

SRM UNIVERSITY – AP

A Project Based on

“ ARDUINO ” [Password Door Lock]

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ABSTRACT

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.

Nowadays every device's operation 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. These locking systems are controlled by a keypad and are installed at the side hedge of the door. The main objective of this project is to give safety at every common places like home, public places.

Thus, what we want is digital technology to construct an integrated and well customized safety system using Arduino UNO at a price which is reasonable.

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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 to 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. By using this advanced models we can make new kinds of locking systems.

Earlier we use mechanical locking models 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.

Aim of the Project :

The main aim of the Project is to Build a Door Lock System Using Arduino UNO.

The Door Lock contains a Passcode so the owner of the Room can enter into it with typing a correct password

ADVANTAGES :

- There is no need to carry a key
- where ever we go and once return back to our Door, it is very easy to access [open the door]
- Provides Security to each Door
- Easy to Handle
- Most Effortable Product for Everyone regarding Prize and Object

DIS-ADVANTAGES :

- There are no Dis-Advantage's mostly
- If any person shares his Passcode it may be harmful for him

Materials Used

- Arduino UNO
- LCD Display
- Key Pad
- Servo Motor
- Buzzer
- Potentiometer
- Passive Infra Red Sensor (PIR)
- Temperature Sensor
- USB A-B Cable
- Half-Sized Bread Board
- Jump Wires

Additional Materials

- Finger Print Sensor
- Image Scanner

S.NO	MATERIALS	PRIZE
1	Arduino UNO	330 Rs
2	LCD Display	170 Rs
3	Key Pad	110 Rs
4	Servo Motor	200 Rs
5	Buzzer	200 Rs
6	Potentiometer	220 Rs

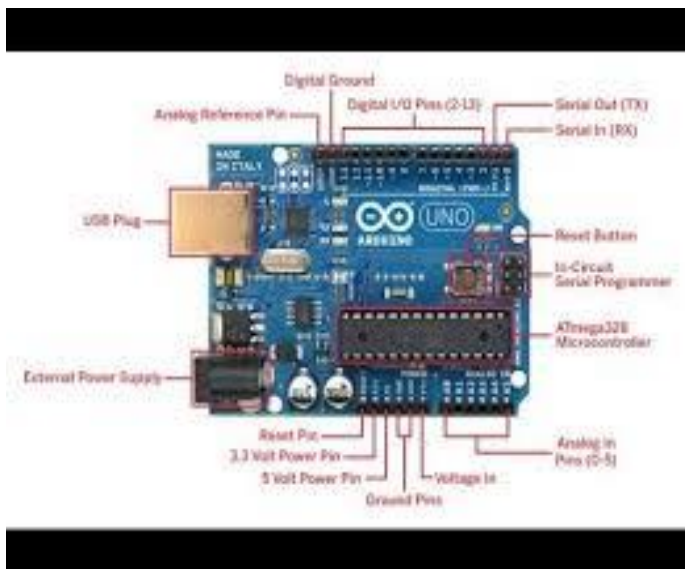
7	Passive Infra Red Sensor (PIR)	120 Rs
8	Temperature Sensor	100 Rs
9	USB A-B Cable	50 Rs
10	Bread Board	50 Rs
11	Jump Wires	100 Rs

