



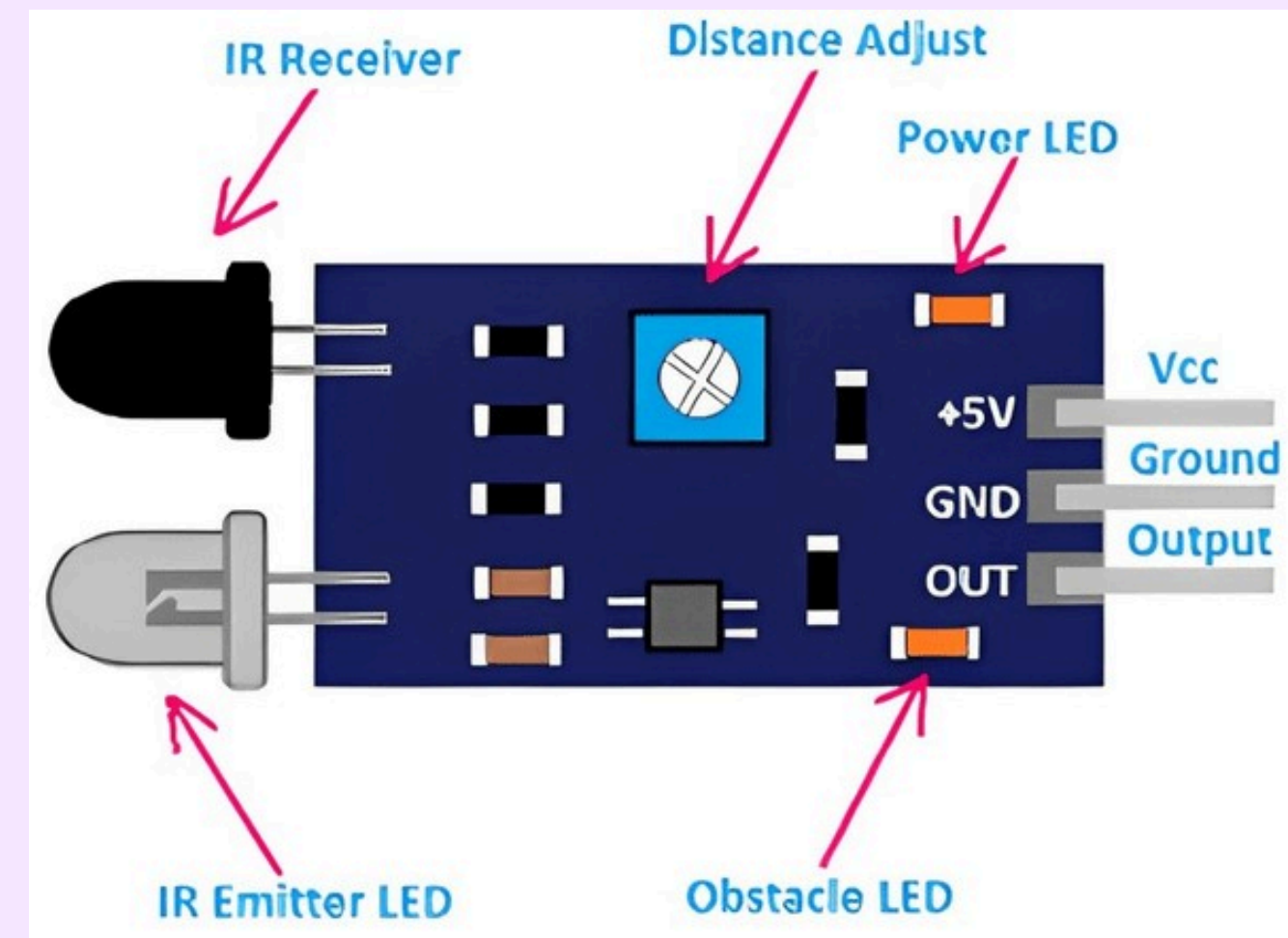
# **INFRARED SENSOR(IR)**

**SUBMITTED BY:**  
**H.M. TAHSIN SHEIKH**  
**ID: 22201243**  
**SEC: E**  
**COURSE CODE : CSE 437**

**SUBMITTED TO:**  
**A.S. ZAFORULLAH MOMTAZ**  
**ASSISTANT PROFESSOR**  
**DEPARTMENT OF CSE**  
**UNIVERSITY OF ASIA PACIFIC**

