"AUTOMATIC ROOM LIGHTING SYSTEM USING 8051 MICROCONTROLLER"

A MINIPROJECT REPORT

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AUTONOMOUS COLLEGE Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade

CERTIFICATE

Certified that the mini-project entitled "**AUTOMATIC ROOM LIGHTING SYSTEM USING 8051 MICROCONTROLLER**" is carried out by **ATHIKARI GANESH(1NH18EC014), BANDLA SAI KUMAR (1NH18EC019),BHARATH RAJ P (1NH18EC133), G VENKATA VAMSI KRISHNA(1NH18EC038)** students of **NEW HORIZON COLLEGE OF ENGINEERING** partial fulfilment for the award of Bachelor of Engineering in Electronics and Communication of the Visvesvaraya Technological University, Belgavi during the year **2020-2021**

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ABSTRACT

Basically people are very busy in there daily businesess and emotions in there life .often we forget small things (like looking after the home,switching ofbth lights fans etc) in life while we focus on the different and higher goals in carrier or relationships

Automatic Room Lighting System is a microcontroller based project that automatically turn on or off the lights in a room. Electricity, being one of the most important resources, must be utilized carefully.

We often forget to switch off lights or fans when we leave a room. By using this system, we can intentionally forget about the lights as the system will automatically take care of them.

The digital World we are living in allows us to use different technologies to automatically perform certain tasks. Such automation is very useful in certain areas like energy consumption, reducing human efforts, improving standard of living etc.

The project implemented here is one such project where the microcontroller based system automatically controls the room lights.

CONTENTS

PAGE NO

CHAPTER 1

INTRODUCTION

Automatic Room Lighting System is a microcontroller based project that automatically turn on or off the lights in a room. Electricity, being one of the most important resources, must be utilized carefully.

We often forget to switch off lights or fans when we leave a room. By using this system, we can intentionally forget about the lights as the system will automatically take care of them.

The digital World we are living in allows us to use different technologies to automatically perform certain tasks. Such automation is very useful in certain areas like energy consumption, reducing human efforts, improving standard of living etc.

The project implemented here is one such project where the microcontroller based system automatically controls the room lights.

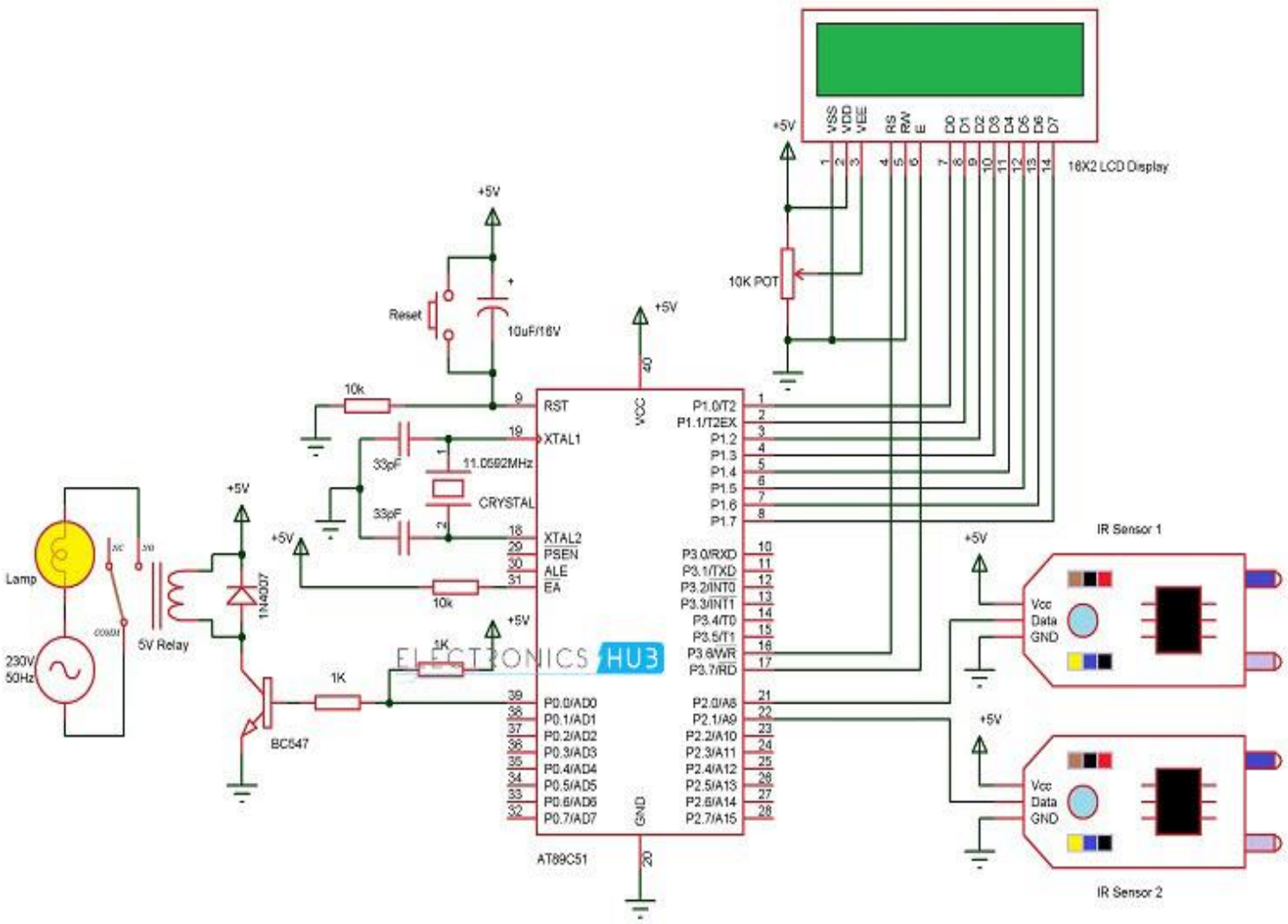
The aim of this project is to automatically turn on or off the lights in a room by detecting the human movement. We implemented this project using 8051 Microcontroller and two Infrared (IR) sensors.