ARDUINO - UNO

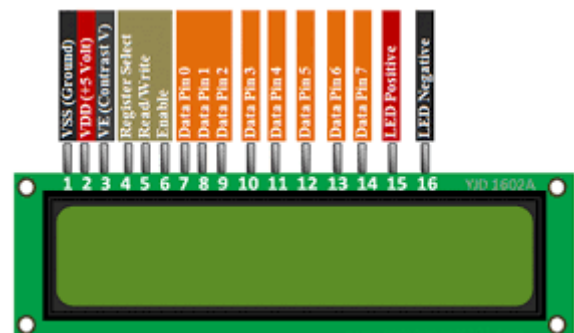
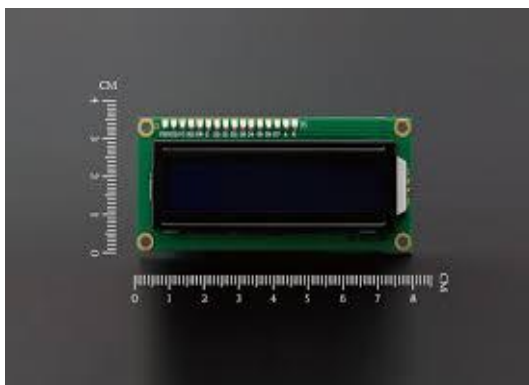
This is a micro controller based on the ATmega 328P.

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.



LCD



Liquid Crystal Display, which we are using in our project is 16*2 LCD. This display consists of 16 columns and 2 rows.

This is programmed using the library <LiquidCrystal.h>

Key Pad



In our project we will be using 4X4 matrix membrane keypad.

This 16 button keypad will provide user interface component for Arduino project. In this we can type password to open the door.

This is programmed using the library <Keypad.h>

Potentiometer



In our project we have used a potentiometer of 10K ohm resistance in order to adjust the contrast of the Liquid crystal display.

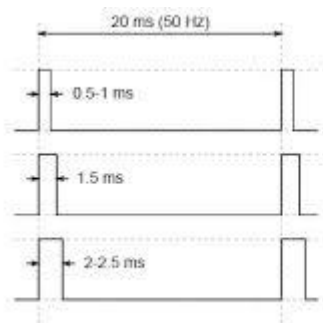
Buzzer



In our project the buzzer is used for beep sound indicating the entry of wrong password.

when any one enter's incorrect Password Buzzer makes sound.

Servo Motor

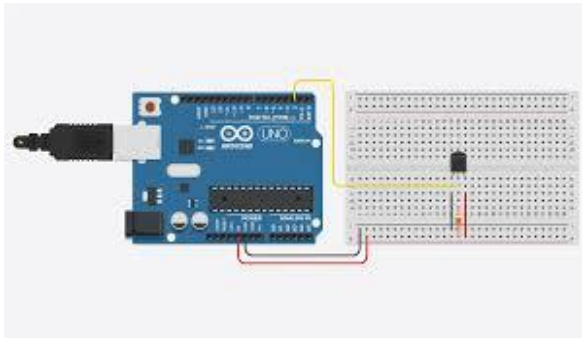


The servo motor used in the project is SG90 Micro Servo weighing about 9g.

This is programmed using the

library <servo.h>

Temperature Sensor



We are using Temperature [TMP 36]

The TMP36 temperature sensor is an easy to measure temperature using an Arduino.

The sensor can measure a fairly wide range of temperature (-50°C to 125°C), is fairly precise (0.1°C resolution), and is very low cost, making it a popular choice.

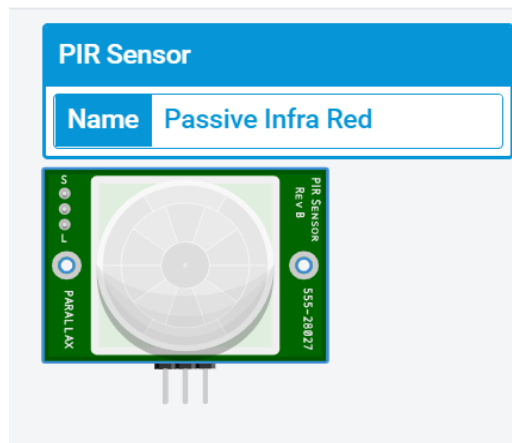
Temperature Sensor [TMP36]

Name Temperature Sensor



The TMP36 is a low voltage, precision centigrade temperature sensor. It provides a voltage output that is linearly proportional to the Celsius.

