**APPENDIX**

#define sensor1 2 //Inductive Sensor Level (1) connected to pin 2 //

#define sensor2 3 //Inductive Sensor Level (2) connected to pin 3 //

#define sensor3 4 //Inductive Sensor Level (3) connected to pin 4 //

#define echoPin 12 //Ultrasonic Echo connected to pin 12 //

#define trigPin 1 //Ultrasonic Triger connected to pin 13 //

#define relay1 36 //Relay(1) connected to pin 36 //

#define relay2 38 // Relay(2) connected to pin 38 //

#define relay3 40 //Relay(3) connected to pin 40 //

#define relay4 42 //Relay(4) connected to pin 42 //

#define relay5 44 //Relay(5) connected to pin 44 //

#define relay6 46 //Relay(6) connected to pin 46 //

#define relay7 48 //Relay(7) connected to pin 48 //

#define relay8 50 //Relay(8) connected to pin 50 //

#define limit 52 //Door closed limit switch connected to pin 52 //

#define segmentA 22 //Seven Segment(A) connected to pin 22 //

#define segmentB 24 //Seven Segment(B) connected to pin 24 //

#define segmentC 26 //Seven Segment(C) connected to pin 26 //

#define segmentD 28 //Seven Segment(D) connected to pin 28 //

#define segmentE 30 //Seven Segment(E) connected to pin 30 //

#define segmentF 32 //Seven Segment(F) connected to pin 32 //

#define segmentG 34 //Seven Segment(G) connected to pin 34 //

#define buzzer 53 //Buzzer connected to pin 53 //

#include<Stepper.h>

const int stepsPerRevolution = 200;

Stepper myStepper(stepsPerRevolution,8,9,10,11); // Stepper Motor connected to pin 8,9,10,11 //

const int buttonPin1 = 5; //Level(1) Button and Keypad connected to pin 5 //

const int buttonPin2 = 6; //Level(2) Button and Keypad connected to pin 6 //

const int buttonPin3 = 7; //Level(3) Button and Keypad connected to pin 7 //

int buttonState1 = 0;

int buttonState2 = 0;

int buttonState3 = 0;

int lastButtonState1 = 0;

int lastButtonState2 = 0;

int lastButtonState3 = 0;

boolean level1 = true;

boolean level2 = false;

boolean level3 = false;

void setup()

{

myStepper.setSpeed(65); // Define the Stepper motor speed //

Serial.begin(9600);

pinMode(sensor1,INPUT);

pinMode(sensor2,INPUT);

pinMode(sensor3,INPUT);

pinMode(buttonPin1,INPUT);

pinMode(buttonPin2,INPUT);

pinMode(buttonPin3,INPUT);

pinMode(echoPin,INPUT);

pinMode(trigPin,OUTPUT);

pinMode(relay1,OUTPUT);

pinMode(relay2,OUTPUT);

pinMode(relay3,OUTPUT);

pinMode(relay4,OUTPUT);

pinMode(relay5,OUTPUT);

pinMode(relay6,OUTPUT);

pinMode(relay7,OUTPUT);

pinMode(relay8,OUTPUT);

pinMode(limit,INPUT);

pinMode(segmentA,OUTPUT);

pinMode(segmentB,OUTPUT);

pinMode(segmentC,OUTPUT);

pinMode(segmentD,OUTPUT);

pinMode(segmentE,OUTPUT);

pinMode(segmentF,OUTPUT);

pinMode(segmentG,OUTPUT);

pinMode(buzzer,OUTPUT);

}

void loop()

{

buttonState1 = digitalRead(buttonPin1);

buttonState2 = digitalRead(buttonPin2);

buttonState3 = digitalRead(buttonPin3);

if(digitalRead(sensor1)!=HIGH || digitalRead(sensor2)!=HIGH ||

digitalRead(sensor3)!=HIGH)

{

long duration, distance;

digitalWrite(trigPin,LOW);

delayMicroseconds(20);

digitalWrite(trigPin,HIGH);

delayMicroseconds(20);

digitalWrite(trigPin,LOW);

duration=pulseIn(echoPin,HIGH);

distance=(duration/2)/29.1;

if(distance>90) // Condition of Ultrasonics sensor sensing //

{

digitalWrite(relay1,LOW); // Open Door condition //

digitalWrite(relay2,LOW);

digitalWrite(relay3,LOW);

digitalWrite(relay4,LOW);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

Serial.print(distance);

Serial.println("cm");

delay(4500);

}

else // Condition of Ultrasonics sensor no sensing //

{

digitalWrite(relay5,LOW); // Closed Door condition //

digitalWrite(relay6,LOW);

digitalWrite(relay7,LOW);

digitalWrite(relay8,LOW);

digitalWrite(relay1,HIGH);

digitalWrite(relay2,HIGH);

digitalWrite(relay3,HIGH);

digitalWrite(relay4,HIGH);

if(digitalRead(limit)==HIGH) // To Stop the Door closing condition //

{

digitalWrite(relay1,HIGH); // Both the Door opening and closing condition Stop //

digitalWrite(relay2,HIGH);

digitalWrite(relay3,HIGH);

digitalWrite(relay4,HIGH);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

}

}

Serial.print(distance);

