A Mini Project Report

On

PASSWORD BASED DOORLOCK SYSTEM

USING ARDUINO

Submitted in partial fulfillment for the award of the degree

of

Bachelor of Technology

in

Electronics & Communication Engineering

by

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY

(AUTONOMOUS)

(Approved by AICTE & Affiliated to JNTUA, Ananthapuramu)
(Accredited by NBA for Civil, EEE, ECE, MECH and CSE, New Delhi)
(Accredited by NAAC with 'A' Grade, an ISO 9001:2008 Certified Institution)
Siddharth Nagar, Narayanavanam road, Puttur-517583, A.P
2021

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

CERTIFICATE

This is to certify that the Project entitled " PASSWORD BASED DOORLOCK SYSTEM USING ARDUINO "that is being submitted by

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is in partial fulfillment of the requirements for the award of BACHELOR OF TECHNOLOGY in ELECTRONICS & COMMUNICATION ENGINEERING *to* JNTUA , ANANTHAPURAMU. *The results embodied in this Project report have not been submitted to any other University or Institute for the award of any degree.*

Internal Guide   **Head of the Department**
G. Logadevi, M. Tech   Dr. P.Ratna kamala, M.Tech.,Phd

Submitted for the project viva-voce examination held on _____

Internal Examiner   **External Examiner**

Acknowledgement

An endeavor of a long period can be successful only with the advice of many well-wishers. I take this opportunity to express my deep gratitude and appreciation to all those who encouraged me for successful completion of the mini project work.

I am thankful to my Guide **G LOGADEVI, M. Tech** *Assistant Professor* in Department of *Electronics & Communication Engineering*, Siddharth Institute of Engineering & Technology, Puttur, for her valuable guidance and suggestions in analyzing and testing throughout the period, till the end of mini project work.

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Very importantly, we would like to place on record our profound indebtedness to our parents and families for their substainal moral support and encouragement throughout our studies.

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ABSTRACT

Security is our main concern in our everyday life. Each and every individual needs to feel secure. An access control for doors forms an essential part in our security pattern.Doors locked using conventional locks are not as safe as they used to be, anyone can break-inby breaking this locks. We have to make a frame work that will give 24/7 benefit. Password based door lock system allows only approved persons to access restricted arrears. The system is fully controlled by Arduino. The password can be entered via a keypad. If the password is matched with the stored password in Arduino, the door gets open. This programmed password based bolt frame work will give client more secure and minimal effort method for locking – opening frame work. The security door lock automation system promises a bold step to the future where mechanical door locks will be substituted by electronic door locks.

LIST OF FIGURES

V

LIST OF ABBREVIATIONS

Abbreviation	Description
LCD	Liquid Crystal Display
USB	Universal Crystal Display
LPG	Liquified petroleum Gas
PIR	Passive Infrared
IEEE	Institute of Electrical and Electronics Engineers

CHAPTER 1

INTRODUCTION

Password Based Door Lock System is designed using ARDUINO UNO where in once the correct code or password is entered, the door is opened and the concerned person is allowed access to the secured area. Password Based Door Lock System using Arduino UNO is a simple project where a secure password will act as a door unlocking system. Old fashioned lock systems use mechanical locking and these can be replaced by new advanced techniques of locking systems. These methods are a combination of mechanical and electronic devices and are highly intelligent. One of the distinct features of these intelligent lock systems is their simplicity and high efficiency. Such an automated lock system consists of electronic control assembly, which controls the output load through a password. The example of this output load can be a motor or a lamp or any other mechanical/electrical load. 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-latch opening using a password entered through keypad. As well as turning on the Buzzer when passcode is entered wrong for multiple times. User can modify this password anytime he/she wishes using a keypad. The main component in the circuit is Arduino UNO which is basically used to send a text message to owner of the house about the breach of security. 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

Arpita Mishra ,Siddharth sharma, Sachin Dubey, S K Dubey, "PASSWORD BASED DOORLOCK SYSTEM USING ARDUINO", International journal of advanced technology inengineering and science ,volume No.02,issue N0.05,may 2014.

