***Project Title:***

Password Based Door Locking System.

***Abstract:***

Many times we forgot to carry the key of our home. Or sometimes we come out of our home and door latch closes by mistake. In these cases it is really difficult to get inside the house. Moreover, In day to day life security of any object or place is plays a major role. This project has considered about that and created a secure access for a door which needs a password to open the door.  Using keypad it enters a password to the system and if it is entered correctly door is open by motor which is used to rotate the handle of the door lock. The Buzzer will be tuned when password is entered wrong for multiple times. Some features like adding new users and changing old password are configure by the keypad.LCD module is used to display messages to the user.

**Equipments:**

* Arduino Mega
* 16\*2 LCD display
* 4\*4 Keypad
* DC Motor
* Buzzer
* Motor Driver L293D
* Bread Board

**Circuit Diagram with details:**



* We know 16\*2 LCD display has 16 pins. Here is the pin Configuration.

|  |  |  |
| --- | --- | --- |
| **Pin Number** | **Symbol** | **Function** |
| **1** | Vss | Ground Terminal |
| **2** | Vcc | Positive Supply |
| **3** | Vo | Contrast adjustment |
| **4** | RS | Register Select; 0→Instruction Register, 1→Data Register |
| **5** | R/W | Read/write Signal; 1→Read, 0→ Write |
| **6** | E | Enable; Falling edge |
| **7** | DB0 | Bi-directional data bus, data transfer is performed once, thru DB0 to DB7, in the case of interface data length is 8-bits; and twice, through DB4 to DB7 in the case of interface data length is 4-bits. Upper four bits first then lower four bits. |
| **8** | DB1 |
| **9** | DB2 |
| **10** | DB3 |
| **11** | DB4 |
| **12** | DB5 |
| **13** | DB6 |
| **14** | DB7 |
| **15** | LED-(K) | Back light LED cathode terminal |
| **16** | LED+(A) | Back Light LED anode terminal |

Where, we use

Vss = Arduino GND

Vcc = Arduino +5V

Vo = here we use 9K and 1K for adjustment

RS = Arduino pin no 12

R/W = Arduino pin no 11

E = Arduino pin no 10

DB4 = Arduino pin no 9

DB5 = Arduino pin no 8

DB6 = Arduino pin no 7

DB7 = Arduino pin no 6

* We use 4\*4 Keypad

And we use Arduino pin 22,24,26,28 for keypad Row and 30,32,34,36 for keypad Column.



4\*4 Keypad

* We use a motor driver L293D for DC motor for bi-directional rotation.

Here is the pin configuration of L293D IC



IC Configuration of L293D

And we use this ckt for DC motor



DC Motor Circuit

For rotating the motor in clockwise direction the input pins has to be provided with Logic 1 and Logic 0.

• Pin 2 = Logic 1 and Pin 7 = Logic 0  Clockwise Direction  
• Pin 2 = Logic 0 and Pin 7 = Logic 1  Anticlockwise Direction  
• Pin 2 = Logic 0 and Pin 7 = Logic 0  Idle [No rotation] [Hi-Impedance state]  
• Pin 2 = Logic 1 and Pin 7 = Logic 1  Idle [No rotation]

IC Pin 2 = Arduino pin 4

IC Pin 7 = Arduino pin 3

* We also use a buzzer

And for buzzer we use Arduino pin 2 for positive pin to buzzer and for negative pin of Buzzer we use Arduino GND.

**Code:**

#include <Password.h>

#include <LiquidCrystal.h>

#include <Keypad.h>

LiquidCrystal lcd(6,7,8,9,10,11,12);

Password password = Password( "4321" );

const byte ROWS = 4;

const byte COLS = 4;

// Define the Keymap

char keys[ROWS][COLS] = {

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

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

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

{'\*','0',' ','D'}

};

// Connect keypad ROW0S to these Arduino pins.

byte rowPins[ROWS] = {22,24,26,28};

byte colPins[COLS] = {30, 32, 34,36};

const int buttonPin = 5;

int motor\_forward = 4;

int motor\_reverse = 3;

int pin = 2;

// Create the Keypad

Keypad keypad = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS );

void setup()