Since the job of the circuit is to turn on the light when someone enters the room and turn off the light when the last person leaves the room, the project has to internally count the number of visitors entering and leaving the room. Hence, the project acts as an Automatic Room Lighting System as well as Bidirectional Visitor Counter.

Warning: A 230V light bulb is used in this project and is connected to relay and mains supply. We should be very careful when connecting the mains wires.

CHAPTER 2

CIRCUIT DIAGRAM



CHAPTER 3

CIRCUIT AND WORKING

Let us see the design of the circuit for automatic room lighting project. The circuit diagram shows all the connections with respect to microcontroller. If you are doing this project on a development board, some of the connections mentioned in the circuit diagram might not be necessary.

Also, we have used modules for Relay and IR Sensor and hence, the connections are shown with respect to those modules only. Corresponding circuit diagrams are also provided.

Coming to the circuit design, a 16 x 2 LCD Display, two IR Sensors and a 5V Relay Module must be connected to the 8051 Microcontroller. First, connect the 8 data pins of the LCD to PORT1 pins i.e. P1.0 to P1.7.

The 3 control pins of LCD i.e. RS, RW and E are connected to P3.6, GND and P3.7 pins respectively. A 10 KΩ Potentiometer is connected to contrast adjust pin of LCD i.e. its pin 3.

Two Reflective type IR Sensors are connected to PORT2 pins i.e. P2.0 and P2.1. Detailed circuit of the IR Sensor is mentioned in the Component Description.

The input of the 5V Relay is connected to PORT0 pin P0.0. The detailed circuit of the 5V Relay module used in the project is explained in the component description section. Alternatively, you can construct the circuit as per the circuit diagram (which consists of 5V Relay, Transistor, Diode and a Resistor).

Working of the project

In this project, an automatic room lighting system is developed using 8051 microcontroller. The working of the project is explained here.

The main component of the project is IR Sensor and we have used two of them. The placement of the sensors is important as it will determine the functioning of the project.

Practically speaking, both the sensors must be placed on the either side of the door or entrance of the room. The sensor placed on the outside of the room is named as Sensor 1 and the sensor, which is placed on the inside is named Sensor 2.

When a person tries to enter the room, Sensor 1 detects the person first and then Sensor 2. This action will indicate the 8051 Microcontroller that the person is entering the room.

Hence, the microcontroller will turn on the light and also increments the visitor counter to 1. If there are more visitor, the microcontroller will keep the light turned on and increments the visitor counter accordingly.

When a person tries to leave the room, Sensor 2 detects the person first and then Sensor 1. This process will make the microcontroller to understand that a person is trying to leave the room and hence, it will decrement the count of visitors. The microcontroller will not turn off the light until the last person has left the room.

As the visitors start leaving the room, the visitor count will be decremented and when the last person leaves the room, the count be comes 0. During this point, the microcontroller understands that there is nobody in the room and turns OFF the light.