The need of safety can be achieved by making locks which can be electrical or mechanical with one or a few keys, but for locking a big area many locks are required. As everyone knowsold fashioned locks are heavy weight and fragile also depending on the tools therefore electronic locks are given more value than those of mechanical locks. Nowadays every device'soperation is based on digital technology. For example, technology based identity devices are used for automatic door unlocking or locking. These locking systems are used to control the movement of door and are functional without requiring a key to lock or unlock the door. Theselocking systems are controlled by a keypad and are installed at the side hedge of the door. Themain objective of this project is to give safety at every common places like home, public places.In this user would give a known password. The information will be stored in database. When the correct passcode will be entered, the microcontroller will give instruction to servo motor. Servo motor will perform the action on door unlocking. Thus, what we want is digital technology to construct an integrated and well customized safety system at a price which is real.

CHAPTER 3

COMPONENTS

The main components/materials used for password based door lock system using Arduino are:

1. Arduino UNO
2. LCD
3. Membrane Keypad
4. Servo Motor

3.1.1 Arduino UNO:

This microcontroller is based on the ATmega328P. There are total of 20 pins (0-19) out of which 6 are analog inputs, 14 are digital input output pins(6 pins provide PWM voltage) which can also be used as general purpose pins, a ceramic resonator of frequency 16 MHz, an USB connection, a power jack and a reset button. It has an operating voltage of 5V. It contains everything needed to support a microcontroller.
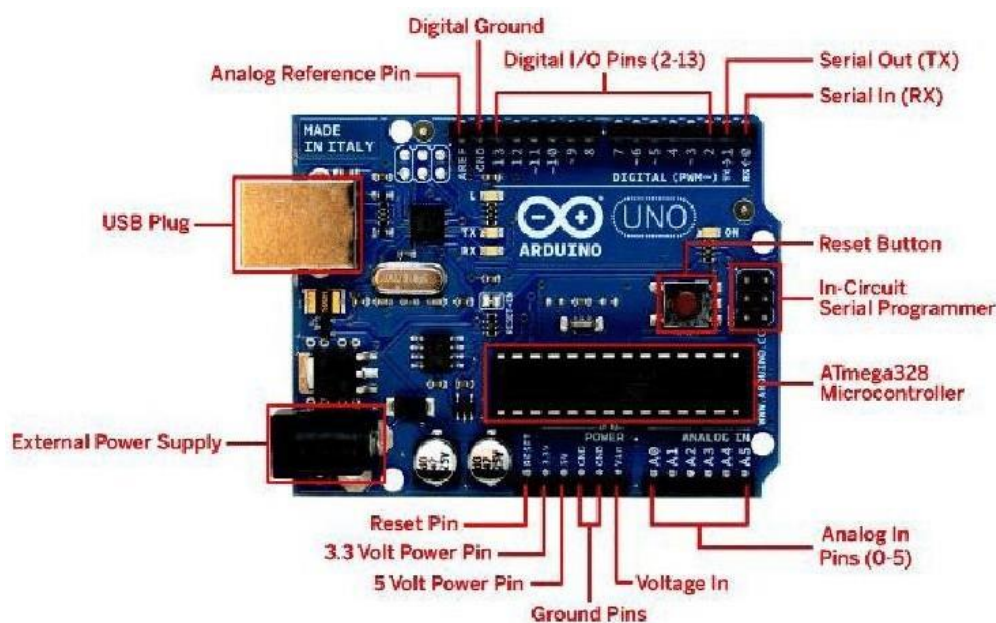

Fig 3.1Arduino UNO

3.1.2 *LCD*:

Liquid Crystal Display, which we are using in our project is 16*2 LCD. This displayconsists of 16 columns and 2 rows. This is programmed using the library.
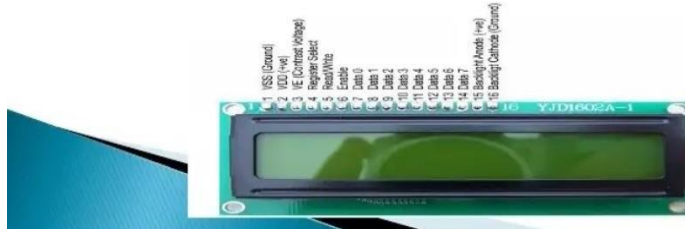

Fig 3.2 16*2 LCD

3.1.3 Membrane Keypad:

In our project we will be using 4X4 matrix membrane keypad. This 16 button keypad will provide user interface component for Arduino project. This is programmed using the library.
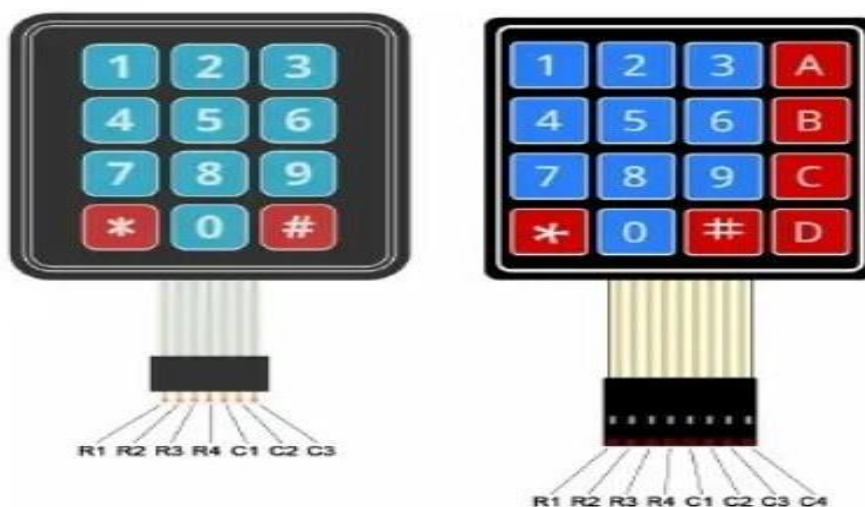

Fig 3.3 4*4 Keypad

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3.1.4 Servo Motor:

The servo motor used in the project is SG90 Micro Servo weighing about 9g. This is programmed using the library.

The servo motor is most commonly used for high technology devices in the industrial applications like automation technology. It is a self contained electrical device, that rotates parts of machine with high efficiency and great precision. Moreover the output shaft ofthis motor can be moved to a particular angle. Servo motors are mainly used in home electronics, toys, cars, airplanes and many more devices.

Thus this blog discusses the definition, types, mechanism, principle, working, controlling, andlastly the applications of a servo machine. A servo motor is a rotary actuator or a motor that allows for a precise control in terms of the angular position, acceleration, and velocity. Basically it has certain capabilities that a regular motor does not have. Consequently it makesuse of a regular motor and pairs it with a sensor for position feedback

Fig 3.4 Servo Motor

CHAPTER 4

SOFTWARE DESCRIPTION

The software components required for password based door lock system using Arduino are

- Arduino IDE

ARDUINO IDE :

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuine hardware to upload programs and communicate with them. Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom righthand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

