AUTOMATED LIGHTING SYSTEM USING ARDUINO

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AIM:

To design an automated light using Arduino board.

ABSTRACT:

This project AIMS TO CREATE AUTOMATED LIGHTS Using Arduino. We make this project because we want to create an efficient light so that when we use the light there is no need to manually switch on / off, or when we forget to turn off the light, we don't need to fear more electricity costs.

THEORY:

Pir sensor:

- It is a passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view.
- It works by detecting the infrared radiation emitted or reflected by objects. • They use a pair of pyro-electric sensors to detect heat energy in the surrounding environment.

How to use Pir sensor:

A Pir sensor has three terminals which acts as signal, power and ground. The power pin is connected with 5v power supply. The ground pin in sensor is connected with gnd pin in Arduino uno board. Whenever the pair of pyro-electric sensors has difference between them means there is a movement in the sensor area, so by using this sensor we can detect motion of the object. When the Pir sensor detects a motion, it triggers us using signal pin via digital pin in Arduino uno board.

Photoresistor:

- It is also called as light dependent resistor, used to indicate the presence or absence of light or to measure the light intensity.

- If the intensity of the light increases then resistance decreases vice Versa. It changes its resistance only when it is exposed to light. It contains two pins in which one pin is connected to 5v power and second pin is connected with gnd and also it is connected with analog pin in Arduino uno board to measure the intensity of light.
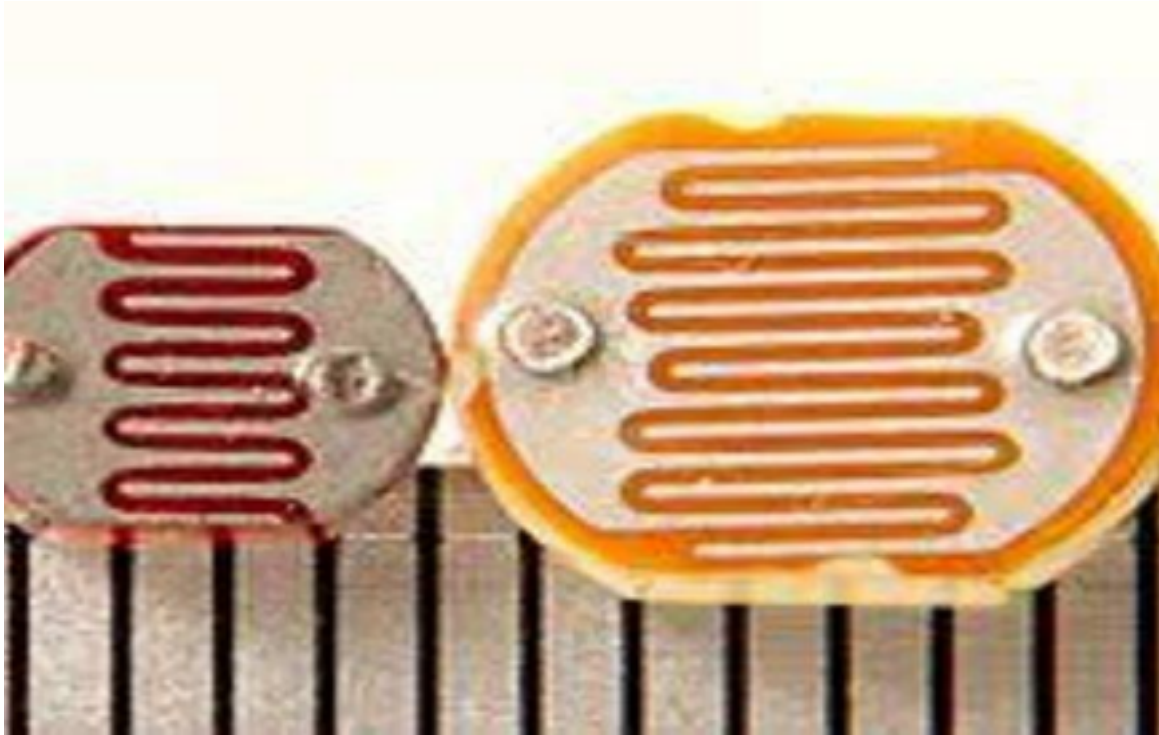
Relay (SPDT):

- Relay is an electro-mechanical switch used to control high power application through low power signal electronic circuits.
- The SPDT Relay is a **high-quality Single Pole Double Throw Relay (**SPDT). • It contains electromagnetic coil, normally closed, common contact and normally opened pins.

