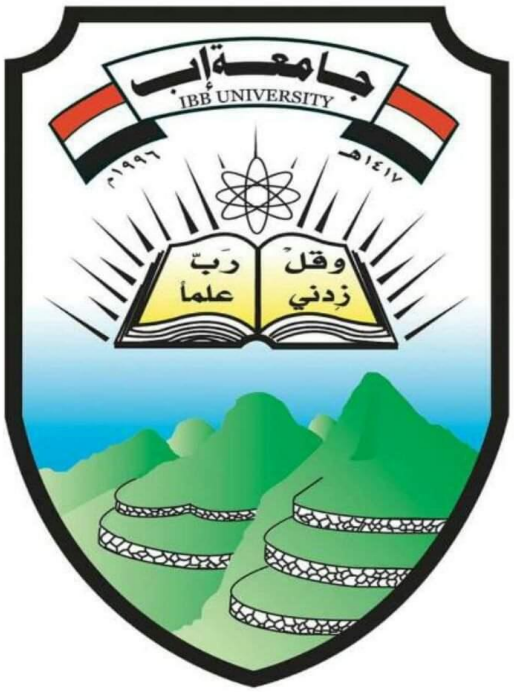
Ibb university **level:Three**
Faculty of Engineering and Architecture **Computer Engineering And informatics**
Electrical Engineering Department



Microprocessor Project

Automatic Street light using 8051 Microcontroller

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ABSTRACT

Generally, street lights are switched on for whole night and during the day, they are switched off. But during the night time, street lights are not necessary if there is no traffic. Saving of this energy is very important factor these days as energy resources are getting reduced day by day

We need to save energy because most of the energy sources we depend on, like coal and natural gas can't be replaced. Once we use them up, they're gone forever. Saving power is very important, instead of using the power in unnecessary times it should be switched off. In any city “STREET LIGHT” is one of the major power consuming factors. Most of the time we see street lights are ON even after sunrise thus wasting lot of energy.

This project presents a design and a prototype implementation of Automatic street light system using Proteus simulation tool to represent the hardware in addition to assembly Language as its controlling software.

Our purpose of this project is to have a clear understanding of how to use Microprocessor in mini project ,how all the components combine and how it's controlled the software to perform its special task that was designed to do.

