

INFRARED SENSOR(IR)

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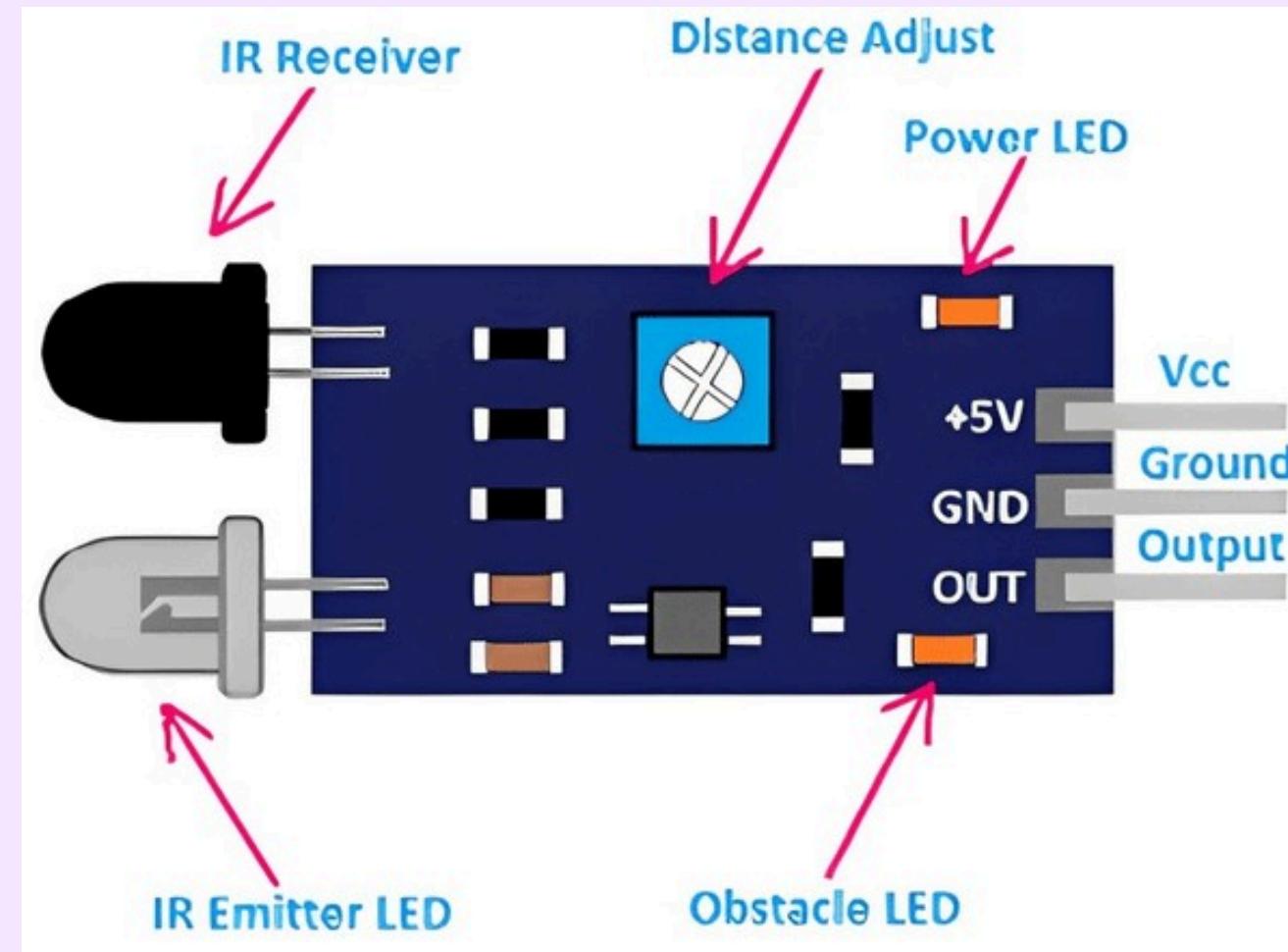
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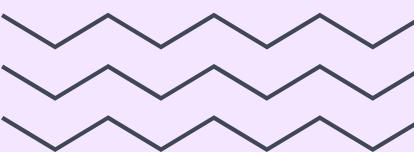
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INTRODUCTION