CHAPTER 4

COMPONENTS AND ITS DETAILS

IN THIS PROJECT WE ARE USEING TH FOLLOWING COMPONENTS:

- **AT89C51 Microcontroller (any 8051 architecture based microcontroller)**

Pin Description

Pin Number	Pin Name	Description
1	P1.0	0th pin of PORT P1
2	P1.1	1st pin of PORT P1
3	P1.2	2nd pin of PORT P1
4	P1.3	3rd pin of PORT P1
5	P1.4	4th pin of PORT P1
6	P1.5	5th pin of PORT P1
7	P1.6	6th pin of PORT P1
8	P1.7	7th pin of PORT P1

9	RST	Reset pin of the Microcontroller
10	(RXD) P3.0	0th pin of PORT P3 or Receiver pin of Microcontroller
11	(TXD) P3.1	1st pin of PORT P3 or Transmitter pin of Microcontroller
12	(INT0) P3.2	2nd pin of PORT P3 or External Interrupt 0 of MCU
13	(INT1) P3.3	3rd pin of PORT P3 or External Interrupt 1 of MCU
14	(T0) P3.4	4th pin of PORT P3 or Timer 0 interrupt of MCU
15	(T1) P3.5	5th pin of PORT P3 or Timer 1 interrupt of MCU
16	(WR) P3.6	6th pin of PORT P3 or Write to External data memory pin
17	(RD) P3.7	7th pin of PORT P3 or Read from External data memory pin
18	XTAL2	External crystal pin 2 of Microcontroller
19	XTAL1	External crystal pin 1 of Microcontroller
20	GND	Ground pin of MCU
21	P2.0(A8)	0th pin of PORT P2 or High-order Address bit 8 of MCU
22	P2.1(A9)	1st pin of PORT P2 or High-order Address bit 9 of MCU
23	P2.2(A10)	2nd pin of PORT P2 or High-order Address bit 10 of MCU
24	P2.3(A11)	3rd pin of PORT P2 or High-order Address bit 11 of MCU

25	P2.4(A12)	4th pin of PORT P2 or High-order Address bit 12 of MCU
26	P2.5(A13)	5th pin of PORT P2 or High-order Address bit 13 of MCU
27	P2.6(A14)	6th pin of PORT P2 or High-order Address bit 14 of MCU
28	P2.7(A15)	7th pin of PORT P2 or High-order Address bit 15 of MCU
29	PSEN	Program store enable pin, Read external program memory
30	ALE/PROG	Address Latch Enable/ Program Pulse input for flashing
31	EA/VPP	Access Enable voltage/Program enable voltage
32	P0.7(AD7)	7th pin of PORT P0 or Low-order Address bit 7 of MCU
33	P0.6(AD6)	6th pin of PORT P0 or Low -order Address bit 6 of MCU
34	P0.5(AD5)	6th pin of PORT P0 or Low -order Address bit 5 of MCU
35	P0.4(AD4)	6th pin of PORT P0 or Low -order Address bit 4 of MCU
36	P0.3(AD3)	3rd pin of PORT P0 or Low -order Address bit 3 of MCU
37	P0.2(AD2)	2nd pin of PORT P0 or Low -order Address bit 2 of MCU
38	P0.1(AD1)	1st pin of PORT P0 or Low -order Address bit 1 of MCU
39	P0.0(AD0)	0th pin of PORT P0 or Low -order Address bit 0 of MCU
40	Vcc	Supply pin of MCU

Features

AT89C51 –Simplified Features	
CPU	8-bit 8051
Number of Pins	40
Operating Voltage (V)	2 to 5.5 V
Number of I/O pins	32
ADC Module	Nil
Timer/Counter Module	16-bit(2)
Comparators	Nil
DAC Module	Nil
Communication Peripherals	UART(1)
External Oscillator	3MHz to 24Mhz
Internal Oscillator	Yes
Program Memory Type	Flash
Program Memory (KB)	4K

RAM Bytes	128 × 8-bit
Data EEPROM	Nil

Note: The **AT89C51 datasheet** of the Microcontroller and more detailed Features can be found at the bottom of this page.

Other ATMEL MCU's

AT89S52, ATtiny45, ATMega328P, ATMega8, ATMEga32, ATtiny88

AT89C51 Microcontroller

The **AT89C51** is an age old 8-bit microcontroller from the Atmel family. It works with the popular 8051 architecture and hence is used by most beginners till date. It is a 40 pin IC package with 4Kb flash memory. It has four ports and all together provide 32 Programmable GPIO pins. It does not have in-built ADC module and supports only USART communication. Although it can be interfaced with external **ADC IC** like the ADC084 or the ADC0808.