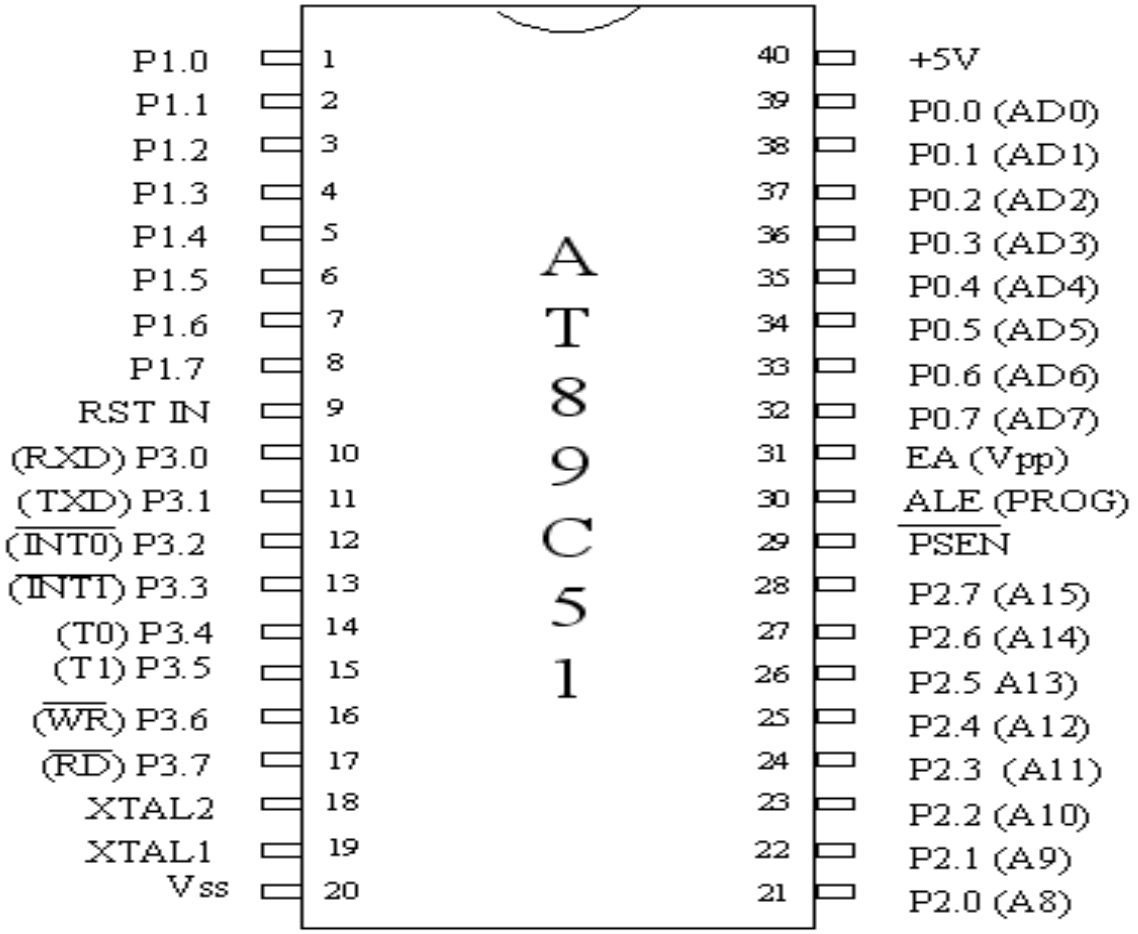
TABLE OF CONTENTS

Components

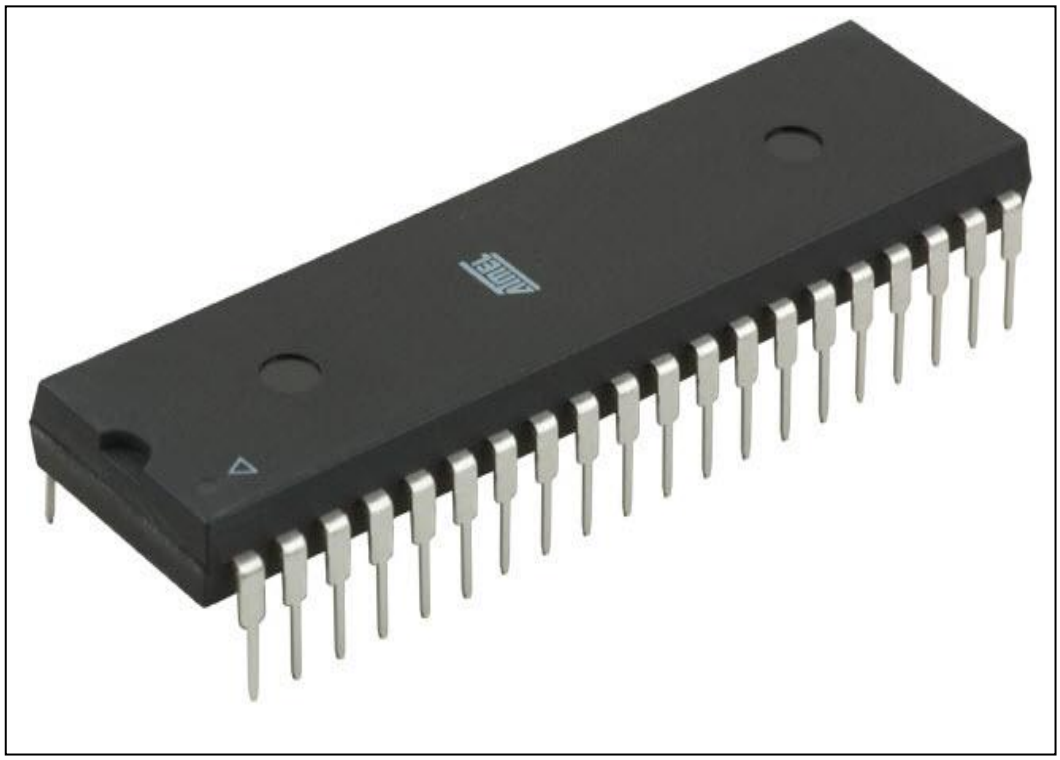
1) AT89C51 MICROCONTROLLER

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4K
bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pinout. The on-chip
Flash allows the program memory to be reprogrammed in-system or by a conventional
nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides

a highly-flexible and cost-effective solution to many embedded control applications.



