

# **Assignment 1**

## **Arduino-Based Smart Home Security System with Motion Detection and Light Sensing**

Team Leader: Pooja. G

REGISTER NUMBER: B2A9BCD0020B73F838648E027EAEBA94

EMAIL: [poojagunavardhan54678@gmail.com](mailto:poojagunavardhan54678@gmail.com)

DEGREE: Bachelor of Engineering

BRANCH: B.E. Computer Science and Engineering

COLLEGE: OXFORD COLLEGE OF ENGINEERING

## Introduction:

For my project, I decided to design an Arduino-based smart home security system that utilizes motion detection and light sensing. I used an Arduino Uno board, a PIR sensor, a light sensor, an LED, and a buzzer to create a system that can detect motion and light levels, and respond by turning on an LED and sounding a buzzer.

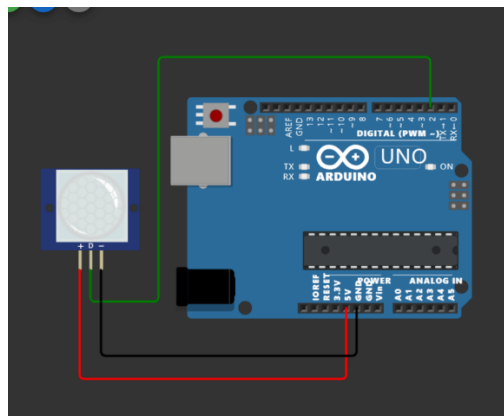
## Components required:

1. Photo resistor sensor
2. PIR Motion sensor
3. LED
4. Buzzer
5. Arduino UNO
6. Connecting wires

## Connections:

### Step 1:

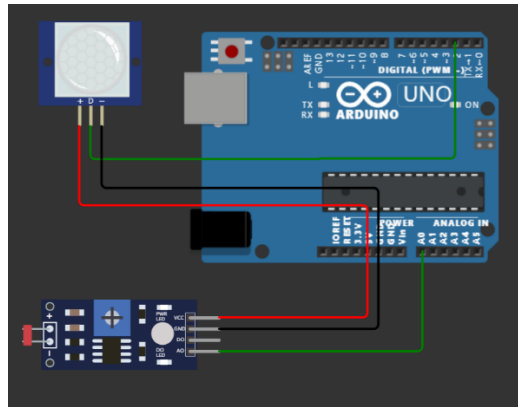
The PIR sensor is taken and its VCC pin connected to 5V in the Arduino, GND is connected to the GND in Arduino, and OUT is connected to pin 2.



**Fig 1:** PIR Sensor connected to Arduino uno

### Step 2:

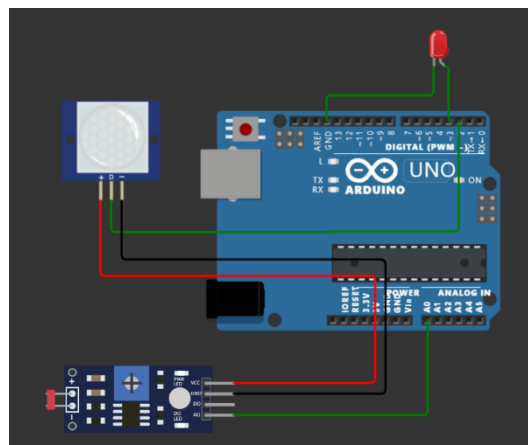
The Light sensor is imported and its VCC is connected to 5V in the Arduino, the GND pin is connected to the GND in the Arduino uno and the signal pin is connected to the analog pin A0.



**Fig 2:** LDR Sensor connected to Arduino uno

### Step 3:

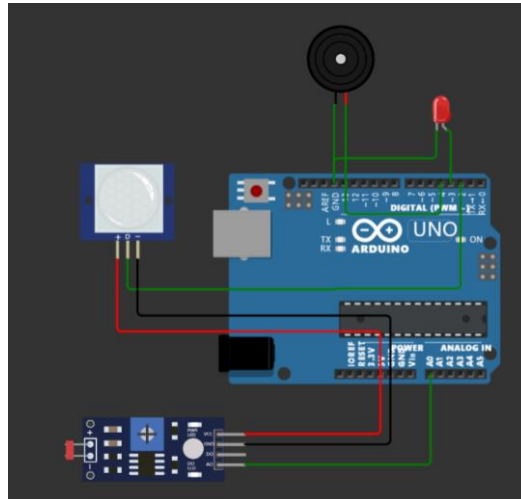
Now the LED is imported. The positive leg of the LED is connected to the pin 3 and the negative leg is connected to the GND in the Arduino uno.



