DIGITAL LOGIC DESIGN

(EL-1005)

PROJECT REPORT

Smart Street Light System

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Problem Statement

- The main consideration in the present field technologies are Automation, Power Consumption and cost effectiveness. Automation is intended to reduce man power with the help of intelligent systems. Power saving is the main consideration forever as the source of the power are getting diminished due to various reasons.
- As we all know that energy consumption has been increasing day by day so, to overcome these consequences we are using Iota devices. This project proposes a modal for modifying street light illumination by using sensors at minimum electrical energy consumption. When presence is detected, all surrounding street lights glow at their brightest mode, else they stay in the dim mode.
- LED bulbs shall be implemented as they are better than conventional incandescent bulbs in every way. This shall reduce heat emissions, power consumption, maintenance and replacement costs and carbon dioxide emissions.

Introduction and Background

- Street lights pay a very important role for lightening the walkway during nights when surroundings go dark. It is also very important for the vehicles running during the night for the proper direction of the roads.
- Nowadays controlling the street lights require human presence to switch them ON/OFF which means this system is not digitalized yet. This human controlled system has the disadvantage of having regular individual presence to turn the lights ON/OFF which is a loss of electrical energy and manpower because this people can be deployed somewhere else.
- Thus, to overcome these problems the controlling system might be converted to a system where it is controlled via wireless technology.
- In this project, an automatic system is demonstrated to control the system by wireless technology using Arduino Uno. The system is programmed in such a way that the whole street light is divided in some sections which can be turned ON/OFF with a single short

message service (SMS) through sensors. When there is no vehicles on the road the light OFF. But when vehicle or any Obstacle will pass in front of the sensors, the lights of this particular section will ON. When the obstacle will pass away, the lights will remain OFF.

Block Diagram of Main Modules
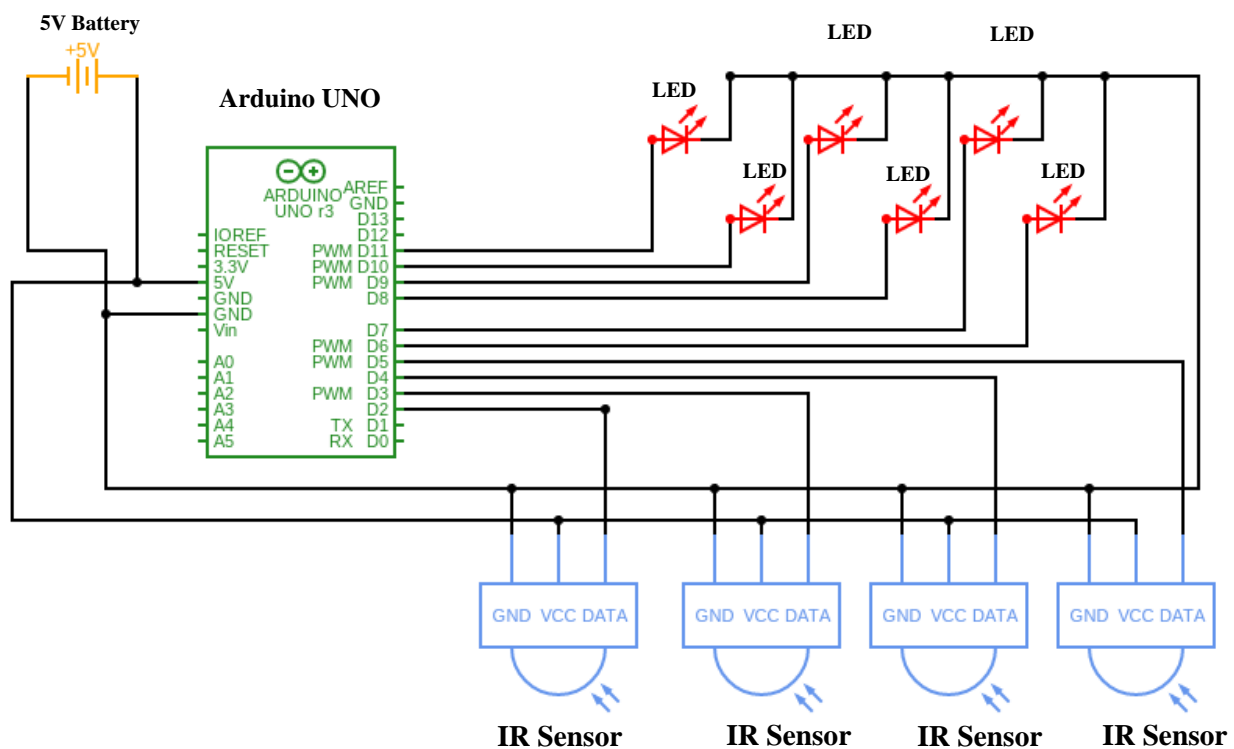
This is the Block diagram of the Smart Street Lighting System

