

P.E.S. COLLEGE OF ENGINEERING, MANDYA-571401

(An Autonomous & Govt. Aided Institution, Affiliated to VTU, Belagavi)



A Laboratory Project Component Report

On

***"PASSWORD BASED DOOR LOCK SYSTEM
USING ARDUINO UNO"***

Submitted in partial fulfilment for the award of the degree of

BACHELOR OF ENGINEERING

in

INFORMATION SCIENCE & ENGINEERING

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Department of Information Science & Engineering



CERTIFICATE

This is to certify that **Bhavana K, Chaithrashree, Charan C V, Nithin H L** bearing USN **4PS19IS011, 4PS19IS014, 4PS19IS015, 4PS19IS042** has successfully completed the Laboratory Project Component of IOT Laboratory (P18ISL67) entitled “**Password Based Door Lock System Using Arduino UNO**” in partial fulfilment for the award of Degree of Bachelor of Engineering in Information Science and Engineering, P.E.S. College of Engineering, Mandya (An Autonomous Institution Affiliated to VTU, Belagavi) during the academic year 2021-2022. It is certified, that all corrections indicated in internal assessment have been incorporated in the report deposited in the library. The Laboratory Project Component has been approved as it satisfies the academic requirements in respect of Laboratory Project Component prescribed for the Degree in Bachelor of Engineering.

Signature of Guide
M R SURESH
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Signature of Head of the Department
Dr. M L Anitha
Professor & Head

| Details of Laboratory Project Component report Viva Voce Examination | | | |
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| Sl. No. | Name of the Examiners | Signature | Date |
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ABSTRACT

The want of protection may be accomplished through making locks which may be electric or mechanical with one or a few keys, however for locking a large region many locks are required. As everybody is aware of old fashioned locks are heavy weight and fragile additionally relying at the tools consequently digital locks are given greater cost than those of mechanical locks. Nowadays each device's operation is primarily based totally on virtual era. For example, era primarily based totally identification gadgets are used for computerized door unlocking or locking. These locking structures are used to manage the motion of door and are useful without requiring a key to fasten or release the door. These locking structures are managed through a keypad and are hooked up at the aspect hedge of the door. The fundamental goal of this assignment is to present protection at each not unusual place locations like home, public locations. In this consumer might supply a recognised password. The statistics could be saved in database. When the correct passcode could be entered, the microcontroller will supply practise to servo motor. Servo motor will carry out the movement on door unlocking. Thus, what we need is virtual era to assemble an incorporated and nicely customized protection device at a fee that's reasonable.

Keywords: PASSWORD, DOOR LOCK SYSTEM ARDUINO

TABLE OF CONTENTS

PAGE NO

| | |
|---|-----------|
| 1.INTRODUCTION..... | 5 |
| 2.LITERATURE SURVEY..... | 6 |
| 3.DESIGN/IMPLEMENTATION..... | 7 |
| 4.RESULT AND ANALYSIS..... | 17 |
| 5.CONCLUSIONS & FUTURE ENHANCEMENTS..... | 19 |
| 6.REFERENCES..... | 20 |

CHAPTER 1

INTRODUCTION

As we all are very familiar with the term “Security”. Nowadays it is most important to keep our valuable things safe. The world is also growing digitally dependent, and we can even design the doors to be more secure. We can make these digital doors by using “Password” which is more secure than traditional lock system. In this project we have make a “Password Based Door Locking System” using an Arduino. It will be more efficient for the peoples in the field of security. It will be implemented in any places like our Houses, Institutions, Banks and any Public Places. We can only able open the door if we entered correct password for door and if users entered an incorrect password, then message will be display or door will not be open. One of the awesome functions of those clever lock structures is their simplicity and high efficiency. Here, we made an electronic code lock system using Arduino UNO, which provides control to the actuating the load. It is a simple embedded system with takes input from the keyboard and the output being actuated accordingly. This system demonstrates a Password based Door Lock System using Arduino UNO, wherein once the correct code or password is entered, the door is opened and the concerned person is allowed access to the secured area. If another person arrives, it will ask to enter the password again. If the password is wrong, then door would remain locked, denying access to the person. Main idea behind this project is of a door opening using a password entered through keypad. As well as turning on the Buzzer when passcode is entered wrong for multiple times. 4*4 keypad is used to enter the password. The entered password is compared with the known password. If it is correct password, the system opens the door by servo motor and displays the status of door on LCD. If the password is wrong then door remains closed and displays “WRONG PASSWORD” on LCD.

