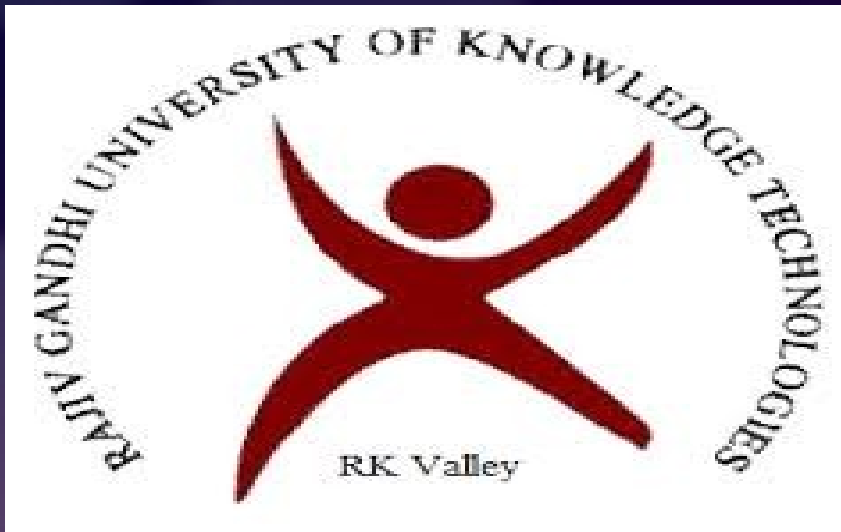


Arduino Based Smart Street Light



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ABSTRACT

- The main purpose of the project is to switch ON and OFF the street lights without manual operation.
- By using the system energy consumption is reduced
- The proposed work is accomplished by using arduino micro controller and sensor that will control the electricity based on light
- We are confident that the proposed idea will be beneficial in the future applications of microcontrollers and sensors, etc

INTRODUCTION

- Automation systems are being preferred over the manual mode because it reduces the use of energy to saves energy.
- The automation system play an essential role in making our daily life more comfortable and facilitate users from ceiling fans to washing machine and in other applications.
- Among all other applications the street lights play vital role in our environment and plays a critical role in providing light for safety during night time travel
- The traditional light system has been limited to two options ON and OFF only,and it is not efficient because this kind of operation meant power loss due to continuing working on maximum voltage.
- Hence,wastage of power from street lights is one of the powerloss but with the use of automation it leads to many new methods of energy and money saving.