> It contains the four IR sensors which are connected to VCC and GND of the Arduino UNO and their output are connected to the pins of Arduino UNO.
> There are 6 LED's connected to the GND of the Arduino UNO and Anode of the LED's connected to the pins of Arduino UNO.
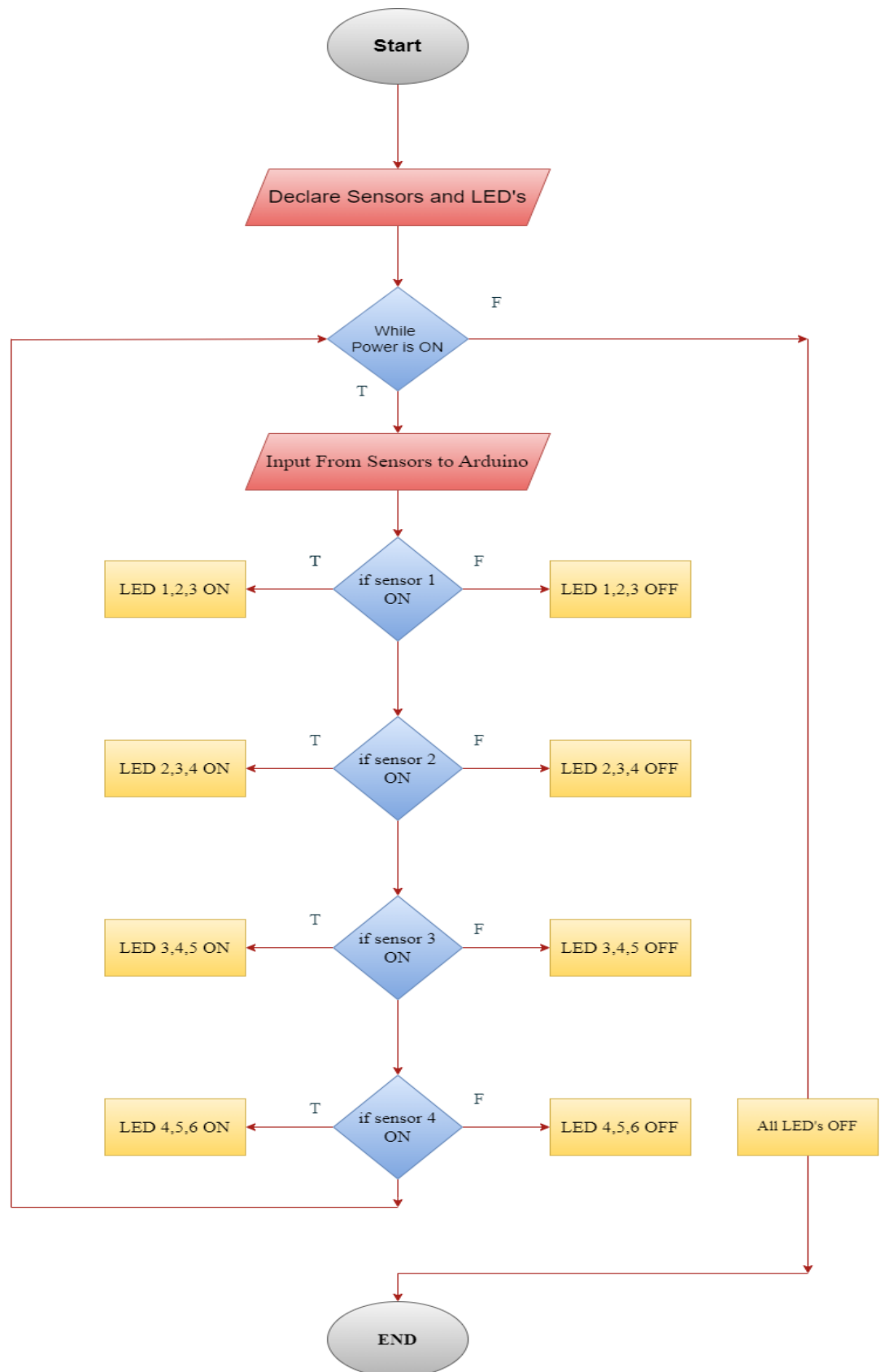
So, when the IR sensors senses the obstacle passes in-front of it ,it send a signal to the Arduino and according to information provided to Arduino UNO through CODE , it turns ON the specific LED's.