CHAPTER 2

LITERATURE SURVEY

[1] Prof.A.Y.Prabhakar¹,Prof.Dr. Shruti K Oza²,Nayan Shrivastava³, Prakhar Srivastava⁴, GarvitWadhwa⁵, "Password based Door lock System", Volume: 06 Issue: 02 | 2019.

The main objective of this project is to relinquish safety at each common place like home, public places. during this project all the data hold on within the info. once the proper password are going to be entered, the microcontroller can provide steering to servo engine then door can unlock. What we want is computerised innovation to develop a coordinated and every one around altered upbeat framework at a worth that is wise.

[2] Akshaya Krishna das Bhat, SiddPraveen Kini, "Password Enabled Door lockup System victimization Arduino and IoT", Volume: half-dozen Issue: fifteen, 5-1-2019. during this paper, we have a tendency to gift Associate in Nursing electronically controlled entranceway lockup framework that utilizes Arduino, Associate in Nursing open supply microcontroller board that may discover, screen, store and management applications. This framework likewise utilizes Associate in Nursing IoT based mostly log that screens the section and exit of the shoppers.

[3] Anuj Kumar Gupta, Prachi Sharma, Sahil Pandey, Surabhi, "Password based door lockup system", 2015. The main objective of this project is to style a secure door lockup system. to make this project they've to perform sure task like, planning the facility provide for the whole electronic equipment. choice of Microcontroller, Key pad, DC motor and conjoint choice of buzzer in line with the necessity for his or her project.

CHAPTER 3

DESIGN/IMPLEMENTATION

3.1 FLOWCHART

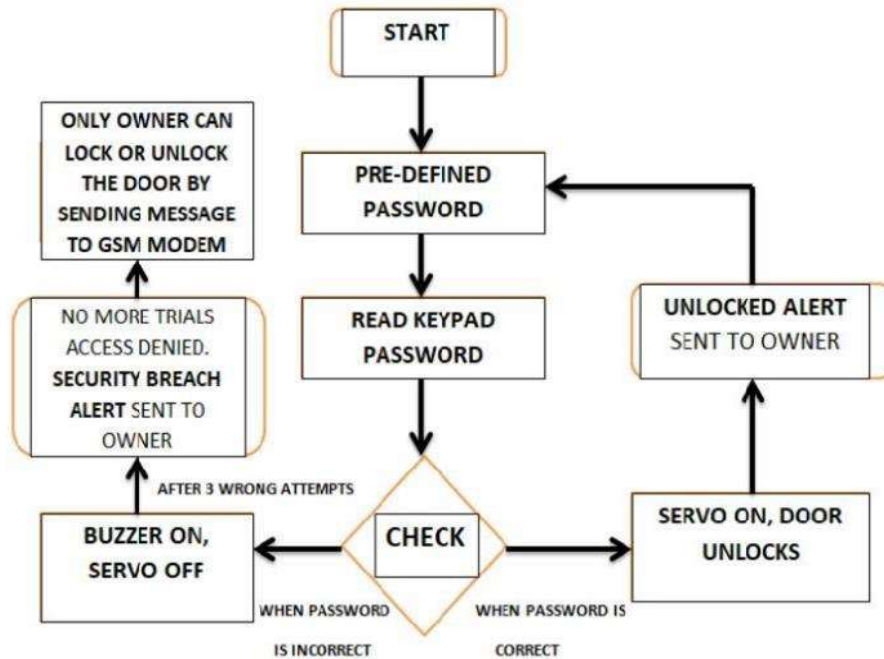


Fig.3.1 Flowchart

The above flowchart gives a brief idea as to how the project works. Initially the password is known. When the device is turned on, it resets the servo angle to lock the door. Now the user is prompted to enter the password. The user enters the passcode through a keypad which is read by the Arduino. Now the entered password is checked with the known password. If the password matches, then the servo motor deflects and the door unlocks for 10 seconds else the buzzer beeps indicating the invalidity of the password. Owner do get the information too about the locking and unlocking of door through SMS sent to his smart phone by GSM modem.