Fig(1) AT89C51 pin configuration



Fig(2) AT89C51 Microcontroller

2)RELAY 5V

Relays are most commonly used switching device in electronics.

Features of 5-Pin 5V Relay

- Trigger Voltage (Voltage across coil) : 5V DC
- Trigger Current (Nominal current) : 70mA
- Maximum AC load current: 10A @ 250/125V AC
- Maximum DC load current: 10A @ 30/28V DC
- Compact 5-pin configuration with plastic moulding
- Operating time: 10msec Release time: 5msec
- Maximum switching: 300 operating/minute (mechanically)

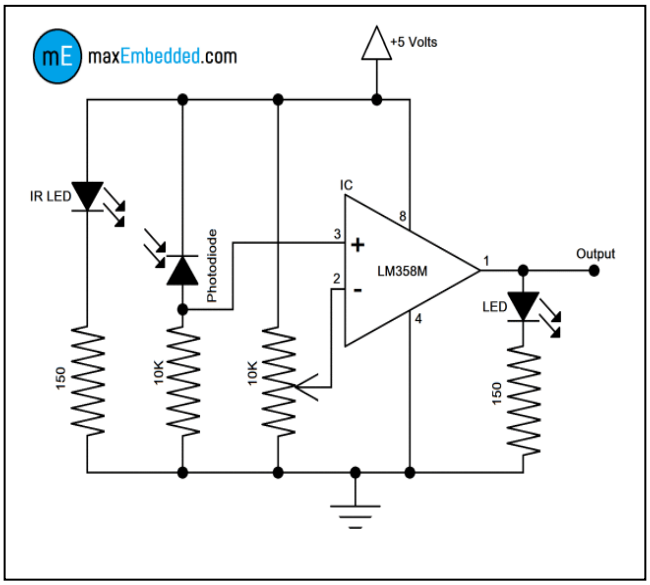
Fig(3) 5V RELAY

Relay Pin Configuration

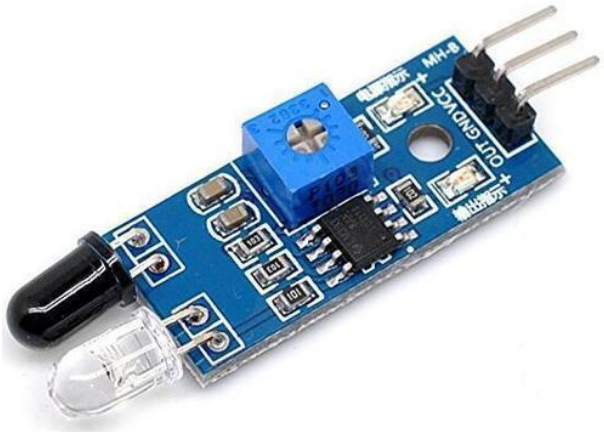
Pin Number	Pin Name	Description
1	Coil End 1	Used to trigger(On/Off) the Relay, Normally one end is connected to 5V and the other end to ground
2	Coil End 2	Used to trigger(On/Off) the Relay, Normally one end is connected to 5V and the other end to ground
3	Common (COM)	Common is connected to one End of the Load that is to be controlled
4	Normally Close (NC)	The other end of the load is either connected to NO or NC. If connected to NC the load remains connected before trigger
5	Normally Open (NO)	The other end of the load is either connected to NO or NC. If connected to NO the load remains disconnected before trigger

3) **IR SENSOR**

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion as well as the presence of an object due to intervention or interruption.