How it works:

We all know that whenever electricity flows in cable it acts as a magnet. Relay acts as a switch between the common contact and normally opened. When the coil is electrified, it pulls the iron rod to normally opened nothing but common contact towards N/O.

ADVANTAGES:

• They can provide energy savings as the lights are only turned on when they are
needed.

• There is no reliance on users remembering to turn the lights off when they leave
the area.

• They consume very less energy.

APPLICATIONS:

• Automatic street light control system.
• walk-in pantries, Hallways, common staircases, basement, corridor, restroom,
ATMs, parking area.
• And anywhere that automatic control of lights is needed.

COMPONENTS:

COMPONENT	NO. OF COMPONENTS
Arduino uno board	1
Photoresistor	1

Pir sensor	1
Relay (SPDT)	1
Light bulb	1
Power supply	1
Slide switch and jumper wires	2 and 10
resistor	4.7k ohms

Working principle:

We need light to switch on when the light intensity is less and there is a motion of objects in that area.

First the we take light sensor value if the intensity is less than 857 then we take the Pir sensor value and if the value is high then the relay is activated by digital pin 4. Then the bulb glows for 10 seconds and again reads the sensor values.

Cases:

1.when light intensity is less and motion of objects is high the bulb glows.

2. when light intensity is high it not checks the Pir sensor value and directly not glows bulb.

3. when light intensity is less and motion of objects is low the bulb not glows.

Code, circuit and simulation output:

1)code:
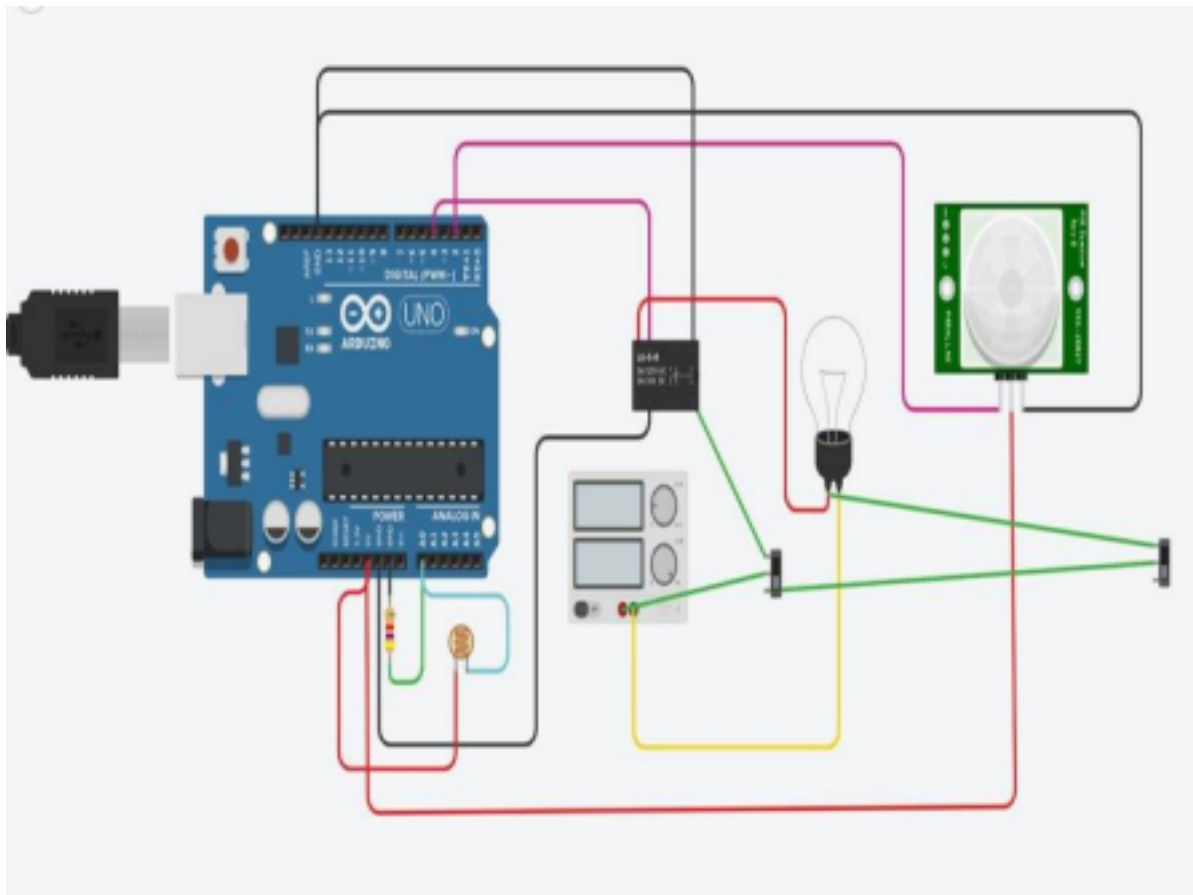
```
int lightsensor=0;

void setup()

{

 pinMode(A0, INPUT);

 Serial.begin(9600);

 pinMode(2, INPUT);

 pinMode(4, OUTPUT);

}

void loop()

{

 lightsensor=analogRead(A0);

 Serial.println(lightsensor);

 if (lightsensor< 857)

 {

if(digitalRead(2)==HIGH)
{

 digitalWrite(4, HIGH);

delay(10000);

 }
```

```
  else

  {

 digitalWrite(4, LOW);

delay(1000);

  }

  }

  else

  {

 digitalWrite(4, LOW);

delay(1000);

  }

  }
```
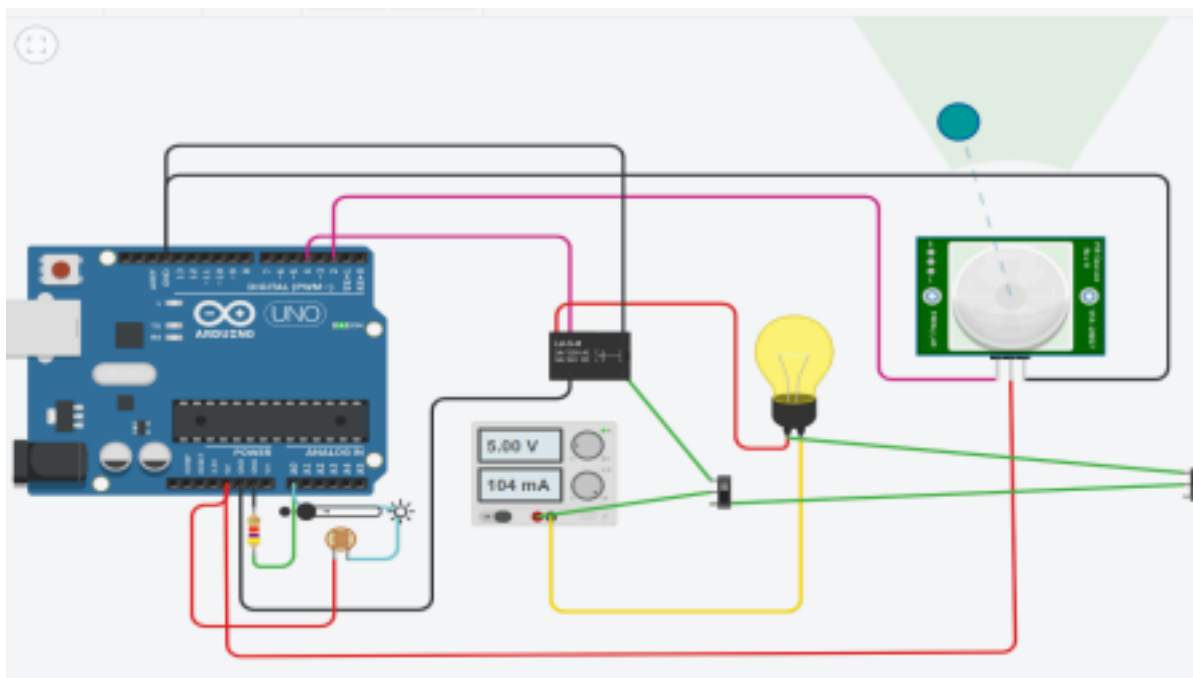
2)circuit diagram:

Simulation output:

Case1:

Case2:

Case3:

CONCLUSION:

The final works about Automated lighting system using

Arduino are mentioned in this project. Full circuit models are given above. We divided the application of the project into 3 cases. They are 1) when the intensity of the light is low and Pir sensor value is high. 2) when the light intensity is high. 3) when light intensity is less and Pir sensor value is low. We all know in any automation some manual operation is needed, so we included the slide switches to control automated light. There are two slide switches 1) automated switch 2) manual switch. When automation switch is off, we can control the light using manual switch. This project does not work when there is a person but not in motion. In order to fulfill this we add the D6T thermal sensor it detects the human presence even though they are not in motion. Overall, the automated lighting system using Arduino was successfully designed and implemented.