After 3 wrong attempts, the system automatically gets locked showing “NO MORE TRIALS ACCESS DENIED”. Now, the password won’t be entered through keypad but only the owner who knows some pre-defined code will be able to unlock or lock the door through SMS sent by his phone to the sim which is connected in GSM modem.

3.2 CIRCUIT DIAGRAM

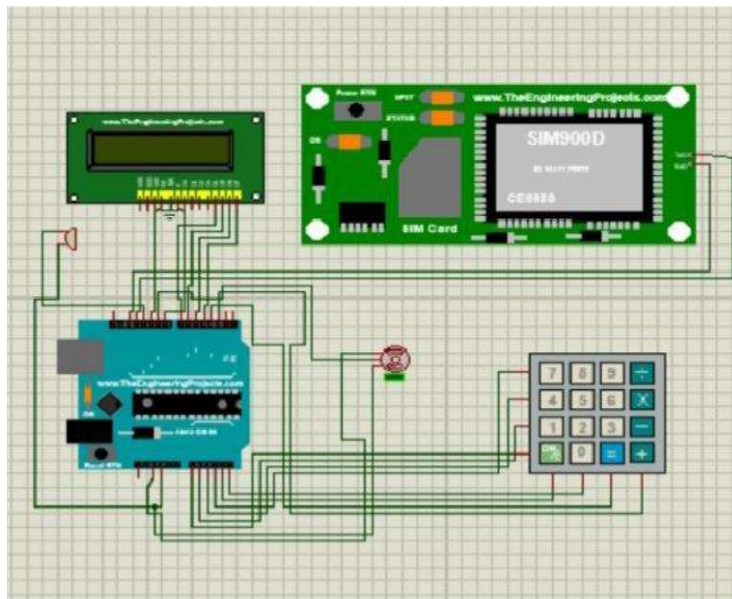


Fig 3.2 Circuit Diagram

3.3 COMPONENTS REQUIRED

The Password based security door lock is an electronic device that is made up of different kinds of components which are put together to perform a particular task.

Those components are:

- **HARDWARE COMPONENTS**
 - A. Arduino UNO
 - B. Servo Motor
 - C. Keypad
 - D. Buzzer
 - E. LCD Display
 - F. Potentiometer
 - G. GSM modem
- **SOFTWARE**
 - Arduino IDE

A. ARDUINO UNO:

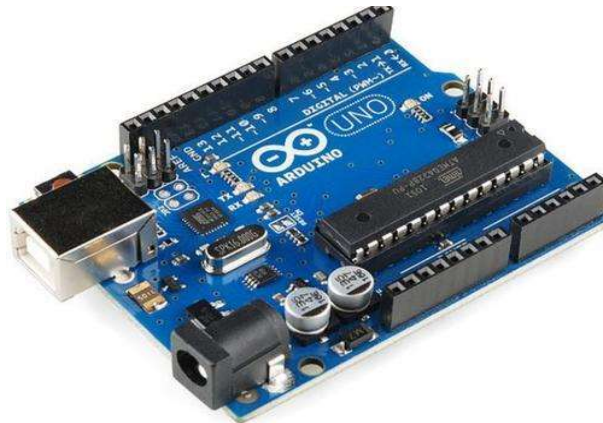


Fig 3.3(a)

This microcontroller depends on the ATmega328P. There are all out of 20 pins (0-19) out of which 6 are simple information sources, 14 are computerized input yield pins (6 pins give PWM voltage) which can like be utilized as broadly useful pins, a ceramic resonator of recurrence 16 MHz, a USB association, a force jack and a reset button. It has a working voltage of 5V. It contains all that expected to help a microcontroller.