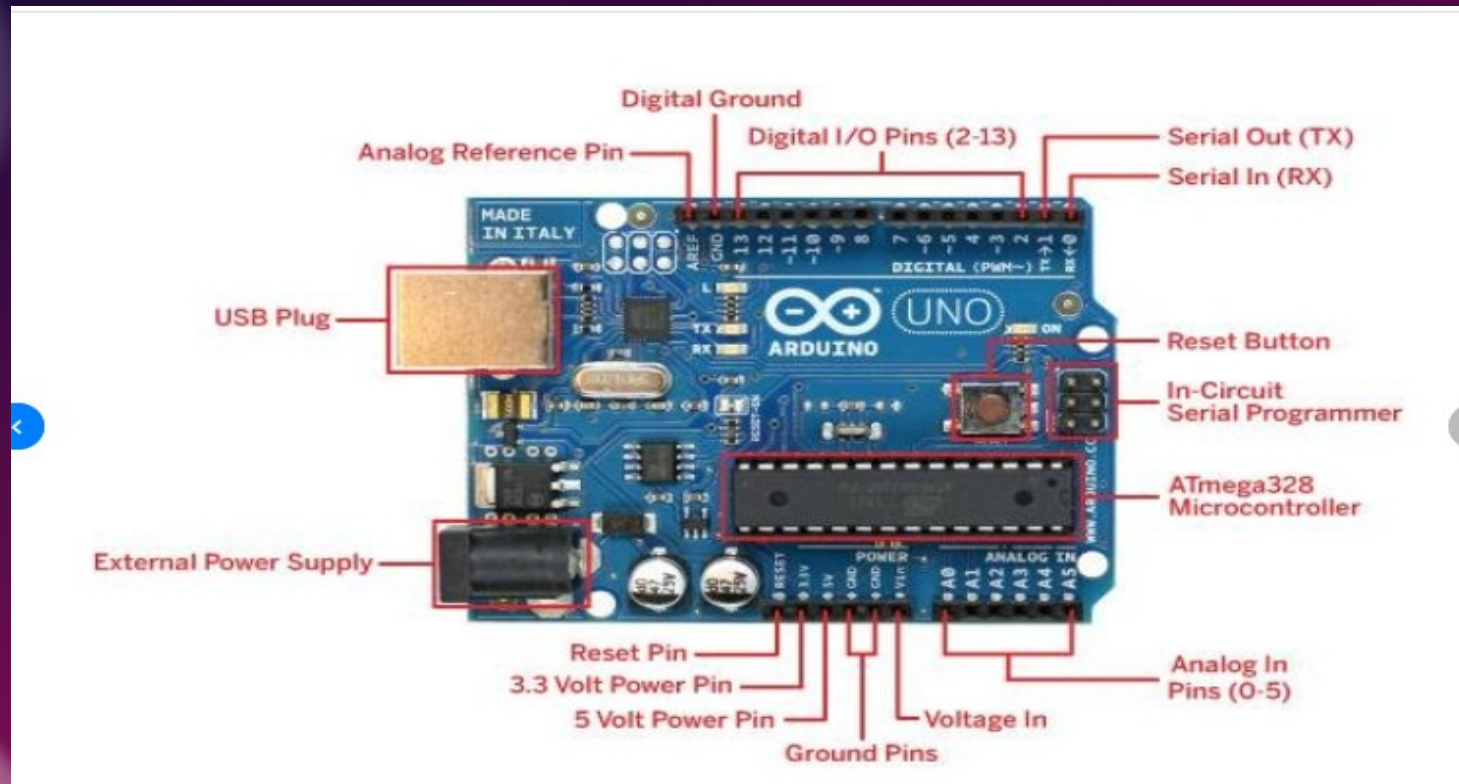
Hardware Components:

- Arduino Uno (22 pins, operating voltage 6-20V)
- Resistors (2,1kiloohm)
- Jump wires
- LDR(Light-Dependent Resistor)
- Light Bulb
- Power supply
- NPN Transistor

Hardware Components:

- **Arduino Uno :**

Arduino board is a microcontroller that is used to accept inputs from sensors connected