Fig(4) Circuit Diagram of IR Sensor



Fig(5) IR SENSOR (TRANSIMMET AND RECEIVER)

4) LAMP

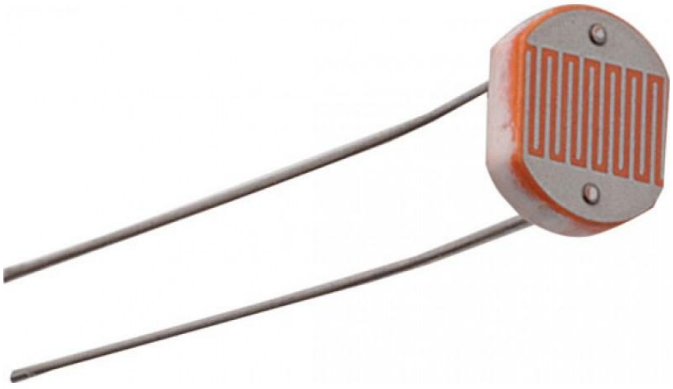
Fig(6) 5V LAMP

5) RESISTANCE

Fig(7) 10K ohm RESISTANCE

5) LDR

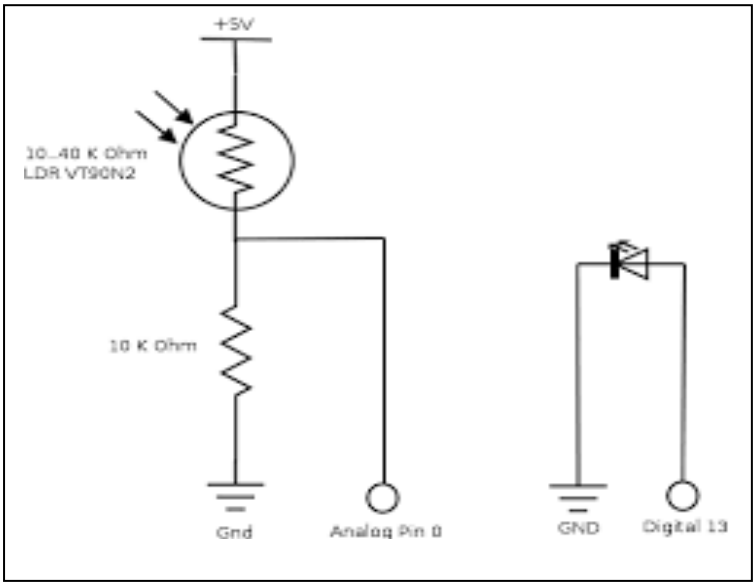
LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000000 ohms, but when they are illuminated with light resistance drops dramatically.



Fig(9) LDR(LIGHT DEPENDENTRESISTOR)

Darkness: Maximum resistance, about 1Mega ohm. 16

Very bright light: Minimum resistance, about 100 ohm. The LDR is a variable resistor whose resistance decreases with the increase in light intensity.



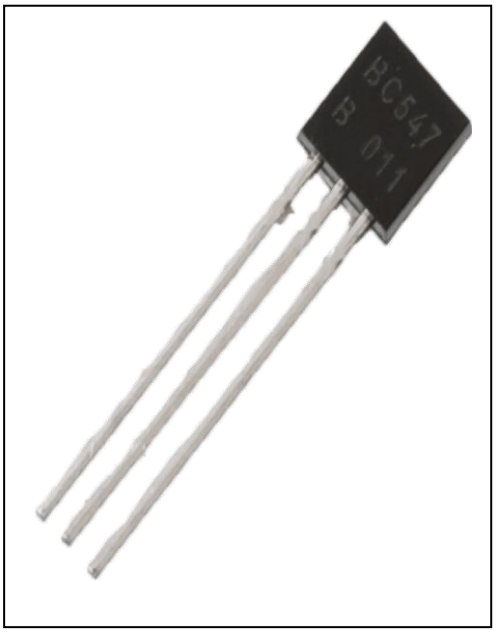
Fig(8) LDR Circuit

7) BC547 TRANSISTOR

BC 547 NPN transistor 45V 100mA hFE 150

Specifications:

- BIPOLAR TRANSISTOR, NPN, 45V, TO-92
- Transistor Polarity: NPN
- Collector Emitter Voltage V(br)ceo: 45V
- Transition Frequency Typ ft: 300MHz
- Power Dissipation Pd: 625mW
- DC Collector Current: 100mA
- DC Current Gain hFE: 150
- Straight-lead housing



Fig(10) BC547 NPN TRANSISTOR

Principle of Operation

The principle behind the working of the project lies in the functioning of IR Sensor. We are going to use a Transmissive type IR Sensor in this project.