Passive Infra Red Sensor (PIR)



PIR sensors allow you to sense motion. They are used to detect whether a human has moved in or out of the sensor's range.

The output of PIR motion detection sensor can be connected directly to one of the Arduino (or any microcontroller) digital pins. PIR modules have a passive infrared sensor that detects the occupancy and movement from the infrared radiated from human body.

[NOTE] : Upto now we have taken these features to develop a “ Password Door Lock ”

Future Implementations

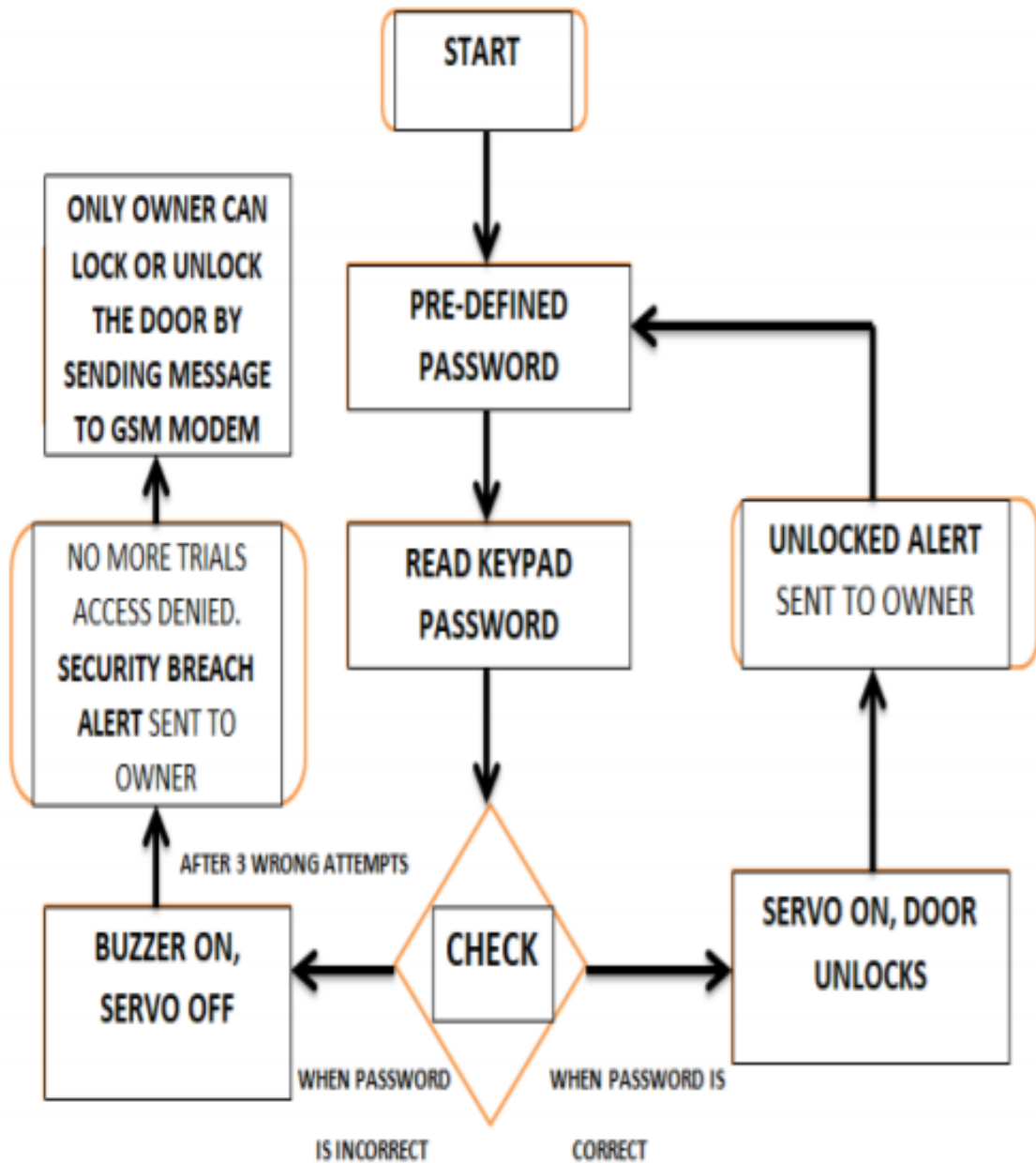
Additional Features to be added :

