

REWA ENGINEERING COLLEGE, REWA(M.P.)



A Major Project Report On “Bidirectional Visitor Counter”

Submitted in partial fulfillment of the requirements for the degree of

BACHELOR OF TECHNOLOGY

IN

ELECTRICAL ENGINEERING

SUBMITTED BY:

SOYAL NAMDEV

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Under the Guidance of

Prof. A. B. Sarkar

(HOD- EE DEPT.)



**DEPARTMENT OF ELECTRICAL ENGINEERING REWA
ENGINEERING COLLEGE,REWA(M.P.)**

(Established in 1964 as Government Engineering College ,Rewa by State Govt.)

Session- 2018-2022

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL(M.P.)

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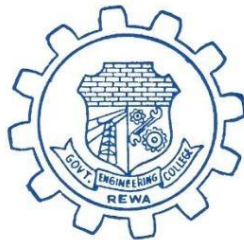
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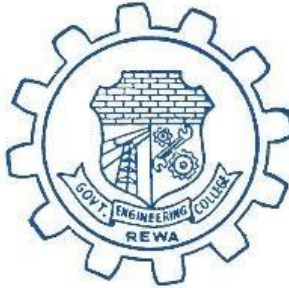
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CERTIFICATE

This is to certify that the dissertation entitled “**BIDIRECTIONAL VISITOR COUNTER**” has been carried out under my guidance and supervision. The dissertation is approved for submission towards partial fulfillment for the award of degree of **Bachelor of Technology in Electrical Engineering**.

Prof. A.B. SARKAR

(Guide)

Head of Department

Department of Electrical Engineering

Dr. B. K. AGRAWAL

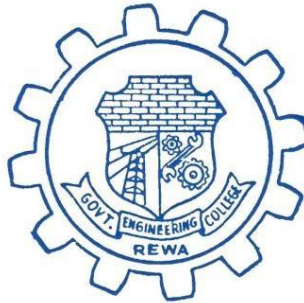
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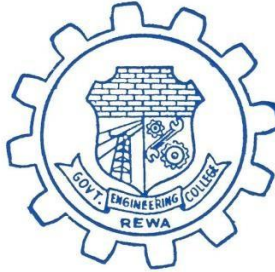
CERTIFICATE OF APPROVAL

This is to certify that dissertation entitled “**BIDIRECTIONAL VISITORCOUNTER**” submitted by SOYAL NAMDEV (0301EE181054) accepted towards partial fulfillment for the award of the degree of **Bachelor of Technology in Electrical Engineering.**

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CANDIDATE'S DECLARATION

We hereby declare that the work which is being presented in this dissertation, entitled **“BIDIRECTIONAL VISITORCOUNTER”** in partial fulfillment for the award of **Bachelor of technology** degree in **Electrical Engineering**, submitted in the Department of Electrical Engineering, Rewa Engineering College, Rewa, is an authentic record of our own work carried under the guidance of **Prof. A.B. Sarkar, Electrical Engineering, Rewa Engineering College, Rewa.**

We have not submitted the matter embodied in this report for award of any other degree or diploma.

Date:

SOYAL NAMDEV

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We would also like to take this opportunity for this kind support and assistance during the period to present my sincere regards to **Prof. A.B. SARKAR, Head of Department of Electrical Engineering College, Rewa**, of study.

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ABSTRACT

Many times we need to monitor the person/people visiting some place like Seminar hall, conference room or Shopping mall or temple. This project can be used to count and display the number of visitors entering inside any conference room or seminar hall. This is a bidirectional counter which means it works in a two way. That means counter will be incremented if person enters the room and will be decremented if a person leaves the room. LCD displays this value which is placed outside the room.

This system is helpful for counting the number of people in an auditorium or halls for seminar to avoid congestion. Moreover it can also be used to check the number of people who have come to an event or a museum to watch a certain exhibit. Microcontroller is a reliable circuit that takes over the task of counting the number of persons/ visitors in the room very accurately. We will be showing both In count i.e. number of people entering the room and Out count i.e. number of people exiting the room on a 16x2 Alphanumeric LCD. An IR sensor is used to monitor the person entering and exiting the room.

The Ardunio uno does the above job. It receives the signals from the sensors, and this signal is operated under the control of software which is stored in ROM. Ardunio uno continuously monitor the Infrared Receivers. When any object pass through the IR Receiver's then the IR Rays falling on the receiver are obstructed, this obstruction is sensed by theArdunio uno.