# INTRODUCTION

- **An Infrared (IR) sensor is an electronic device used to detect infrared radiation.**
- **It can sense objects, motion, and heat without physical contact.**
- **IR sensors are widely used in robotics, automation, and security systems.**



# WHAT IS INFRARED RADIATION?

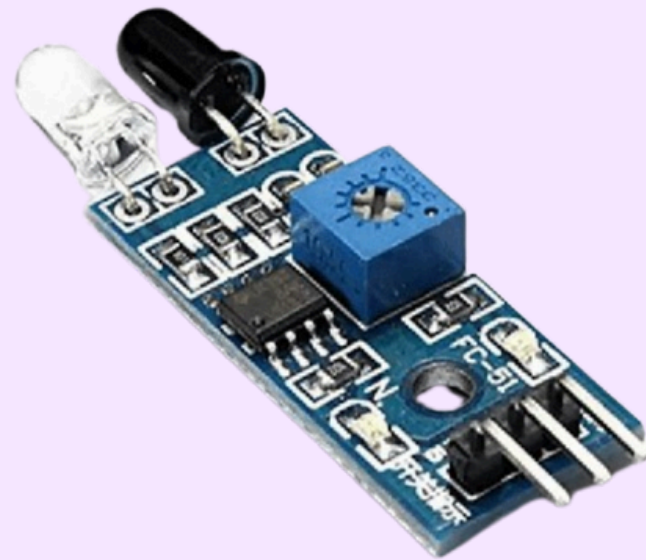
- Infrared is a type of electromagnetic wave Wavelength range: 700 nm - 1 mm Invisible to human eyes
- Emitted by all warm objects