and provide an output action on the desired device connected to it.



Hardware Components:

- **Resistor :**

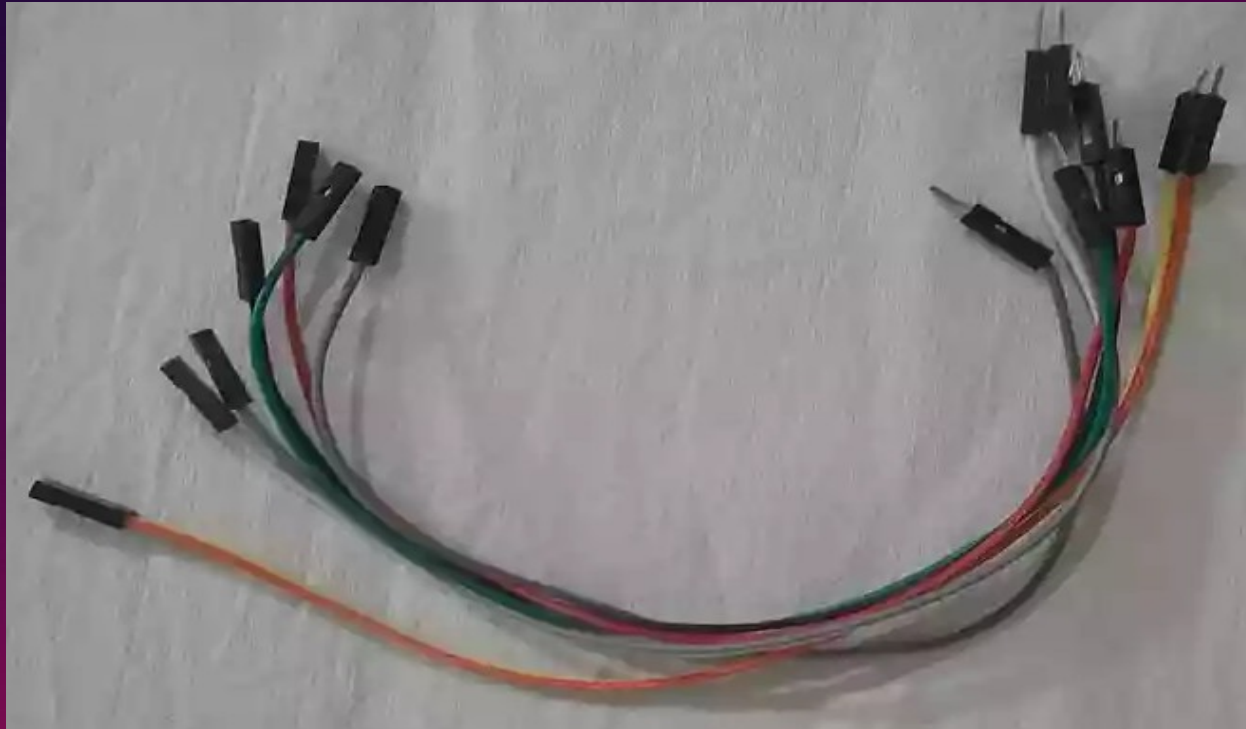
Resistors are passive devices that restrict the flow of current or divide the voltage through the circuit. The input power passes through these resistors and then to the sensors to avoid damage.