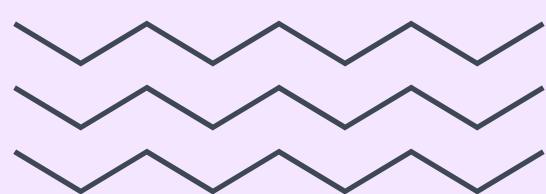
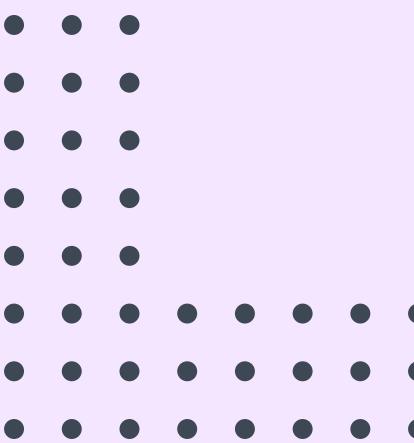
- An Infrared (IR) sensor is an electronic device used to detect infrared radiation.
- It can sense objects, motion, and heat without physical contact.
- IR sensors are widely used in robotics, automation, and security systems.





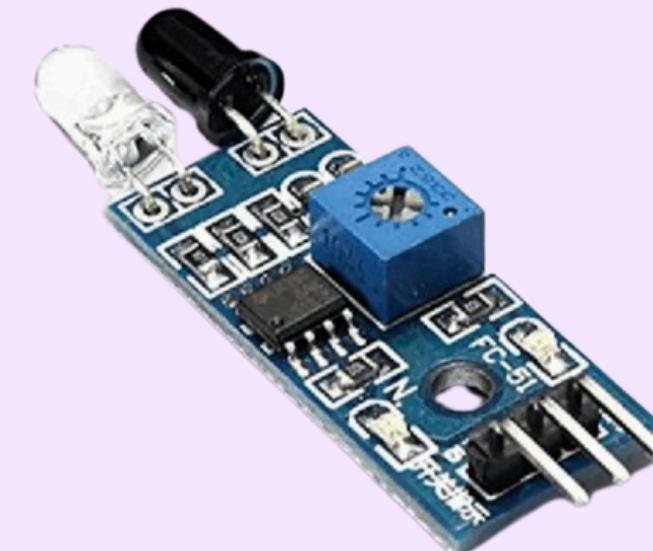
WHAT IS INFRARED RADIATION?