# TYPES OF IR SENSORS

## ACTIVE IR SENSOR

**USES IR TRANSMITTER AND RECEIVER  
USED FOR OBSTACLE DETECTION**



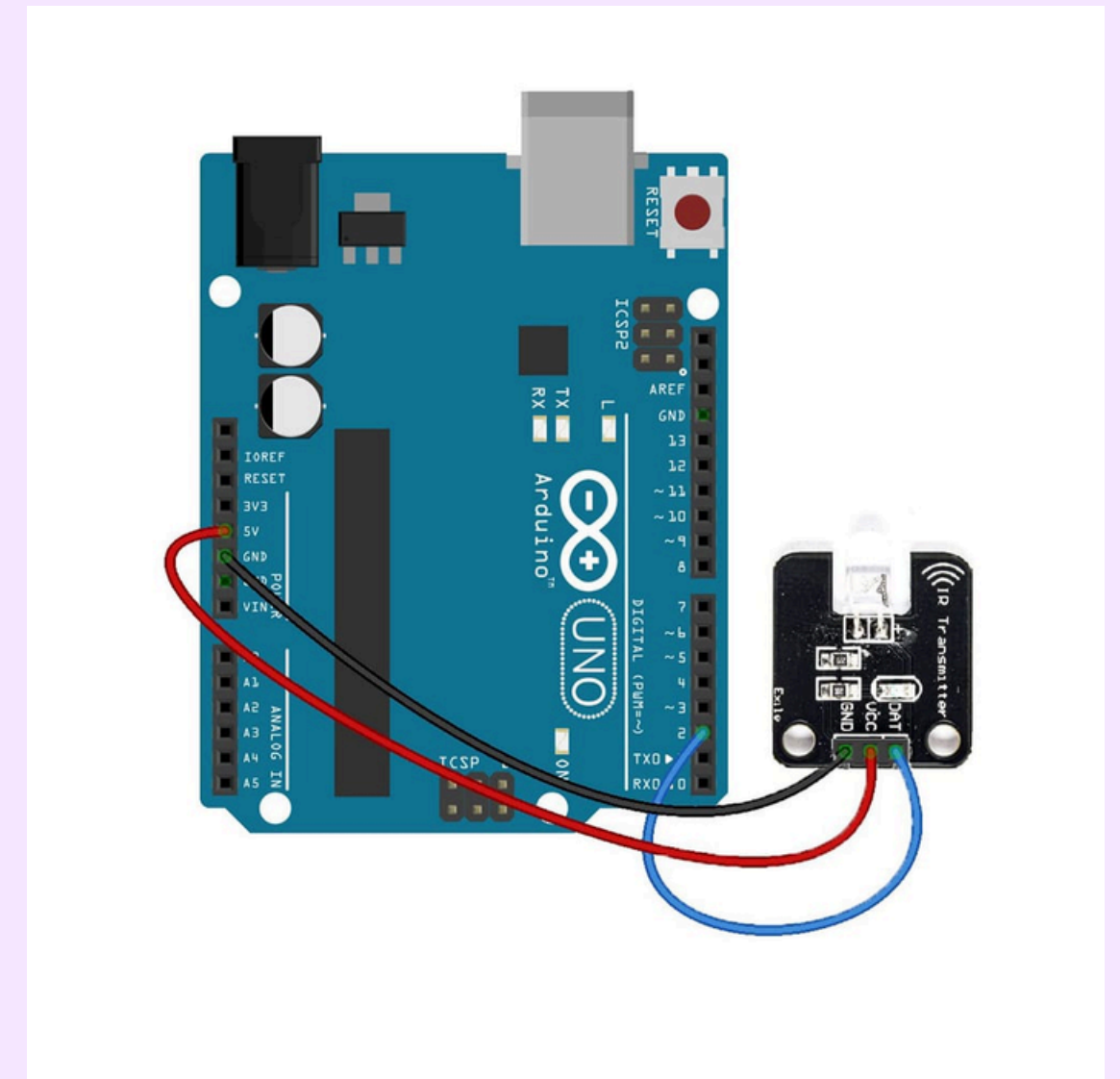
## PASSIVE IR SENSOR (PIR)