Hardware Components:

- **Jump wires :**

These are the main components that are used to establish the connections between different devices of the circuit.



Hardware Components:

- **LDR (Light Dependent Resistor) :**

LDR is a photoresistor that works on the principle of photoconductivity. The surface of the LDR is made with a layer of semiconducting material that is responsible for measuring the light intensity.



Hardware Components:

- **Light Bulb:**

Electric bulbs, otherwise called incandescent bulbs are electrical components that emit light when a certain amount of power is given to them. Usually, bulbs are manufactured in a wide range of sizes based on the input power capacity. Ex. 1.5V, 13 Watts, etc



Hardware Components:

- **Power supply:**

DC Power supply is used for electricals components like the electrical bulb. Alternatively, Power supply modules can be used to connect electrical components. In this circuit, we will be using the DC power supply component in the simulation software.



Hardware Components:

- **NPN Transistor:**

It is a low-power amplifying transistor. A common NPN Bipolar Junction transistor (BJT). This transistor is usually used for Switching purposes as we have used in our circuit.



Software Requirements:

- **TinkerCad Circuit simulation software:**

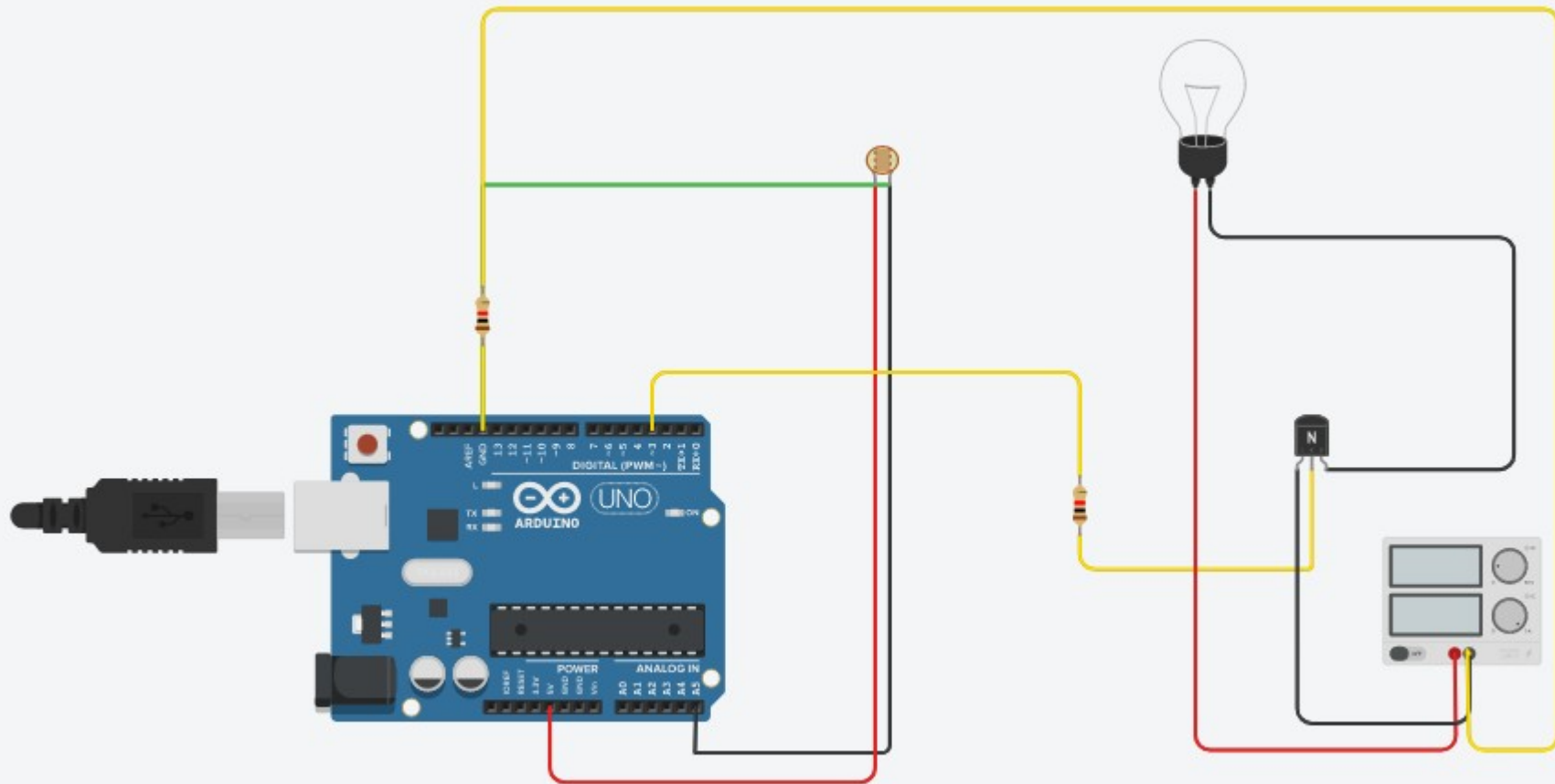
It is an online simulation software used for circuit design. It has all the electrical components required to built circuits and runs them



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TinkerCad Logo

Circuit connections:



Code :

- `Int idr =A5` # here the integer variable "idr" is assigned with the value of the pin of the arduino board connected to it
- `Int idr_value` #it is declared for storing the input values of the LDR sensor
- `Int light=3;`#the variable light is intialized with the value 3
- `pinMode(light, OUTPUT);`#light variable is connected to the bulb. it is assigned as the output.
- `pinMode(ldr, INPUT);`#ldr is the sensor and it will take the input values and it is assigned as the input
- `void loop()`#the loop function is going to excute lines of code repeatedly
- `ldr_value=analogRead(ldr);`#the first idr value is going to get the values from the sensor which is read from the analog read() function.
- `if (ldr_value>512)`#If the value from the input exceeds 512 the bulb remians off
- `Else` #Else the light bulb is switched on

Complete Code:

```
int ldr=A5;
int ldr_value;
int light=3;
void setup()
{
  pinMode(light, OUTPUT);
  pinMode(ldr, INPUT);
}
void loop()
{
  ldr_value=analogRead(ldr);
  if (ldr_value>512)
    digitalWrite(light, LOW);
  else
    digitalWrite(light, HIGH);
}
```

Advantages:

- **Maintenance cost reduction**
- **Reduction in co2 emission**
- **Reduction of the light pollution**
- **Wirelesscommunication**
- **Energy saving**
- **Reduction of the man power**
- **Over heating and risk of accidents is also minnimized**

Disadvantages:

- **Initial investment is higher compared to the conventional street lights**
- **Risk of the theft is higher as the equipment costs are comparatively higher**
- **Flexibility is high**
- **High sensitivity**

Applications:

- **This system can be easily implemented in smart cities, home automation, agriculture field monitoring, timely automated lights, parking lights of hospitals, malls, airport, universities and industries etc.**
- **To be able to design the device that add safety in the dark areas**
- **To be able to design the efficient street lights**
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Conclusion:

- **The proposed streetlight automation system is a cost effective and the safest way to reduce power consumption. It helps us to get rid of today's world problems of manual switching and most importantly, primary cost and maintenance can be decreased easily.**

