



SMART HOME AUTOMATION SYSTEM

(Gas Detection & Smart Motion Security System)

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OBJECTIVE

To develop a smart home automation system using Arduino.

To detect:

- Motion (PIR Sensor)
- Gas leakage/smoke (MQ2 Sensor)
- Trigger an alarm system (buzzer + LED) based on the output.



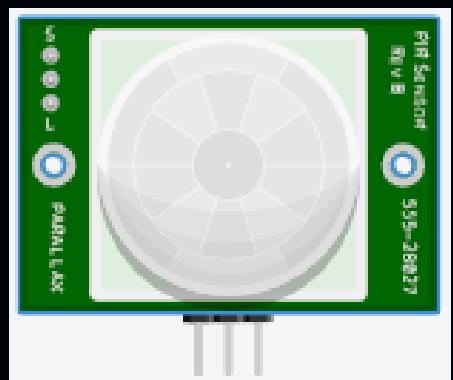
COMPONENTS USED



- Arduino UNO
- PIR Motion Sensor
- Gas Sensor (MQ2)
- Piezo (Buzzer)
- LED
- Resistor

| Name | Quantity | Component |
|----------|----------|-----------------|
| U1 | 1 | Arduino Uno R3 |
| GAS1 | 1 | Gas Sensor |
| PIEZ02 | 1 | Piezo |
| D1 | 1 | Red LED |
| R3 R1 | 2 | 4.7 kΩ Resistor |
| PIR1 | 1 | PIR Sensor |

