

APPENDIXES

Program code

```
#include <LiquidCrystal.h>

#include <Password.h>

#include <Keypad.h>

#include <Servo.h>

LiquidCrystal lcd(44, 45, 46, 47, 48, 49);

Password password1 = Password( "1111" );

Password password2 = Password( "2222" );

Password password3 = Password( "3333" );

const byte ROWS = 4; // Four rows

const byte COLS = 4; // columns

// Define the Keymap

char keys[ROWS][COLS] = {

  {'7','4','1','0'},

  {'8','5','2','A'},

  {'9','6','3','B'},

  {'C','D','E','F'}

};

byte rowPins[ROWS] = { 32, 33, 34, 35 }; // Connect keypad ROW0, ROW1, ROW2 and ROW3 to these
Arduino pins.

byte colPins[COLS] = { 36, 37, 38, 39, }; // Connect keypad COL0, COL1 and COL2 to these Arduino pins.
```

```
//
```

```
Create the Keypad
```

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

```
const int sensorpin = A0;
```

```
int reading;
```

```
float voltage;
```

```
float temperaturec;
```

```
Servo myservo;
```

```
int f;
```

```
int buzzer= 53;
```

```
int r;
```

```
int led=30;
```

```
int ss1=12;
```

```
int sss1;
```

```
int ss2=6;
```

```
int sss2;
```

```
int ss3=7;
```

```
int sss3;
```

```
int ss4=11;
```

```
int sss4;
```

```
int s1;
```

```
int magnetic = 9;
```

```
int s2;
```

```
int s3;
```

```
int s4;
```

```
int m;
```

```
int cc;
```

```
int sensor1=2;
```

```
const int sensor2 =4;
```

```
int sensor3=3;
```

```
int sensor4=5;
```

```
const int leda = 22;
```

```
const int ledb = 23;
```

```
const int ledc = 24;
```

```
const int ledd = 25;
```

```
const int lede = 26;
```

```
const int ledf = 27;
```

```
const int ledg = 28;
```

```
int cardpin = 30;
```

```
int c;
```

```
void setup() {
```

```
myservo.attach(10);
```

```
pinMode(buzzer,OUTPUT);
```

```
keypad.addEventListener(keypadEvent);
```

```
pinMode(sensor2,INPUT);
```

```
pinMode(ss1,INPUT);
```

```
pinMode(ss2,INPUT);
```

```

pinMode(ss3,INPUT);

pinMode(ss4,INPUT);

pinMode(magnetic,INPUT);

pinMode(sensor3,INPUT);

pinMode(sensor1,INPUT);

pinMode(sensor4,INPUT);

pinMode(cardpin,INPUT);

pinMode(leda,OUTPUT);

pinMode(ledb,OUTPUT);

pinMode(ledc,OUTPUT);

pinMode(ledd,OUTPUT);

pinMode(ledf,OUTPUT);

pinMode(ledg,OUTPUT);

pinMode(led,OUTPUT);


Serial.begin(9600);

lcd.begin(16, 2);

lcd.print("ENTER PASSWORD");

}

void loop() {

Normal();

```

```

Control();

keypad.getKey();

}

void Normal(){f=Serial.read();

c=digitalRead(cardpin);

s1=digitalRead(sensor1);

s2=digitalRead(sensor2);

s3=digitalRead(sensor3);

s4=digitalRead(sensor4);

sss1=digitalRead(ss1);

sss2=digitalRead(ss2);

sss3=digitalRead(ss3);

sss4=digitalRead(ss4);

m=digitalRead(magnetic);

reading=analogRead(sensorpin);

voltage=reading*5.0/1024;

temperaturec=((voltage+0.5)*100)-52;

lcd.setCursor(7,1);

lcd.print("TEM:");

lcd.setCursor(11,1);

lcd.print(temperaturec);

if((c==HIGH)&&(sss2==HIGH)&&(s4==HIGH)&&(
s2==LOW)&&(m==HIGH)){

