**👨‍🎓 About the Project:**

This project was developed during my **second year of electronics engineering**. The aim was to build a system that automatically turns ON lights at night and OFF during the daytime using simple sensor-based logic. The idea came from real-life observations, where street lights or garden lights are often left ON unnecessarily during the day, leading to power wastage.

I designed and implemented a working prototype using an Arduino Nano, an LDR (Light Dependent Resistor), and a relay module to control the light based on ambient light levels. The system is compact, low-cost, and energy-efficient.

**🔧 Components Used:**

* Arduino Nano
* LDR (Light Dependent Resistor)
* 10kΩ resistor
* Relay module (5V)
* AC light bulb / LED bulb
* Jumper wires
* Breadboard
* USB cable for programming

**⚙️ Working Principle:**

The LDR senses the surrounding light intensity. During the day, the resistance of the LDR is low, and the Arduino keeps the relay OFF (light OFF). As it gets darker in the evening, the resistance increases, and once it crosses a certain threshold, the Arduino turns ON the relay, which switches the light ON.

The process is fully automated and runs continuously without the need for manual control.

**🔌 Circuit Explanation:**

* The **LDR** is connected to **A0** through a voltage divider circuit with a 10kΩ resistor.
* The **relay module** is connected to **digital pin D7** and controls the AC light.
* The **Arduino** processes the analog value and makes decisions to turn the light ON or OFF automatically.

**📍 Applications:**

* **Street lighting automation**
* **Garden/pathway lighting**
* **Balcony or staircase lighting**
* **Rural area light control**
* Smart homes and energy-efficient buildings

**🧠 What I Learned:**

As this was my **second-year project**, it really helped me build my basics in automation and Arduino programming. I gained hands-on experience with sensor circuits, relay modules, and how to control electrical appliances using microcontrollers. It also gave me confidence in implementing real-world solutions with minimal hardware.