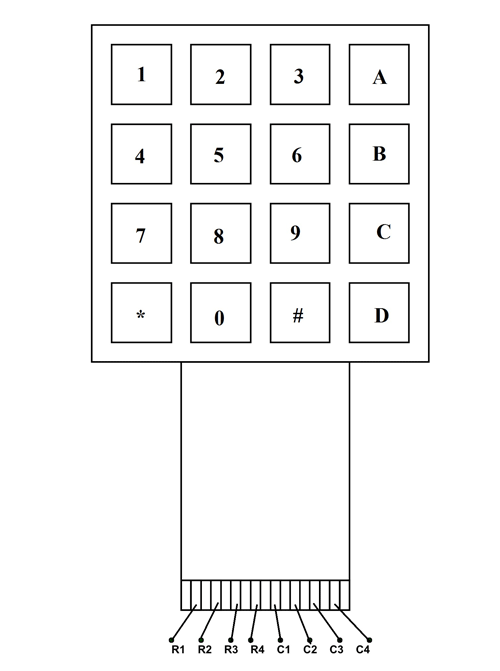
**Password Based Security System Using Arduino & Keypad**

Introduction

As thefts are increasing day by day security is becoming a major concern nowadays. So a digital code lock can secure your home or locker easily. It will open your door only when the right password is entered.

The circuit of this project is very simple which contains Arduino, keypad module, buzzer, Servo Motor, and LCD. Arduino controls the complete processes like taking a password from the keypad module, comparing passwords, driving buzzer, rotating servo motor, and sending status to the LCD display. The keypad is used for taking the password. The buzzer is used for indications. Servo motor is used for opening the gate while rotating and LCD is used for displaying status or messages on it.



**Components**

Arduino uno

4\*3 keypad module

LCD display

Potentiometer

Servo motor

Buzzer

Connecting wires

Breadboard

Application

Objective

**During this activity ,you will help students to achieve following objectives**

**1.** Understanding the principle and operation of home security using keypad lock

2. Design algorithm and flowchart for password based security

3. Programming 4\*3 keypad module using Arduino uno

4. Interfacing 4\*3 keypad module with Arduino uno

Programming steps

1. Include library for keypad and LCD
2. Include library for servo motor
3. Initialise variable pos for servo motor position
4. Initialise each row and column of keypad
5. Define default password for lock
6. Enter password,
7. If it is correct, then it will show ‘Access Granted, Welcome’ and then rotate the servo motor to 180 doors as the door is opened.
8. If the password is wrong, then it will show ‘Code Incorrect, Go Away’. The buzzer will also beep once when any key is pressed.

Program

#include <Keypad.h>

#include <LiquidCrystal.h>

#include <Servo.h>

Servo myservo;

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); //SERVO ATTACHED//

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();

}

}

// LOOP ENDS!!!//

}

//\*\*\*\*\*\*\*\*OPEN THE DOOR FUNCTION!!!!\*\*\*\*\*\*\*\*\*\*\*//

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) // goes from 180 degrees to 0 degrees

{

myservo.write(pos); // tell servo to go to position in variable 'pos'

delay(5); // waits 15ms for the servo to reach the position

}

delay(2000);

delay(1000);

counterbeep();

delay(1000);

for(pos = 0; pos <= 180; pos +=5) // goes from 0 degrees to 180 degrees

{ // in steps of 1 degree

myservo.write(pos); // tell servo to go to position in variable 'pos'

delay(15);

currentposition=0;

lcd.clear();

displayscreen();

}

}

//\*\*\*\*\*\*\*\*\*\*\*\*WRONG CODE FUNCTION\*\*\*\*\*\*\*\*//

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();

}

//\*\*\*\*\*\*\*\*\*\*\*\*\*\* CLEAR THE SCREEN!!!\*\*\*\*\*\*\*\*\*\*\*\*\*//

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(" ");

}

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*KEYPRESS\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*//

void keypress()

{

digitalWrite(buzz, HIGH);

delay(50);

digitalWrite(buzz, LOW);

}

//\*\*\*\*\*\*\*\*DISPALAY FUNCTION!!!\*\*\*\*\*\*\*\*\*\*\*\*\*//

void displayscreen()

{

lcd.setCursor(0,0);

lcd.println("\*ENTER THE CODE\*");

lcd.setCursor(1 ,1);

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

}

//\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* ARM SERVO\*\*\*\*\*\*\*\*\*\*\*//

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);

}

}

//\*\*\*\*\*\*\*\*\*\*UNLOCK BUZZ\*\*\*\*\*\*\*\*\*\*\*\*\*//

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);

}

//\*\*\*\*\*\*\*\*\*\*COUNTER BEEP\*\*\*\*\*\*\*\*\*\*//

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);

}

//\*\*\*\*\*\*\*\*\*TORTURE1\*\*\*\*\*\*\*\*\*\*\*//

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();

}

//\*\*\*\*\*TORTURE2\*\*\*\*\*//

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();

