Automatic Night Lighting System

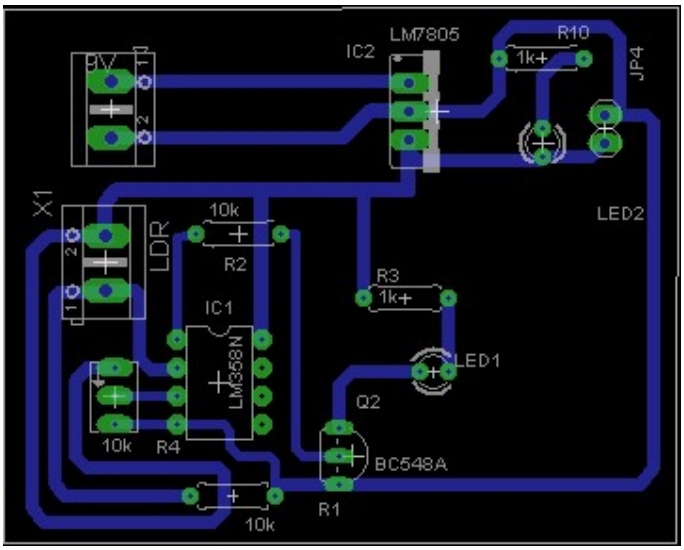
Objective:

To design and implement an automatic lighting system that turns on the light when the ambient light intensity drops (at night) and turns off when the ambient light increases (during the day). This is achieved using an LDR sensor to detect light levels.

Components Required:

1. Arduino Uno Board (or any compatible board)
2. LDR (Light Dependent Resistor)
3. Relay Module (to control the light)
4. LED (for testing, or use an actual light bulb for final project)
5. Resistor (10kΩ) (for LDR)
6. Jumper Wires
7. Breadboard
8. Power Supply (for Arduino and light)

Circuit Diagram:



Working Principle:

1. The LDR changes its resistance based on the intensity of light falling on it. When it's dark, its resistance increases, and when it's bright, its resistance decreases.
2. The Arduino reads the voltage across the LDR (using analog input) and compares it to a preset threshold value.
3. If the light intensity is low (night), the Arduino triggers the relay to turn on the light.
4. When the light intensity increases (day), the Arduino switches the relay off, turning off the light.

Working:

1. At night (when light levels are low), the LDR detects darkness, and its resistance increases, causing the voltage to drop below the threshold. The Arduino detects this and turns on the light (via the relay).
2. During the day (when light levels are high), the LDR detects light, and its resistance decreases, causing the voltage to rise above the threshold. The Arduino detects this and turns off the light.