**DETECTS HEAT FROM OBJECTS USED  
FOR MOTION DETECTION**



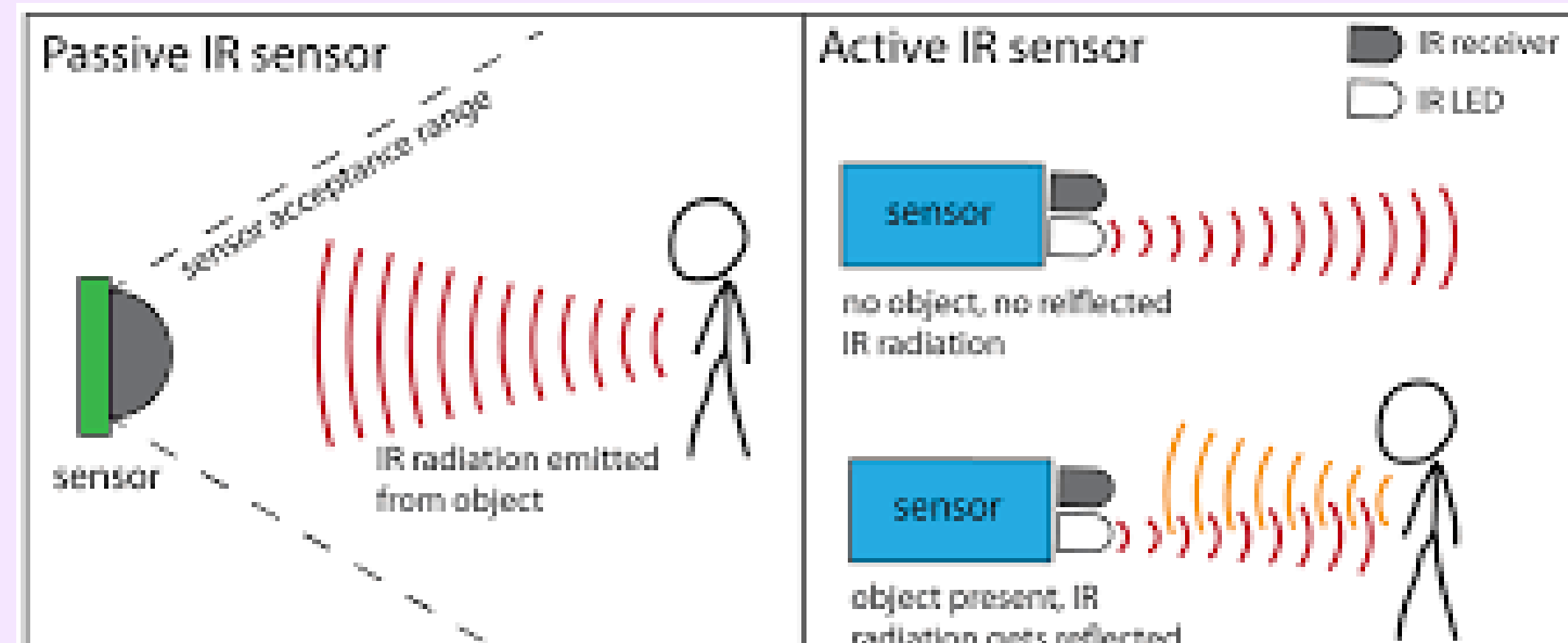
# COMPONENTS OF IR

- **IR Transmitter (IR LED)**
- **IR Receiver (Photodiode / Phototransistor) LM358 Comparator IC**
- **Potentiometer (Sensitivity control)**
- **Output LED**
- **VCC, GND, OUT Pins**



# WORKING METHODOLOGY

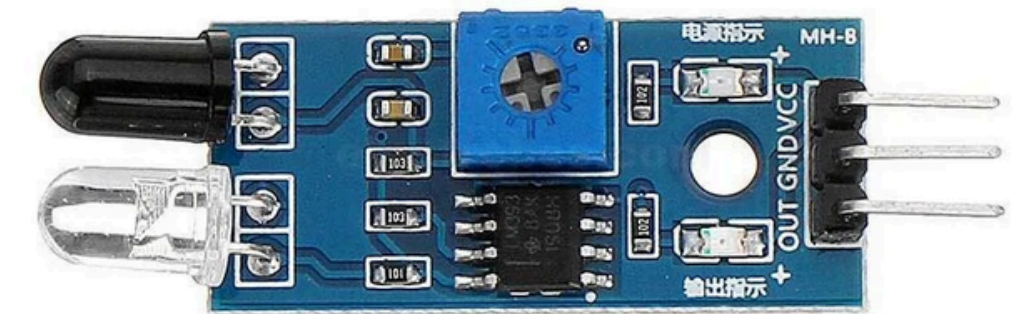
1. IR LED EMITS INFRARED RADIATION
2. RADIATION STRIKES AN OBJECT
3. REFLECTED IR LIGHT IS RECEIVED BY THE PHOTODIODE
4. LM358 COMPARATOR COMPARES SIGNAL WITH REFERENCE
5. OUTPUT CHANGES TO HIGH OR LOW
6. MICROCONTROLLER READS THE OUTPUT





# FEATURES

- **Power Supply: +5V DC Quiescent Current:  $< 2\text{mA}$  Working Current:  $15\text{mA}$  Effectual Angle:  $< 15^\circ$**
- **Ranging Distance: 2 cm - 400 cm / 1" - 13 ft Resolution: 0.3 cm**
- **Measuring Angle:  $30^\circ$**
- **Trigger Input Pulse Width:  $10\ \mu\text{s}$  Dimensions: 45 mm  $\times$  20 mm  $\times$  15 mm**



