

Arduino Ultrasonic and LDR Project

Components List

1. Arduino Uno
2. Ultrasonic Sensor (HC-SR04)
3. LDR (Light Dependent Resistor)
4. 3 LEDs (One for darkness indication, two for object detection in darkness)
5. Resistors (10k Ω for LDR, 220 Ω for LEDs)
6. Breadboard and Jumper Wires

Connections

LDR Circuit:

1. LDR: Connect one side of the LDR to the 5V pin of the Arduino.
2. 10k Ω Resistor: Connect one side of the resistor to the other side of the LDR and the other side of the resistor to GND.
3. Analog Pin: Connect the junction between the LDR and the resistor to the A0 pin on the Arduino.

Ultrasonic Sensor (HC-SR04):

1. VCC: Connect to the 5V pin on the Arduino.
2. GND: Connect to the GND pin on the Arduino.
3. Trig Pin: Connect to digital pin 9.
4. Echo Pin: Connect to digital pin 10.

LEDs:

1. LED 1 (Darkness Indicator): Connect the anode (long leg) of the LED to digital pin 3 through a 220 Ω resistor. Connect the cathode (short leg) to GND.
2. LED 2 & 3 (Object Detection in Darkness): Connect the anodes of both LEDs to digital pins 4 and 5 respectively through 220 Ω resistors. Connect the cathodes to GND.

Arduino Code

// Pin definitions

```
const int LDRPin = A0;      // LDR connected to A0
const int trigPin = 9;      // Ultrasonic Sensor Trig pin
const int echoPin = 10;     // Ultrasonic Sensor Echo pin
```

```

const int ledDarknessPin = 3;    // LED for darkness indication
const int ledObjectPin1 = 4;    // LED 1 for object detection
const int ledObjectPin2 = 5;    // LED 2 for object detection

// Thresholds
const int ldrThreshold = 500;    // Adjust according to your lighting conditions
const int distanceThreshold = 30; // Distance threshold in cm

void setup() {
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(ledDarknessPin, OUTPUT);
  pinMode(ledObjectPin1, OUTPUT);
  pinMode(ledObjectPin2, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  // Read LDR value
  int ldrValue = analogRead(LDRPin);

  // Check for darkness
  if (ldrValue < ldrThreshold) {
    digitalWrite(ledDarknessPin, HIGH); // Turn on darkness LED

    // Measure distance using ultrasonic sensor
    long duration, distance;
    digitalWrite(trigPin, LOW);
    delayMicroseconds(2);
    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);
    duration = pulseIn(echoPin, HIGH);
    distance = (duration / 2) / 29.1; // Convert duration to distance in cm

    // Check if object is within range
    if (distance > 0 && distance < distanceThreshold) {
      digitalWrite(ledObjectPin1, HIGH); // Turn on LED 1
      digitalWrite(ledObjectPin2, HIGH); // Turn on LED 2
    } else {
      digitalWrite(ledObjectPin1, LOW); // Turn off LED 1
      digitalWrite(ledObjectPin2, LOW); // Turn off LED 2
    }
  }
}

```

```
} else {  
    digitalWrite(ledDarknessPin, LOW); // Turn off darkness LED  
    digitalWrite(ledObjectPin1, LOW); // Turn off LED 1  
    digitalWrite(ledObjectPin2, LOW); // Turn off LED 2  
}  
  
delay(100); // Small delay to stabilize readings  
}
```