**Fig 3:** LED connected to Arduino uno

#### Step 4:

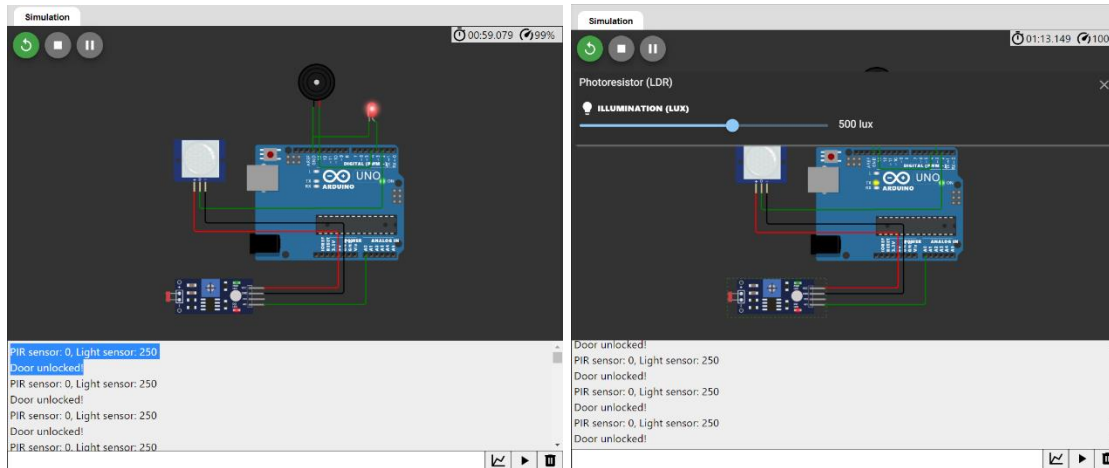
Finally, the buzzer is imported and its positive leg is connected to pin 4 and negative leg connected to GND.



**Fig 4:** Buzzer connected to Arduino uno

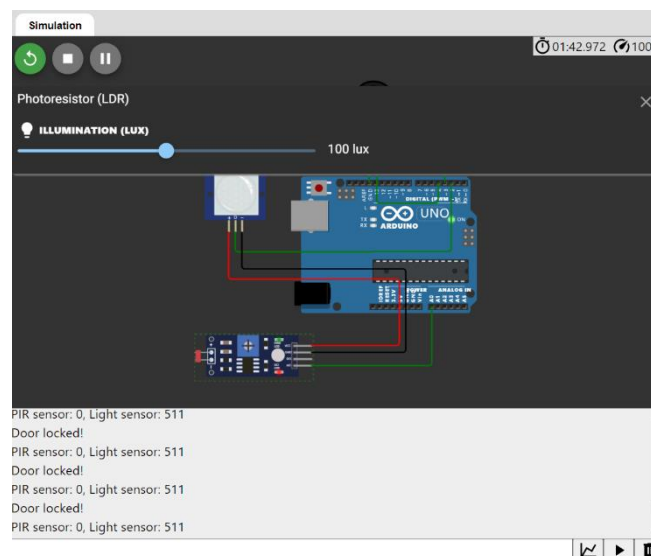
Now the connection part is over. Next, I wrote the code for the project in the workwi coding tab. The code consisted of two main parts: one to detect motion using the PIR sensor, and one to detect light levels using the light sensor. When motion was detected, the LED and buzzer were turned on. When the light levels dropped below a certain threshold, the LED was turned on to indicate that the door was unlocked.

Once the code was written, I tested the project. I powered on the Arduino board and opened the serial monitor to view the sensor readings. I moved in front of the PIR sensor to trigger the motion detection and saw the LED and buzzer turn on. I also covered the light sensor to lower the light level and saw the LED turn on to indicate that the door was unlocked.



**Fig 5:** Simulation “Door Unlocked!”

From fig 5, the simulation is done with light intensity with 500 lux, the door is unlocked hence “Door Unlocked!” is displayed in the output.



**Fig 6:** Simulation, “Door locked!”

From fig 6, the light intensity is set to 100 lux so, the door is locked hence the “Door locked!” output is displayed.

### Code:

```
// PIR sensor pin
int pirPin = 2;

// Light sensor pin
int lightPin = A0;

// LED pin
```

```

int ledPin = 3;

// Buzzer pin
int buzzerPin = 4;

// Variables to store sensor readings
int pirState = LOW;
int lightValue = 0;

void setup() {
    // Set up the pins
    pinMode(pirPin, INPUT);
    pinMode(lightPin, INPUT);
    pinMode(ledPin, OUTPUT);
    pinMode(buzzerPin, OUTPUT);

    // Initialize serial communication
    Serial.begin(9600);
}

void loop() {
    // Read the PIR sensor
    pirState = digitalRead(pirPin);

    // Read the light sensor
    lightValue = analogRead(lightPin);

    // Print the sensor readings
    Serial.print("PIR sensor: ");
    Serial.print(pirState);
    Serial.print(", Light sensor: ");
    Serial.print(lightValue);
    Serial.println();

    // Check if motion is detected by the PIR sensor
    if (pirState == HIGH) {
        digitalWrite(ledPin, HIGH); // Turn on the LED
        digitalWrite(buzzerPin, HIGH); // Sound the buzzer
        Serial.println("Motion detected!");
    } else {
        digitalWrite(ledPin, LOW); // Turn off the LED
        digitalWrite(buzzerPin, LOW); // Stop the buzzer
    }

    // Check the light level
    if (lightValue < 500) { // If light level is below 500
        digitalWrite(ledPin, HIGH); // Turn on the LED
        Serial.println("Door unlocked!");
    }
}

```

```
} else {  
    digitalWrite(ledPin, LOW); // Turn off the LED  
    Serial.println("Door locked!");  
}  
  
delay(500); // Wait for half a second  
}
```

**Workwi project link: [Pooja G Assignment 1](#)**