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INTRODUCTION

Visitor counting is simply a measurement of the visitor traffic entering and exiting conference rooms, malls, sports venues, etc. With the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life.

several well established institutions (libraries, community centers, auditorium, etc.) across the globe have encountered various incidents related to traffic monitoring. It has been a necessity to monitor the visitors to carry out the human traffic management task and tourist flow estimate to vindicate accurate result for the organizational marketing and statistical research. This eventually indicates the patronage rate of goods and services by consumers.

The human auditing application or the human-based data collection was unreliable and came at great cost. For instance, in situations where a large number of visitors entering and exiting buildings such as conference rooms, law courts, libraries, malls and sports venues, going for human auditors to manually tally the number of visitors may result in inaccurate data collection. For this reason, many organizations have tried to find solutions to mitigate the inaccurate traffic monitoring issues. It is our intention to design and construct this digital bidirectional visitor counter (DBVC) with maximum efficiency and make it very feasible for anyone who wants to design and construct the prototype. Building this circuit will provide information to management on the volume and flow of people in a building.

OBJECTIVE OF PROJECT

The objective of this project is to make a microcontroller based model to count number of persons visiting particular room and accordingly light up the room. Here we can use IR sensor and can know present number of persons.

In today's world, there is a continuous need for automatic appliances with the increase in standard of living; there is a sense of urgency for developing circuits that would ease the complexity of life.

SCOPE OF PROJECT

This project can be used to count and display the number of visitors entering inside any conference room or seminar hall. This is a bidirectional counter which means it works in a two way. That means counter will be incremented if person enters the room and will be decremented if a person leaves the room.

1. Lights can be turned ON/OFF according to the number of people in the room.
2. We can check the ambient light intensity and then decide if the light needs to be turned ON or not.
3. Metal detector can be added for security reasons

We conclude and make recommendations in this section based on our results.

We re-iterate the following as noted from our discussions of the results in the above section:

- In demonstration of the project, the infrared sensing part used to detect the passage of visitors worked
- Microcontroller was very efficient in its task performance, thus computation of counts and controlling I/O devices
- Also, the LCD, led and the buzzer were effective in alerting and notifications.
- Hence the whole purpose of the bidirectional visitor counter was successfully achieved and is applicable in the wider scope.

COMPONENTS REQUIRED

- 1.ARDUINO UNO
2. LED
- 3.IR SENSOR MODULE
- 4.POWER SUPPLY
- 5.BREADBOARD
- 6.CONNECTING WIRES
- 7.LCD DISPLAY (16x2)

DESCRIPTION

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.

Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and embedded environments.