- 1.) When a person enters the room after entering Passcode in room according to temperature Air-conditioner should be turned on.
- 2.) The password should be generated each time to our Mobile phone when a person tries to open the door.
- 3.) Instead of password we can use face recognition by uploading our images to that.

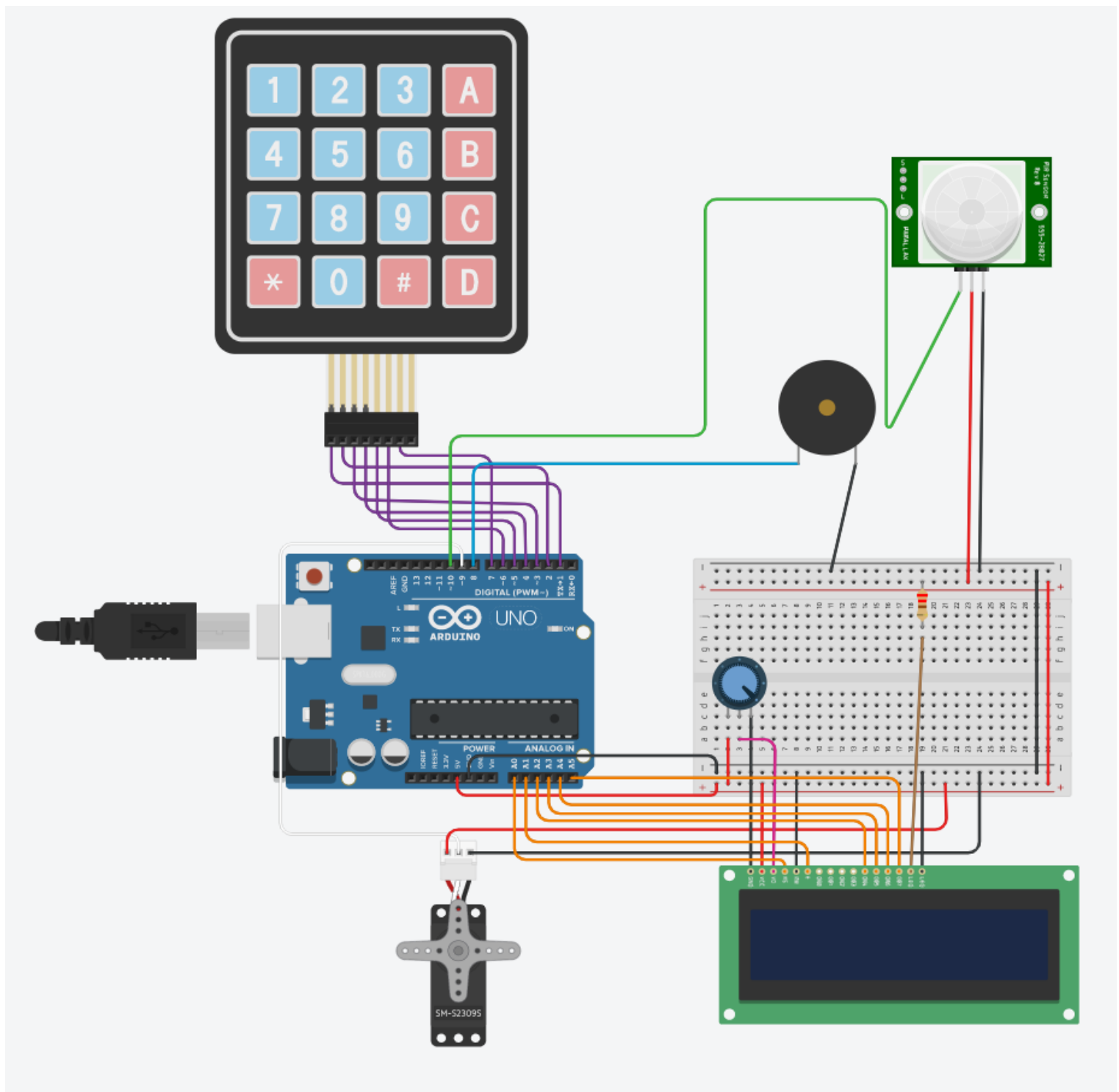
FUTURE SCOPE :