CHAPTER 5

5.1 Circuit Diagram:

The circuit diagram of password based door lock system using Arduino is
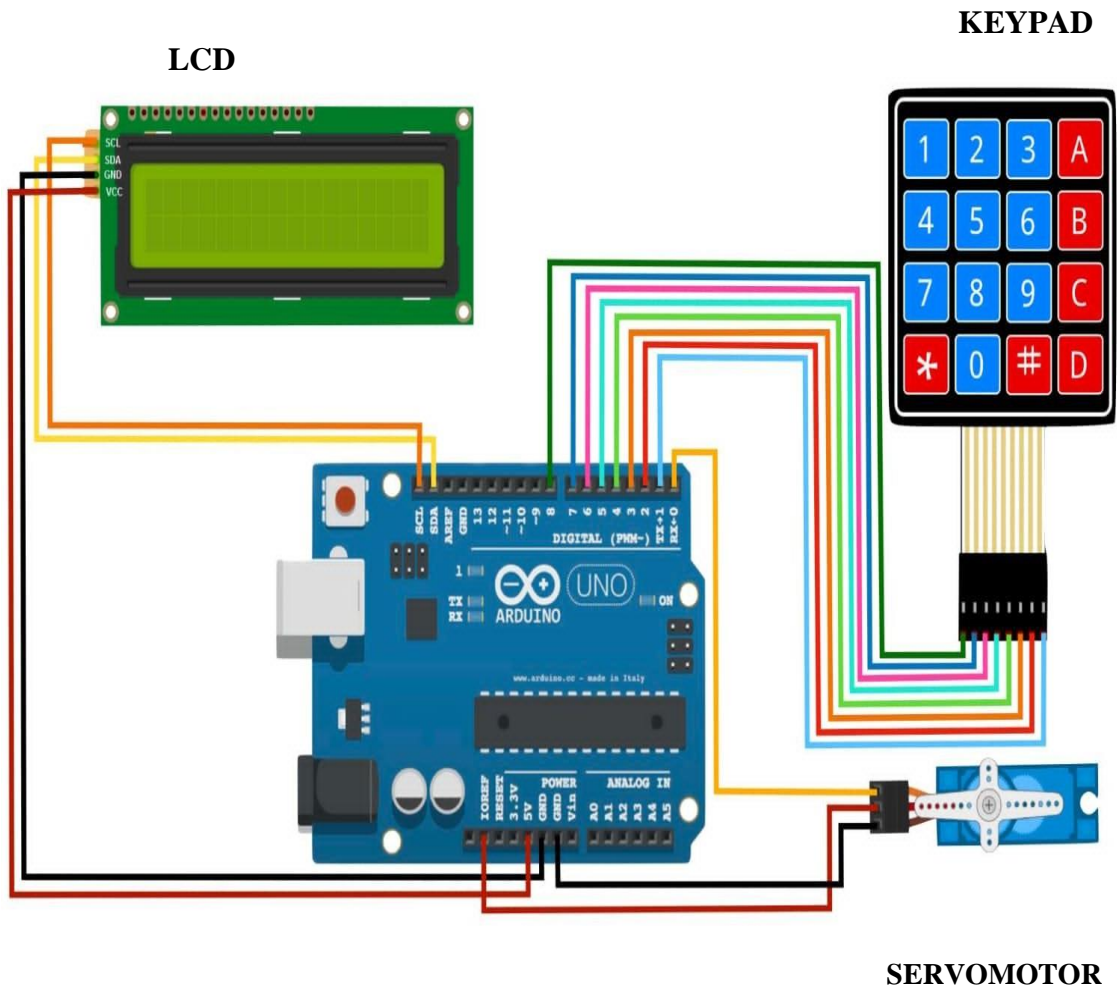
LCD

KEYPAD

SERVOMOTOR

Fig 5.1 Arduino with door lock system

5.2 EXPLAINATION

Often times, we need to secure a room at our home or office so that no one can access the room without our permission and ensure protection against theft or loss of our important accessories and assets . There are so many types of security systems present today but behind the scene, for authentication they all relay on fingerprint, retina, scanner, iris scanner, face id, RFID reader, password, pin, patterns, etc. Off all the solutions the low cost oneis the use a password or pin based system. So, in this project, I have an ARDUINO KEYPAD DOOR LOCK, which can be mounted to any of your existing doors to secure them with a digital password. Previously, we have also build other interesting door locks which are listed below.