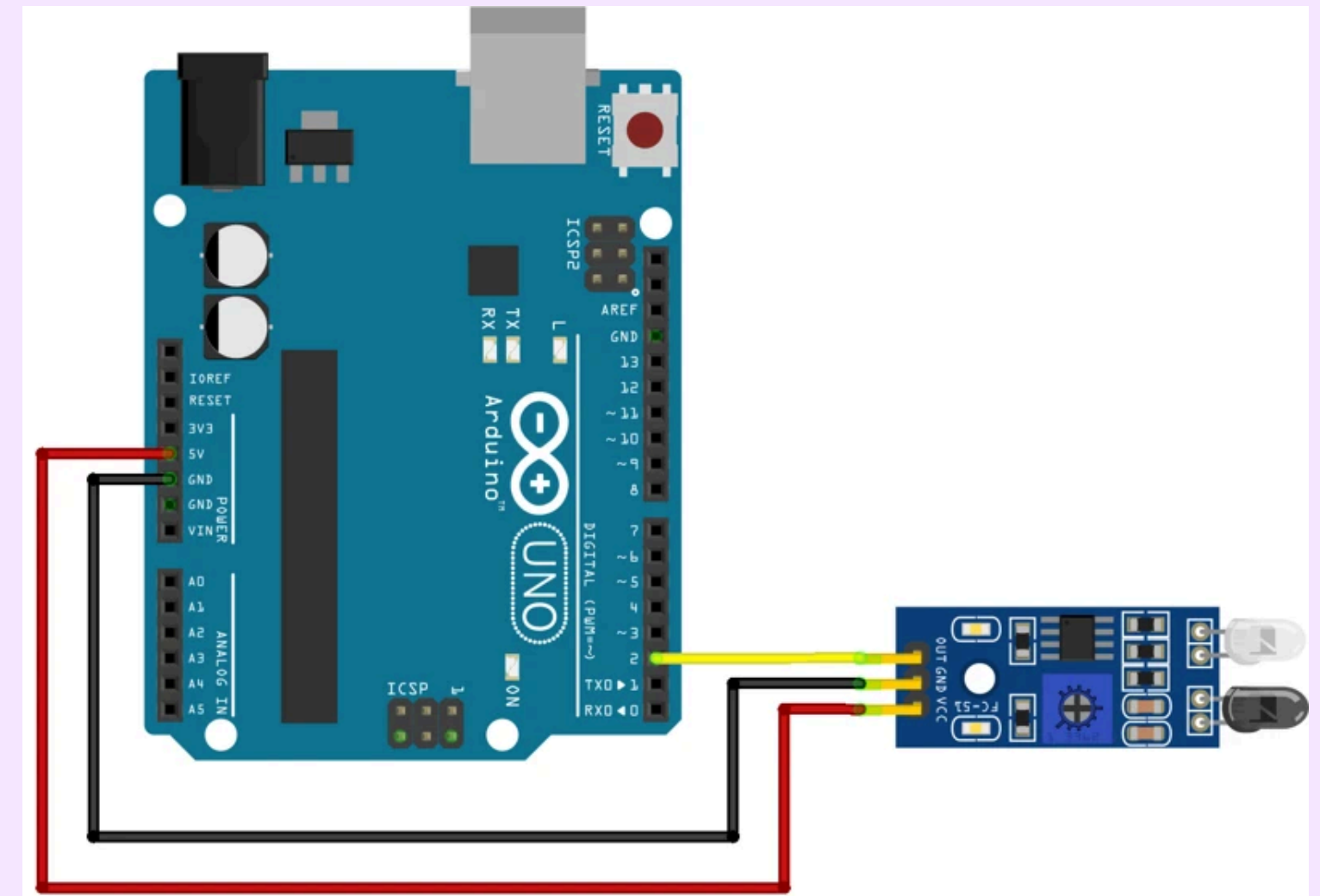
# DIAGRAM

## CONNECTIONS:

IR VCC → ARDUINO 5V

IR GND → ARDUINO GND

IR OUT → ARDUINO DIGITAL  
PIN 7







# LIBRARY INSTALLATION



1. CONNECT THE IR SENSOR TO YOUR ARDUINO.
2. OPEN ARDUINO IDE.
3. SELECT YOUR BOARD:
4. TOOLS → BOARD → ARDUINO UNO
5. SELECT CORRECT COM PORT:
6. TOOLS → PORT → (YOUR PORT)
7. COPY THE CODE BELOW.
8. CLICK UPLOAD.
9. OPEN SERIAL MONITOR (9600 BAUD RATE).

```
/*
 * IR Sensor Object Detection Code
 */

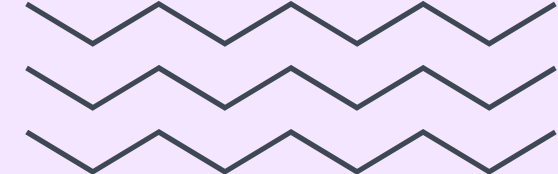
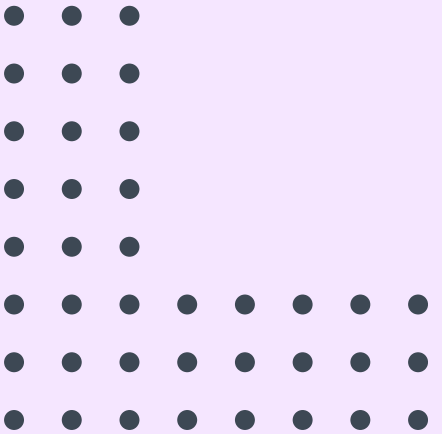
#define IR_PIN 7
int irValue;

void setup() {
  Serial.begin(9600);
  pinMode(IR_PIN, INPUT);
}

void loop() {
  irValue = digitalRead(IR_PIN);

  if (irValue == 0) {
    Serial.println("Object Detected");
  } else {
    Serial.println("No Object");
  }

  delay(250);
}
```



# CORE CODE

```
// Define the pins
const int irSensorPin = 2; // OUT pin connected to Digital 2
const int ledPin = 13;     // Built-in LED for visual feedback

void setup() {
  // Set pin modes
  pinMode(irSensorPin, INPUT); // Set sensor as input