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 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 slight modification, this project can also be used to control the switching of loads through password. It can also be used at organizations to ensure authorized access to highly secured places.

Circuit Flow Chart



Circuit Diagram



PROCEDURE :

WORKING PROCEDURE OF THE PROJECT :

The entire project is controlled by
Using the Arduino.

Download Arduino UNO from the browser.

Arduino is an open-source hardware and software company in this project, we have defined the default password “4567” in the Arduino. You can change it in coding. When we enter a password,

It will match it with the password stored in the Arduino.

If it is correct, then it will show ‘Access Granted, Welcome’ and then rotate servo motor to 180 degrees and doors will open.

where once the correct code or password is entered, the door is opened and the concerned person is allowed access to the secured area.

Again, if another person arrives, it will ask to enter the password.

If the password is wrong, then door would remain closed, denying access to the person. It will then give 5 seconds time for entering via the door.

Once 5 seconds is completed, the door will get locked automatically.

If the password is wrong, then it will show 'Code Incorrect, Go Away'. The buzzer will also beep once when any key is pressed.

- Arduino UNO
- LCD Display
- Key Pad
- Servo Motor
- Buzzer
- Potentiometer
- Passive Infra Red Sensor (PIR)
- Temperature Sensor
- USB A-B Cable
- Half-Sized Bread Board
- Jump Wires

These are all are used in password door lock. when password is correct door unlocks, it will send information to ownwer by a lcd display.

CIRCUIT CONNECTIONS

1. Arduino Uno 5V Output to Breadboard Positive Rail
2. Arduino Ground to Breadboard Negative Rail
3. Arduino Uno Digital Pin D1 to Row 1 pin of Keypad
4. Arduino Uno Digital Pin D2 to Row 2 pin of Keypad
5. Arduino Uno Digital Pin D3 to Row 3 pin of Keypad
6. Arduino Uno Digital Pin D4 to Row 4 pin of Keypad
7. Arduino Uno Digital Pin D5 to Coloumn 1 pin of Keypad
8. Arduino Uno Digital Pin D6 to Coloumn 2 pin of Keypad
9. Arduino Uno Digital Pin D7 to Coloumn 3 pin of Keypad
10. Arduino Uno Digital Pin D8 to Positive terminal of Buzzer
11. Buzzer Negative terminal to Breadboard Negative Rail
12. Arduino Uno Digital Pin D9 to Signal of Micro Servo
13. Micro Servo Power to Positive of Breadboard Rail
14. Micro Servo Ground to Negative of Breadboard Rail
15. Arduino Uno Digital Pin D10 to Signal of PIR Sensor
16. Power of PIR Sensor to Breadboard Positive Rail
17. Ground of PIR Sensor to Breadboard Negative Rail
18. Arduino Uno Analog Pin A0 to LCD Register Select
19. Arduino Uno Analog Pin A1 to LCD Enable
20. Arduino Uno Analog Pin A2 to LCD Data Pin D4
21. Arduino Uno Analog Pin A3 to LCD Data Pin D5
22. Arduino Uno Analog Pin A4 to LCD Data Pin D6
23. Arduino Uno Analog Pin A5 to LCD Data Pin D7
24. LCD Pin 15 to Terminal 2 of 220 Ohm Resistance