B. SERVO MOTOR:



Fig 3.3(b)

This A servo motor is a rotational or translational motor that receives power from a servo amplifier and is used to impart torque or force to a mechanical device like an actuator or a brake. Servo motors provide exact angular position, acceleration, and velocity control. This programmed using the library < Servo.h >

C. KEYPAD

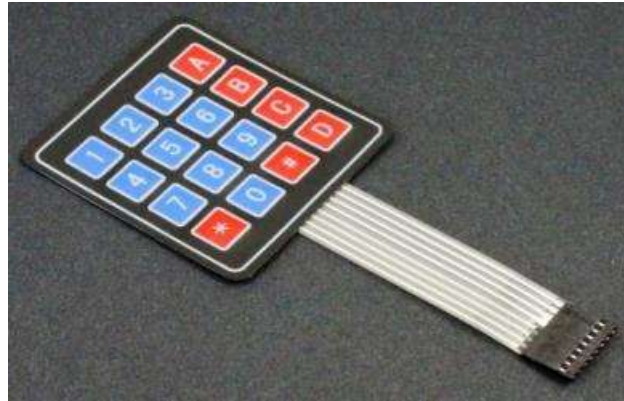


Fig 3.3(c)

In this project 4X4 matrix membrane keypad is used. This 16-button keypad will provide user interface component for Arduino project. This is programmed using the library <Keypad.h>

D. BUZZER

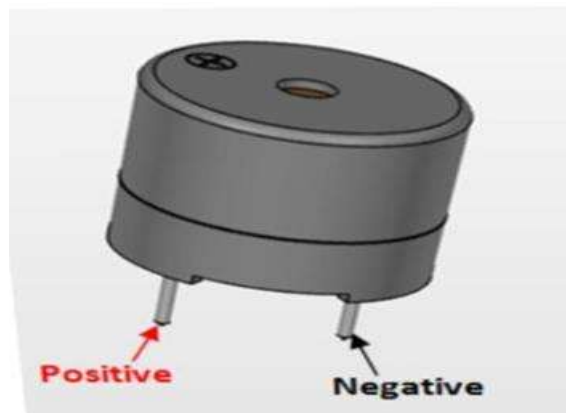


Fig 3.3(d)

In our project, we tend to used buzzer to point the right entry of password and beep sound indicating the entry of wrong password.

E. LCD DISPLAY



Fig 3.3(e)

This 16×2 LCD display has the outline size of 80.0×36.0mm & VA size of 66.0×16.0mm & the maximum thickness is 13.2mm WH 1602W 16×2 LCD display are built in controller ST7066 or equivalent. It is optional for +5.0v or +3.0v power supply. The LEDs can be driven by pin1, pin2 or pin15, pin16 or A/K.

F. POTENTIOMETER

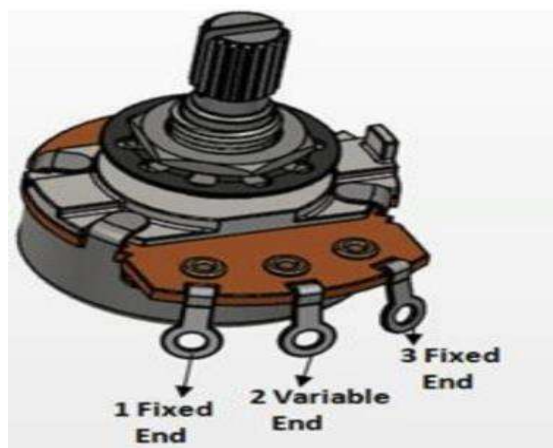


Fig 3.3(f)

In our project we have used a potentiometer of 10Kohm Resistance in order to adjust the contrast of the Liquid Crystal.

G. GSM MODULE



Fig 3.3(g)

GSM module is mainly used for mobile communication. GSM module is connected to ARDUINO for sending and receiving of messages. SIM900 GSM module is used that supports communication in 900MHz band. This GSM module requires a 12V power supply. The block of GSM modules are enabled by interfacing GSM modem to PCB and giving outputs for RS232. The data can be feed from GSM module to ARDUINO UNO through the output pins.