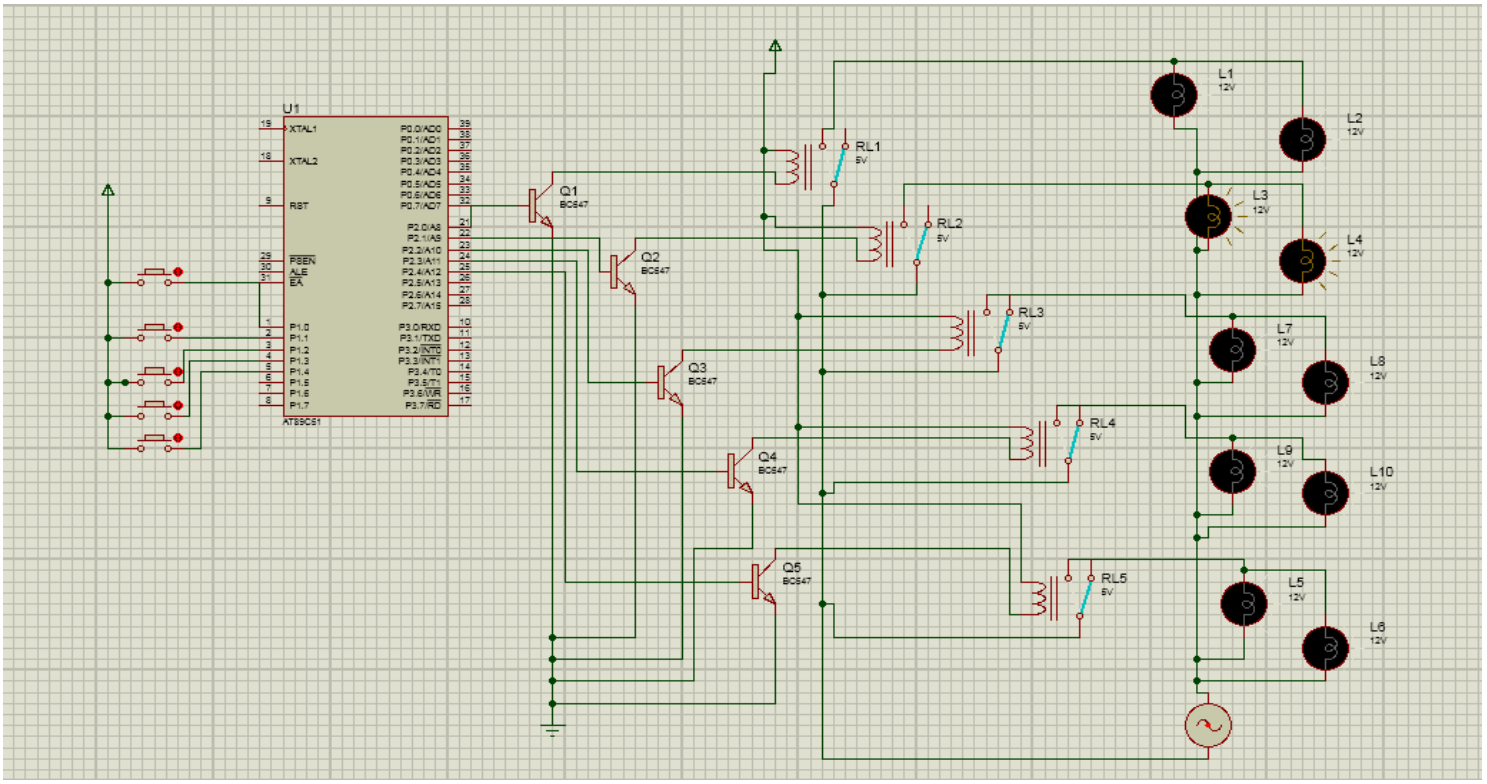
In Transmissive IR Sensor, the IR transmitter and receiver are placed facing each other so that IR receiver always detects IR Rays emitted by the IR Transmitter.