25. Terminal 1 of 220 Ohm Resistance to Breadboard Positive Rail
26. LCD Pin 16 to Breadboard Negative Rail
27. LCD Power to Breadboard Positive Rail
28. LCD Ground to Breadboard Negative Rail
29. LCD Contrast Pin to Wiper of Potentiometer
30. Potentiometer Terminal 1 to Breadboard Positive Rail
31. Potentiometer Terminal 2 to Breadboard Negative Rail

[NOTE] :

- Connect both Positive Rails of Breadboard
- Connect both Negative Rails of Breadboard

IMPLEMENTATION

Code :

```
#include <Keypad.h>

#include <LiquidCrystal.h>

#include <Servo.h>

Servo myservo;

int pos=0;

LiquidCrystal lcd(A0,A1,A2,A3,A4,A5);

const byte rows=4;

const byte cols=3;

char key[rows][cols]={

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

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

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

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

};

byte rowPins[rows]={1,2,3,4};

byte colPins[cols]={5,6,7};

Keypad keypad= Keypad(makeKeymap(key),rowPins,colPins,rows,cols);

char* password="4567";

int currentposition=0;

int redled=10;

int greenled=11;

int buzz=8;
```

```
int invalidcount=12;

void setup()

{

    displayscreen();
    Serial.begin(9600);
    pinMode(redled, OUTPUT);
    pinMode(greenled, OUTPUT);
    pinMode(buzz, OUTPUT);
    myservo.attach(9);

    lcd.begin(16,2);

}

void loop()
{
    if( currentposition==0)
    {
        displayscreen();

    }

    int l ;
    char code=keypad.getKey();
    if(code!=NO_KEY)
```



```
{  
  lcd.clear();  
  lcd.setCursor(0,0);  
  lcd.print("PASSWORD:");  
  lcd.setCursor(7,1);  
  lcd.print(" ");  
  lcd.setCursor(7,1);  
  for(l=0;l<=currentposition;++l)  
  {  
  
    lcd.print("*");  
    keypress();  
  }  
  
  if (code==password[currentposition])  
  {  
    ++currentposition;  
    if(currentposition==4)  
    {  
  
      unlockdoor();  
      currentposition=0;  
  
    }  
  
  }  
}
```

```
else
{
++invalidcount;
incorrect();
currentposition=0;

}
if(invalidcount==5)
{

++invalidcount;
torture1();

}
if(invalidcount==8)
{
torture2();
}

}
}

void unlockdoor()
{
delay(900);
```

```
lcd.setCursor(0,0);  
lcd.println(" ");  
lcd.setCursor(1,0);  
lcd.print("Access Granted");  
lcd.setCursor(4,1);  
lcd.println("WELCOME!!");  
lcd.setCursor(15,1);  
lcd.println(" ");  
lcd.setCursor(16,1);  
lcd.println(" ");  
lcd.setCursor(14,1);  
lcd.println(" ");  
lcd.setCursor(13,1);  
lcd.println(" ");  
unlockbuzz();  
  
for(pos = 180; pos>=0; pos-=5)  
{  
myservo.write(pos);  
delay(5);  
}  
delay(2000);  
delay(1000);  
counterbeep();
```

```
delay(1000);
```

```
for(pos = 0; pos <= 180; pos +=5)
```

```
{
```

```
myservo.write(pos);
```

```
delay(15);
```

```
currentposition=0;
```

```
lcd.clear();
```

```
displayscreen();
```

```
}
```

```
}
```

```
void incorrect()
```

```
{
```

```
delay(500);
```

```
lcd.clear();
```

```
lcd.setCursor(1,0);
```

```
lcd.print("CODE");
```

```
lcd.setCursor(6,0);
```

```
lcd.print("INCORRECT");
```

```
lcd.setCursor(15,1);
```

```
lcd.println(" ");
```

```
lcd.setCursor(4,1);
```

```
lcd.println("GET AWAY!!!");
```

