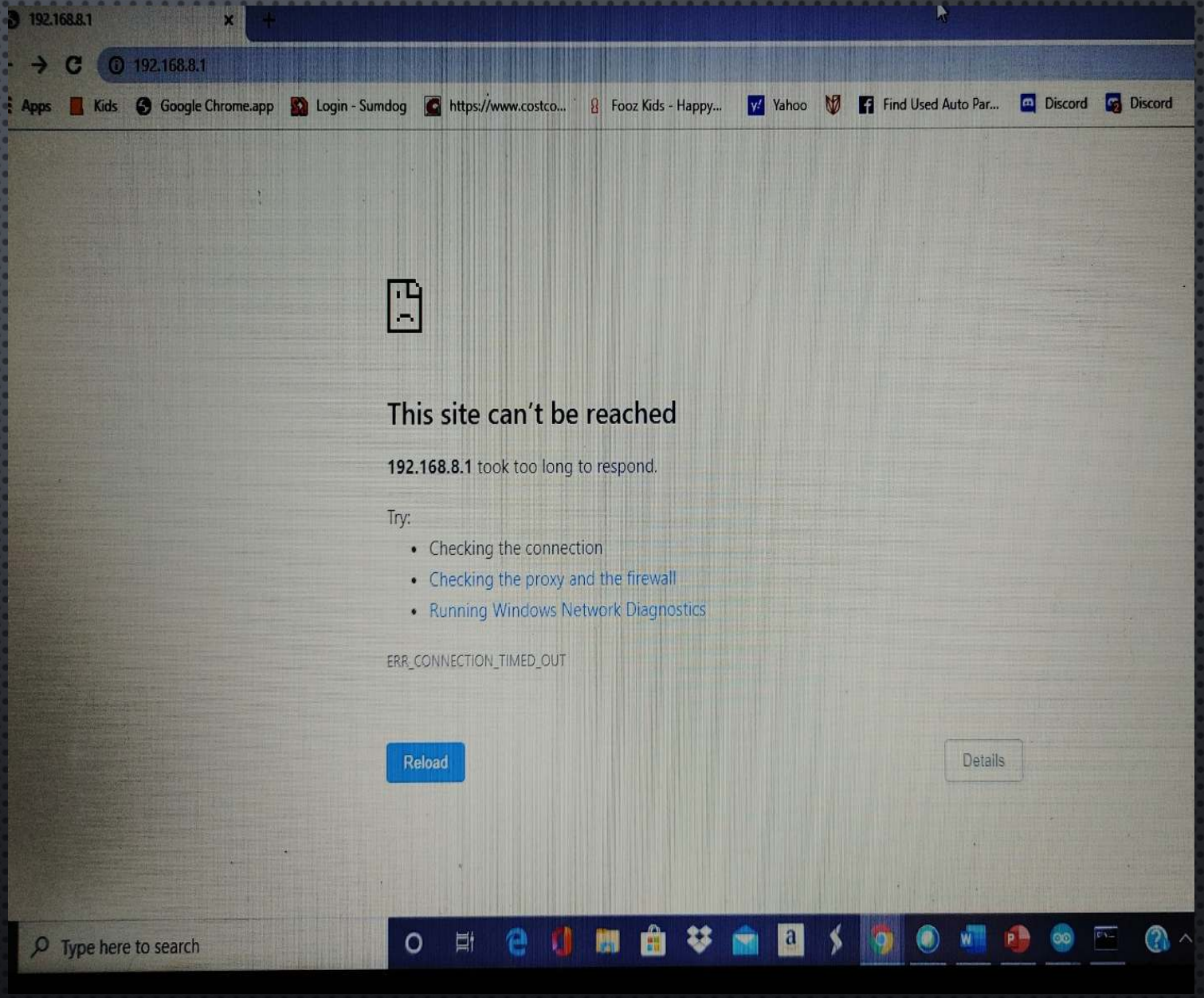
# FINAL PHASE: REBUILDING SYSTEM ON ESP 32 BOARD WITH WEB CAPABILITIES

- THE PURPOSE OF THE NEXT PHASE IS TO MAKE MY HOME SECURITY SYSTEM ACCESSIBLE OVER THE INTERNET. IN ORDER TO DO THIS I WILL HAVE TO REBUILD THE PROTOTYPE ONTO A NEW BOARD WITH A DIFFERENT MICROPROCESSOR THAT HAS WI-FI CAPABILITIES.