COMPONENTS



- *PIR Sensor*

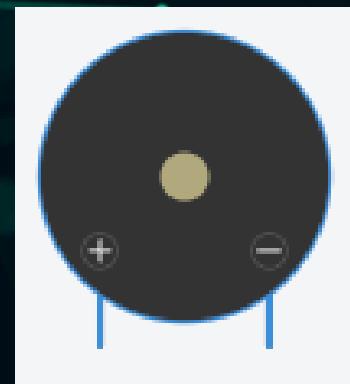


- *LED*

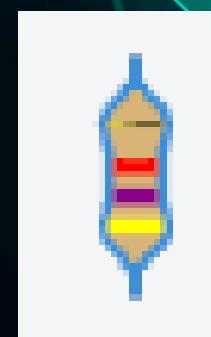


- *Gas Sensor*

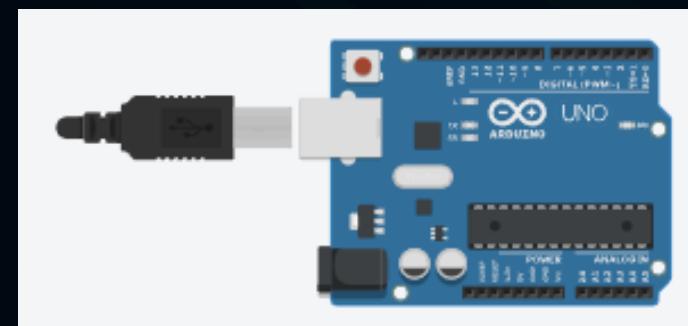
- *Piezo*



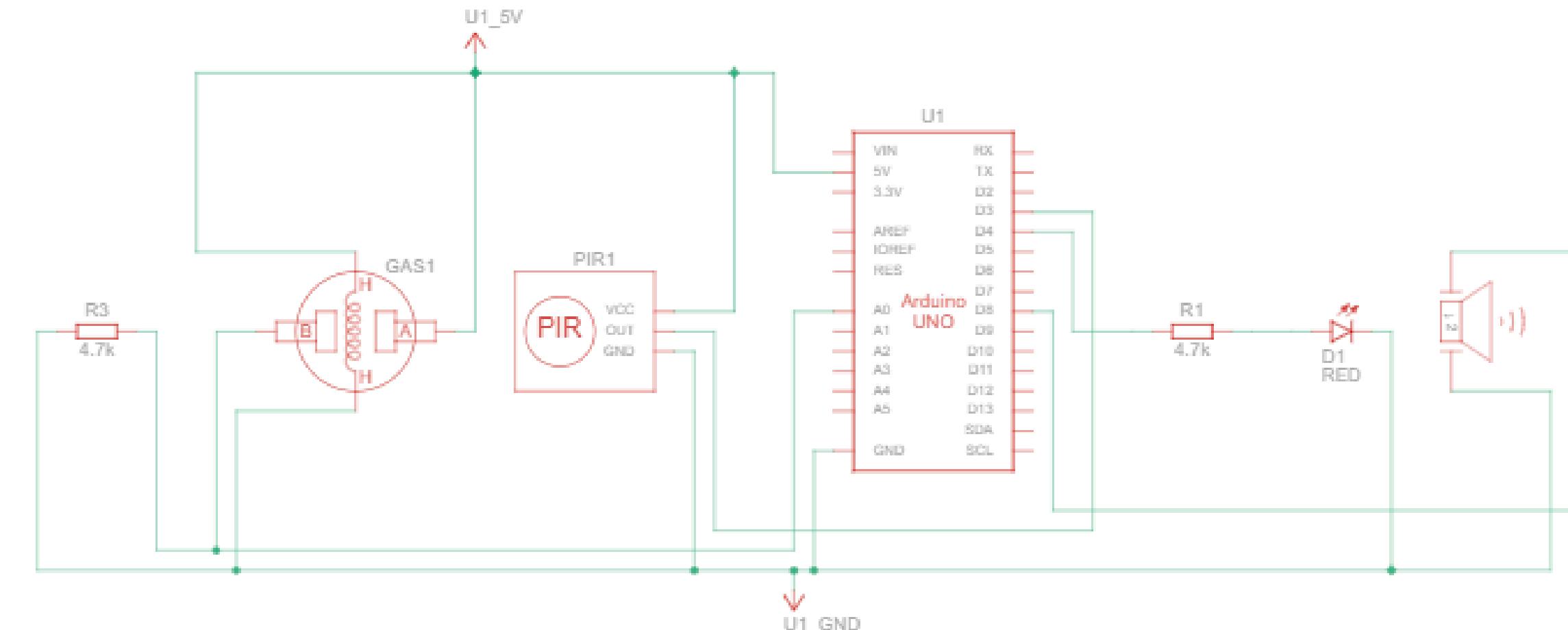
- *Resistor*



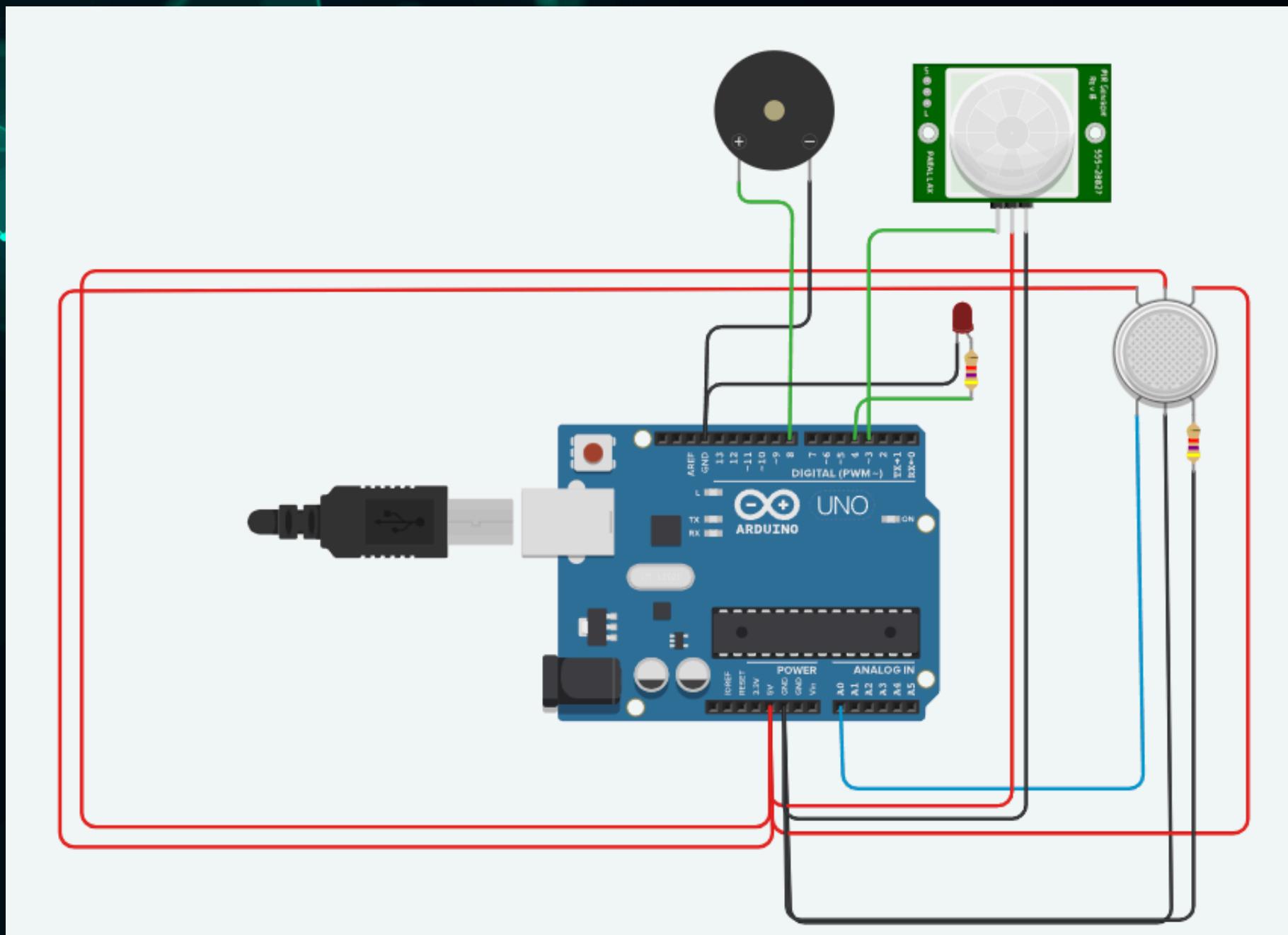
- *Arduino UNO R3*



SCHEMATIC CIRCUIT DIAGRAM



CIRCUIT DIAGRAM (WITHOUT SIMULATION)



Red Wires → 5V (VCC)

Black Wires → GND

Green Wires → Digital Pins

Blue Wire → Analog Pin

ARDUINO CODE

```
int gasSensor = A0;
int buzzer = 8;
int led = 4;
int pirPin = 3;

void setup() {
    pinMode(gasSensor, INPUT);
    pinMode(pirPin, INPUT);
    pinMode(buzzer, OUTPUT);
    pinMode(led, OUTPUT);
    Serial.begin(9600);
}

void loop() {
    int gasValue = analogRead(gasSensor);
    int motion = digitalRead(pirPin);

    Serial.print("Gas: ");
    Serial.print(gasValue);

    if (gasValue > 400) {
        Serial.println("Gas Detected!");
        digitalWrite(buzzer, HIGH);
        digitalWrite(led, HIGH);
    } if ( motion == HIGH) {
        Serial.println("Motion Detected!");
        digitalWrite(buzzer, HIGH);
        digitalWrite(led, HIGH);
    } else if ( motion == LOW) {
        Serial.println("Motion Not Detected");
        digitalWrite(buzzer, LOW); r
        digitalWrite(led, LOW); }

    delay(500);
}
```

CONNECTION OVERVIEW

Gas sensor(MQ2) detects LPG leakage/smoke.

PIN Connection:-

- B1 → A0 (Analog Pin 0)
- H2 → GND (Ground)
- B2 → Resistor + GND
- A1, A2 & H1 → 5V (VCC)

PIR sensor detects motion.

PIN Connection:-

- Signal → D3 (Digital Pin 3)
- Power → 5V (VCC)
- Ground → GND (Ground)

Buzzer (Piezo) activates when gas or motion is detected.

PIN Connection:-

- Positive → D8 (Digital Pin 8)
- Negative → GND (Ground)

LED activates when gas or motion is detected.

