NAVODAYA INSTITUTE OF TECHNOLOGY, RAICHUR

DEPARMENT OF COMPUTER SCIENCE & ENGINEERING

IOT Lab

Program - 05

05 Develop a program to deploy smart street light system using LDR sensor.

🛠 Components Required

- Arduino Uno (or similar board)
- 1 × LDR (Light Dependent Resistor)
- 1 × 10kΩ resistor (for LDR voltage divider)
- 1 × LED (for demo) + 220Ω resistor, or Relay Module + AC bulb for real street light
- Breadboard + jumper wires

⚡ Working Principle

- The LDR's resistance changes with light:
  - **Bright light → Low resistance → Higher voltage at analog pin**
  - **Dark → High resistance → Lower voltage at analog pin**
- Arduino reads this voltage via **analog pin (A0)**.
- If value < threshold (dark), the street light (LED/relay) turns ON.
- If value > threshold (bright), the street light turns OFF.

🔌 Circuit Connections

1. **LDR + Resistor Voltage Divider**
   - One side of LDR → 5V
   - Other side of LDR → **A0** and one side of 10kΩ resistor
   - Other side of resistor → GND
2. **Street Light (Demo with LED)**
   - Arduino D7 → LED (through 220Ω resistor) → GND

☞ For real-world: Replace LED with a **relay module IN pin** at D7 → relay controls AC bulb.

🧪 Steps to Do the Experiment

1. Connect the circuit as above.
2. Open Arduino IDE → paste code (below).
3. Upload program to Arduino.
4. Open **Serial Monitor** (9600 baud) to observe LDR readings.
5. Cover the LDR → LED/Street light turns ON.
6. Shine light on LDR → LED turns OFF.
7. Adjust **threshold value** in code after checking readings.

💻 Arduino Program

```
// Smart Street Light using LDR and Arduino

int LDR_Pin = A0;     // LDR connected to A0
int Light_Pin = 7;    // LED/Relay connected to D7
int LDR_Value = 0;
int Threshold = 500;  // Adjust after testing your LDR readings

void setup() {
  pinMode(Light_Pin, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  LDR_Value = analogRead(LDR_Pin); // Read LDR value
  Serial.print("LDR Value: ");
  Serial.println(LDR_Value);

  if (LDR_Value < Threshold) {
    digitalWrite(Light_Pin, HIGH);  // Turn ON light (dark condition)
    Serial.println("Street Light ON");
  } else {
    digitalWrite(Light_Pin, LOW);   // Turn OFF light (bright condition)
    Serial.println("Street Light OFF");
  }

  delay(500);
}\
```