AUTOMATIC STREET LIGHT CONTROLLER

Done By:

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Abstract:-

The objective of the project is to provide automatic control and monitoring on street light. The project deals with designing a lighting system which targets the energy saving and autonomous operation on economical affordable for the streets and immediate remedy on complaint. The Energy Consumption of street light of a specified area can be recorded and accounted on Energy Saving Lighting System with integrated sensors and controllers. Moreover, errors which occur due to manual operation can also be eliminated. Also the street lights can be switched ON/OFF through computer from central control station or can be automated using light sensors embedded in the street light pole circuit of the application. With these facilities the performance and life of the lamps will be increased.

AIM:-

To create an automatic street light control system using a LDR module to make a street light that can turn on and off automatically.

OBJECTIVE:-

- Our project is used to turn on and off the street lights automatically depending on the availability of sunlight
- the project is built using Arduino along with LDR sensor module which detects the availability of sunlight

MOTIVATION:-

A problem associated with the street lights is that they keep on running during the daytime or early in the morning when there is no need for artificial (bulb) light. Sometimes the light from the sun is too bright especially in summers when the days are longer than night that you can clearly see the surroundings , so keeping this in mind we are developing this project.

Literature survey:-

1. Automated street lighting using PLC, Street light controlling using PLC is a novel concept using XD26 PLC controller. In this system manual work is not required. Automatic switch ON and OFF of light in response to sunlight is done by using LDR, which plays a major role. Effect of seasonal variations; increased energy efficiency; low operating costs low maintenance costs are advantages of this method. The testing and analysis of this project with accurate operation of the streetlights is done involving Crouzet Millennium software

2. GSM based smart street light monitoring and control system, it is an automated system designed to increase the efficiency and accuracy of an industry by automatically timed controlled switching of street lights they are basically two modules which include the client side and the server side. the client side consists of GSM modem which is further connected to the microcontroller. the server side consist of java based web server

3. Intelligent Street Lighting System Using GSM, Conventional street lighting systems in areas with a low frequency of passersby are online most of the night without purpose. The consequence is that a large amount of power is wasted meaninglessly. With the broad availability of flexible-lighting technology like

light-emitting diode lamps and everywhere available wireless internet connection, fast reacting, reliably operating, and power-conserving street lighting systems become reality. The purpose of this work is to describe the Intelligent Street Lighting (ISL) system, a first approach to accomplish the demand for flexible public lighting systems.

4. CitiPower and Powercor - Report Streetlight Fault, the project is committed to maintaining the highest of standards of street lighting quality and reliability, and will attend to faulty streetlights as soon as practicable when notified of their condition, or immediately when they are identified through our regular patrols. Customers can assist us in keeping streetlights in top working order by reporting faults directly to CitiPower or Powercor. You can report the exact address of damaged streetlights on our 24 hour Service Faults and Difficulties telephone lines or via the online reporting services.

5. Automatic Street Lights, This project is all about to control the power consumptions at the streets and eliminating manpower. This includes controlling a circuit of street lights with specific Sensors, LDR and Microcontrollers during day and night. This requires three basic components i.e. LDR, Sensors and microcontroller. During daytime there is no requirement of street lights so the LDR keeps the street light off until

the light level is low or the frequency of light is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Thus the street lights do not glow.

6. Automatic Street Light Control System Using Microcontroller, This paper aims at designing and executing the advanced development in embedded systems for energy saving of street lights. Nowadays, human has become too busy, and is unable to find time even to switch the lights wherever not necessary. This paper gives the best solution for electrical power wastage. Also the manual operation of the lighting system is completely eliminated. In this paper the two sensors are used which are Light Dependent Resistor LDR sensor to indicate a day/night time and the photoelectric sensors to detect the movement on the street. the microcontroller PIC16F877A is used as brain to control the street light system, where the programming language used for developing the software to the microcontroller is C-language.