The **AT89C51** is no longer in production and Atmel does not support new design. Instead the new AT89S51 is recommended for new applications. But, since the AT89C51 has a strong community support if your motive is to learn embedded then AT89C51 can still be a good choice.

How to Program the AT89C51 (8051) Microcontroller

Atmel microcontroller can be programmed with different software's that is available in the market. Arduino, Keil uVision are the most used platforms to name a few. If you are planning on serious programming and expansion with community support then Keil is recommended.

In order to program the Atmel microcontroller we will need an IDE (Integrated Development Environment), where the programming takes place. A compiler, where our program gets converted into MCU readable form called HEX files. An IPE (Integrated Programming Environment), which is used to dump our hex file into our MCUs.

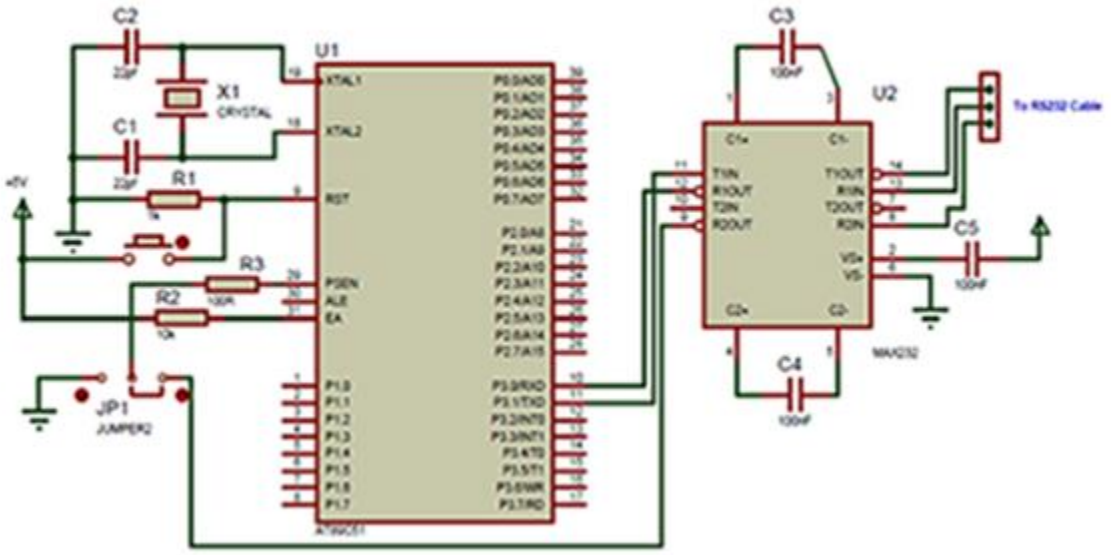
IDE: Keil uVision IDE

Programming Hardware: MAX232 with RS232 to USB converter

Programmer: USBASP

To dump or upload our code into Atmel IC we need a programmer, the most commonly used programmer is the USBASP which has to be purchased separately. Also simulating you program on software before trying it on hardware will save a lot of time. So you can use software like ISIS proteus from Labcenter to simulate your programs.

A 8051 **(AT89C51) Programming circuit** is shown below



Detailed Features

AT89C51 – Detailed Features	
CPU	8-bit 8051 family
Architecture	8051
Program Memory Size (Kbytes)	4K Flash
RAM (bytes)	128
EEPROM/HEF	Nil

Pin Count	40
Max. CPU Speed (MHz)	24
Peripheral Pin select (PPS)	No
Internal Oscillator	No
No. Of comparators	2
No. Of Operational Amplifier	0
No. Of ADC channels	Nil
Max ADC Resolution (bits)	NA
ADC with Computation	No
Number of DAC Converter	0
Max DAC resolution	0
Internal Voltage Reference	NA
Zero Cross Detect	No
No. Of 8-bit timers	0
No. Of 16-bit Timers	2
Signal Measurement Timer	0

Hardware Limit Timer	0
No. Of PWM outputs	0
Max PWM resolution	NA
Angular Timer	No
Math Accelerator	No
No. Of UART module	1
No. Of SPI Module	0
No. Of I2C module	0
No. Of USB Module	0
Windowed Watchdog Timer (WWDT)	No
CRC/Scan	No
Numerically Controlled Oscillator	0
Cap. Touch Channels	NA
Segment LCD	0
Minimum Operating Temperature (*C)	-55
Maximum Operating Temperature (*C)	125

Minimum Operating Voltage (V)	4
Maximum Operating Voltage (V)	5.5
High Voltage Capable	No

How to select your Atmel Microcontroller

Microchip provides a vast variety of Microcontrollers from PIC family and Atmel Family. Their collection has just piled up after Microchip has acquired Atmel. Each MCU has its own advantage and disadvantage. There are many parameters that one has to consider before selecting a MCU for his/her project. The below points are just suggestions which might help one to select a MCU.