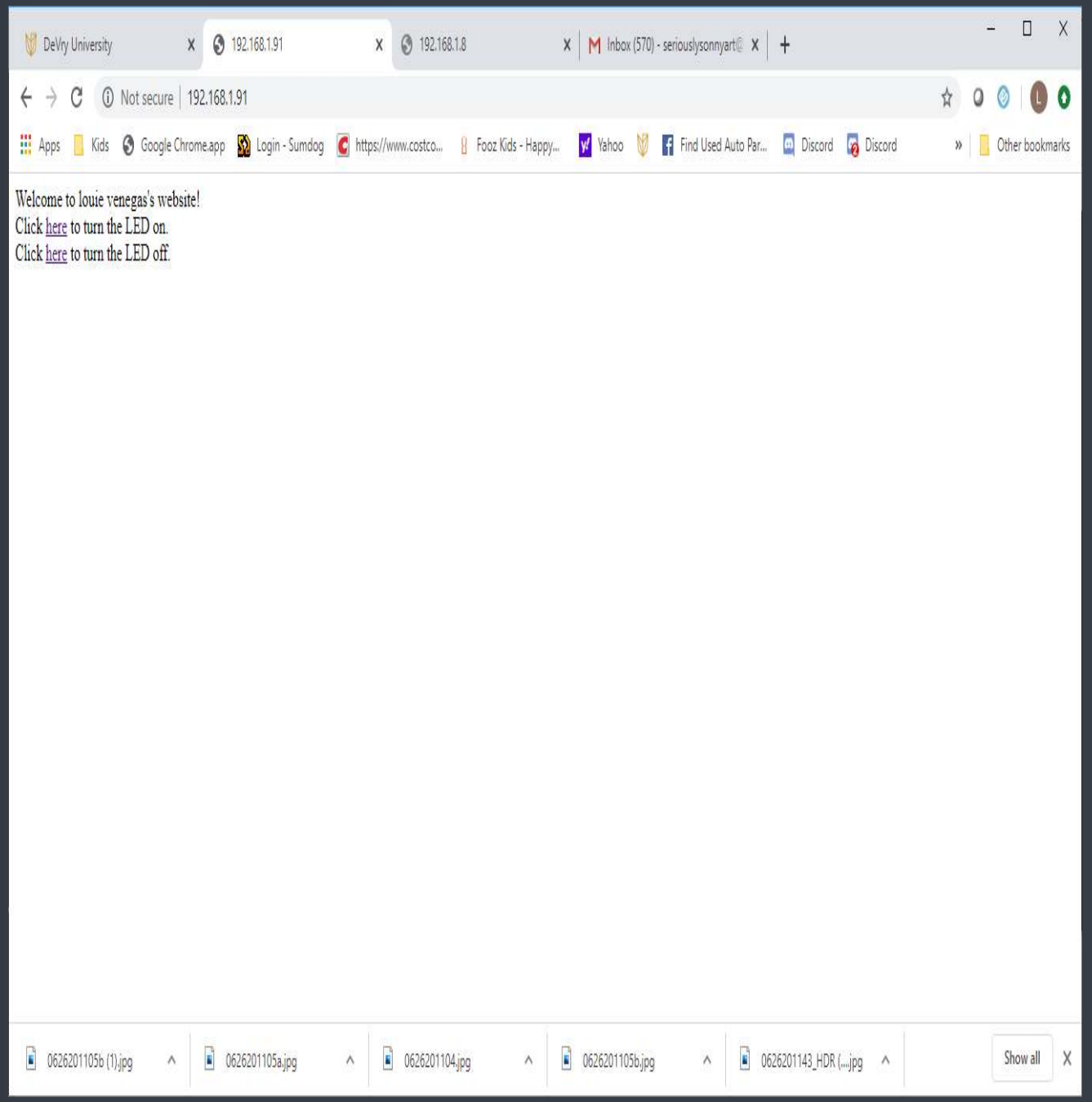
# FIRST, I INSTALLED MY OWN PERSONAL TRAVEL ROUTER TO THE HOME ROUTER SO THAT I'M OPERATING ON MY OWN NETWORK.

