



**RAJALAKSHMI**  
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# **AUTOMATIC STREET LIGHT CONTROLLER USING PIC16F877A**

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# ABSTRACT

The Automatic Street Light Controller is a smart embedded system that automatically manages street lighting based on ambient light levels. Utilizing a PIC16F877A microcontroller and an LDR sensor, the system ensures that street lights turn ON at dusk and OFF at dawn without human intervention. This project aims to reduce electricity wastage, improve operational efficiency, and provide a cost-effective solution for public infrastructure automation. The system can be further enhanced by integrating motion sensors and IoT capabilities for intelligent city applications.

# PROBLEM STATEMENT

“Street lights in many cities operate on a fixed schedule, wasting energy by staying ON during daylight or when unnecessary. Our project addresses this inefficiency.”

- Manual switching of street lights leads to inefficiencies.
- Lights may remain ON during daytime, wasting energy.
- Human-dependent systems are prone to errors and delays.

# OBJECTIVE

To design and implement a microcontroller-based system that:

- Detects ambient light using an LDR sensor.
- Automatically switches street lights ON/OFF.
- Eliminates manual operation.
- Reduces energy consumption and operational costs.

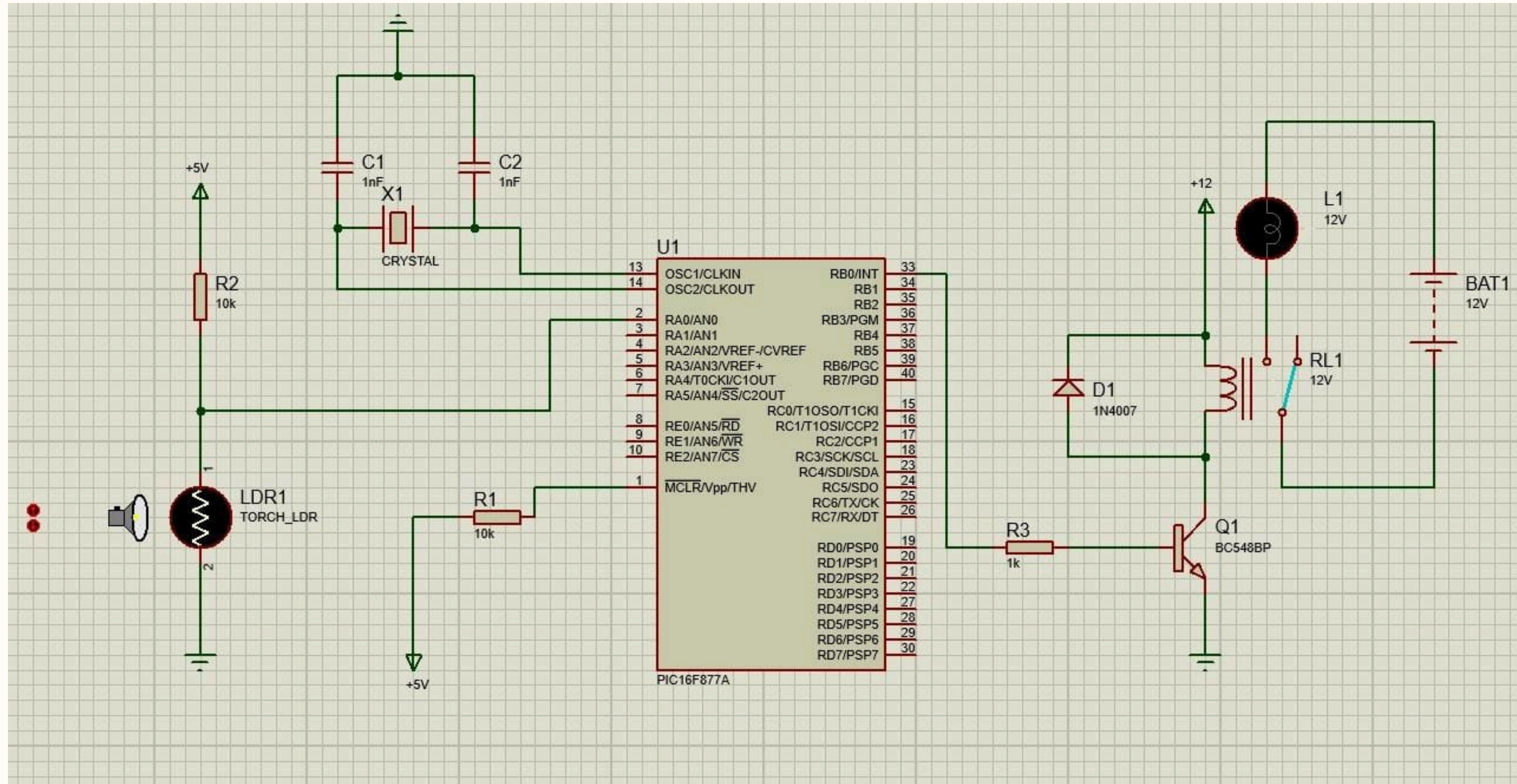
# WORKING PRINCIPLE

We use a Light Dependent Resistor (LDR) to detect ambient light levels. The LDR gives analog voltage to the microcontroller's ADC. Based on the light intensity, the microcontroller activates or deactivates a relay, controlling a street lamp accordingly.