SOURCE CODE:

```
#include<SoftwareSerial.h>
#include <LiquidCrystal_I2C.h>
#include <Keypad.h>
#include <SoftwareSerial.h>
#include <Servo.h>
#include <SPI.h>
#include <Wire.h>
// Create instances]
SoftwareSerial SIM900A(3, 4); // SoftwareSerial SIM900A(Rx, Tx)
LiquidCrystal_I2C lcd(0x3F,20,4);
Servo sg90;
constexpr uint8_t servoPin = 9;
constexpr uint8_t buzzerPin = 5;
char initial_password[4] = {'1', '2', '3', '4'}; // Variable to store initial password
char password[4]; // Variable to store users password
boolean NormalMode = true; // boolean to change modes
char key_pressed = 0; // Variable to store incoming keys
uint8_t i = 0; // Variable used for counter
// defining how many rows and columns our keypad have
const byte rows = 4;
const byte columns = 4;
// Keypad pin map
char hexaKeys[rows][columns] = {
    {'1', '2', '3', 'A'},
    {'4', '5', '6', 'B'},
    {'7', '8', '9', 'C'},
    {'*', '0', '#', 'D'}
};
// Initializing pins for keypad
byte row_pins[rows] = {A0, A1, A2, A3};
byte column_pins[columns] = {2, 1, 0};
```

```

// Create instance for keypad

Keypad keypad_key = Keypad( makeKeymap(hexaKeys), row_pins, column_pins, rows,
columns);

void setup() {
  // Arduino Pin configuration
  lcd.init();
  pinMode(buzzerPin, OUTPUT);
  sg90.attach(servoPin); //Declare pin 8 for servo
  sg90.write(0); // Set initial position at 0 degrees // LCD screen
  lcd.backlight();
  SPI.begin();
  // Init SPI bus
  // Arduino communicates with SIM900A GSM shield at a baud rate of 19200
  // Make sure that corresponds to the baud rate of your module
  SIM900A.begin(19200);
  // AT command to set SIM900A to SMS mode
  SIM900A.print("AT+CMGF=1\r");
  delay(100);
  // Set module to send SMS data to serial out upon receipt
  SIM900A.print("AT+CNMI=2,2,0,0,0\r");
  delay(100);
  lcd.clear(); // Clear LCD screen
}

// Function to send the message
void send_message(String message)
{
  SIM900A.println("AT+CMGF=1"); //Set the GSM Module in Text Mode
  delay(100);
  SIM900A.println("AT+CMGS=\"+919972981769\""); // Replace it with your mobile
number
  delay(100);
  SIM900A.println(message); // The SMS text you want to send
  delay(100);
}

```

```

SIM900A.println((char)26); // ASCII code of CTRL+Z
delay(100);
SIM900A.println();
delay(1000);
}
void loop()
{
    lcd.setCursor(0, 0);
    lcd.print("  Door Lock");
    lcd.setCursor(0, 1);
    lcd.print(" enter password");
    key_pressed = keypad_key.getKey(); // Storing keys
    if (key_pressed)
    {
        password[i++] = key_pressed; // Storing in password variable
        lcd.clear();
        lcd.print("*");
    }
    if (i == 4) // If 4 keys are completed
    {
        delay(200);
        if (!(strcmp(password, initial_password, 4))) // If password is matched
        {
            lcd.clear();
            lcd.print("Pass Accepted");
            sg90.write(90); // Door Opened
            send_message("Door Opened \nIf it was't you, type 'close' to halt the system.");
            delay(3000);
            sg90.write(0); // Door Closed
            lcd.clear();
            i = 0;
        }
    }
}

```

```
else // If password is not matched
{
    lcd.clear();
    lcd.print("Wrong Password");
    digitalWrite(buzzerPin, HIGH);
    send_message("Someone Tried with the wrong Password \nType 'close' to halt the
system.");
    delay(3000);
    digitalWrite(buzzerPin, LOW);
    lcd.clear();
    i = 0;
}
}
}
```