- If you are a beginner who is learning Microcontroller then, **selecting a MCU** that has good online community support and wide applications will be a good choice. For Atmel AT89S52 or ATmega328 will be a good choice.
- Consider the operating voltage of your system. If they are 5V then select a 5V MCU some sensors or devices work and communicate on 3.3V in such case a 3.3V MCU can be selected
- If size and price is a limitation then you can choose small 8-pin MCUs like Attiny1614. These are also comparatively cheaper.
- Based on the sensors and actuators used in your project, verify which modules you might need in for MCU. For example is you are reading many Analog voltages then make sure MCU has enough ADC channels and supportive resolution. The details of all modules are given in the table above.
- If you project involves communication protocols like UART, SPI ,I2C, CAN etc make sure you MCU can support them. Some MCU can support more than one module of the same protocol

Applications

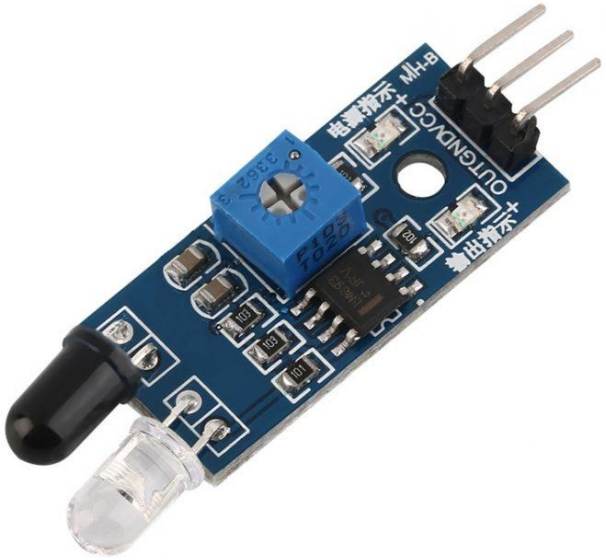
- Multiple DIY Projects
- Very good choice if you are learning ATmel
- Projects requiring Multiple I/O interfaces and communications
- Replacement for Arduino Module
- Ideal for more advanced level A/D applications in automotive, industrial, appliances and consumer applications.

- 8051 Development Board

8051 Development Board with inbuilt programmer. On board Voltage Regulator with filters and operating voltage- 5V to 12V. DB-9 connector to connect with the serial port of the computer(UART communication). On Board IN-circuit programmer consisting AT89C2051 and MAX232. 11.0592 MHz Crystal Oscillator for clock pulsing. In built motor driving circuitry (4 DC / 2 Stepper motor). 2 pin connector to connect the Power Supply. Red Led as Power Indicator. Green Led as Programming Indicator. A reset switch. A jumper to toggle between Programming circuit and Reset circuit. All ports accessible through Male Header Pins.

Infrared Sensors

IR sensor is an electronic device, that emits the light in order to sense some object of the surroundings. An **IR sensor** can measure the heat of an object as well as detects the motion. Usually, in the **infrared spectrum**, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes, but infrared sensor can detect these radiations.



The emitter is simply an IR LED **(Light Emitting Diode**) and the detector is simply an IR photodiode . Photodiode is sensitive to IR light of the same wavelength which is emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.

There are five basic elements used in a typical infrared detection system: an infrared source, a transmission medium, optical component, infrared detectors or receivers and signal processing. Infrared lasers and Infrared LED's of specific wavelength used as infrared sources.

The three main types of media used for infrared transmission are vacuum, atmosphere and optical fibers. Optical components are used to focus the infrared radiation or to limit the spectral response.

Watch this video if you wish to skip the rest of the blog.

Types of IR Sensor

There are two types of IR sensors are available and they are,

Active Infrared Sensor

Passive Infrared Sensor

Active Infrared Sensor

Active infrared sensors consist of two elements: infrared source and infrared detector. Infrared sources include the LED or infrared **laser diode**. Infrared detectors include photodiodes or phototransistors. The energy emitted by the infrared source is reflected by an object and falls on the infrared detector.