- 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

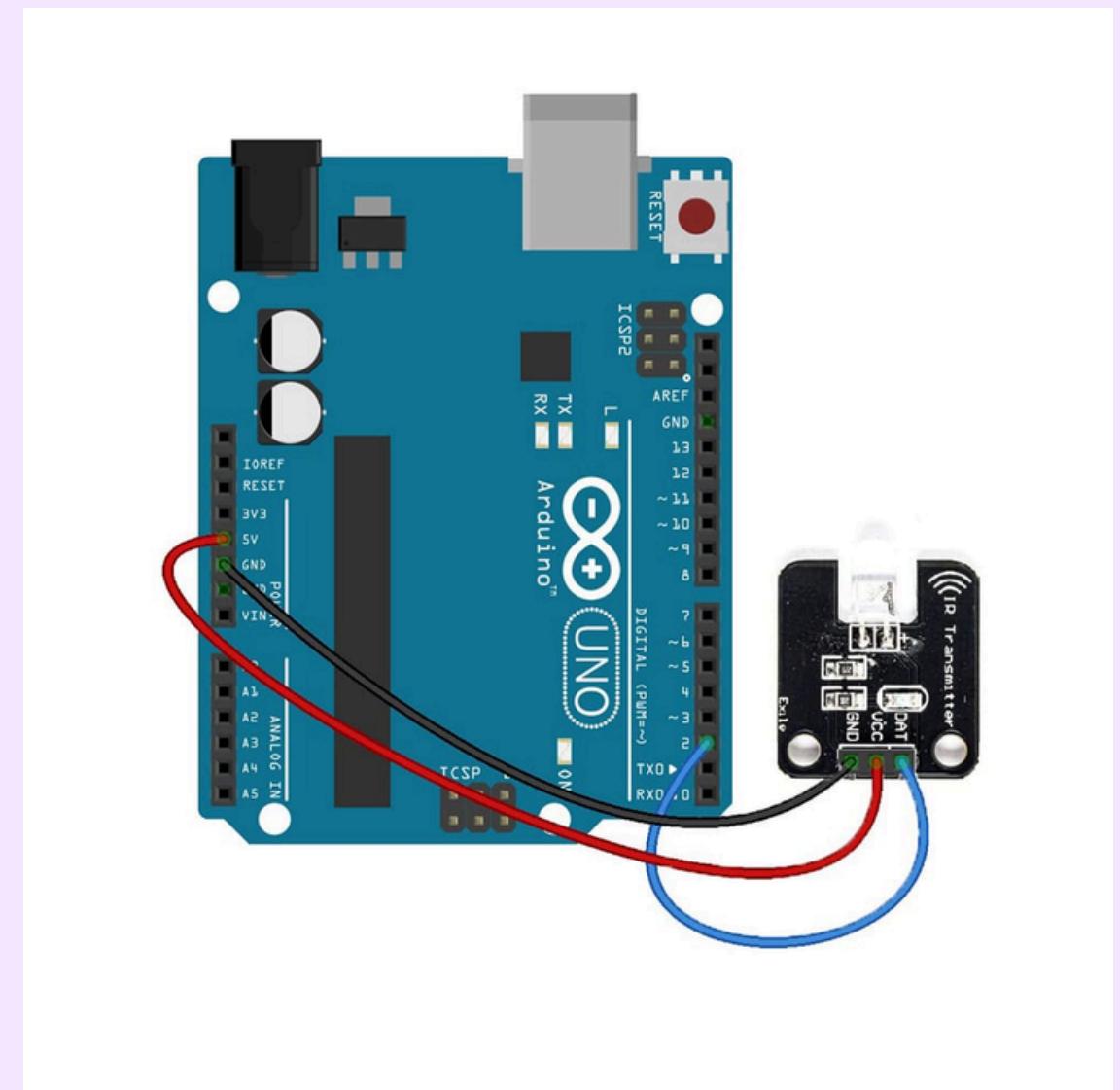


PASSIVE IR SENSOR (PIR)
DETECTS HEAT FROM OBJECTS USED
FOR MOTION DETECTION



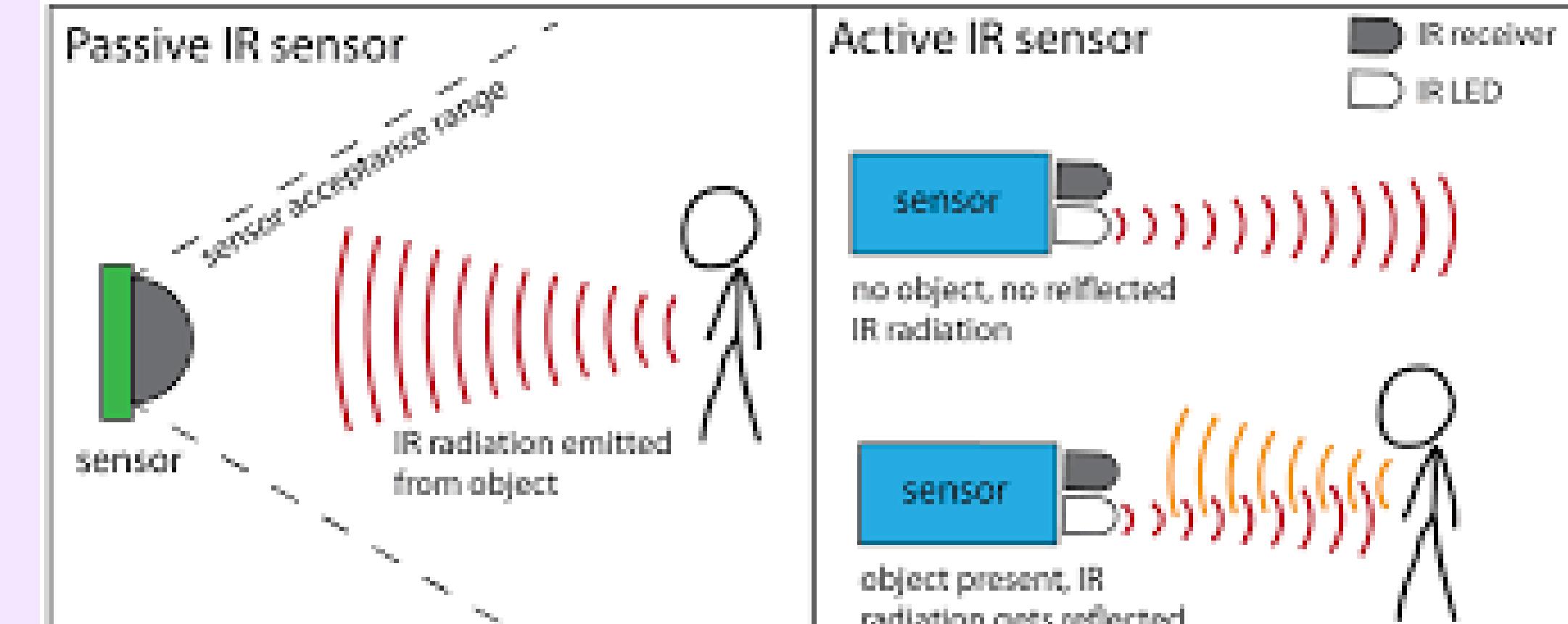
COMPONENTS OF IR

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



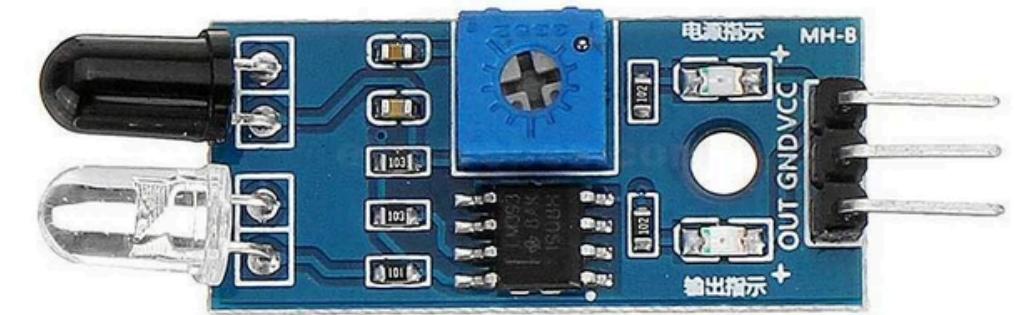
WORKING METHODOLOGY

- 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: < 2mA Working Current: 15mA Effectual Angle: < 15°**
- **Ranging Distance: 2 cm - 400 cm / 1" - 13 ft Resolution: 0.3 cm**
- **Measuring Angle: 30°**
- **Trigger Input Pulse Width: 10 µs Dimensions: 45 mm × 20 mm × 15 mm**