Serial.println("cm");

delay(5);

}

if(buttonState1 !=lastButtonState1 || buttonState2 !=lastButtonState2 ||

buttonState3 !=lastButtonState3)

{

if(level1 == true )

{

if(buttonState1 == HIGH )

{

level1 = true;

level2 = false;

level3 = false;

digitalWrite(segmentA,LOW); // To display number 1 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentC,HIGH);

digitalWrite(segmentD,LOW);

digitalWrite(segmentE,LOW);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,LOW);

long duration, distance;

digitalWrite(trigPin,LOW);

delayMicroseconds(20);

digitalWrite(trigPin,HIGH);

delayMicroseconds(20);

digitalWrite(trigPin,LOW);

duration=pulseIn(echoPin,HIGH);

distance=(duration/2)/29.1;

digitalWrite(relay1,LOW);

digitalWrite(relay2,LOW);

digitalWrite(relay3,LOW);

digitalWrite(relay4,LOW);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

Serial.print(distance);

Serial.println("cm");

delay(4500);

}

if (buttonState2 == HIGH ){

myStepper.step(885);

level1 = false;

level2 = true;

level3 = false;

digitalWrite(segmentA,HIGH); //To display number 2 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentC,LOW);

digitalWrite(segmentD,HIGH);

digitalWrite(segmentE,HIGH);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,HIGH);

digitalWrite(buzzer,HIGH); //Buzzer alarm //

delay(1000);

digitalWrite(buzzer,LOW);

long duration, distance;

digitalWrite(trigPin,LOW);

delayMicroseconds(20);

digitalWrite(trigPin,HIGH);

delayMicroseconds(20);

digitalWrite(trigPin,LOW);

duration=pulseIn(echoPin,HIGH);

distance=(duration/2)/29.1;

digitalWrite(relay1,LOW);

digitalWrite(relay2,LOW);

digitalWrite(relay3,LOW);

digitalWrite(relay4,LOW);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

Serial.print(distance);

Serial.println("cm");

delay(4500);

}

if (buttonState3 == HIGH )

{

myStepper.step(885);

delay(5);

digitalWrite(segmentA,HIGH); // To display number 2 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentC,LOW);

digitalWrite(segmentD,HIGH);

digitalWrite(segmentE,HIGH);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,HIGH);

myStepper.step(1005);

level1 = false;

level2 = false;

level3 = true;

digitalWrite(segmentA,HIGH); // To display number 3 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentC,HIGH);

digitalWrite(segmentD,HIGH);

digitalWrite(segmentE,LOW);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,HIGH);

digitalWrite(buzzer,HIGH);

delay(1000);

digitalWrite(buzzer,LOW);

long duration, distance;

digitalWrite(trigPin,LOW);

delayMicroseconds(20);

digitalWrite(trigPin,HIGH);

delayMicroseconds(20);

digitalWrite(trigPin,LOW);

duration=pulseIn(echoPin,HIGH);

distance=(duration/2)/29.1;

digitalWrite(relay1,LOW);

digitalWrite(relay2,LOW);

digitalWrite(relay3,LOW);

digitalWrite(relay4,LOW);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

Serial.print(distance);

Serial.println("cm");

delay(4500);

}

}

else if (level2 == true )

if (buttonState1 == HIGH )

{

myStepper.step(-885);

level1 = true;

level2 = false;

level3 = false;

digitalWrite(segmentA,LOW); // To display number 1 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentC,HIGH);

digitalWrite(segmentD,LOW);

digitalWrite(segmentE,LOW);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,LOW);

digitalWrite(buzzer,HIGH);

delay(1000);

digitalWrite(buzzer,LOW);

long duration, distance;

digitalWrite(trigPin,LOW);

delayMicroseconds(20);

digitalWrite(trigPin,HIGH);

delayMicroseconds(20);

digitalWrite(trigPin,LOW);

duration=pulseIn(echoPin,HIGH);

distance=(duration/2)/29.1;

digitalWrite(relay1,LOW);

digitalWrite(relay2,LOW);

digitalWrite(relay3,LOW);

digitalWrite(relay4,LOW);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

Serial.print(distance);

Serial.println("cm");

delay(4500);

}

if (buttonState2 == HIGH )