Proteus Diagram
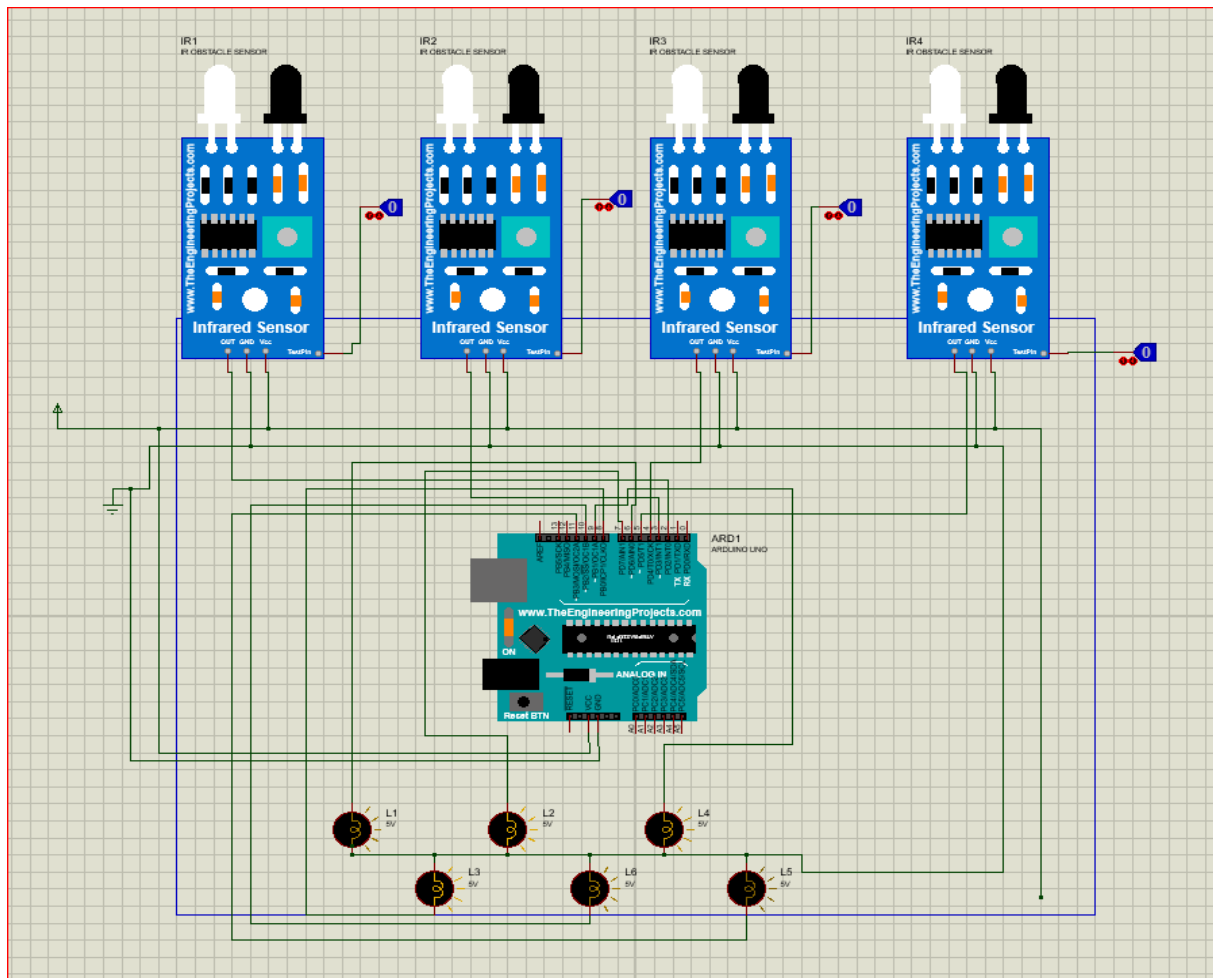
This project is first implemented on Proteus software. The Diagram on the Proteus implementation is sown above.