```

```

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");

    seven1();

    myservo.write(105);

    delay(4050);

    lcd.setCursor(0,1);

    lcd.print("FLOOR1");

    seven2();

    delay(3900);

    myservo.write(90);

    seven3();

    lcd.setCursor(0,1);

    lcd.print("FLOOR0");buzz();

}

if((c==HIGH)&&(sss2==HIGH)&&(s4==HIGH)&&(
s1==LOW)&&(m==HIGH)){lcd.setCursor(0,1);

    lcd.print("FLOOR3");

    seven0();

    myservo.write(105);

    delay(3890);

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");

    seven1();

    delay(3890);

    lcd.setCursor(0,1);

```

```

    lcd.print("FLOOR1");

    seven2();

    delay(3890);

    myservo.write(90);

    seven3();

    lcd.setCursor(0,1);

    lcd.print("FLOOR0");buzz();

}

if((c==HIGH)&&(sss2==HIGH)&&(s4==HIGH)&&(
s3==LOW)&&(m==HIGH)){

    lcd.setCursor(0,1);

    lcd.print("FLOOR1");

    seven2();

    myservo.write(105);

    delay(3900);

    myservo.write(90);

    seven3();

    lcd.setCursor(0,1);

    lcd.print("FLOOR0");buzz();

}

if((c==HIGH)&&(sss1==HIGH)&&(s3==HIGH)&&(
s2==LOW)&&(m==HIGH)){

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");

    seven1();

```

```

myservo.write(105);

delay(3900);

myservo.write(90);

seven2();

lcd.setCursor(0,1);

lcd.print("FLOOR1");buzz();

}

if((c==HIGH)&&(sss1==HIGH)&&(s3==HIGH)&&(
s1==LOW)&&(m==HIGH)){seven0();

lcd.setCursor(0,1);

lcd.print("FLOOR3");

myservo.write(105);

delay(3775);

seven1();

lcd.setCursor(0,1);

lcd.print("FLOOR2");

delay(3775);

myservo.write(90);

seven2();

lcd.setCursor(0,1);

lcd.print("FLOOR1");buzz();

}

if((c==HIGH)&&(sss1==HIGH)&&(s3==HIGH)&&(
s4==LOW)&&(m==HIGH)){

lcd.setCursor(0,1);

lcd.print("FLOOR0");

```

```

seven3();

myservo.write(70);

delay(5600);

myservo.write(90);

seven2();

lcd.setCursor(0,1);

lcd.print("FLOOR1");buzz();

}

if((c==HIGH)&&(sss3==HIGH)&&(s2==HIGH)&&(
s3==LOW)&&(m==HIGH)){

lcd.setCursor(0,1);

lcd.print("FLOOR1");

seven2();

myservo.write(70);

delay(5300);

myservo.write(90);

seven1();

lcd.setCursor(0,1);

lcd.print("FLOOR2");buzz();

}

if((c==HIGH)&&(sss3==HIGH)&&(s2==HIGH)&&(
s1==LOW)&&(m==HIGH)){

lcd.setCursor(0,1);

lcd.print("FLOOR3");

seven0();

myservo.write(105);

```

```

delay(3800);

myservo.write(90);

seven1();

lcd.setCursor(0,1);

lcd.print("FLOOR2");buzz();

}

if((c==HIGH)&&(sss3==HIGH)&&(s2==HIGH)&&(
s4==LOW)&&(m==HIGH)){

    lcd.setCursor(0,1);

    lcd.print("FLOOR0");

    seven3();

    myservo.write(70);

    delay(5400);

    seven2();

    lcd.setCursor(0,1);

    lcd.print("FLOOR1");

    delay(5400);

    myservo.write(90);

    seven1();

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");buzz();

}

if((c==HIGH)&&(sss4==HIGH)&&(s1==HIGH)&&(
s2==LOW)&&(m==HIGH)){

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");