{

pinMode(buttonPin, INPUT);

pinMode(motor\_forward, OUTPUT);

pinMode(motor\_reverse, OUTPUT);

pinMode(pin,OUTPUT);

lcd.begin(16, 2);

Serial.begin(9600);

lcd.print("Password Based");

lcd.setCursor(0,1);

lcd.print(" Door Locking");

delay(2500);

lcd.clear();

lcd.print("Enter Pasword...");

delay(200);

lcd.clear();

keypad.addEventListener(keypadEvent);

keypad.setDebounceTime(200);

}

void loop()

{

keypad.getKey();

}

void keypadEvent(KeypadEvent eKey)

{

switch (keypad.getState())

{

case PRESSED:

lcd.print(eKey);

switch (eKey)

{

case ' ':

guessPassword();

break;

default:

password.append(eKey);

}

}

}

void guessPassword()

{

if (password.evaluate())

{

lcd.setCursor(0,1);

lcd.print(" VALID PASSWORD ");

password.reset();

delay(1500);

lcd.clear();

lcd.print(" Thank You ^\_^ ");

lcd.setCursor(0,1);

lcd.print(" Door Open!!");

delay(5000);

motor\_rotate();

}

else

{

lcd.setCursor(0,1);

lcd.print("INVALID PASSWORD ");

buzzer();

password.reset();

delay(1500);

lcd.clear();

lcd.setCursor(0,0);

lcd.print(" Try Again ");

lcd.setCursor(0,1);

lcd.print("Enter Password");

delay(2000);

lcd.clear();

}

}

int motor\_rotate()

{

digitalWrite(motor\_forward,1);

digitalWrite(motor\_reverse,0);

delay(7000);

digitalWrite(motor\_forward,0);

digitalWrite(motor\_reverse,1);

delay(7000);

digitalWrite(motor\_forward,1);

digitalWrite(motor\_reverse,0);

delay(3000);

digitalWrite(motor\_forward,0);

digitalWrite(motor\_reverse,0);

}

void buzzer()

{

digitalWrite(pin, HIGH);

delay(3000);

digitalWrite(pin, LOW);

delay(1000);

digitalWrite(pin, HIGH);

delay(3000);

digitalWrite(pin, LOW);

delay(1000);

}

**Tutorial:**

* First need to connect full circuit properly .
* Then must upload the code in arduino.
* When code uploading will be finished LCD display will show some text and the text say to give password.
* Then need to give input by keypad key, and after giving input need to prees enter(we use # as enter).
* If password is wrong then LCD display will show that “Invalid Password” and a buzzer will be played. When buzzer will be off then LCD display say to give password again.
* Now , if password is correct then LCD display say that “Valid Password” and motor will be rotate by directionally(which means that door will be open)

**Problem faced:**

Here is the problem list that we faced to doing our work.

* At first for LCD interfacing we avoid backlight pin in LCD that is pin no 15 & 16 so that our LCD screen did not glow and the text that was floating on the screen was not clear. Then we used backlight pin and then our text was clear.
* Then at Keypad interfacing we take keypad input directly without time delay that’s why when we press one key it we could see 3 same numbers. For solving this problem we use debounce method for time delay that the amount of milliseconds the keypad will wait until it accepts a new keypress/keyEvent
* We said our proposal that we will use a stepper motor for door to open, but unfortunately our stepper motor was ruined, all its wire was sort, and it’s rotate head was internally locked. So at last we use a DC motor , and we able to rotate it bi-directionally as stepper motor does.

**Reference:**

* Arduino
* <http://arduino.cc/en/Reference/HomePage#.UwoTYPmSyLE>
* LCD :
* <http://www.engineersgarage.com/electronic-components/16x2-lcd-module-datasheet>
* <http://arduino.cc/en/Tutorial/LiquidCrystal#.UwoUsPmSyLE>
* Keypad:
* <http://playground.arduino.cc/Code/Keypad#.UwoVx_mSyLE>
* <http://www.maximintegrated.com/app-notes/index.mvp/id/3546>
* Motor :
* <http://www.seattlerobotics.org/encoder/may98/steppers.html>
* <http://www.rakeshmondal.info/L293D-Motor-Driver>