Passive Infrared Sensor

Passive infrared **sensors** are basically Infrared detectors. Passive infrared sensors do not use any infrared source and detector. They are of two types: quantum and thermal. Thermal infrared sensors use infrared energy as the source of heat. **Thermocouples**, pyroelectric detectors and bolometers are the common types of thermal infrared detectors. Quantum type infrared sensors offer higher detection performance. It is faster than thermal type infrared detectors. The photo sensitivity of quantum type detectors is wavelength dependent.

IR Sensor Working Principle

There are different types of infrared transmitters depending on their wavelengths, output power and response time. An IR sensor consists of an IR LED and an IR Photodiode, together they are called as PhotoCoupler or OptoCoupler.

IR Transmitter or IR LED

Infrared Transmitter is a light emitting diode (LED) which emits infrared radiations called as IR LED's. Even though an IR LED looks like a normal LED, the radiation emitted by it is invisible to the human eye.

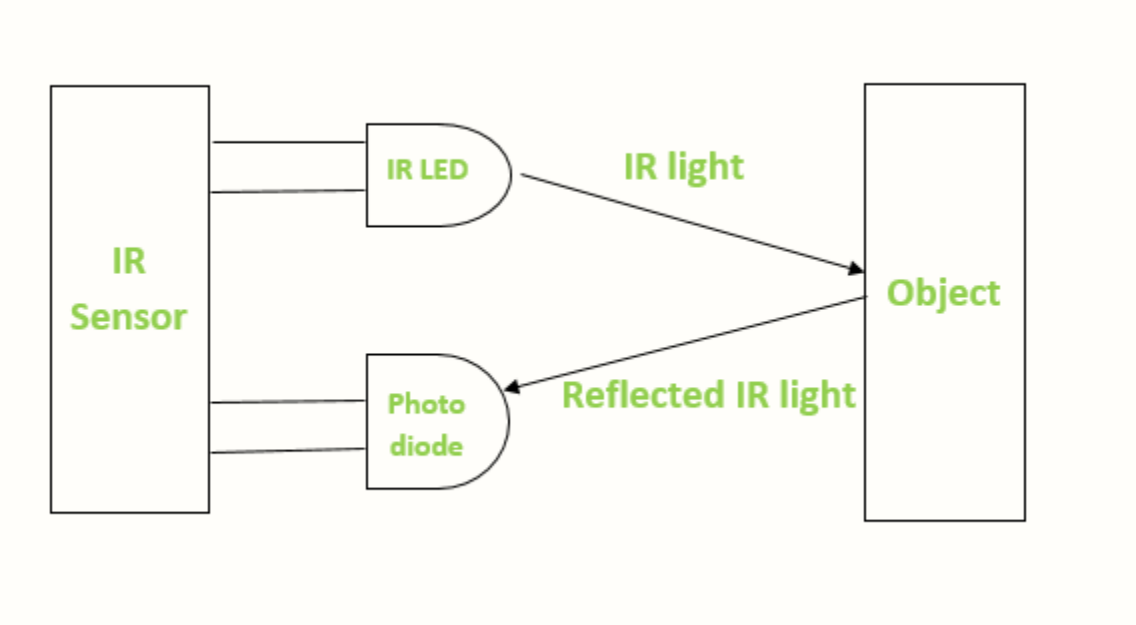
The picture of an Infrared LED is shown below.

IR Receiver or Photodiode

Infrared receivers or infrared sensors detect the radiation from an IR transmitter. IR receivers come in the form of photodiodes and phototransistors. Infrared Photodiodes are different from normal photo diodes as they detect only infrared radiation. Below image shows the picture of an IR receiver or a photodiode,

Different types of IR receivers exist based on the wavelength, voltage, package, etc. When used in an infrared transmitter – receiver combination, the wavelength of the receiver should match with that of the transmitter.

The emitter is an IR LED and the detector is an IR photodiode. The IR photodiode is sensitive to the IR light emitted by an IR LED. The photo-diode's resistance and output voltage change in proportion to the IR light received. This is the underlying working principle of the IR sensor.



When the IR transmitter emits radiation, it reaches the object and some of the radiation reflects back to the IR receiver. Based on the intensity of the reception by the IR receiver, the output of the **sensor** defines.

Applications of IR Sensor

IR sensors use in various projects and also in various electronic devices. They all are as follow,

Night Vision Devices

An Infrared technology implemented in **night vision equipment** if there is not enough visible light available to see unaided. Night vision devices convert ambient photons of light into electrons and then amplify them using a chemical and electrical process before finally converting them back into visible light.

- ## 16 x 2 LCD Display

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.

16X2 LCD

LCD 16×2 Pin Diagram

The 16×2 LCD pinout is shown below.