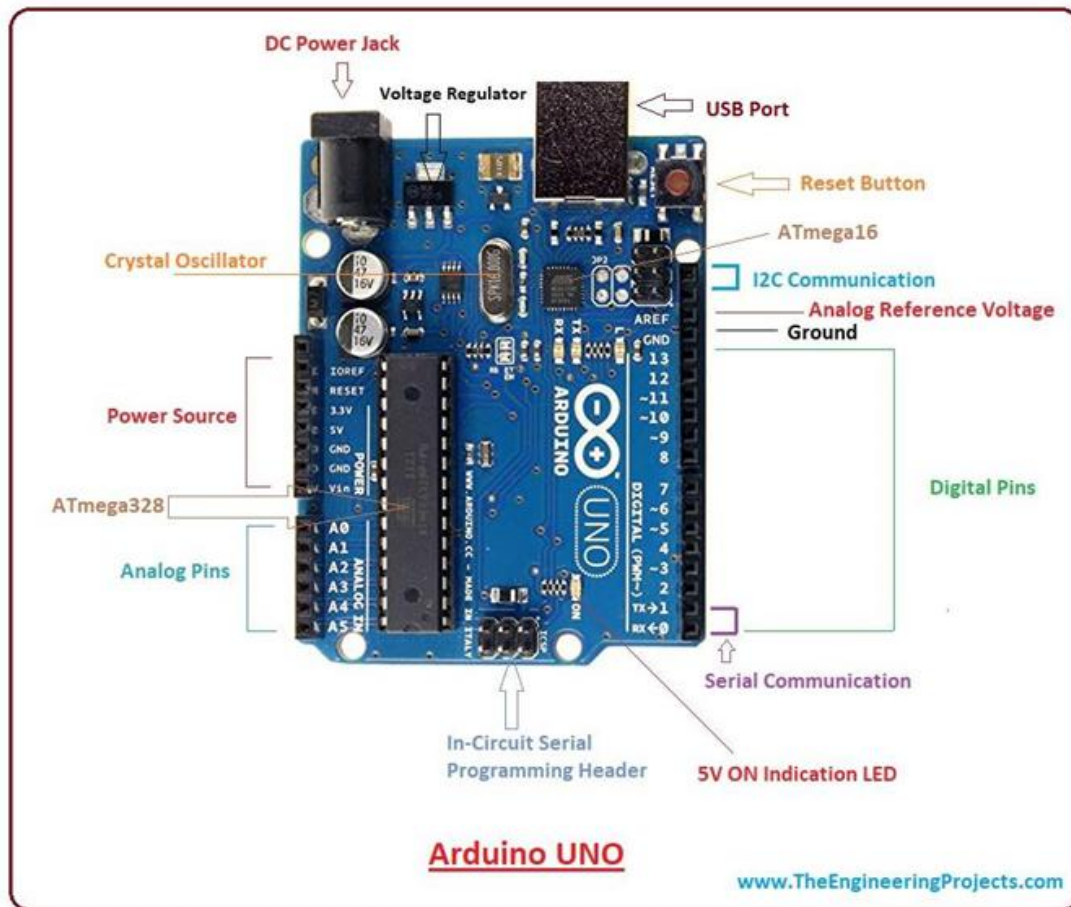


FIG 1: ARDUINO UNO

Power USB

Arduino board can be powered by using the USB cable from your computer. All you need to do is connect the USB cable to the USB connection (1).

Power (Barrel Jack)

Arduino boards can be powered directly from the AC mains power supply by connecting it to the Barrel Jack (2).

Voltage Regulator

The function of the voltage regulator is to control the voltage given to the Arduino board and stabilize the DC voltages used by the processor and other elements.

Crystal Oscillator

The crystal oscillator helps Arduino in dealing with time issues. How does Arduino calculate time? The answer is, by using the crystal oscillator. The number printed on top of the Arduino crystal is 16.000H9H. It tells us that the frequency is 16,000,000 Hertz or 16 MHz.

Arduino Reset

You can reset your Arduino board, i.e., start your program from the beginning. You can reset the UNO board in two ways. First,

by using the reset button (17) on the board. Second, you can connect an external reset button to the Arduino pin labelled RESET (5).

Pins (3.3, 5, GND, Vin)

3.3V (6) – Supply 3.3 output volt

5V (7) – Supply 5 output volt

Most of the components used with Arduino board works fine with 3.3 volt and 5 volt.

GND (8)(Ground) – There are several GND pins on the Arduino, any of which can be used to ground your circuit.

Vin (9) – This pin also can be used to power the Arduino board from an external power source, like AC mains power supply.

Analog pins

The Arduino UNO board has six analog input pins A0 through A5. These pins can read the signal from an analog sensor like the humidity sensor or temperature sensor and convert it into a digital value that can be read by the microprocessor.

Main microcontroller

Each Arduino board has its own microcontroller (11). You can assume it as the brain of your board. The main IC (integrated circuit) on the Arduino is slightly different from board to board. The microcontrollers are usually of the ATMEL Company. You must know what IC your board has before loading up a

new program from the Arduino IDE. This information is available on the top of the IC. For more details about the IC construction and functions, you can refer to the data sheet.

Power LED indicator

This LED should light up when you plug your Arduino into a power source to indicate that your board is powered up correctly. If this light does not turn on, then there is something wrong with the connection.

TX and RX LEDs

On your board, you will find two labels: TX (transmit) and RX (receive). They appear in two places on the Arduino UNO board. First, at the digital pins 0 and 1, to indicate the pins responsible for serial communication. Second, the TX and RX led (13). The TX led flashes with different speed while sending the serial data. The speed of flashing depends on the baud rate used by the board. RX flashes during the receiving process.

Digital I/O

The Arduino UNO board has 14 digital I/O pins (15) (of which 6 provide PWM (Pulse Width Modulation) output. These pins can be configured to work as input digital pins to read logic values (0 or 1) or as digital output pins to drive different modules like LEDs, relays, etc. The pins labeled “~” can be used to generate PWM.

LED

They are the size of fleck of pepper, and can emit light in a range of colour. A mix of red, green and blue LEDs is sometimes used to make white light. LEDs emit very little heat. It emit light in a specific direction, reducing the need for reflectors and diffusers that can trap light.