{

level1 = false;

level2 = true;

level3 = false;

digitalWrite(segmentA,HIGH); // To display number 2 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentC,LOW);

digitalWrite(segmentD,HIGH);

digitalWrite(segmentE,HIGH);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,HIGH);

long duration, distance;

digitalWrite(trigPin,LOW);

delayMicroseconds(20);

digitalWrite(trigPin,HIGH);

delayMicroseconds(20);

digitalWrite(trigPin,LOW);

duration=pulseIn(echoPin,HIGH);

distance=(duration/2)/29.1;

digitalWrite(relay1,LOW);

digitalWrite(relay2,LOW);

digitalWrite(relay3,LOW);

digitalWrite(relay4,LOW);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

Serial.print(distance);

Serial.println("cm");

delay(4500);

}

if (buttonState3 == HIGH ){

myStepper.step(1010);

level1 = false;

level2 = false;

level3 = true;

digitalWrite(segmentA,HIGH); // To display number 3 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentE,LOW);

digitalWrite(segmentD,HIGH);

digitalWrite(segmentC,HIGH);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,HIGH);

digitalWrite(buzzer,HIGH);

delay(1000);

digitalWrite(buzzer,LOW);

long duration, distance;

digitalWrite(trigPin,LOW);

delayMicroseconds(20);

digitalWrite(trigPin,HIGH);

delayMicroseconds(20);

digitalWrite(trigPin,LOW);

duration=pulseIn(echoPin,HIGH);

distance=(duration/2)/29.1;

digitalWrite(relay1,LOW);

digitalWrite(relay2,LOW);

digitalWrite(relay3,LOW);

digitalWrite(relay4,LOW);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

Serial.print(distance);

Serial.println("cm");

delay(4500);

}

}

else if (level3 == true ){

if (buttonState1 == HIGH )

{ myStepper.step(-1005);

delay(5);

digitalWrite(segmentA,HIGH); // To display number 2 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentC,LOW);

digitalWrite(segmentD,HIGH);

digitalWrite(segmentE,HIGH);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,HIGH);

myStepper.step(-885);

level1 = true;

level2 = false;

level3 = false;

digitalWrite(segmentA,LOW); // To display number 1 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentC,HIGH);

digitalWrite(segmentD,LOW);

digitalWrite(segmentE,LOW);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,LOW);

digitalWrite(buzzer,HIGH);

delay(1000);

digitalWrite(buzzer,LOW);

long duration, distance;

digitalWrite(trigPin,LOW);

delayMicroseconds(20);

digitalWrite(trigPin,HIGH);

delayMicroseconds(20);

digitalWrite(trigPin,LOW);

duration=pulseIn(echoPin,HIGH);

distance=(duration/2)/29.1;

digitalWrite(relay1,LOW);

digitalWrite(relay2,LOW);

digitalWrite(relay3,LOW);

digitalWrite(relay4,LOW);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

Serial.print(distance);

Serial.println("cm");

delay(4500);

}

if (buttonState2 == HIGH )

{myStepper.step(-1010);

level1 = false;

level2 = true;

level3 = false;

delay(1);

digitalWrite(segmentA,HIGH); // To display number 2 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentC,LOW);

digitalWrite(segmentD,HIGH);

digitalWrite(segmentE,HIGH);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,HIGH);

digitalWrite(buzzer,HIGH);

delay(1000);

digitalWrite(buzzer,LOW);

long duration, distance;

digitalWrite(trigPin,LOW);

delayMicroseconds(20);

digitalWrite(trigPin,HIGH);

delayMicroseconds(20);

digitalWrite(trigPin,LOW);

duration=pulseIn(echoPin,HIGH);

distance=(duration/2)/29.1;

digitalWrite(relay1,LOW);

digitalWrite(relay2,LOW);

digitalWrite(relay3,LOW);

digitalWrite(relay4,LOW);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

Serial.print(distance);

Serial.println("cm");

delay(4500);

}

if (buttonState3 == HIGH ){

level1 = false;

level2 = false;

level3 = true;

digitalWrite(segmentA,HIGH); // To display number 3 //

digitalWrite(segmentB,HIGH);

digitalWrite(segmentE,LOW);

digitalWrite(segmentD,HIGH);

digitalWrite(segmentC,HIGH);

digitalWrite(segmentF,LOW);

digitalWrite(segmentG,HIGH);

long duration, distance;

digitalWrite(trigPin,LOW);

delayMicroseconds(20);

digitalWrite(trigPin,HIGH);

delayMicroseconds(20);

digitalWrite(trigPin,LOW);

duration=pulseIn(echoPin,HIGH);

distance=(duration/2)/29.1;

digitalWrite(relay1,LOW);

digitalWrite(relay2,LOW);

digitalWrite(relay3,LOW);

digitalWrite(relay4,LOW);

digitalWrite(relay5,HIGH);

digitalWrite(relay6,HIGH);

digitalWrite(relay7,HIGH);

digitalWrite(relay8,HIGH);

Serial.print(distance);

Serial.println("cm");

delay(4500);

}

}

lastButtonState1 = buttonState1;

lastButtonState2 = buttonState2;

lastButtonState3 = button

}