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

```
lcd.println(" ");
```

```
Serial.println("CODE INCORRECT YOU ARE UNAUTHORIZED");
```

```
digitalWrite(redled, HIGH);
```

```
digitalWrite(buzz, HIGH);
```

```
delay(3000);
```

```
lcd.clear();
```

```
digitalWrite(redled, LOW);
```

```
digitalWrite(buzz,LOW);
```

```
displayScreen();
```

```
}
```

```
void clearScreen()
```

```
{
```

```
lcd.setCursor(0,0);
```

```
lcd.println(" ");
```

```
lcd.setCursor(0,1);
```

```
lcd.println(" ");
```

```
lcd.setCursor(0,2);
```

```
lcd.println(" ");
```

```
lcd.setCursor(0,3);
```

```
lcd.println(" ");
```

```
}
```

```
void keypress()
```

```
{
```

```
digitalWrite(buzz, HIGH);  
delay(50);  
digitalWrite(buzz, LOW);  
}
```

```
void displayscreen()  
{
```

```
  lcd.setCursor(0,0);  
  lcd.println("*ENTER THE CODE*");  
  lcd.setCursor(1,1);
```

```
  lcd.println("TO _/_ (OPEN)!!");  
}
```

```
void armservo()  
{
```

```
  for (pos=180;pos<=180;pos+=50)  
  {  
    myservo.write(pos);  
    delay(5);  
  }
```

```
  delay(5000);
```

```
  for(pos=180;pos>=0;pos-=50)
```

```
{  
myservo.write(pos);  
}  
  
}  
  
void unlockbuzz()  
{  
  
digitalWrite(buzz, HIGH);  
delay(80);  
digitalWrite(buzz, LOW);  
delay(80);  
digitalWrite(buzz, HIGH);  
delay(80);  
digitalWrite(buzz, LOW);  
delay(200);  
digitalWrite(buzz, HIGH);  
delay(80);  
digitalWrite(buzz, LOW);  
delay(80);  
digitalWrite(buzz, HIGH);  
delay(80);  
digitalWrite(buzz, LOW);  
delay(80);  
}  