7. Arm Based Street Lighting System with Fault Detection, In this paper a new innovative street light system with optimized street light management and efficiency is presented. It uses many sensors to control and guarantee a better efficient system. Presence of a person or an obstacle is detected by using the presence detector sensors. Street lights will be switched ON only

when a person or an obstacle comes in the detection range else it will be switched OFF. Wireless communication uses GSM devices which allow more efficient street lamp management system and control. Arm processor will check the state of street lamp and informs through GSM module to the control by sending a message to the prescribed number. The system allows substantial energy savings with increased performance and maintainability. By using this system the manual works will be reduced to a great extent.

8. GSM based RFID approach to automatic street lighting system, This system proposes a new way of reduced power consumption. With this system, recovering from power failure period can be reduced. Street light maintenance, load maintenance and if there is any complaints regarding power it can be intimated through GSM. In future the Electricity department can adopt this system in order to save power as well as time. This system can be extended in such a way that time taken for processing any new power connection request can be minimized by using RFID.
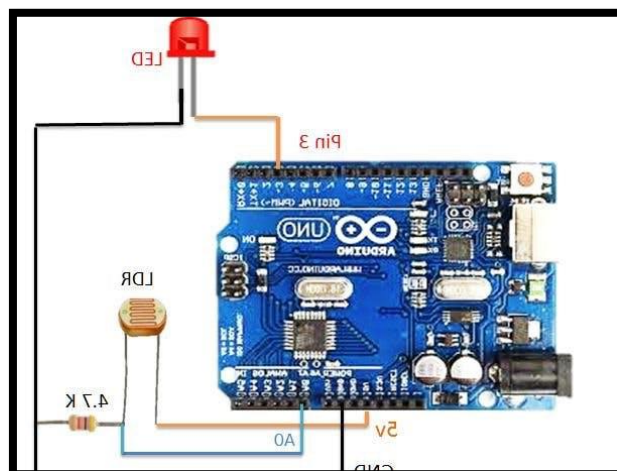
Existing system:-
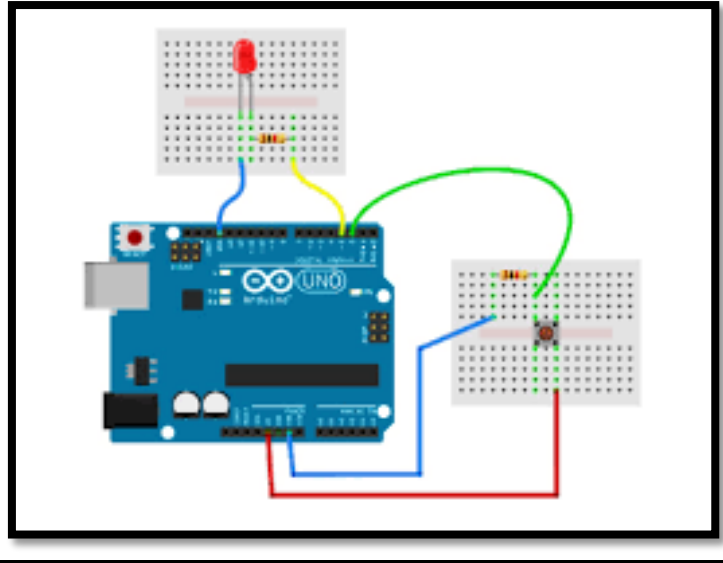
DISADVANTAGES OF EXISTING SYSTEM:

- Manual switching on /off of street lights
- More energy consumption
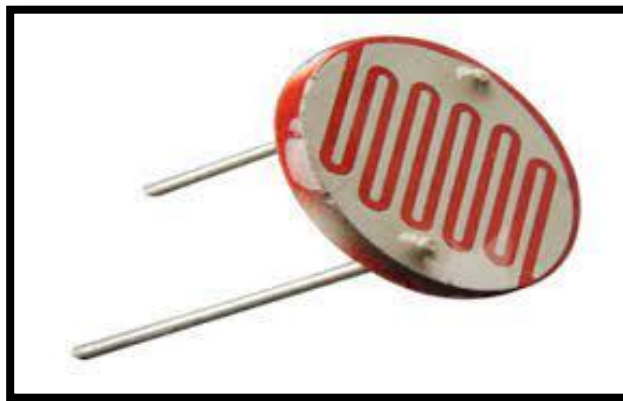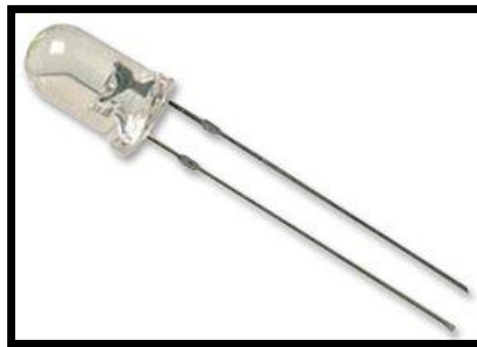- More manpower
- High expense