If there is an obstacle between the IR Transmitter and Receiver, the IR Rays are blocked by the obstacle and the IR Receiver stops detecting the IR Rays.

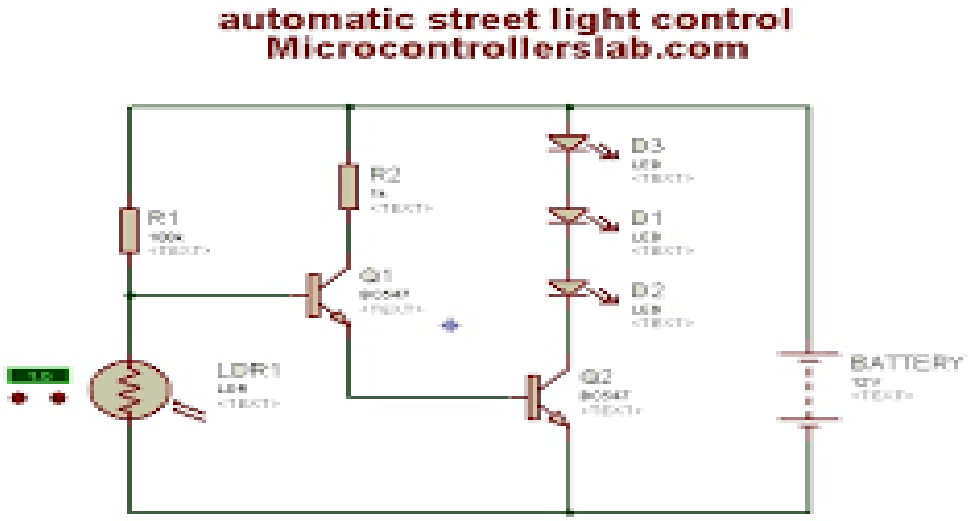
This can be configured to turn ON or OFF the LEDs (or street lights) with the help of microcontroller.

Also ,Street lights are switched on depending on the intensity of the Sun light on LDR. If the intensity of Sunlight on light dependent resistor is low, its resistance value is high. This value increases and becomes high when it is completely in dark. This resistance value decides when the street lights are required to switch ON.

Circuit Diagram



. Fig(11-1) circuit diagram on protous



. **Fig(11-2) circuit diagram for LDR Circuit**

Application and Advantages

◎ The street light control circuit can be used in normal roads, highways, express ways etc.

◎ The project can also be used in parking areas of malls, hotels, industrial lighting, etc.

◎ If the lighting system implements all LED lights, the cost of the maintenance can be reduced as the life span and durability of LEDs is higher than Neon based lights which are normally used as street lights.

◎ As the lights are automatically turned ON or OFF, huge amount of energy can be saved.

◎ This system less costly, less installation and maintenance cost and more efficient as compared to the others system

Codeing

```
 #include<reg51.h>
sbit sensor1=P1^0;
sbit sensor2=P1^1;
sbit sensor3=P1^2;
sbit sensor4=P1^3;
sbit sensor5=P1^4;
sbit load1=P2^0;
sbit load2=P2^1;
sbit load3=P2^2;
sbit load4=P2^3;
sbit load5=P2^4;
void main()
{
load1=load2=load3=load4=load5=0;
sensor1=sensor2=sensor3=sensor4=sensor5=0;
while(1)
{
if(sensor1==1)
load1=1;
else
load1=0;
if(sensor2==1)
load2=1;
else
load2=0;
if(sensor3==1)
load3=1;

else
load3=0;
if(sensor4==1)
load4=1;
else
load4=0;
if(sensor5==1)
load5=1;
else  load5=0;}}
```