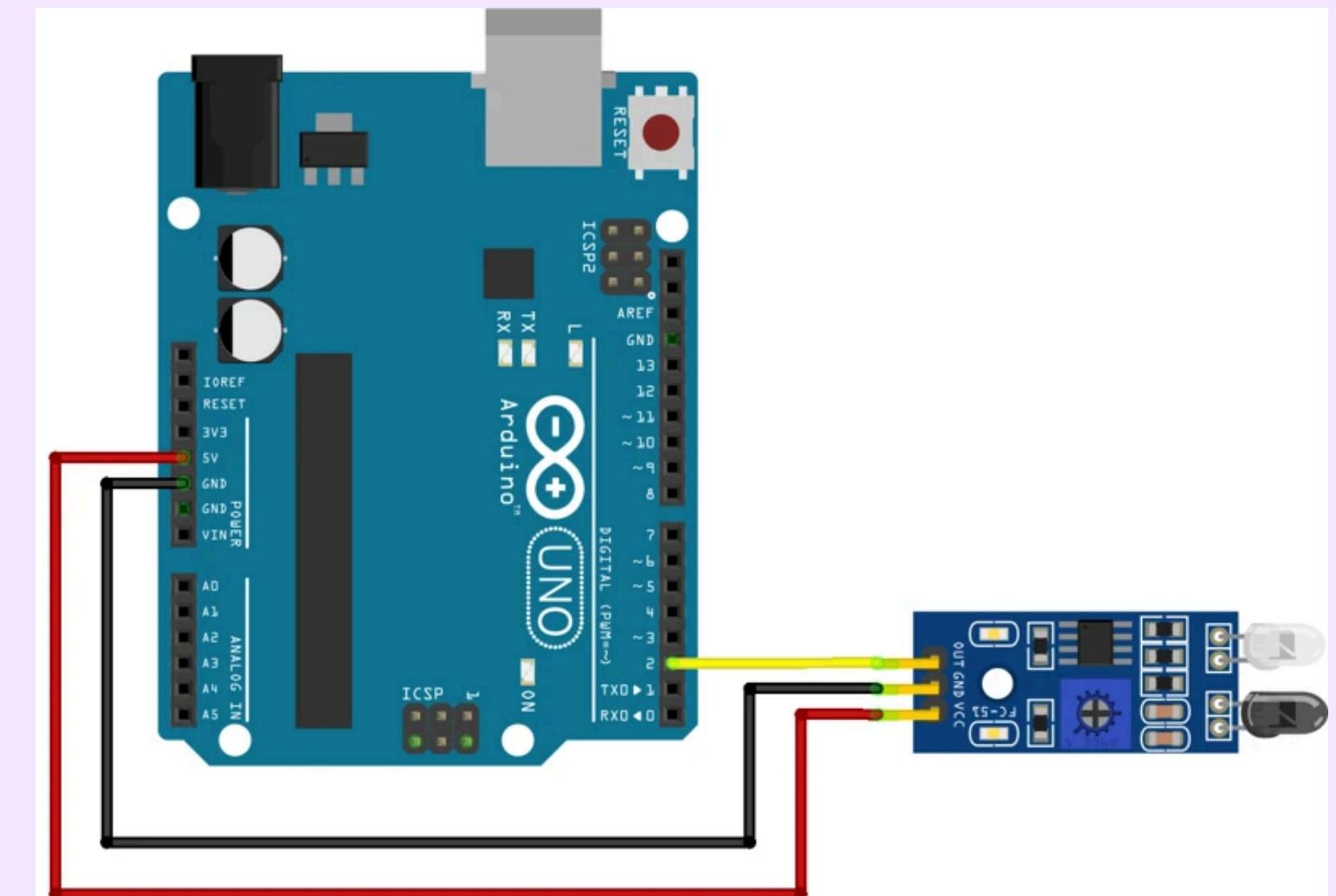
DIAGRAM

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
}
```

```
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);
    }
}
```

OBSTACLE AVOIDANCE ROBOT (ARDUINO)