```

```

seven1();

myservo.write(70);

delay(5350);

myservo.write(90);

seven0();

lcd.setCursor(0,1);

lcd.print("FLOOR3");buzz();

}

if((c==HIGH)&&(sss4==HIGH)&&(s1==HIGH)&&(
s3==LOW)&&(m==HIGH)){

    lcd.setCursor(0,1);

    lcd.print("FLOOR1");

    seven2();

    myservo.write(70);

    delay(5300);

    seven1();

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");

    delay(5300);

    seven0();

    myservo.write(90);

    lcd.setCursor(0,1);

    lcd.print("FLOOR3");buzz();

}

if((c==HIGH)&&(sss4==HIGH)&&(s1==HIGH)&&(
s4==LOW)&&(m==HIGH)){

```

```

    lcd.setCursor(0,1);

    lcd.print("FLOOR0");

    seven3();

    myservo.write(70);

    delay(5360);

    seven2();

    lcd.setCursor(0,1);

    lcd.print("FLOOR1");

    delay(5360);

    seven1();

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");

    delay(6160);

    myservo.write(90);

    seven0();

    lcd.setCursor(0,1);

    lcd.print("FLOOR3");buzz();

}

if(temperaturec>37){digitalWrite(buzzer,HIGH);

}

}

void keypadEvent(KeypadEvent eKey){

```

```

    switch (keypad.getState()){

        case PRESSED:

            Serial.print("Pressed: ");

            Serial.println(eKey);

            switch (eKey){

                case 'A': checkPassword(); break;

                case 'B': password1.reset(); break;

                password2.reset(); break;

                password3.reset(); break;

                default: password1.append(eKey);

                password2.append(eKey);

                password3.append(eKey);

            }

        }

    }

}

void checkPassword(){

    if

    ((password1.evaluate())&&(m==HIGH)){lcd.setCursor(0,1);

    lcd.print("FLOOR0");

    seven3();

    myservo.write(70);

    delay(5500);

    myservo.write(90);

```

```

lcd.setCursor(0,1);

lcd.print("FLOOR1");

Serial.println("FLOOR1");

seven2();buzz();

delay(5000);

myservo.write(110);

delay(3400);

myservo.write(90);

lcd.setCursor(0,1);

lcd.print("FLOOR0");

seven3();buzz();


password1.reset();

password2.reset();

password3.reset(); }

if
((password2.evaluate())&&(m==HIGH)){lcd.setC
ursor(0,1);

lcd.print("FLOOR0");

seven3();

myservo.write(70);

delay(5500);

lcd.setCursor(0,1);

lcd.print("FLOOR1");

seven2();

delay(5900);

```

```

myservo.write(90);

lcd.setCursor(0,1);

lcd.print("FLOOR2");

seven1();

Serial.println("FLOOR2");

buzz();

delay(5000);

myservo.write(110);

delay(3900);

lcd.setCursor(0,1);

lcd.print("FLOOR1");

seven2();

delay(3000);

myservo.write(90);

lcd.setCursor(0,1);

lcd.print("FLOOR0");

seven3();buzz();


password1.reset();

password2.reset();

password3.reset();

}

if
((password3.evaluate())&&(m==HIGH)){lcd.setC
ursor(0,1);

lcd.print("FLOOR0");

