**Automated Street Light Control System using LDR and Arduino**

This project automatically turns street lights ON and OFF based on ambient light levels using an **LDR (Light Dependent Resistor)** and **Arduino**.

**Hardware Required:**

1. **Arduino Uno** (or any compatible microcontroller)
2. **LDR (Light Dependent Resistor)**
3. **10KΩ Resistor** (for LDR voltage divider)
4. **Relay Module (5V)** (to control high-power lights)
5. **Bulb/LED Street Light (230V AC or 12V DC, depending on the relay)**
6. **BC547 Transistor (if needed for relay switching)**
7. **Diode (1N4007 for back EMF protection)**
8. **Connecting Wires**
9. **Power Supply (5V for Arduino, external power for relay and light)**

**Arduino Code:**

*#define LDR\_PIN A0 // LDR connected to Analog pin A0*

*#define RELAY\_PIN 7 // Relay connected to Digital pin 7*

*void setup() {*

*pinMode(RELAY\_PIN, OUTPUT);*

*digitalWrite(RELAY\_PIN, HIGH); // Turn OFF light initially*

*Serial.begin(9600);*

*}*

*void loop() {*

*int ldrValue = analogRead(LDR\_PIN); // Read LDR value*

*Serial.println(ldrValue); // Display value in Serial Monitor*

*if (ldrValue < 300) { // Threshold for darkness*

*digitalWrite(RELAY\_PIN, LOW); // Turn ON light*

*} else {*

*digitalWrite(RELAY\_PIN, HIGH); // Turn OFF light*

*}*

*delay(500); // Small delay to prevent flickering*

*}*

**Explanation:**

* The LDR reads ambient light levels.
* If it's **dark** (LDR value < 300), the relay is activated, turning the light **ON**.
* If it's **bright** (LDR value >= 300), the relay is deactivated, turning the light **OFF**.

**Circuit Diagram:**

**Basic Connection Overview:**

* **LDR**: One leg connected to **5V**, the other leg connected to **A0 and a 10KΩ resistor to GND** (voltage divider).
* **Relay**: **IN pin** to **Arduino pin 7**, **VCC** to **5V**, **GND** to **GND**.
* **Light (AC Bulb or LED)** connected to relay output (NO & COM terminals).