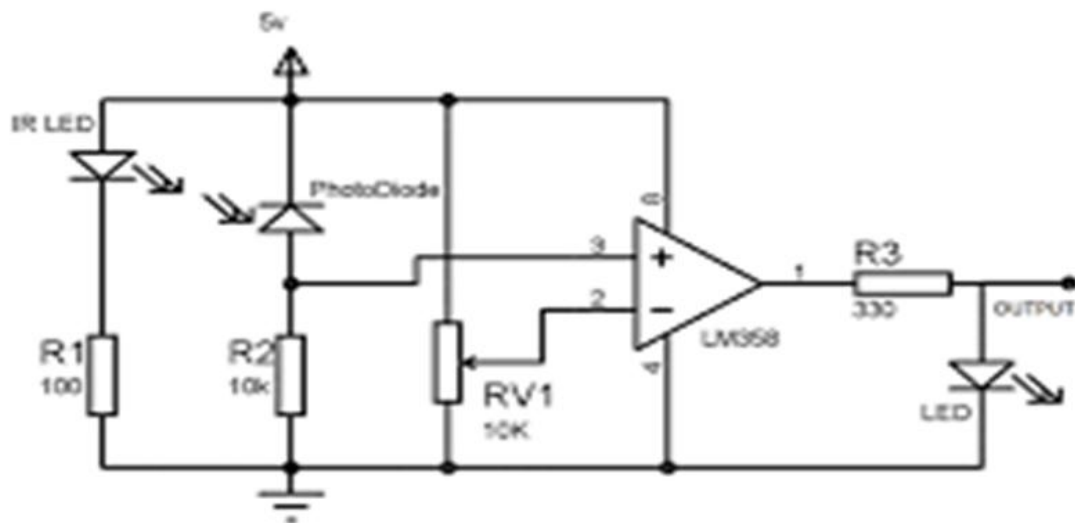
IR SENSOR MODULE-



This comprises the IR sensor which consists of a transmitter (white LED) and a receiver (black LED). The emitter passes an infrared beam which is detected by an IR receiver (phototransistor). When a person walks by, he "breaks" the beam. Upon this event, the phototransistor no longer can detect infrared light and another event is triggered (door opens). The infrared emitter generates a source of light energy (invisible) in the infrared spectrum. There are several sensors that may be used for the detection of visitor's presence, but the preferred one used in this project is the infrared sensor. The infrared sensor also called IR sensors consists of two parts, namely, IR transmitter circuit and IR receiver unit. The transmitter unit consists of an infrared LED and its associated circuitry as well as the receive. Since the human eye cannot see the infrared radiations, it is not possible for a person to identify

whether the IR LED is working or not, unlike a common LED. To overcome this problem, the camera on a cellphone can be used. The camera can show us the IR rays being emanated from the IR LED in a circuit. To test if the sensors were functioning, the sensor circuit was connected to a power source. The circuit was built with 2 resistors with different Ohm value ratings. A $1k\Omega$ resistor connected to a Light Emitting Diode (LED) served as the transmitter whereas a $3k\Omega$ resistor connected to a transistor was used as the Receiver. The circuit is then powered by a 5V DC supply and grounded.

IR Sensor Module Circuit



www.Circuits-DIY.com

POWER SUPPLY

The Arduino Nano can be powered via the Mini-B USB connection, 6-20V unregulated external power supply (pin 30), or 5V regulated external power supply (pin 27). The power source is automatically selected to the highest voltage source.



BREADBOARD

The Breadboard Power Supply Kit allows your breadboard projects to easily access a selectable voltage regulated to either 3.3Volts or 5Volts. It receives its power through a DC wall wart like this one. Any stripped +/- DC supply can also be connected instead of the barrel connector if desired. This guide will help with everything you need to get started with the Breadboard Power Supply.

Features:

1. The concave design, do not waste bread board space.
2. 2-way distribution may have disconnected, you can choose 5V, 3.3V voltage.
3. The power supply can be powered via USB and DC head
4. Fluctuation two road independent control, can switch over to 0 V, 3.3 V, 5 V.
5. On-board two groups of 3.3V, 5V DC output plug pin, convenient external lead use.
6. Apply to MB102 breadboard

Specifications:

Input voltage: 6.5-12 V (DC) or USB power supply

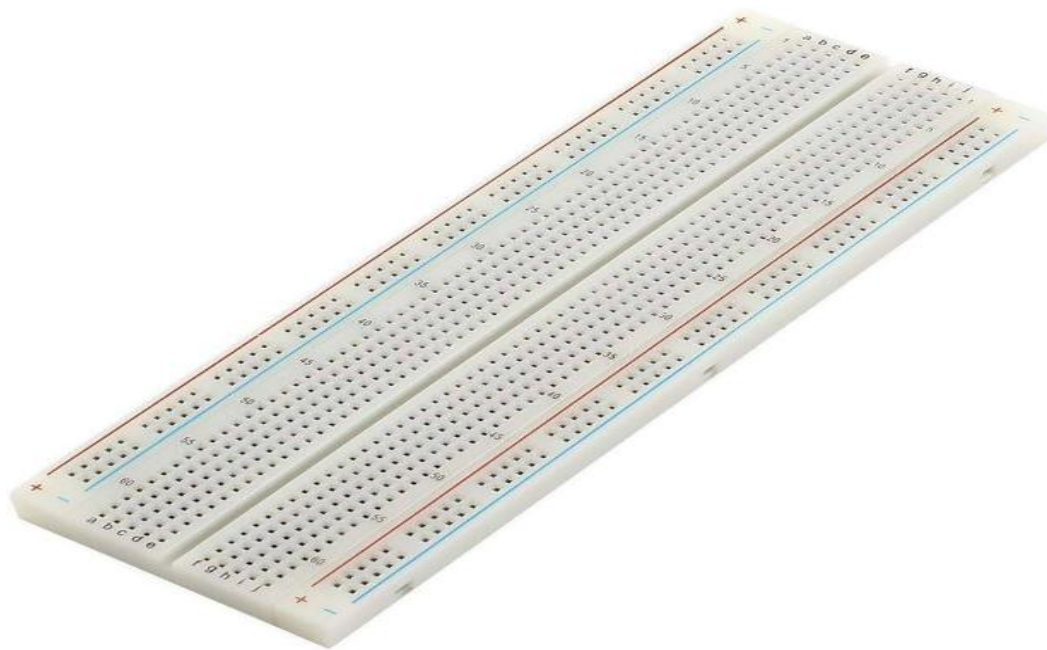
Output voltage: 3.3V/5V can switch over

Maximum output current: <700 ma

Size: 5.3cm x 3.5cm

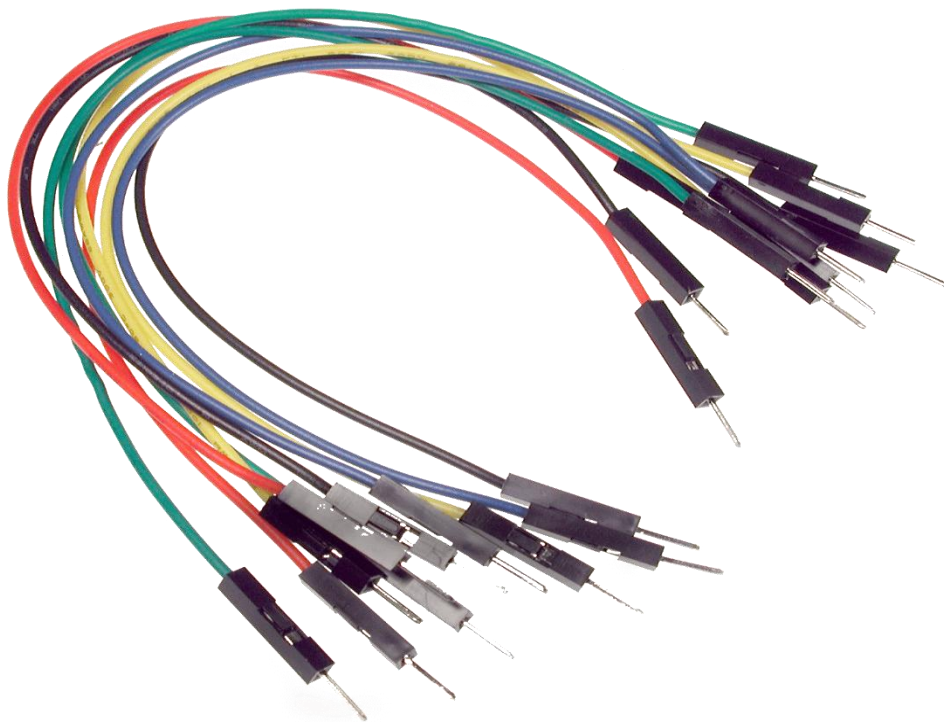
Package Included:

1 x MB102 2 Channel 3.3V 5V Breadboard Power Supply
Module



CONNECTING WIRES

Jumper wires have connectors and pins that are used to connect different components on a breadboard.