```



```
seven3();  
myservo.write(70);  
delay(5333);  
lcd.setCursor(0,1);  
lcd.print("FLOOR1");  
seven2();  
delay(5333);  
lcd.setCursor(0,1);  
lcd.print("FLOOR2");  
seven1();  
delay(5200);  
myservo.write(90);  
lcd.setCursor(0,1);  
lcd.print("FLOOR3");  
seven0();  
Serial.println("FLOOR3");  
buzz();  
delay(5000);  
myservo.write(110);  
delay(3533);  
lcd.setCursor(0,1);  
lcd.print("FLOOR2");  
seven1();  
delay(3533);  
lcd.setCursor(0,1);
```

```
lcd.print("FLOOR1");  
seven2();  
delay(3000);  
lcd.setCursor(0,1);  
lcd.print("FLOOR0");  
seven3();buzz();  
  
myservo.write(90);  
password1.reset();  
password2.reset();  
password3.reset();  
}  
}  
  
void Control(){f=Serial.read();  
s1=digitalRead(sensor1);  
s2=digitalRead(sensor2);  
s3=digitalRead(sensor3);  
s4=digitalRead(sensor4);  
m=digitalRead(magnetic);  
reading=analogRead(sensorpin);  
voltage=reading*5.0/1024;  
temperaturec=((voltage+0.5)*100)-52;  
lcd.setCursor(7,1);  
lcd.print("TEM:");  
lcd.setCursor(11,1);
```

```

lcd.print(temperaturec);

if((f=='0')&&(s4==HIGH)&&(s2==LOW)&&(m==HIGH)){

  lcd.setCursor(0,1);

  lcd.print("FLOOR2");

  seven1();

  myservo.write(105);

  delay(4050);

  lcd.setCursor(0,1);

  lcd.print("FLOOR1");

  seven2();

  delay(3900);

  myservo.write(90);

  seven3();

  lcd.setCursor(0,1);

  lcd.print("FLOOR0");buzz();

}

if((f=='0')&&(s4==HIGH)&&(s1==LOW)&&(m==HIGH)){lcd.setCursor(0,1);

  lcd.print("FLOOR3");

  seven0();

  myservo.write(105);

  delay(3890);

  lcd.setCursor(0,1);

  lcd.print("FLOOR2");

```

```

seven1();

delay(3890);

lcd.setCursor(0,1);

lcd.print("FLOOR1");

seven2();

delay(3890);

myservo.write(90);

seven3();

lcd.setCursor(0,1);

lcd.print("FLOOR0");buzz();

}

if((f=='0')&&(s4==HIGH)&&(s3==LOW)&&(m==HIGH)){

  lcd.setCursor(0,1);

  lcd.print("FLOOR1");

  seven2();

  myservo.write(105);

  delay(3900);

  myservo.write(90);

  seven3();

  lcd.setCursor(0,1);

  lcd.print("FLOOR0");buzz();

}

if((f=='1')&&(s3==HIGH)&&(s2==LOW)&&(m==HIGH)){

  lcd.setCursor(0,1);

```

```

lcd.print("FLOOR2");

seven1();

myservo.write(105);

delay(3900);

myservo.write(90);

seven2();

lcd.setCursor(0,1);

lcd.print("FLOOR1");buzz();

}

if((f=='1')&&(s3==HIGH)&&(s1==LOW)&&(m==HIGH)){seven0();

lcd.setCursor(0,1);

lcd.print("FLOOR3");

myservo.write(105);

delay(3775);

seven1();

lcd.setCursor(0,1);

lcd.print("FLOOR2");

delay(3775);

myservo.write(90);

seven2();

lcd.setCursor(0,1);

lcd.print("FLOOR1");buzz();

}

if((f=='1')&&(s3==HIGH)&&(s4==LOW)&&(m==HIGH)){

```

```

lcd.setCursor(0,1);

lcd.print("FLOOR0");

seven3();

myservo.write(70);

delay(5600);

myservo.write(90);

seven2();

lcd.setCursor(0,1);

lcd.print("FLOOR1");buzz();

}

if((f=='2')&&(s2==HIGH)&&(s3==LOW)&&(m==HIGH)){

lcd.setCursor(0,1);

lcd.print("FLOOR1");

seven2();

myservo.write(70);

delay(5300);

myservo.write(90);

seven1();

lcd.setCursor(0,1);

lcd.print("FLOOR2");buzz();

}

if((f=='2')&&(s2==HIGH)&&(s1==LOW)&&(m==HIGH)){

lcd.setCursor(0,1);

lcd.print("FLOOR3");

```

```

seven0();

myservo.write(105);

delay(3800);

myservo.write(90);

seven1();

lcd.setCursor(0,1);

lcd.print("FLOOR2");buzz();

}

if((f=='2')&&(s2==HIGH)&&(s4==LOW)&&(m==HIGH)){

    lcd.setCursor(0,1);

    lcd.print("FLOOR0");

    seven3();

    myservo.write(70);

    delay(5400);

    seven2();

    lcd.setCursor(0,1);

    lcd.print("FLOOR1");

    delay(5400);

    myservo.write(90);

    seven1();

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");buzz();

}

if((f=='3')&&(s1==HIGH)&&(s2==LOW)&&(m==HIGH)){