Flow Chart of Main Process

Project Deliverables and Specifications

Its power saving system if implemented on a large scale can allow powers saving on a huge scale.

It uses Arduino Uno and IR sensors which can be replaced with appropriate sensor or cameras and this process can be extended on a vast scale.

Results and Discussion

By using Smart Street light System, we can save surplus amount of energy which is done by using Infrared Sensors, LED's and adding an additional feature for security purposes.

- ✓ It prevents unnecessary wastage of electricity, caused due to manual switching of streetlights when it's not required.
- ✓ It provides an efficient and smart automatic streetlight control system with the help of IR sensors.
- ✓ It can reduce the energy consumption and maintains the cost. The system is versatile, extendable and totally adjustable to user needs. Continuous use of LDR and IR sensors even in day time. Not switched on before the sunset.

The Smart light system can be further extended to make the current system in two-way traffic, making the system more flexible in case of rainy days

Components and Budget

Components:
- ➢ Arduino UNO
- ➢ 4 IR Obstacle Sensors
- ➢ 6 LED's
- ➢ Breadboard
- ➢ Connection Wires
- ➢ Battery or Direct DC Power
- ➢ Cardboard and Stands for LED's

Budget is about Two Thousands overall.

Reference and code

https://create.arduino.cc/projecthub/Vishalsoniiindia/smart-street-light-using-ir-sensor-with-arduino-ee01c4

https://youtu.be/fQWnEvg6X9k?si=gANvR_M8EBunqLhh

https://www.circuiteasy.com/automatic-street-light

CODE:

```
int ir1=2;
int ir2=3;
int ir3=4;
int ir4=5;

int led1=6;
int led2=7;
int led3=8;
int led4=9;
int led5=10;
int led6=11;

int proxy1=0;
int proxy2=0;
int proxy3=0;
int proxy4=0;
void setup()
{
  pinMode(ir1,INPUT);
  pinMode(ir2,INPUT);
  pinMode(ir3,INPUT);
  pinMode(ir4,INPUT);

  pinMode(led1,OUTPUT);
  pinMode(led2,OUTPUT);
  pinMode(led3,OUTPUT);
  pinMode(led4,OUTPUT);
  pinMode(led5,OUTPUT);
  pinMode(led6,OUTPUT);
}
```

```
void loop(){
  proxy1=digitalRead(ir1);
  proxy2=digitalRead(ir2);
  proxy3=digitalRead(ir3);
  proxy4=digitalRead(ir4);

if(proxy1==HIGH)
{
  digitalWrite(led1,HIGH);
  digitalWrite(led2,HIGH);
  digitalWrite(led3,HIGH);
}
else
{
  digitalWrite(led1,LOW);
  digitalWrite(led2,LOW);
  digitalWrite(led3,LOW);
}

if(proxy2==HIGH)
{
  digitalWrite(led2,HIGH);
  digitalWrite(led3,HIGH);
  digitalWrite(led4,HIGH);
}
else
{
  digitalWrite(led2,LOW);
  digitalWrite(led3,LOW);
  digitalWrite(led4,LOW);
}

if(proxy3==HIGH)
{
  digitalWrite(led3,HIGH);
  digitalWrite(led4,HIGH);
  digitalWrite(led5,HIGH);
}
else
{
  digitalWrite(led3,LOW);
  digitalWrite(led4,LOW);
  digitalWrite(led5,LOW);
}
```

```
if(proxy4==HIGH)
{
  digitalWrite(led4,HIGH);
  digitalWrite(led5,HIGH);
  digitalWrite(led6,HIGH);
}
else
{
  digitalWrite(led4,LOW);
  digitalWrite(led5,LOW);
  digitalWrite(led6,LOW);
}
}
```

END….

```
if(proxy4==HIGH)
{
  digitalWrite(led4,HIGH);
  digitalWrite(led5,HIGH);
```