- During daylight, the LDR provides low resistance → voltage at ADC is high → Light remains OFF
- During darkness, the LDR resistance increases → voltage drops → Microcontroller switches ON the relay → Light turns ON

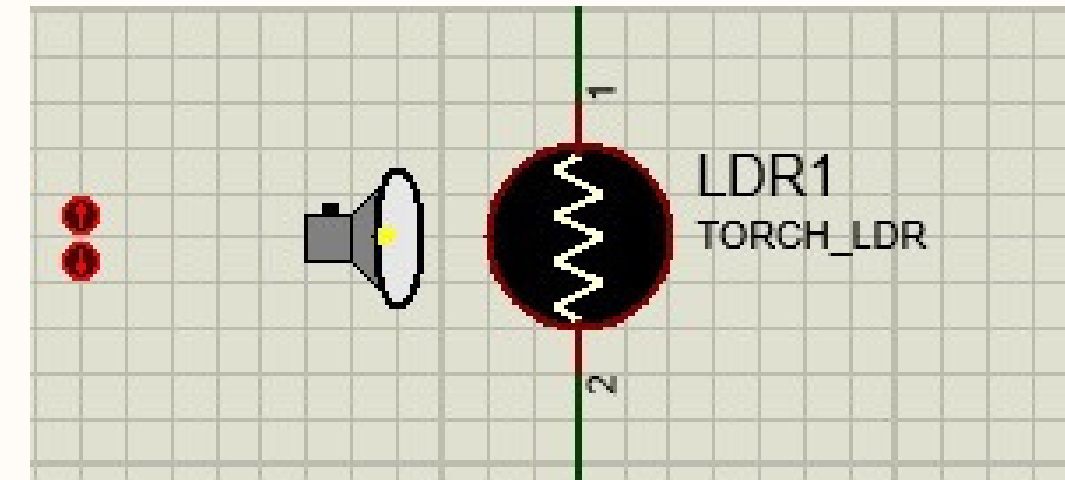


# PROTEUS CIRCUIT DIAGRAM



# LDR(Light Dependent Resistor)

An LDR is a photoresistor whose resistance decreases with increasing incident light intensity. It is used to detect the presence or absence of light.



## Relay

A relay is an electrically operated switch that uses an electromagnet to mechanically operate a switch. It allows a low-power signal from the microcontroller to control a higher power circuit, such as turning ON or OFF a street light.



# PROGRAM

```
.
.  sbit RELAY_PIN at PORTB.B0;
.
.
.  void main() {
-    unsigned int ldr_value;
.
.    TRISA = 0xFF;    // RA0 as input
8    TRISB = 0x00;    // RB0 as output
.    PORTB = 0x00;
10
.    ADCON1 = 0x80;   // Right justified, Vref = Vdd
.
.    while (1) {
.        ldr_value = ADC_Read(0); // Read LDR voltage at RA0
-
.        if (ldr_value > 300) {
.            RELAY_PIN = 1; // Bright => OFF Lamp
.        } else {
.            RELAY_PIN = 0; // Dark => ON Lamp
20        }
.
.        delay_ms(200); // Stabilization delay
.    }
. }
```

Messages Quick Converter

Errors Warnings Hints



# APPLICATIONS

## 1. Smart City Infrastructure

Can be deployed in smart city projects for energy-efficient street lighting.

## 2. Remote and Rural Areas

Useful in villages where manual switching is impractical.

## 3. Campus & Gated Community Lighting

Automated lighting based on day-night cycle, increasing safety and saving power.

## 4. Highway & Public Road Illumination

Prevents over-lighting during early morning or late evening hours.



Thank you!