LCD Display:-

An electronic device that is used to display data and the message is known as LCD 16×2. As the name suggests, it includes 16 Columns & 2 Rows so it can display 32 characters ($16 \times 2 = 32$) in total & every character will be made with 5×8 (40) Pixel Dots.

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.



BLOCK DIAGRAM

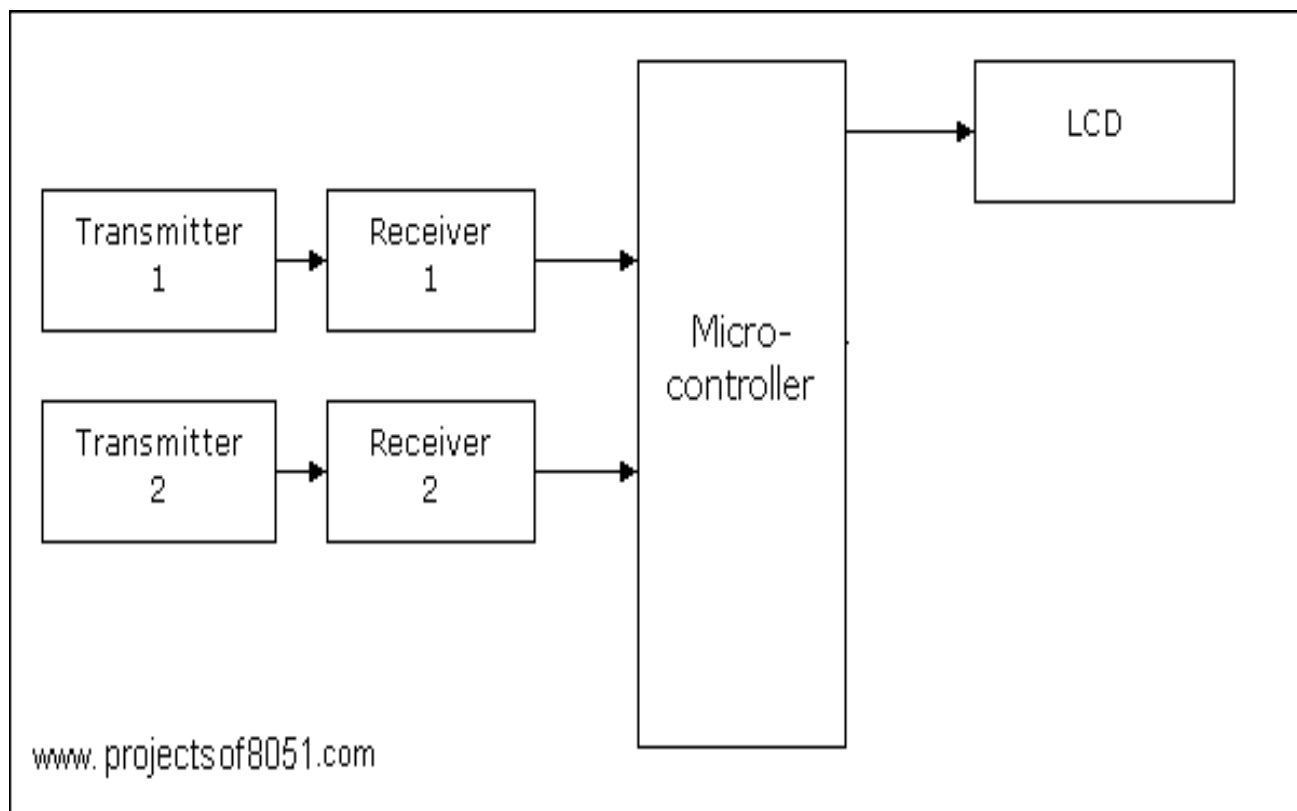
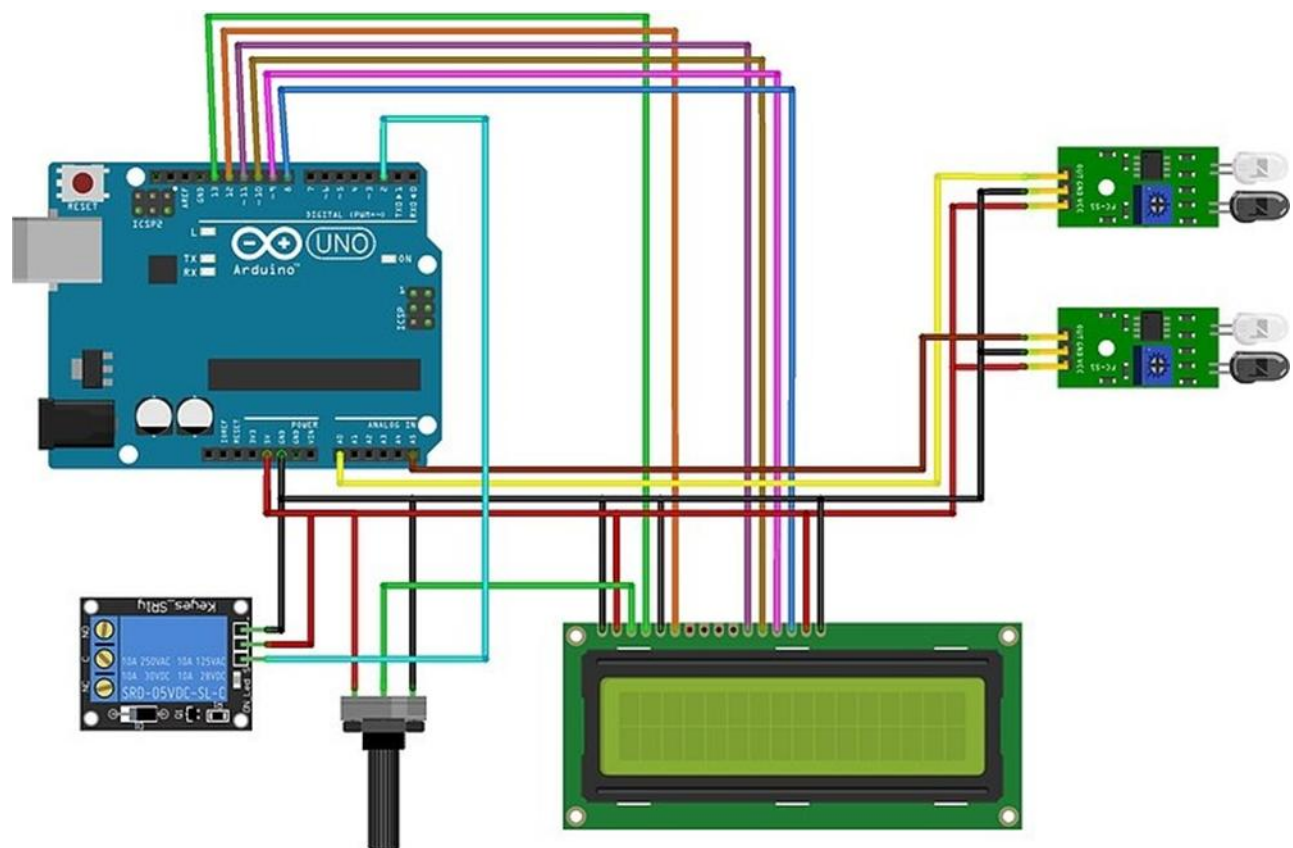
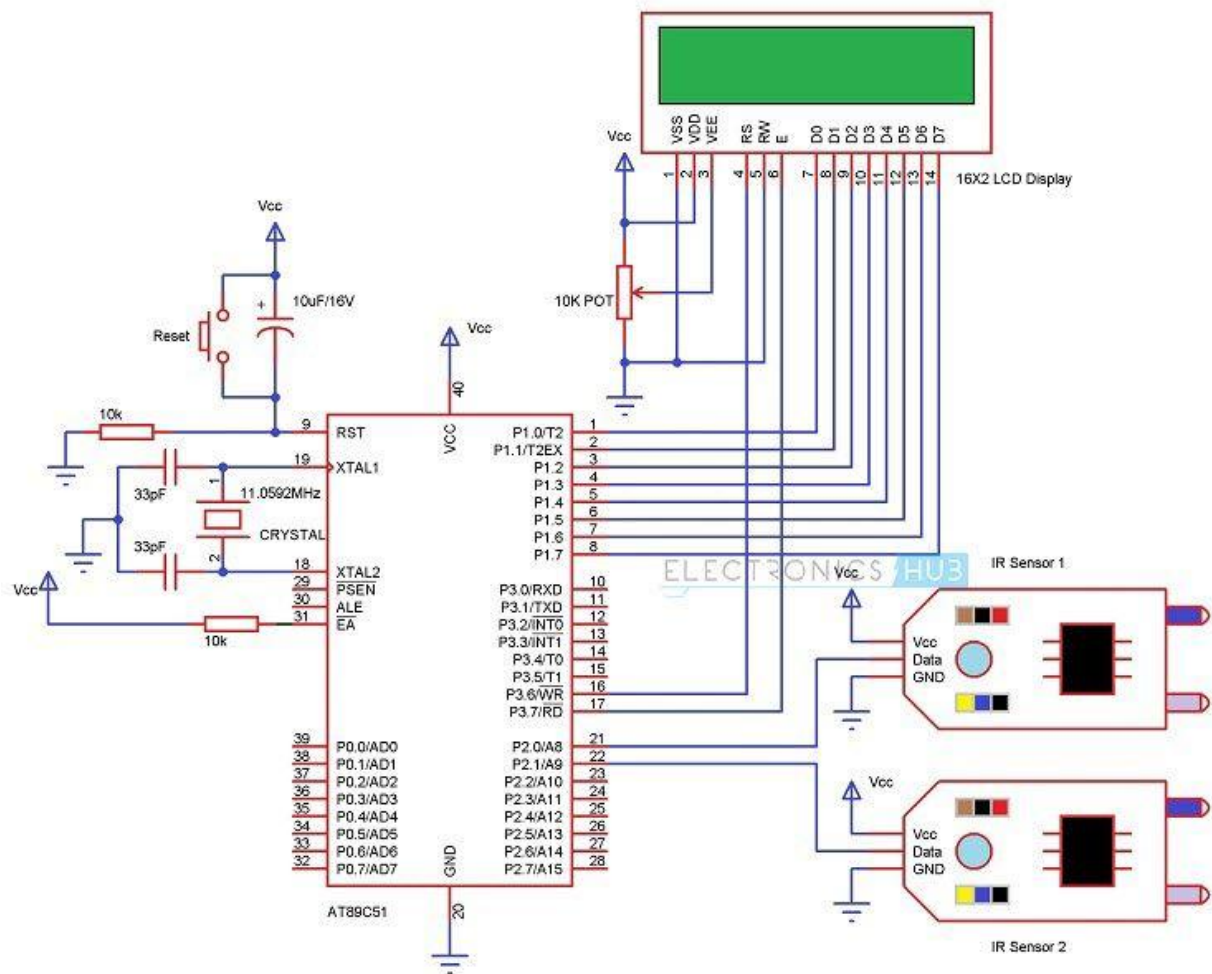