First of all, we start from the brain of this project which is the Arduino uno board. The Arduino board is connected to an LCD and servo motor. The servo motor is used to push or pull the latch on the door. A 16*2 LCD is required to display the message by Arduino, 16*2 means it has 16 number of columns and 2 number of rows

Here, I am using a 5B tower pro SG90 servo motor for making our customized door locker, It is a basic level servo motor and works fine with Arduino without any driving circuit or external module. Also, the cost of this servo motor is very less so you can easily afford to buy it. You can also check this Arduino servo motor control tutorial to learn more about the servo motor and how it works. This servo motor has a total of 3 input lines.

In this project, I have used a 4*4 matrix keypad, but don't worry as 4*3 matrix keypad also works fine with my coding. We need a keypad for password input and manually lock our customized door locker, It consists of 16 keys, 4 keys in rows and 4 keys in columns when a key pressed, it establishes a connection in between the corresponding rows and columns**.**
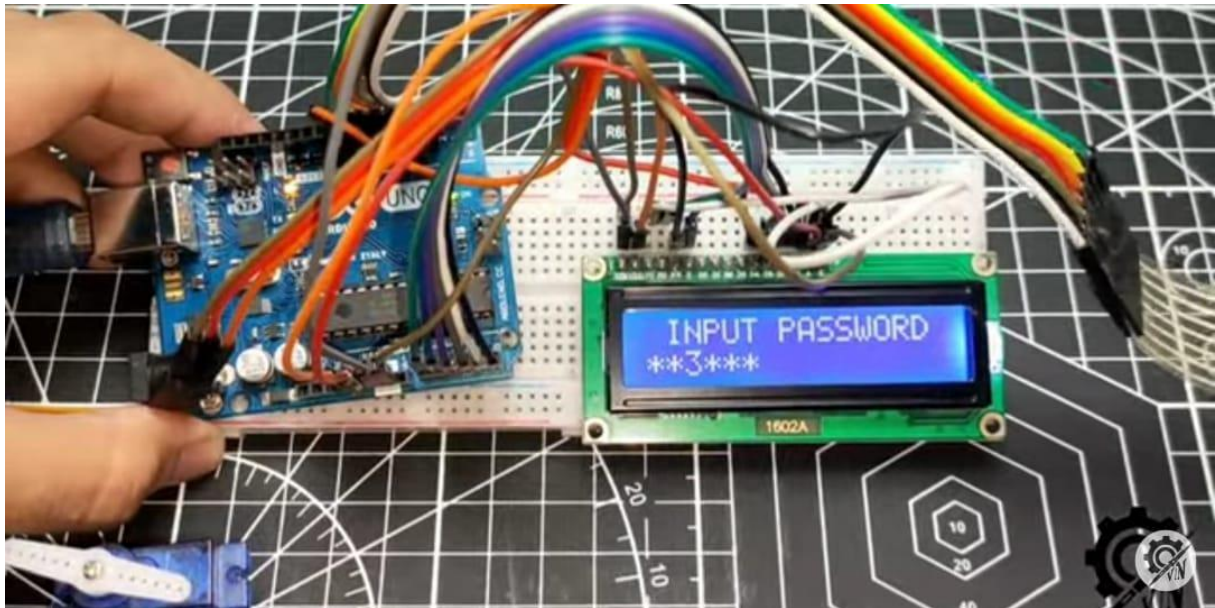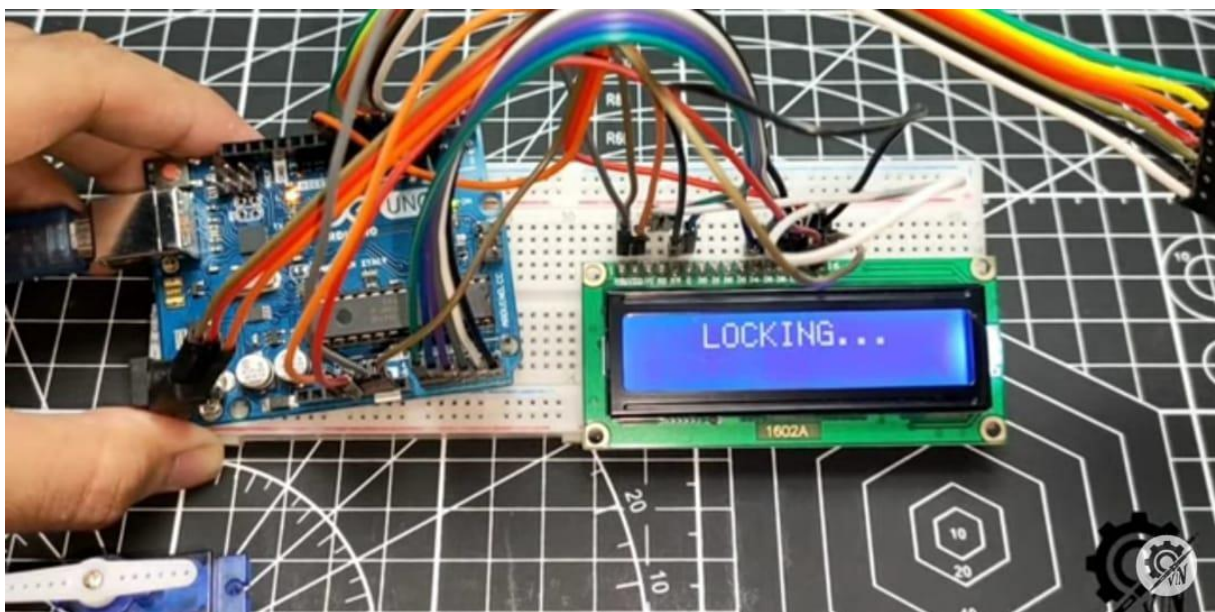
CHAPTER 6