  pinMode(ledPin, OUTPUT);     // Set LED as output

  // Start Serial communication at 9600 baud
  Serial.begin(9600);
}

void loop() {
  // Read the digital value from the sensor (LOW = Obstacle, HIGH = Clear)
  int sensorState = digitalRead(irSensorPin);

  if (sensorState == LOW) {
    // If an obstacle is detected
    digitalWrite(ledPin, HIGH);
    Serial.println("Obstacle Detected!");
  } else {
    // If the path is clear
    digitalWrite(ledPin, LOW);
    Serial.println("Path Clear");
  }

  delay(100); // Small delay to stabilize readings
}
```

**OBSTACLE AVOIDANCE ROBOT (ARDUINO)**

```
const int buzzer = 8;
const int resetBtn = 4;
bool alarmActive = false;

void setup() {
  pinMode(irSensor, INPUT);
  pinMode(buzzer, OUTPUT);
  pinMode(resetBtn, INPUT_PULLUP);
}

void loop() {
  // Trip the alarm
  if (digitalRead(irSensor) == LOW) {
    alarmActive = true;
  }

  // Sound the buzzer if alarm is active
  if (alarmActive) {
    tone(buzzer, 1000); // 1kHz sound
  }

  // Reset the alarm
  if (digitalRead(resetBtn) == LOW) {
    alarmActive = false;
    noTone(buzzer);
  }
}
```