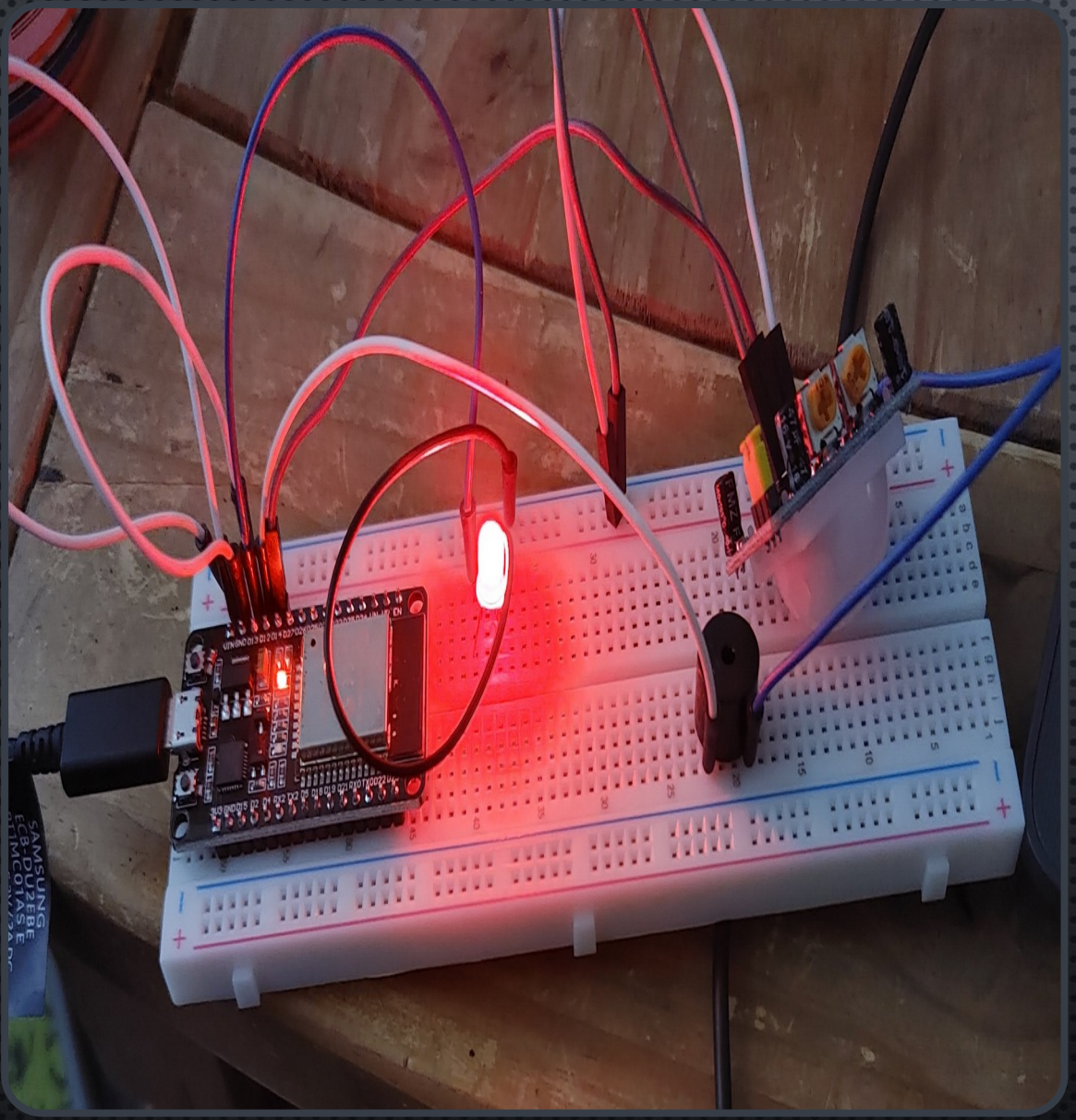
For This Project we chose to use the GL.iNet Mini Travel Router

UNFORTUNATELY I WAS NOT ABLE TO ACCESS THE WIRELESS SETTINGS PORTAL DUE TO INTERNET SPEED ISSUES.



# A SCREENSHOT OF THE BASIC WEB SERVER THAT CONTROLS THE UNIT I BUILT.





OF THE FUNCTIONAL CIRCUIT I BUILT WITH A MOTION SENSOR THAT TRIGGERS A BUZZER AND LED THAT IS CONTROLLED THROUGH A WEB SERVER

# CHALLENGES

OVER THE COURSE OF THE LAST EIGHT WEEKS I ASSEMBLED THIS PROJECT LITTLE BY LITTLE. I STARTED THIS PROJECT WITH ZERO KNOWLEDGE OF IOT AND I DIDN’T EVEN KNOW WHAT AN ARDUINO BOARD WAS OR HOW TO PROGRAM A MICROPROCESSOR.  EVERY STEP WAS A CHALLENGE AND SOMETHING NEW TO LEARN. IN PARTICULAR, TOWARD THE END I STRUGGLED WITH MY INTERNET CONNECTION. IT RAN VERY SLOW AND WOULD NOT CONNECT TO ANY IP ADDRESSES.

# NEW SKILLS

- I GAINED SEVERAL NEW SKILLS IN THE PROJECT
- I LEARN HOW TO USE FLOW CHARTS TO PLAN A PROJECT
- I LEARNED HOW TO WORK WITH AN ARDUINO AND OTHER BOARDS
- I LEARNED HOW TO PROGRAM USING THE ARDUINO IDE

# CONCLUSION

- THROUGHOUT THE COURSE OF THIS PROJECT I'VE LEARNED MANY DIFFERENT FUNDAMENTALS ABOUT THE IOT THROUGH THE CREATION OF A HOME SECURITY SYSTEM
- I HAD HANDS ON EXPERIENCE WITH THE TOPICS IN THIS COURSE THROUGH BUILDING THE CIRCUIT AND PROGRAMMING THE ARDUINO.

# WHERE THIS LED

- THIS WAS MY FIRST PROJECT IN THE PROGRAM. I STARTED IT NOT KNOWING WHAT AN ARDUINO BOARD WAS.
- THE FLOWCHART, CIRCUIT, AND SERIAL DATA HABITS FROM THIS BUILD CARRIED INTO EVERY PROJECT THAT FOLLOWED.
- FOUR YEARS LATER THE SAME INSTINCTS, PLAN IT, INSTRUMENT IT, READ THE DATA, SHOWED UP IN MY SENIOR PROJECT ON BESS INVERTER MONITORING.
- EVERYTHING AFTER THIS GOT EASIER BECAUSE THIS ONE WAS HARD.