RESULTS

RESULTS:
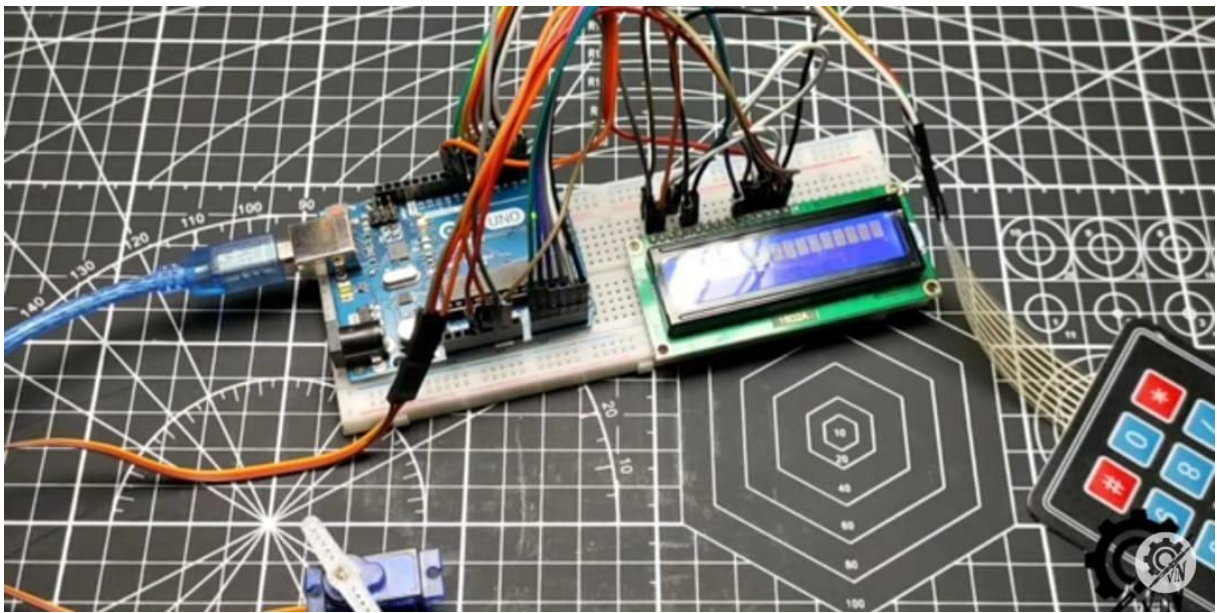
Before uploading code

After uploading code

Final output after uploading code

CONCLUSION:

This project is productive in providing enough security as long as the password is not shared. In future this "password based door lock system using Arduino "can be provided maximum security by the above enhancements in order to completely satisfy users needs. Hence, a common man can afford to buy such locking system in minimal cost to keep his valuables safely without any worries**.**

FUTURE SCOPE:

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 caseof any accident so that door will open automatically. We can interface camera to the microcontroller so that it could capture the picture of the thief who is trying to breach the security. The simple circuit can be used at places like home to ensure better safety. With a slightmodification, this project can also be used to control the switching of loads through password. It can also be used at organaisations to ensure authorized access to highly secured places**.**

REFERENCES:

[1] The working principle of an Arduino, Abuja, Electronics, Computer

and Computation (ICECCO), 2014 11th International Conference, IEEE

[2] http://arduino.cc/tutorial

[3] http://instructables.com

[4] Component details http://en.wikipedia.org/

[5] Theodore S. Rappaport, Wireless Communications, second edition, PHI. New Delhi

APPENDIX-A

Source Code:

```
#include <Keypad.h> // the library for the 4x4 keypad

#include <LiquidCrystal_I2C.h> // the library for the i2c 1602 lcd

#include <Servo.h> // the library to control the servo motor

LiquidCrystal_I2C lcd(0x27,20,4); // gets the lcd

Servo servo;


#define Password_Length 8 // the length of the password, if the password is 4 digits long set this to 5

int Position = 0; // position of the servo

char Particular[Password_Length]; // the password length

char Specific[Password_Length] = "137926A"; // the password which is called specific in the code, change this to anything you want with the numbers 0-9 an dthe letters A-D

byte Particular_Count = 0, Specific_Count = 0; // counts the amount of digits and and checks to see if the password is correct

char Key;

const byte ROWS = 4; // the amount of rows on the keypad

const byte COLS = 4; // the amount of columns on the keypad

char keys[ROWS][COLS] = { // sets the rowns and columns

  // sets the keypad digits

  {'1','2','3','A'},

  {'4','5','6','B'},

  {'7','8','9','C'},

  {'*','0','#','D'}

};

bool SmartDoor = true; // the servo

// the pins to plug the keypad into

byte rowPins[ROWS] = {8, 7, 6, 5};
```

```
byte colPins[COLS] = {4, 3, 2, 1};

Keypad myKeypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS); // gets the data
from the keypad


// locked charcater

byte Locked[8] = {

B01110,

  B10001,

  B10001,

  B11111,

  B11011,

  B11011,

  B11011,

  B11111

};

// open character

byte Opened[8] = {

B01110,

  B00001,

  B00001,

  B11111,

  B11011,

  B11011,

  B11011,

  B11111

};

void setup()

{

  servo.attach(0); // attaches the servo to pin 0

  ServoClose(); // closes the servo when you say this function

  lcd.init(); // initializes the lcd
```

```
lcd.backlight(); // turns on the backlight

lcd.setCursor(0,0); // sets the cursor on the lcd

lcd.print("MR REAL MAKER"); // prints the text/charater

lcd.setCursor(0,1); // sets the cursor on the lcd

lcd.print("DoorLock Project"); // prints text

delay(4000); // waits 4 seconds

lcd.clear(); // clears the lcd diplay


}


void loop()

{

 if (SmartDoor == 0) // opens the smart door

  {

   Key = myKeypad.getKey(); // the word key = myKeypad which gets the value


   if (Key == '#') // when the '#' key is pressed


    {

     lcd.clear(); // clears the lcd diplay

     ServoClose(); // closes the servo motor

     lcd.setCursor(2,0); // sets the cursor on the lcd

     lcd.print("Door Closed"); // prints the text to the lcd

     lcd.createChar(0, Locked); // prints the locked character

     lcd.setCursor(14,0); // sets the cursor on the lcd

     lcd.write(0); // prints the first character when you are on the door closed page

     delay(3000); // waits 3 seconds

     SmartDoor = 1; // closes the door

    }

  }
```

```
  else Open(); // keeps the door open

}


void clearData() // clears the data

{

  while (Particular_Count != 0) // counts the digits pressed

  {

    Particular[Particular_Count--] = 0; // counts how many digits

  }

  return; // returns the data

}


void ServoOpen() // opens the servo

{

  for (Position = 180; Position >= 0; Position -= 5) { // moves from 0 to 180 degrees

    servo.write(Position); // moves to the postion

    delay(15); // waits 15 milliseconds

  }

}


void ServoClose() // closes the servo

{

  for (Position = 0; Position <= 180; Position += 5) { // moves from position 0 to 180 degrees

    servo.write(Position); // moves to the position

    delay(15); // waits 15 milliseconds

  }

}


void Open() // function declarations
```