CHAPTER 4

RESULT & ANALYSIS

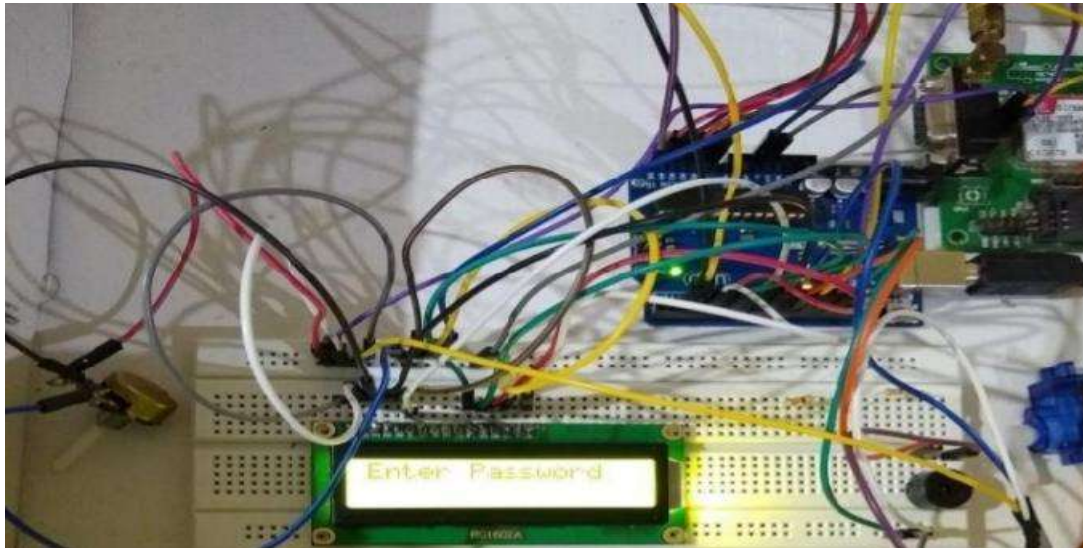


Fig 4.1 SHOWING USER TO ENTER THE PASSWORD

In the figure 4.1, the LCD displays the user “ENTER PASSWORD”. The entered password is displayed. As characters on the LCD. In the figure, the user has entered the correct Password and the LCD shows “ACCESS GRANTED” on the LCD. The servo motor deflects thus unlocking the door.