**IR PROXIMITY SECURITY ALARM (BUZZER)**

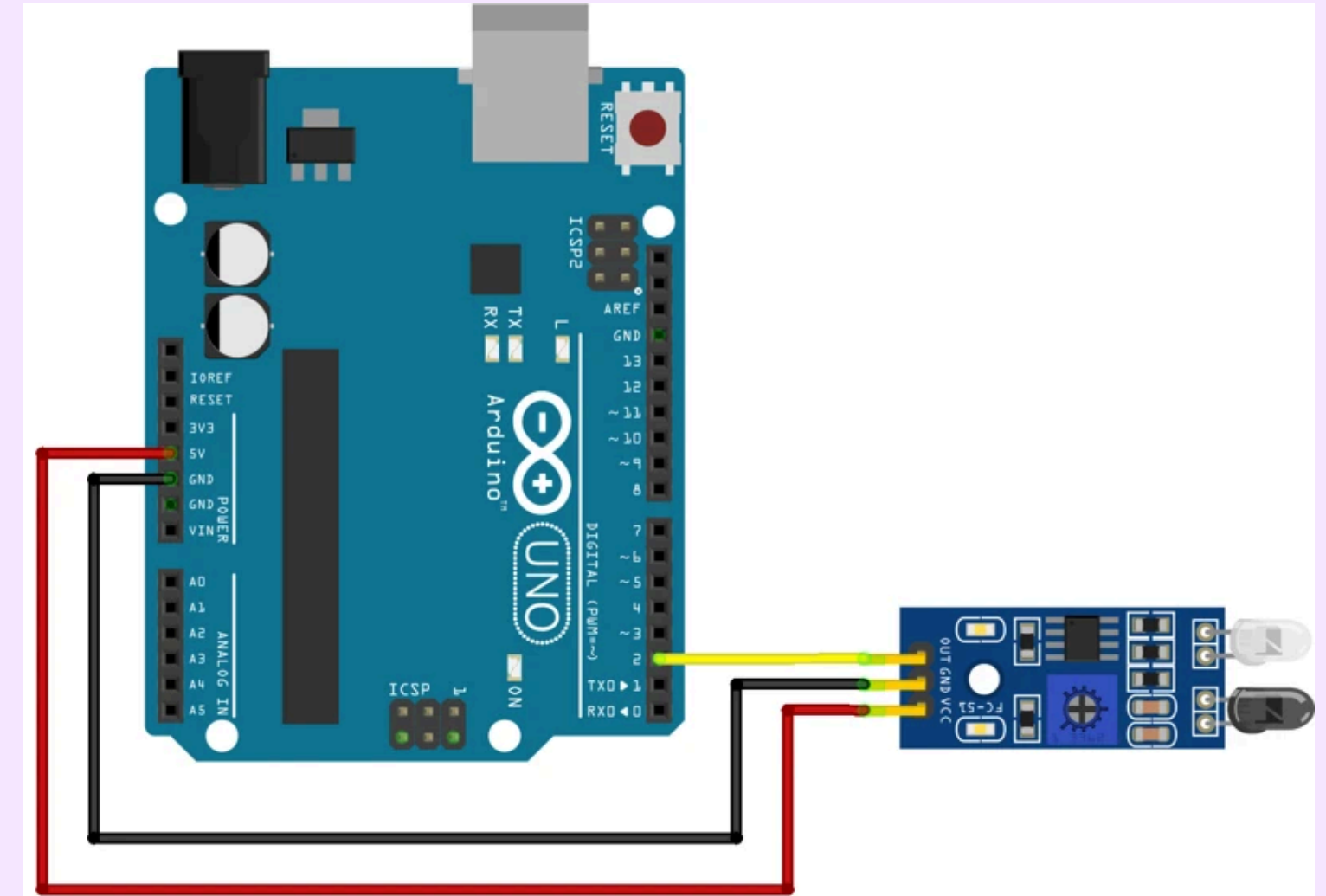
# DIAGRAM

## CONNECTIONS:

IR VCC → ARDUINO 5V

IR GND → ARDUINO GND

IR OUT → ARDUINO DIGITAL  
PIN 7



# THANK YOU

**“An IR sensor is a low-cost and reliable device that detects objects using infrared light. It is widely used in automation, robotics, and security systems to improve efficiency and safety.”**