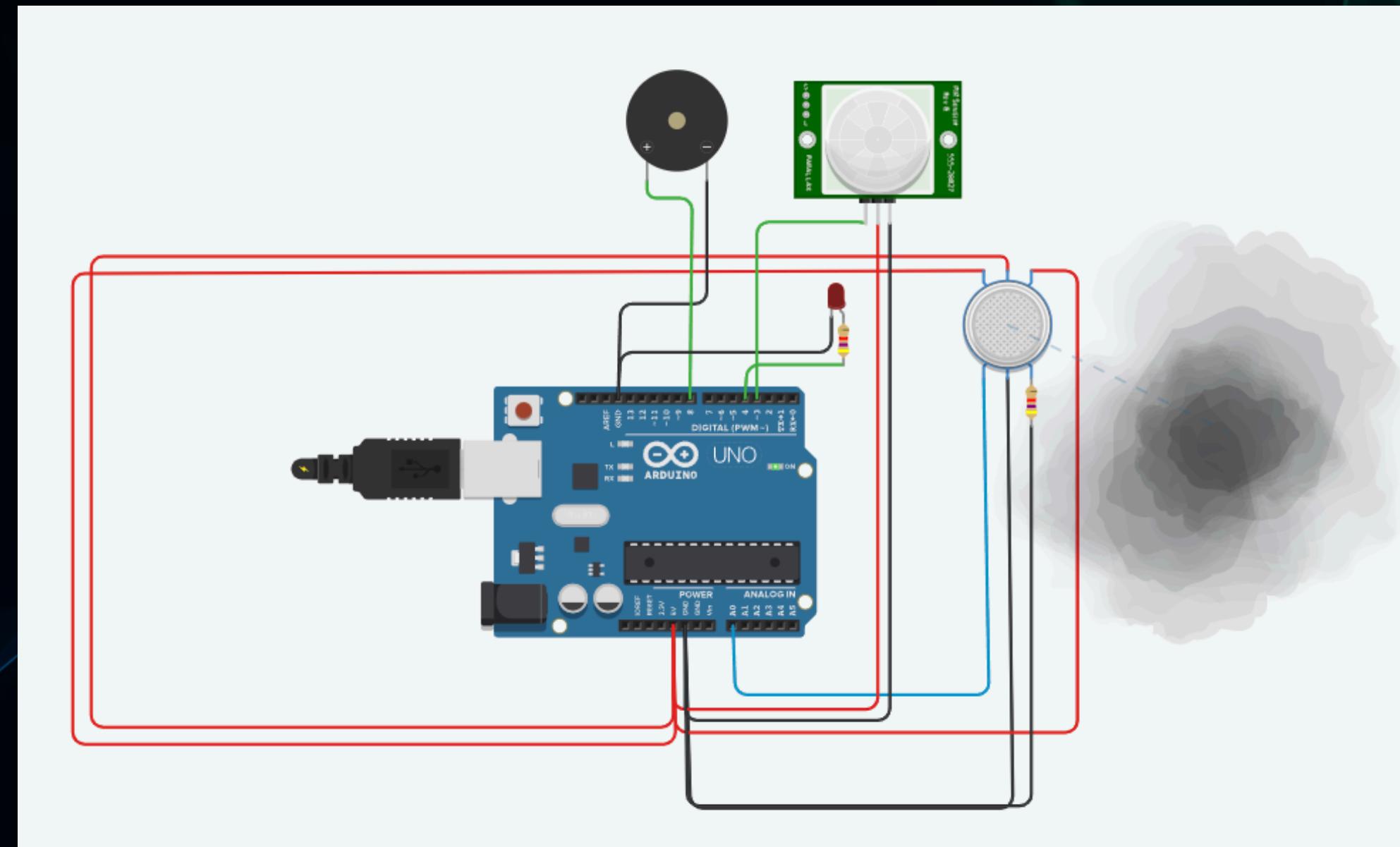
PIN Connection:-

- Anode → Resistor + D4 (Digital Pin 4)
- Cathode → GND (Ground)

GAS SENSOR (MQ2)

- It detects LPG leakage/smoke.
- If gas value < 400, LED and buzzer doesn't go off.
- If gas value > 400, LED and buzzer goes off.
- Serial Monitor shows Gas Detected when LED and buzzer go off.