ECE,SIETK

```
{
 lcd.setCursor(1,0); // sets the cursor on the lcd

 lcd.print("Enter Password"); // prints the text


 Key = myKeypad.getKey(); // gets the keys you press from the keypad

 if (Key)

 {

  Particular[Particular_Count] = Key;

  lcd.setCursor(Particular_Count, 1); // sets the cursor on the lcd

  lcd.print(""); // prints " instead of the password

  Particular_Count++; // counts the length of the password

 }
```

```
if (Particular_Count == Password_Length - 1) // gets the length of the password
  {
    if (!strcmp(Particular, Specific)) // counts the length and checks to see if the password is
correct
    {
      lcd.clear();

      ServoOpen(); // moves the servo 180 degrees

      lcd.setCursor(2,0); // sets the cursor on the lcd

      lcd.print("Door Opened");

      lcd.createChar(1,  Opened);

      lcd.setCursor(14,0); // sets the cursor on the lcd

      lcd.write(1);

      lcd.setCursor(0,1); // sets the cursor on the lcd

      lcd.print("Press # to Close");

      SmartDoor = 0;

    }
    else {
      lcd.clear();

      lcd.setCursor(0,0); // sets the cursor on the lcd

      lcd.print("Wrong Password"); // prints the text/character

      lcd.setCursor(0,1);

      lcd.print("Try Again In");

      lcd.setCursor(13,1);

      lcd.print("10");

      delay(1000);

      lcd.setCursor(13,1);

      lcd.print("09");

      delay(1000);

      lcd.setCursor(13,1);

      lcd.print("08");

      delay(1000);
```

```
   lcd.setCursor(13,1);

   lcd.print("07");

   delay(1000);

   lcd.setCursor(13,1);

   lcd.print("06");

   delay(1000);

   lcd.setCursor(13,1);

   lcd.print("05");

   delay(1000);

   lcd.setCursor(13,1);

   lcd.print("04");

   delay(1000);

   lcd.setCursor(13,1);

   lcd.print("03");

   delay(1000);

   lcd.setCursor(13,1);

   lcd.print("02");

   delay(1000);

   lcd.setCursor(13,1);

   lcd.print("01");

   delay(1000);

   lcd.setCursor(13,1);

   lcd.print("00");

   delay(1000);

   lcd.clear();

   SmartDoor = 1; // closes the smart door

  }

 clearData(); // clears the data

 }

}
```

APPENDIX-B

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Project Budget: The approximate estimated budget for developing this project is 2000/-