Pin1 (Ground/Source Pin): This is a GND pin of display, used to connect the GND terminal of the microcontroller unit or power source.

Pin2 (VCC/Source Pin): This is the voltage supply pin of the display, used to connect the supply pin of the power source.

Pin3 (V0/VEE/Control Pin): This pin regulates the difference of the display, used to connect a changeable POT that can supply 0 to 5V.

Pin4 (Register Select/Control Pin): This pin toggles among command or data register, used to connect a microcontroller unit pin and obtains either 0 or 1(0 = data mode, and 1 = command mode).

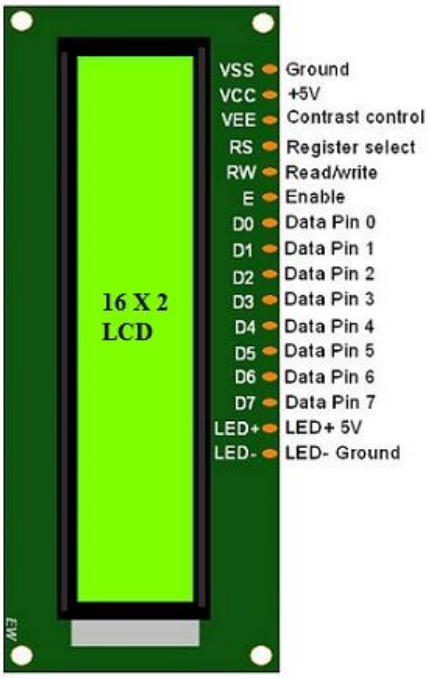
Pin5 (Read/Write/Control Pin): This pin toggles the display among the read or writes operation, and it is connected to a microcontroller unit pin to get either 0 or 1 (0 = Write Operation, and 1 = Read Operation).

Pin 6 (Enable/Control Pin): This pin should be held high to execute Read/Write process, and it is connected to the microcontroller unit & constantly held high.

Pins 7-14 (Data Pins): These pins are used to send data to the display. These pins are connected in two-wire modes like 4-wire mode and 8-wire mode. In 4-wire mode, only four pins are connected to the microcontroller unit like 0 to 3, whereas in 8-wire mode, 8-pins are connected to microcontroller unit like 0 to 7.

Pin15 (+ve pin of the LED): This pin is connected to +5V

Pin 16 (-ve pin of the LED): This pin is connected to GND.



LCD-16×2-pin-diagram

Features of LCD16x2

The features of this LCD mainly include the following.

The operating voltage of this LCD is 4.7V-5.3V

It includes two rows where each row can produce 16-characters.

The utilization of current is 1mA with no backlight

Every character can be built with a 5×8 pixel box

The alphanumeric LCDs alphabets & numbers

Is display can work on two modes like 4-bit & 8-bit

These are obtainable in Blue & Green Backlight

It displays a few custom generated characters

Registers of LCD

A 16×2 LCD has two registers like data register and command register. The RS (register select) is mainly used to change from one register to another. When the register set is '0', then it is known as command register. Similarly, when the register set is '1', then it is known as data register.

- ## 5V Relay Module

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

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)

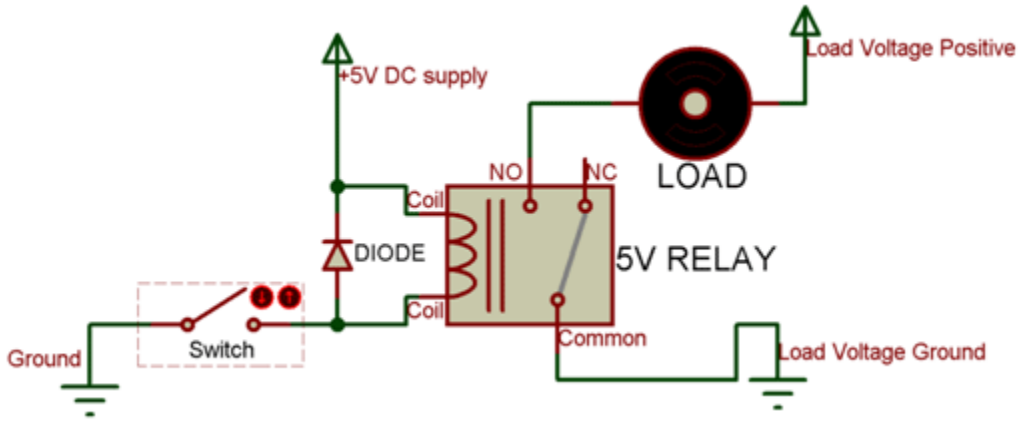
Equivalent Relays

3V Relay, 12V Relay, 1-channel Relay module, 4-channel Relay Module.