```

```
void counterbeep()
{
  delay(1200);

  lcd.clear();
  digitalWrite(buzz, HIGH);

  lcd.setCursor(2,15);
  lcd.println(" ");
  lcd.setCursor(2,14);
  lcd.println(" ");
  lcd.setCursor(2,0);
  delay(200);
  lcd.println("GET IN WITHIN::");

  lcd.setCursor(4,1);
  lcd.print("5");
  delay(200);
  lcd.clear();
  lcd.setCursor(2,0);
  lcd.println("GET IN WITHIN:");
  digitalWrite(buzz,LOW);
  delay(1000);
  //2
```



```
digitalWrite(buzz, HIGH);  
lcd.setCursor(2,0);  
lcd.println("GET IN WITHIN:");  
lcd.setCursor(4,1); //2  
lcd.print("4");  
delay(100);  
lcd.clear();  
lcd.setCursor(2,0);  
lcd.println("GET IN WITHIN:");  
digitalWrite(buzz,LOW);  
delay(1000);  
//3  
digitalWrite(buzz, HIGH);  
lcd.setCursor(2,0);  
lcd.println("GET IN WITHIN:");  
lcd.setCursor(4,1); //3  
lcd.print("3");  
delay(100);  
lcd.clear();  
lcd.setCursor(2,0);  
lcd.println("GET IN WITHIN:");  
digitalWrite(buzz,LOW);  
delay(1000);  
//4  
digitalWrite(buzz, HIGH);  
lcd.setCursor(2,0);
```

```
lcd.println("GET IN WITHIN:");  
lcd.setCursor(4,1); //4  
lcd.print("2");  
delay(100);  
lcd.clear();  
lcd.setCursor(2,0);  
lcd.println("GET IN WITHIN:");  
digitalWrite(buzz,LOW);  
delay(1000);  
//  
digitalWrite(buzz, HIGH);  
lcd.setCursor(4,1);  
lcd.print("1");  
delay(100);  
lcd.clear();  
lcd.setCursor(2,0);  
lcd.println("GET IN WITHIN::");  
digitalWrite(buzz,LOW);  
delay(1000);  
//5  
digitalWrite(buzz, HIGH);  
delay(40);  
digitalWrite(buzz,LOW);  
delay(40);  
digitalWrite(buzz, HIGH);  
delay(40);
```

```
digitalWrite(buzz,LOW);
delay(40);
digitalWrite(buzz, HIGH);
delay(40);
digitalWrite(buzz,LOW);
delay(40);
digitalWrite(buzz, HIGH);
delay(40);
digitalWrite(buzz,LOW);

lcd.clear();
lcd.setCursor(2,0);
lcd.print("RE-LOCKING");
delay(500);
lcd.setCursor(12,0);
lcd.print(".");
delay(500);
lcd.setCursor(13,0);
lcd.print(".");
delay(500);
lcd.setCursor(14,0);
lcd.print(".");
delay(400);
lcd.clear();
lcd.setCursor(4,0);
lcd.print("LOCKED!");
delay(440);
```

```
}
```

```
void torture1()
```

```
{
```

```
  delay(1000);
```

```
  lcd.clear();
```

```
  lcd.setCursor(2,0);
```

```
  lcd.print("WAIT FOR ");
```

```
  lcd.setCursor(5,1);
```

```
  lcd.print("15 SECONDS");
```

```
  digitalWrite(buzz, HIGH);
```

```
  delay(15000);
```

```
  digitalWrite(buzz, LOW);
```

```
  lcd.clear();
```

```
  lcd.setCursor(2,0);
```

```
  lcd.print("LOL..");
```

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

```
  lcd.print(" HOW WAS THAT??");
```

```
  delay(3500);
```

```
  lcd.clear();
```

```
}
```

```
void torture2()
```

```
{  
  delay(1000);  
  lcd.setCursor(1,0);  
  lcd.print(" ");  
  lcd.setCursor(2,0);  
  lcd.print("EAR DRUMS ARE");  
  lcd.setCursor(0,1);  
  lcd.print(" PRECIOUS!! ");  
  delay(1500);  
  lcd.clear();  
  lcd.setCursor(1,0);  
  lcd.print(" WAIT FOR");  
  lcd.setCursor(4,1);  
  lcd.print(" 1 MINUTE");  
  digitalWrite(buzz, HIGH);  
  delay(55000);  
  counterbeep();  
  lcd.clear();  
  digitalWrite(buzz, LOW);  
  lcd.setCursor(2,0);  
  lcd.print("WANT ME TO");  
  lcd.setCursor(1,1);  
  lcd.print("REDICULE MORE??");  
  delay(2500);  
  lcd.clear();  
  lcd.setCursor(2,0);
```

```
lcd.print("Ha Ha Ha Ha");  
delay(1700);  
lcd.clear();  
}
```

End User Of This Project :

Any person who is familiar with technology can use this type of security service.

Most probably From a '12' Year Child to '80' Years older once Can use this Safely

Safety Measures :

Precautions :

- While using this make sure that connections should be done properly.
- Proper Net Connection should be there.
- Children's must be careful while entering and leaving The door.
- Arduino Software should be installed correctly.

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” can be provided maximum security by the above enhancements in order to completely satisfy user’s needs.

Hence, a common man can afford to buy such locking system in minimum cost to keep his valuables safely without any worries.