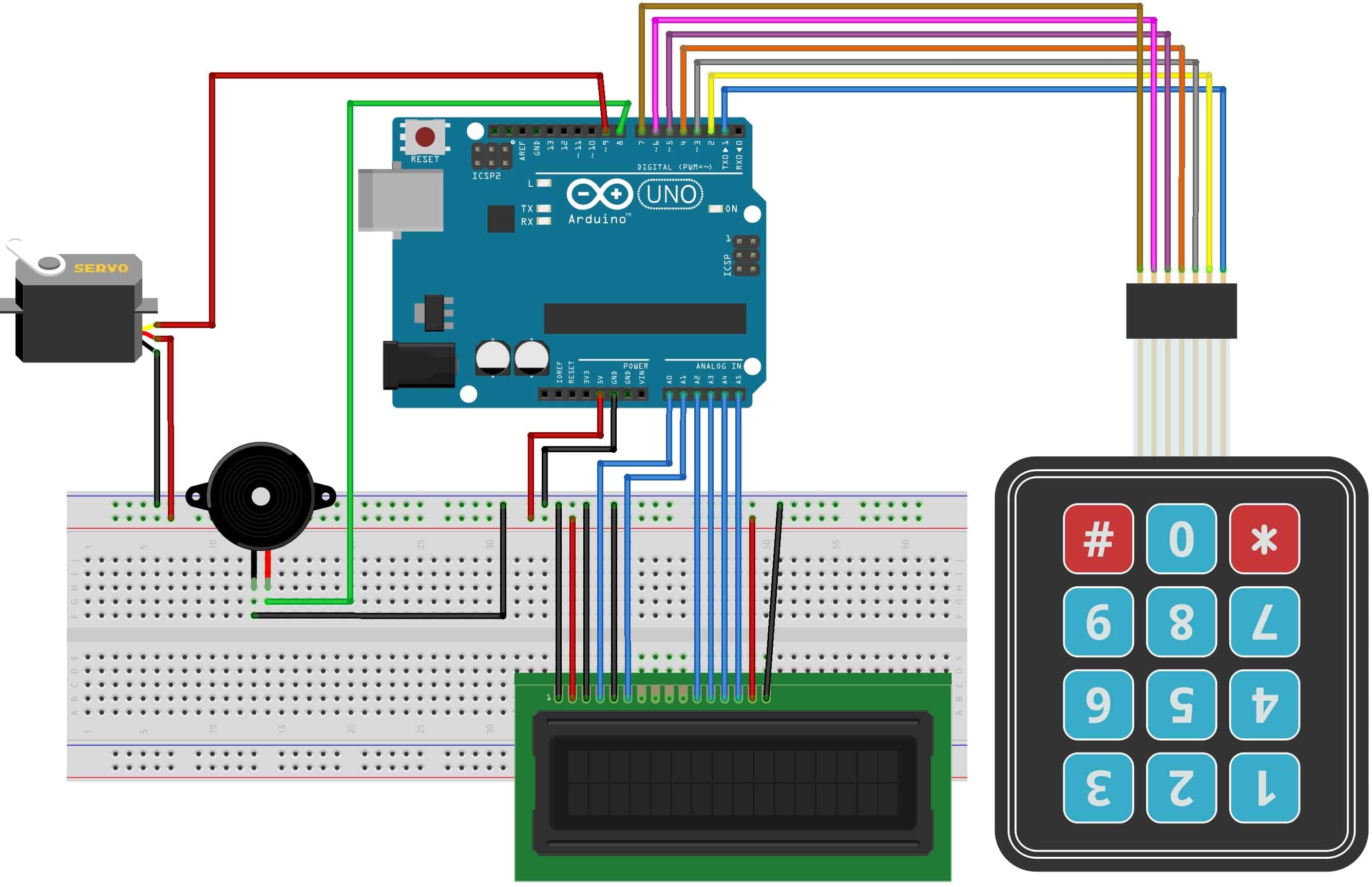
}

Hardware

we will make a connection to the 4×3 Keypad. For connecting the keypad with the Arduino we are using digital pins D1 to D7. Connect all seven pins of the keypad to analog pins D1 ~ D7 of Arduino.

To connect the servo motor with the Arduino, use digital pin D9 of Arduino to output the PWM pin of the servo motor. Now connect the positive wire of the buzzer to the pin D10 of Arduino and the negative wire to the ground.

Now we will connect the 16×2 LCD to the Arduino.  
1. Connect pin 1,3,5,16 of LCD to the GND.  
2. Connect pin 2,15 of LCD to the VCC (5V).  
3. Connect pin 4 of LCD to pin A0 of Arduino.  
3. Connect pin 6 of LCD to pin A1 of Arduino.  
3. Connect pin 11 of LCD to pin A2 of Arduino.  
3. Connect pin 12 of LCD to pin A3 of Arduino.  
3. Connect pin 13 of LCD to pin A4 of Arduino.  
3. Connect pin 14 of LCD to pin A5 of Arduino.



Circuit diagram