PROPOSED SYSTEM :

When there is low amount of light the LED automatically glows and when there is sufficient amount of light it automatically turns off .
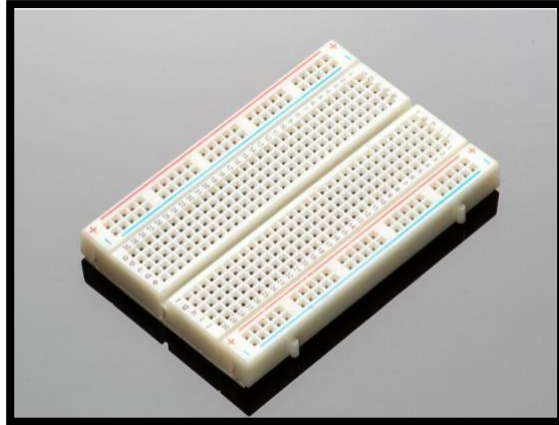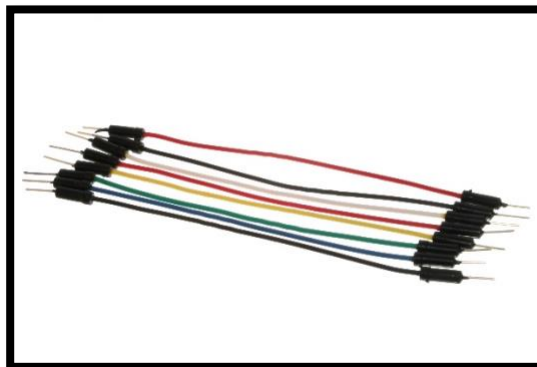
HARDWARE COMPONENTS:
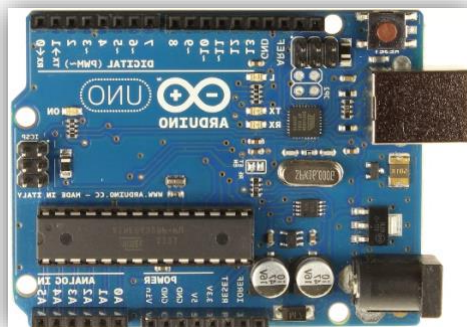
- LDR:

- LED:

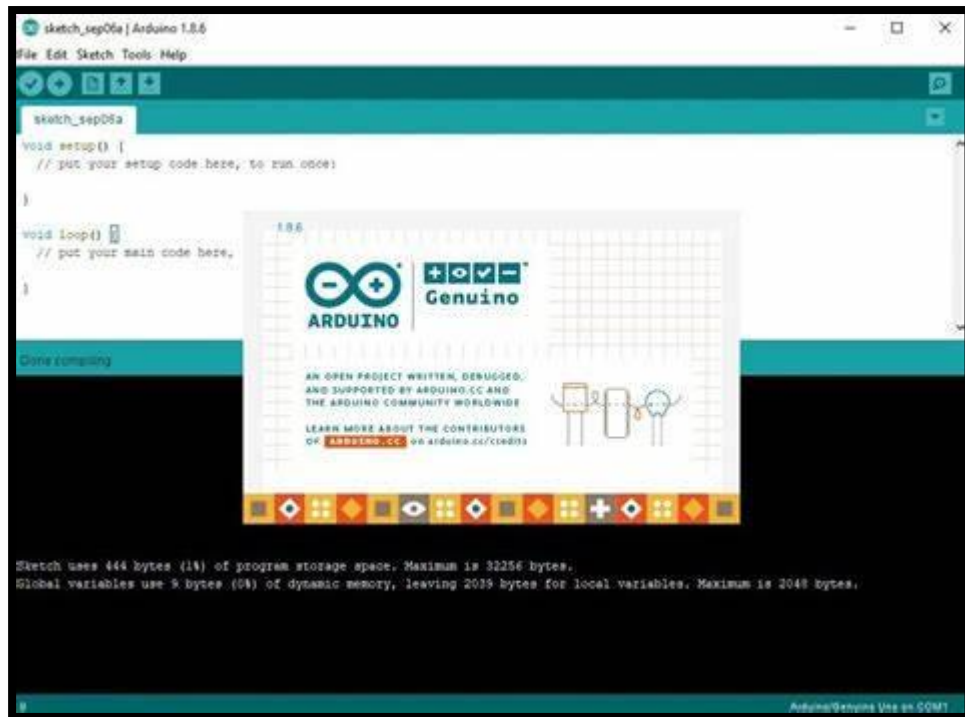- 4.7k Resistor:

- Bread Board:

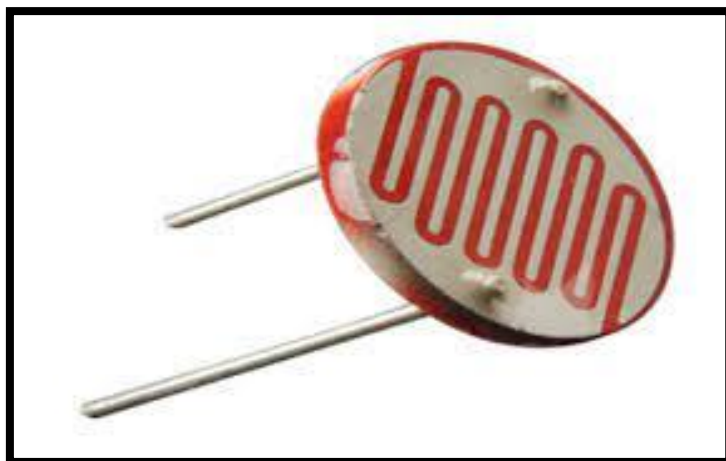- Connecting wires:

- Arduino:

SOFTWARE COMPONENTS:

- Arduino IDE:

LDR SENSOR:

A LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.

SETTING UP THE PROJECT:

- Arduino 3rd pin connected to LED +ve
- Arduino GND connected to LED -ve through 4.7k
- Arduino +5v is connected to LDR One End
- Arduino A0 pin is connected to LDR other end
- Arduino GND is connected to LDR other end with 4.7k
- Arduino to PC
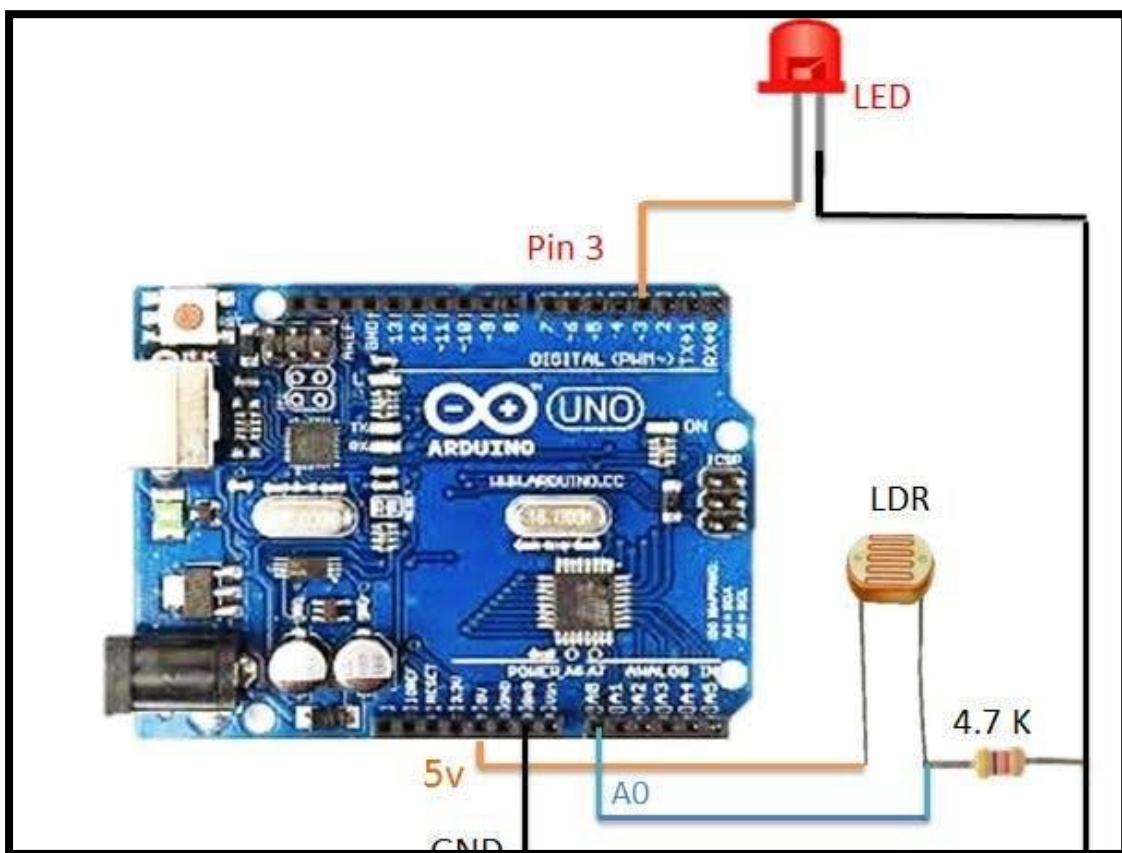
WORKING:
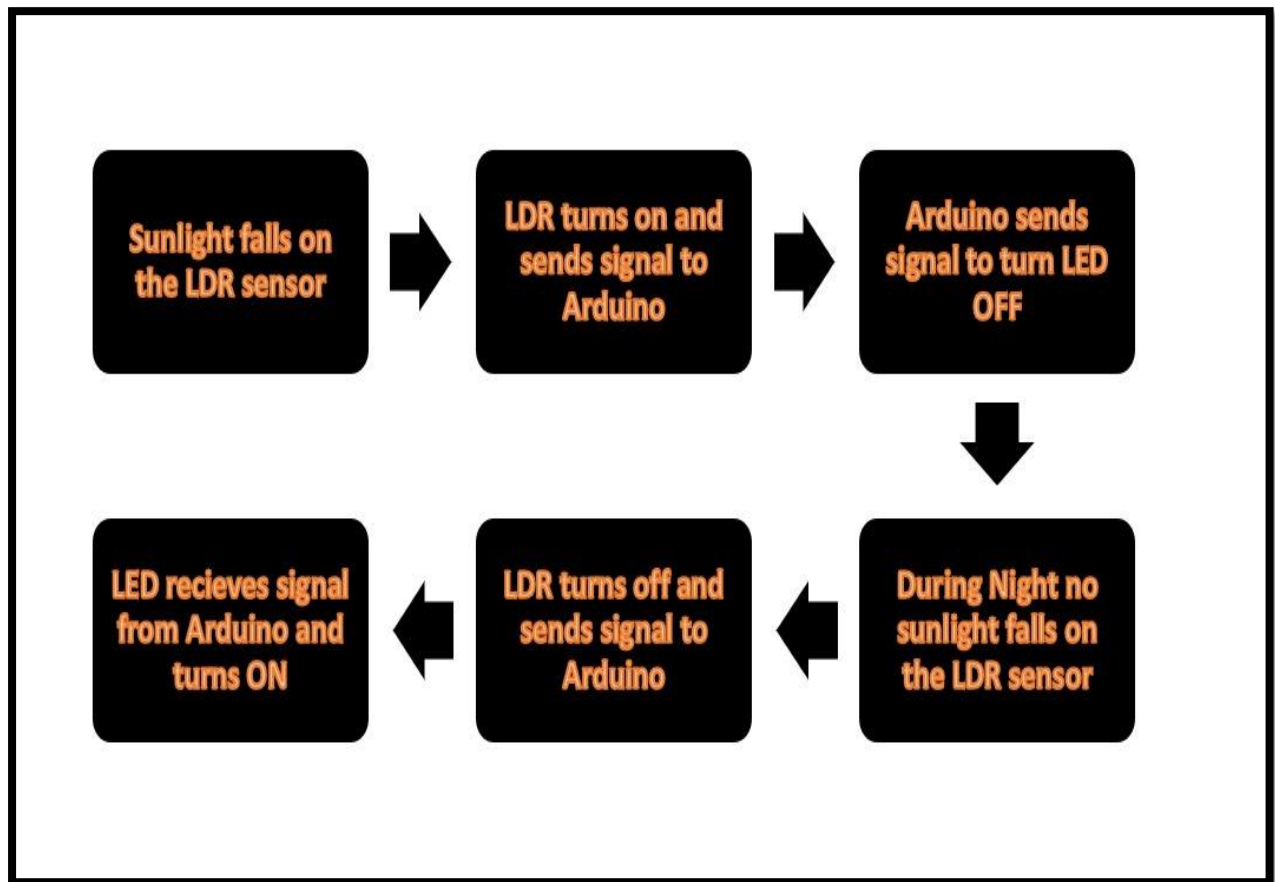
CONCLUSION:

- We have implemented an automatic street light control system in a small scale using a led as an example
- This could further be implemented on a large scale in highway lighting
- It saves power and human action

FUTURE ENHANCEMENTS:

- The project model can be further enhanced into a smart system by developing it into an internet controlled system.

- The new scope in this ideology is to develop it into solar powered smart light control system which further makes efficient use of natural resources.

- This design is not just limited to street lights. This design can be developed into a full fledged traffic light control system throughout the whole nation.

REFERENCES:

- https://create.arduino.cc/projecthub/SURYATEJA/automatic-street-light-controller-27159f

- https://ijmter.com/papers/volume-2/issue-4/street-light-monitoring-and-controlling-system.pdf#:~:text=%20Automatic%20Street%20Lights%2C%20This%20project%20is%20all,the%20streetlights%20is%20done%20involving%20Crouzet%20Millennium%20software

- STREET LIGHT MONITORING AND CONTROLLING SYSTEM (ijmter.com)

APPENDIX

Light Dependent Resistor
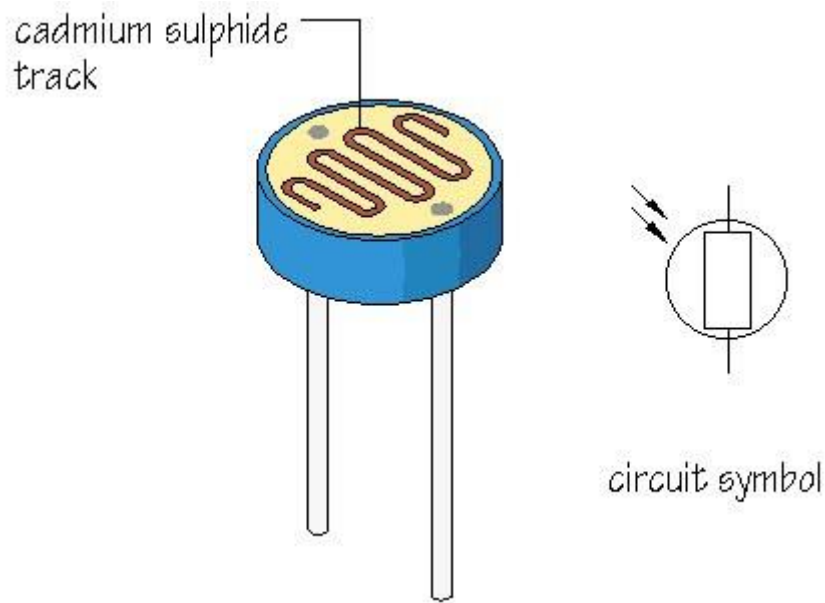
Majority of streetlights, outdoor lights, and a number of indoor home appliances are typically operated and maintained manually on many occasions. This is not only risky, however additionally it leads to wastage of power with the negligence of personnel or uncommon circumstances in controlling these electrical appliances ON and OFF. Hence, we can utilize the light sensor circuit for automatic switch OFF the loads based on daylight's intensity by employing a light sensor. This article discusses in brief about what is a light dependent

resistor, how to make a light dependent resistor circuit and its applications.