How to use a Relay

Relays are most commonly used switching device in electronics. Let us learn how to use one in our circuits based on the requirement of our project.

Before we proceed with the circuit to drive the relay we have to consider two important parameter of the relay. Once is the **Trigger Voltage**, this is the voltage required to turn on the relay that is to change the contact from Common->NC to Common->NO. Our relay here has 5V trigger voltage, but you can also find relays of values 3V, 6V and even 12V so select one based on the available voltage in your project. The other parameter is your **Load Voltage & Current**, this is the amount of voltage or current that the NC,NO or Common terminal of the relay could withstand, in our case for DC it is maximum of 30V and 10A. Make sure the load you are using falls into this range.



The above circuit shows a bare-minimum concept for a relay to operate. Since the relay has 5V trigger voltage we have used a +5V DC supply to one end of the coil and the other end to ground through a switch. This **switch** can be anything from a small transistor to a microcontroller or a microprocessor which can perform switching operating. You can also notice a diode connected across the coil of the relay, this diode is called the **Fly back Diode**. The purpose of the diode is to protect the switch from high voltage spike that can produced by the relay coil. As shown one end of the load can be connected to the Common pin and the other end is either connected to NO or NC. If connected to NO the load remains disconnected before trigger and if connected to NC the load remains connected before trigger.

Applications of Relay

- Commonly used in switching circuits.
- For Home Automation projects to switch AC loads
- To Control (On/Off) Heavy loads at a pre-determined time/condition

- Used in safety circuits to disconnect the load from supply in event of failure
- Used in Automobiles electronics for controlling indicators glass motors etc.

CHAPTER 5

CODE

```
#include <reg51.h>
#define lc d P1
sbit rs=P3^6;
sbit e=P3^7;
sbit relay=P0^0;
sbit s1=P2^0;
sbit s2=P2^1;
void delay (int);
void cmd (ch ar);
void display (char);
void init (void);
void string (char *);
void view (int);
int count=0;
int no[10]={48,49,50,51,52,53,54,55,56,57};
void delay (int d)
{
        unsigned char i=0;
        for(;d>0;d--)
        {
                for(i=250;i>0;i--);
                for(i=248;i>0;i--);
        }
}
void cmd (char c)
{
        lcd=c;
        rs=0;
        e=1;
```

```
        delay(5);
        e=0;
}
void display (char c)
{
        lcd=c;
        rs=1;
        e=1;
        delay(5);
        e=0;
}
void string (char *p)
{
        while(*p)
        {
                display(*p++);
        }
}
void view (int n)
{
        cmd(0xc0);
        display(no[(n/10)%10]);
        display(no[n%10]);
}
void init (void)
{
        cmd(0x38);
        cmd(0x0c);
        cmd(0x01);
        cmd(0x80);
}
void main()
{
  init();
        string("counter.....");
        cmd(0xc0);

        view(count);

```

```
        while(1)
        {
                if(s1==1)
                {
                        while(s2==0);
                        if(count!=99)
                        count=count+1;
                        while(s2==1);
                        view(count);
                }
                else if(s2==1)
                {
                        while(s1==0);
                        if(count!=0)
                        count=count-1;
                        while(s1==1);
                        view(count);
                }
                else if(count==1)
                        relay=0;
                else if(count==0)
                        relay=1;

        }
}
```

CHAPTER 6

FUTURE SCOPE

- Automatic Room Lighting with Bidirectional Visitor Counter can be used to automatically turn on the light in a room when a person enters the room and turn it off when the person leaves the room.

- The project can also be dubbed as a Bidirectional Visitor Counter it is an integral part of the Automatic Room Lighting circuit.

- The project can be modified with LEDs and as the number of persons in the room increases, the number of LEDs turning ON also increases.

CHAPTER 7

REFERENCES

Web references

- Electronicsforu.com
- Electronicshub.com
- Hackaday.com

Youtube references

- Electronicsforu.com

CHAPTER 8

CONCLUSION

So basically here as all the people are busy in there businesses in this busy world ,we often forget small things like switching off the lights,fans etc in the house. So basically in this project we automatically turn on or off the lights in a room by detecting the human movement. We implemented this project using 8051 Microcontroller and two Infrared (IR) sensors.

Since the job of the circuit is to turn on the light when someone enters the room and turn off the light when the last person leaves the room, the project has to internally count the number of visitors entering and leaving the room. Hence, the project acts as an Automatic Room Lighting System as well as Bidirectional Visitor Counter.