IR PROXIMITY SECURITY ALARM (BUZZER)

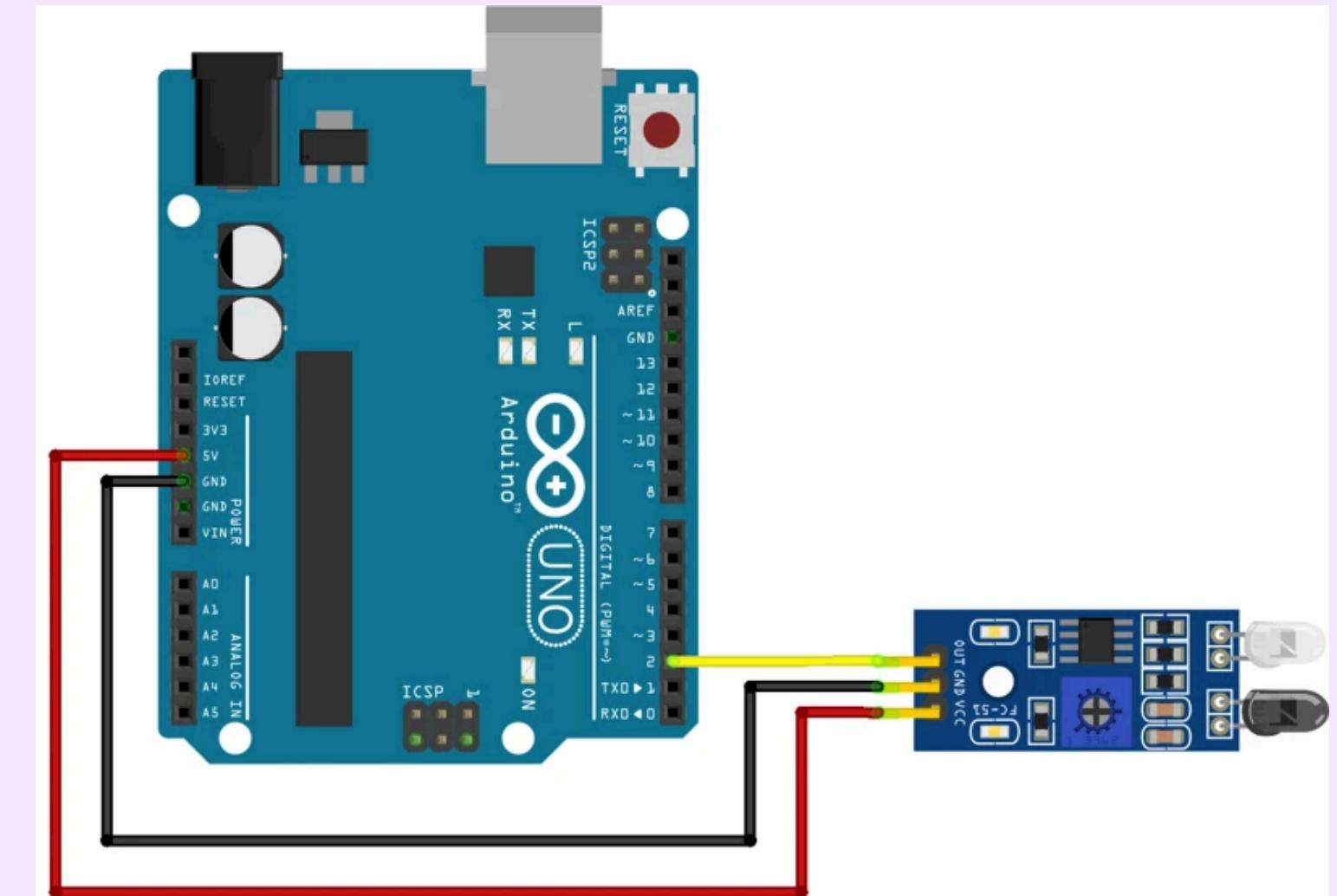
DIAGRAM

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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.”