FIG :block diagram

CIRCUIT DIAGRAM





CODE

```
#include <LiquidCrystal.h>

LiquidCrystallcd(2,3,4,5,6,7);

#define in 8
#define out 9
#define led 10
int count=0;

void setup() {
  lcd.begin(16,2);
  lcd.print("People counter");
  delay(2000);
  pinMode(in, INPUT);
  pinMode(out, INPUT);
  pinMode(led, OUTPUT);

}

void loop() {
  int in_value = digitalRead(in);
```

```
int out_value = digitalRead(out);  
if(in_value == LOW)  
{  
    count++;  
    lcd.clear();  
    lcd.setCursor(1,0);  
    lcd.print("Person in room : ");  
    lcd.setCursor(0,1);  
    lcd.print(count);  
    delay(1000);  
}
```

```
if(out_value == LOW)  
{  
    count--;  
    lcd.clear();  
    lcd.setCursor(1,0);  
    lcd.print("Person in room : ");  
    lcd.setCursor(0,1);  
    lcd.print(count);  
    delay(1000);  
}
```

```
}  
  if(count==0)  
  {  
    lcd.clear();  
    digitalWrite(led,LOW);  
    lcd.clear();  
    lcd.print("Nobody in the Room");  
    lcd.setCursor(0,1);  
  
    lcd.print("Light is off");  
    delay(200);  
  }  
  else{  
    digitalWrite(led, HIGH);  
  
  }  
}
```


APPLICATIONS

1. Offices.
2. Public Places
3. 3.Restrooms at railway stations.

Advantages:

1. No need of human intervention.
2. Can work 24x7 without any problem.
3. Low cost and very easy to implement.

Disadvantages:

1. If there are multiple doors for the same room the project becomes quite complex.
2. IR sensor cannot detect if lots of people are entering atone time

CONCUSION

we conclude that the proposed system will count visitors effectively and efficiently by reducing the rate at which error occurs when counting visitors. As the project was to design and construct a device that would count and display the exact number of people in a building.

Thank

you