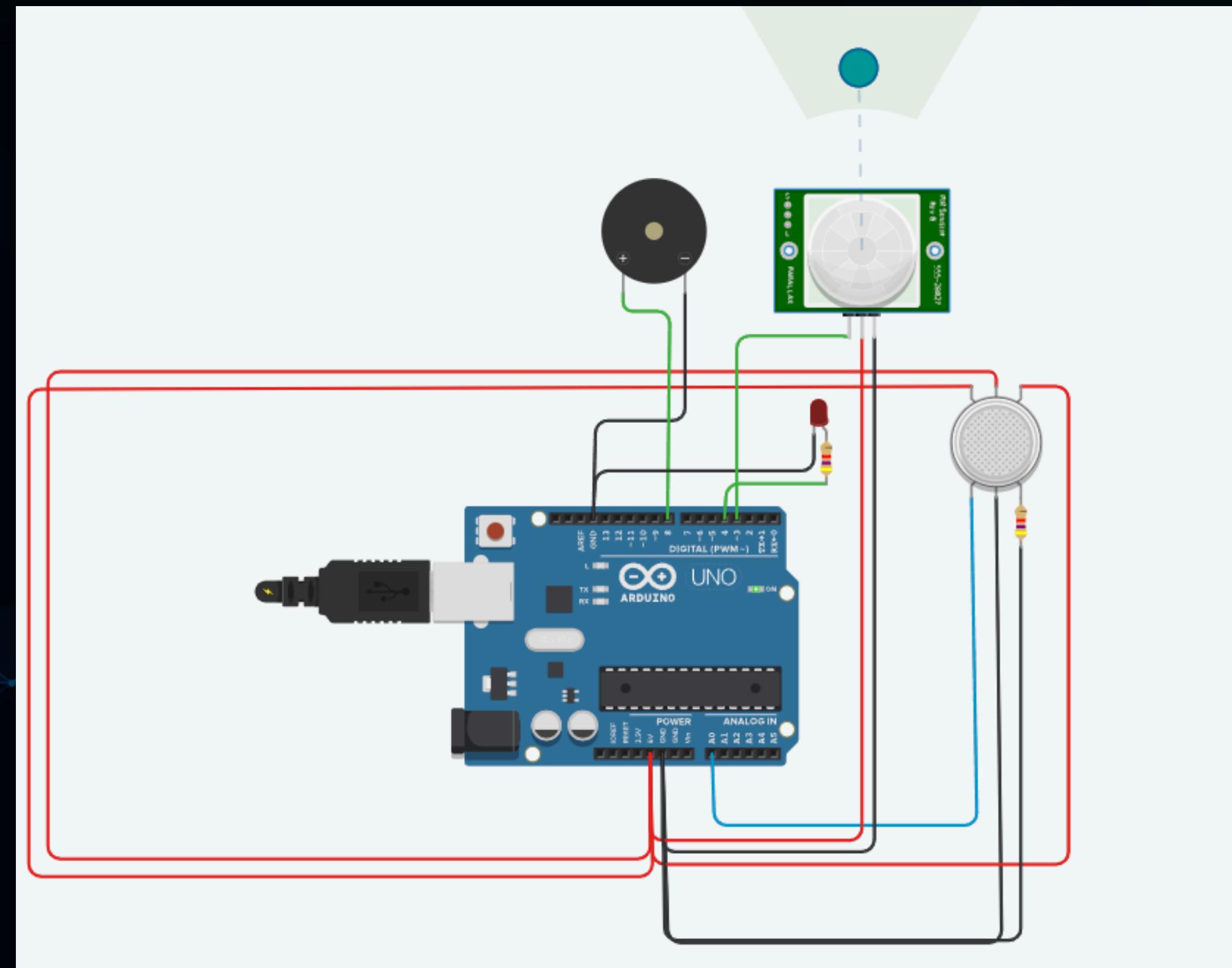
GAS SENSOR (MQ2)



PIR SENSOR

- It detects motion.
- If motion = low, LED and buzzer doesn't go off.
- If motion = high, LED and buzzer goes off.
- Serial Monitor shows Motion Detected when LED and buzzer go off & Motion Not Detected otherwise.

PIR SENSOR



CONCLUSION



1. Motion Detection using the PIR sensor helps identify unauthorized intrusions or movements.
2. Gas/Smoke Detection using the MQ2 sensor alerts in case of harmful gas leaks or smoke buildup.
3. Both sensors are monitored through a single Arduino UNO, and when either sensor detects danger, a buzzer sounds an alarm, and an LED provides a visual warning.

This project demonstrates how multiple types of sensors can be integrated into a compact, and reliable system to enhance home safety and automation.

THANK YOU!