```

```

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");

    seven1();

    myservo.write(70);

    delay(5350);

    myservo.write(90);

    seven0();

    lcd.setCursor(0,1);

    lcd.print("FLOOR3");buzz();

}

if((f=='3')&&(s1==HIGH)&&(s3==LOW)&&(m==HIGH)){

    lcd.setCursor(0,1);

    lcd.print("FLOOR1");

    seven2();

    myservo.write(70);

    delay(5300);

    seven1();

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");

    delay(5300);

    seven0();

    myservo.write(90);

    lcd.setCursor(0,1);

    lcd.print("FLOOR3");buzz();

}

```

```

if((f=='3')&&(s1==HIGH)&&(s4==LOW)&&(m==HIGH)){

    lcd.setCursor(0,1);

    lcd.print("FLOOR0");

    seven3();

    myservo.write(70);

    delay(5360);

    seven2();

    lcd.setCursor(0,1);

    lcd.print("FLOOR1");

    delay(5360);

    seven1();

    lcd.setCursor(0,1);

    lcd.print("FLOOR2");

    delay(6160);

    myservo.write(90);

    seven0();

    lcd.setCursor(0,1);

    lcd.print("FLOOR3");buzz();

}

}

void seven0(){

if(digitalRead(sensor1)==LOW){

    digitalWrite(leda,HIGH);

    digitalWrite(ledb,HIGH);

```

```

    digitalWrite(ledc,LOW);

    digitalWrite(ledd,LOW);

    digitalWrite(lede,HIGH);

    digitalWrite(ledf,HIGH);

    digitalWrite(ledg,HIGH);}

}

void

seven1(){if(digitalRead(sensor2)==LOW){

    digitalWrite(leda,HIGH);

    digitalWrite(ledb,HIGH);

    digitalWrite(ledc,LOW);

    digitalWrite(ledd,HIGH);

    digitalWrite(lede,HIGH);

    digitalWrite(ledf,LOW);

    digitalWrite(ledg,HIGH);

}}

void seven2(){

if(digitalRead(sensor3)==LOW){

    digitalWrite(leda,HIGH);

    digitalWrite(ledb,LOW);

    digitalWrite(ledc,LOW);

    digitalWrite(ledd,LOW);

    digitalWrite(lede,LOW);

    digitalWrite(ledf,HIGH);

    digitalWrite(ledg,LOW);

}}

```

```
void seven3(){if(digitalRead(sensor4)==LOW){  
    digitalWrite(leda,HIGH);  
    digitalWrite(ledb,HIGH);  
    digitalWrite(ledc,HIGH);  
    digitalWrite(ledd,HIGH);  
    digitalWrite(ledf,HIGH);  
    digitalWrite(ledf,HIGH);  
    digitalWrite(ledg,LOW);  
}}
```

```
void buzz(){digitalWrite(buzzer,HIGH);  
    delay(800);  
    digitalWrite(buzzer,LOW);}
```



Figure 1: Aircraft elevators



Figure 2: Paternoster



Figure 3: Scissor lift



Figure 4: Climbing elevator



Figure 5: Handicap Elevators

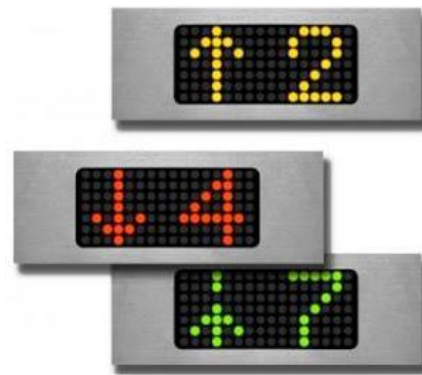


Figure 6: Car display



Figure 7: Relay based controller



Figure 8: Solid-State Logic Technology



Figure 9: PLC controller



Figure 10: manual door