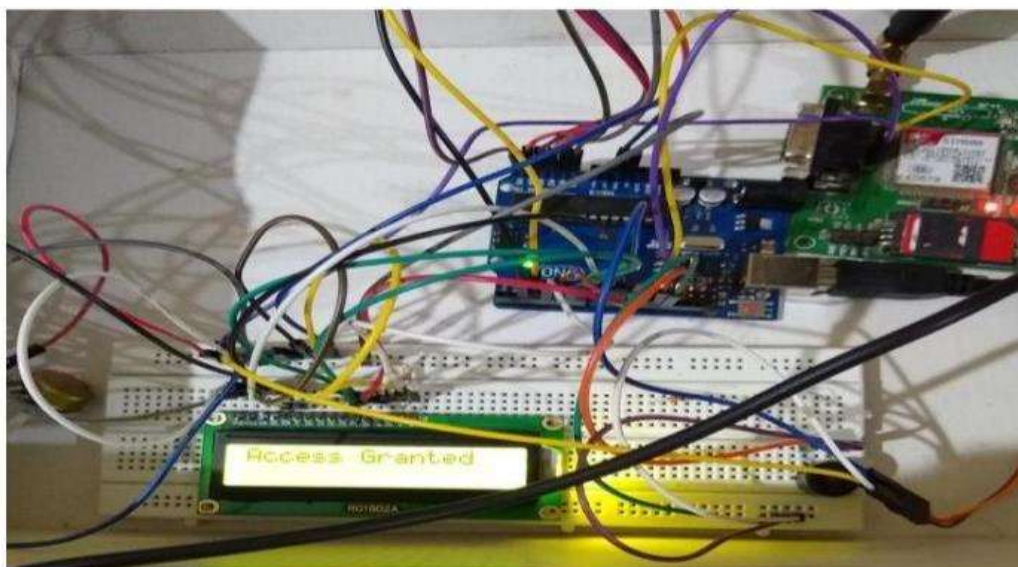


Fig 4.2 ACCESS IS GRANTED AND THE DOOR UNLOCKS

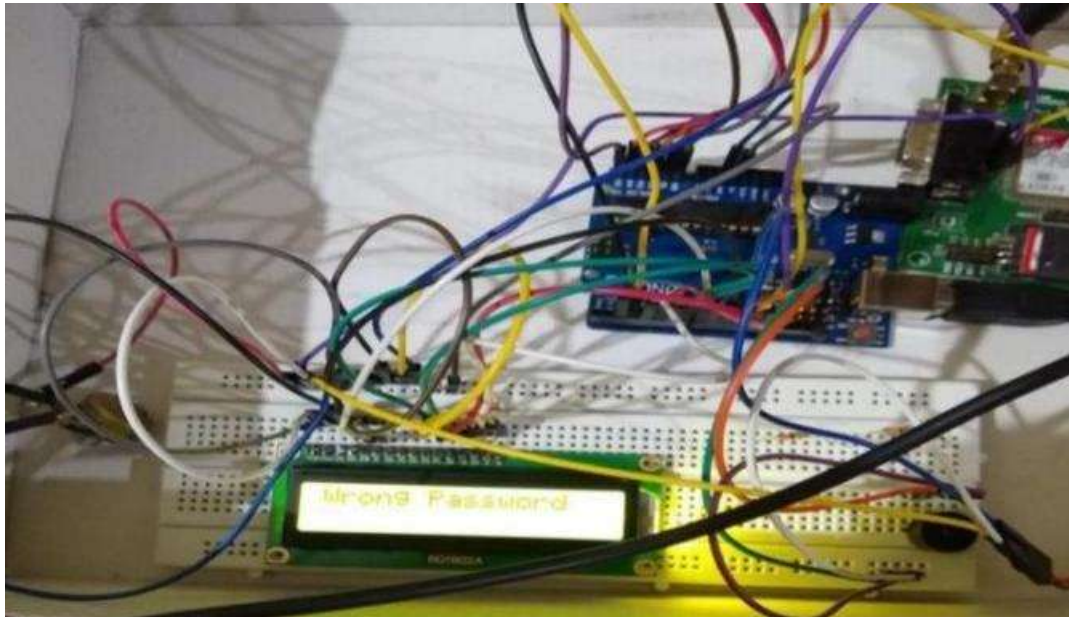


Fig 4.3 SHOWING USER WRONG PASSWORD WHEN THE PASSWORD ENTERED DOES NOT MATCH WITH THE PRE-DEFINED PASSWORD



Fig 4.4 OWNER GETTING INFORMATION WHEN THE DOOR IS UNLOCKED AND ON THREE WRONG ATTEMPT

CHAPTER 5

CONCLUSIONS & FUTURE ENHANCEMENTS

- **CONCLUSION**

The main purpose is to design a security system which is beneficial to each and every individual. We designed a security system using Arduino. The system we designed is a success and provides security effectively. The system is cheap and affordable to everyone. This project is productive in providing enough security as long as the password is not shared. In future this “Password based door lock system” can be provided maximum security by the above enhancement in order to completely satisfy user’s needs. Hence a common man can afford to buy such locking system in minimal cost to keep his valuables safely without any worries.

- **FUTURE ENHANCEMENTS**

The security level can be increased by adding a biometric fingerprint scanner. We can interface sensors like Fire, LPG, PIR motion detector to microcontroller in case of any accident so that door will open automatically. We can interface camera to the micro controller so that it could capture the picture of the thief who is trying to breach the security. This simple circuit can be used at places like home to ensure better safety. With a moderate modification, this assignment also can be used to manipulate the switching of hundreds password. It also can be used at agencies to make certain legal get admission to highly secured location. It also can be used at businesses to make sure legal get admission to the highly secured locations.

CHAPTER 6

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