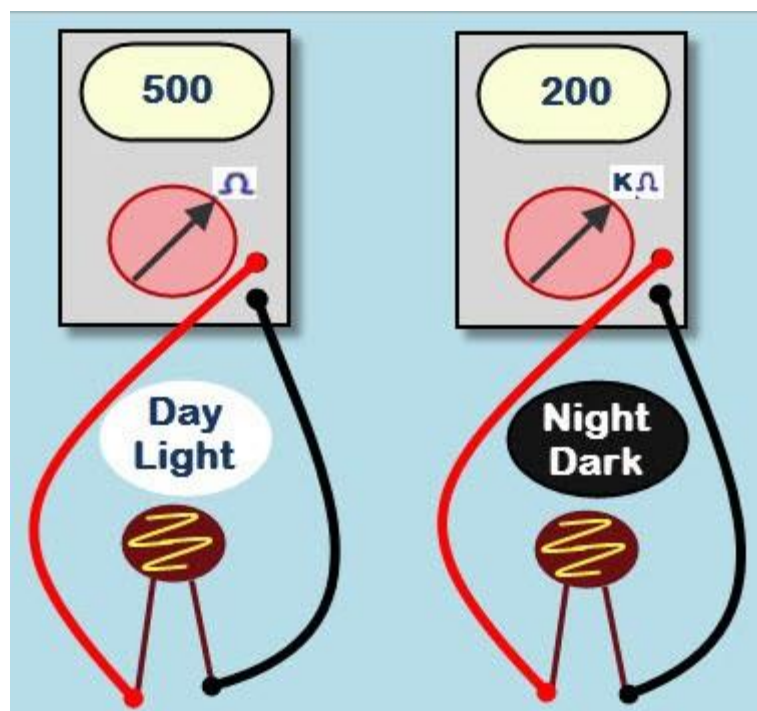## What is a Light Dependent Resistor?
An LDR or light dependent resistor is also known as photoresistor, photocell, photoconductor. It is a one type of resistor whose resistance varies depending on the amount of light falling on its surface. When the light falls on the resistor, then the resistance changes. These resistors are often used in many circuits where it is required to sense the presence of light. These resistors have a variety of functions and resistance. For instance, when the LDR is in darkness, then it can be used to turn ON a light or to turn OFF a light when it is in the light. A typical light dependent resistor has a resistance in the darkness of 1MOhm, and in the brightness a resistance of a couple of KOhm

Working Principle of LDR

This resistor works on the principle of photo conductivity. It is nothing but, when the light falls on its surface, then the material conductivity reduces and also the electrons in the valence band of the device are excited to the conduction band. These photons in the incident light must have energy greater than the band gap of the semiconductor material.This makes the electrons to jump from the valence band to conduction.

LDR
Light Dependent Resistor

These devices depend on the light, when light falls on the LDR then the resistance decreases, and increases in the dark.When a LDR is kept in the dark place, its resistance is high and, when the LDR is kept in the light its resistance will decrease.

If a constant "V' is applied to the LDR, the intensity of the light increased and current increases. The figure below

shows the curve between resistance Vs illumination curve for a particular light dependent resistor.
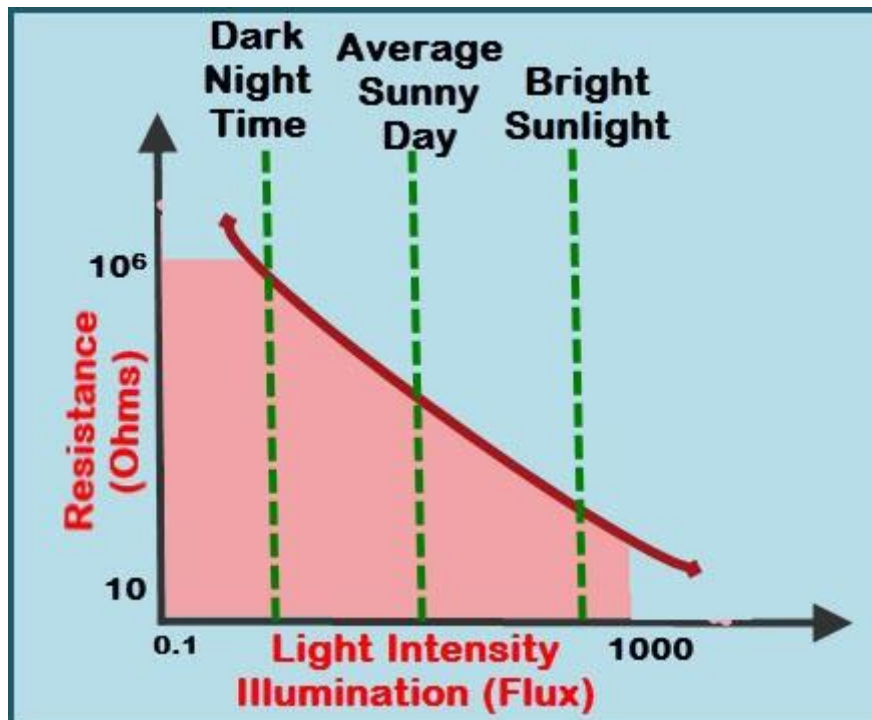
Types of light Dependent Resistors

Light dependent resistors are classified based on the materials used.

Intrinsic Photo Resistors

These resistors are pure semiconductor devices like silicon or germanium. When the light falls on the LDR, then the electrons get excited from the valence band to the conduction band and number of charge carriers increases.

Extrinsic Photo Resistors

These devices are doped with impurities and these impurities creates a new energy bands above the valence band. These bands are filled with electrons. Hence this decrease the band gap and small amount of energy is required in moving them. These resistors are mainly used for long wavelengths.

Circuit Diagram of a Light Dependent Resistor

The circuit diagram of a LDR is shown below. When the light intensity is low, then the resistance of the LDR is high. This stops the current flow to the base terminal of the transistor. So, the LED does not light. However, when the light intensity onto the LDR is high, then the resistance of the LDR is low.So current flows onto the base of the first transistor and then the second transistor.Consequently the LED lights.Here, a preset resistor is used to turn up or down to increase or decrease the resistance.
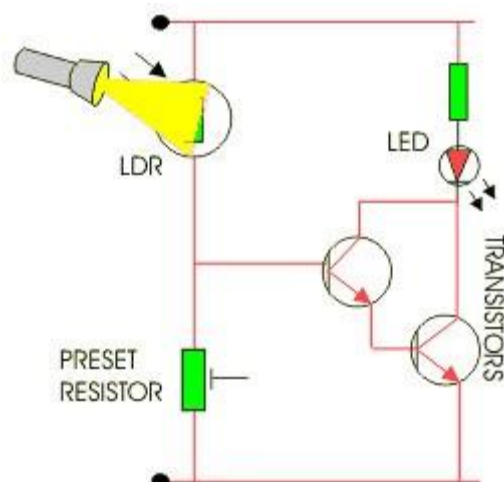
CODE:

```cpp
#include <SoftwareSerial.h>
int sensorPin = A0; // select the input pin
for the LDR
int sensorValue = 0; // variable to store the
value coming from the sensor
int led = 3;
void setup() { // declare the ledPin as an
OUTPUT:
pinMode(led, OUTPUT);
Serial.begin(9600); }
void loop()
{
Serial.println("Welcome to TechPonder LDR
Tutorial");
sensorValue = analogRead(sensorPin);
Serial.println(sensorValue);
if (sensorValue < 100)
{
Serial.println("LED light on");
digitalWrite(led,HIGH);
delay(1000);
}
digitalWrite(led,LOW);
delay(sensorValue);
}
```