#include <LiquidCrystal\_I2C.h> // includes the LiquidCrystalI2C Library

#include <Keypad.h>// includes the Keypad Library

/\*DEFINE PINS\*/

#define buzzer A1 //define the pin of buzzer

#define trigPin A2 //define the pin of first ultrasonic

#define echoPin A3 //define the pin of first ultrasonic

#define trigPin2 10 //define the pin of second ultrasonic

#define echoPin2 11 //define the pin of second ultrasonic

#define pirPin 12 // define the pin of motion sensor

#define redPin 13 // define the pin of red led

#define yellowPin A0 // define the pin of yellow led

/\*DEFINE VARIABLES\*/

long duration,duration2; //for ultrasonics

long distance, initialDistance, currentDistance; //for first ultrasonic

long distance2, initialDistance2, currentDistance2; //for second ultrasonic

int i;

int screenOffMsg =0;

int buttonPushCounter = 1; // counter for the number of button presses

int buttonState = LOW; // current state of the button

int lastButtonState = LOW; // previous state of the button

int countdown; //to deactivate and activate

int val ; //pir Pin

/\*VARIABLES FOR ALARM SYSTEM\*/

String password="1234";

String tempPassword;

boolean activated = false; // State of the alarm

boolean activateAlarm = false;

boolean alarmActivated = false;

boolean passChangeMode = false;

boolean passChanged = false;

boolean passEnter=false;

/\*DEFINE KEYPAD\*/

const byte ROWS = 4; //four rows

const byte COLS = 4; //four columns1

char keypressed;

//define the symbols on the buttons of the keypads

char keyMap[ROWS][COLS] = {

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

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

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

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

};

byte rowPins[ROWS] = {2,3,4,5}; //Row pinouts of the keypad

byte colPins[COLS] = {6,7,8,9}; //Column pinouts of the keypad

Keypad myKeypad = Keypad( makeKeymap(keyMap), rowPins, colPins, ROWS, COLS);

/\*DEFINE KEYPAD\*/

LiquidCrystal\_I2C lcd(0x3F,20,4); //LCD address, gotten through library

void setup() {

lcd.init();

lcd.backlight();

Serial.begin(9600);

pinMode(buzzer, OUTPUT); // Sets the buzzer as an Output

pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output

pinMode(echoPin, INPUT); // Sets the echoPin as an Input

pinMode(trigPin2, OUTPUT); // Sets the trigPin as an Output

pinMode(echoPin2, INPUT); // Sets the echoPin as an Input

pinMode(pirPin, INPUT); // Sets the pirPin as an Input

pinMode(redPin, OUTPUT); // Sets the redPin as an Output

pinMode(yellowPin, OUTPUT); // Sets the yellowPin as an Output

}

void loop() {

if (activateAlarm==true) {

lcd.clear(); //clear lcd screen

lcd.setCursor(0,0); //set the position of lcd

lcd.print("Alarm will be"); //print on lcd

lcd.setCursor(0,1); //set the position

lcd.print("activated in"); //print on lcd

int countdown = 9; // 9 seconds count down before activating the alarm

while (countdown != 0) {

lcd.setCursor(13,1); //set the position of countdown

lcd.print(countdown); //print countdown on screen

countdown--;

tone(buzzer, 700, 100); //buzzer sound in every second

delay(1000);

}

lcd.clear(); //clear the screen

lcd.setCursor(0,0);//set position

lcd.print("System is on!");//print

digitalWrite(yellowPin, HIGH);

delay(1000);

initialDistance = getDistance(); //calculate the initial distance for entry exit

initialDistance2 = getDistance2(); //calculate the initial distance for second ultrasonic sensor

activateAlarm = false;

alarmActivated = true;

}

if (alarmActivated == true){

currentDistance = getDistance() +1.0; //get the current distance for entry exit

currentDistance2 = getDistance2()+1.0; //get the current distance for second ultrasonic sensor

val = digitalRead(pirPin); //read value from motion sensor

if ((currentDistance < initialDistance)){ //countdown begin for entry check if password entered to deactivate

countdown=9;

while (countdown != 0) {

lcd.setCursor(0,0);

lcd.print("you have 9 sec");

lcd.setCursor(0,1);

lcd.print("to deactivate");

lcd.setCursor(9,0);

lcd.print(countdown);

countdown--;

tone(buzzer,700,100);

delay(1000);

checkPassword(); // go to check password this my entry area

digitalWrite(yellowPin, LOW);

delay(1000);

if(countdown==0&& alarmActivated==true){ //if password not entered alarm goes off

digitalWrite(yellowPin, LOW);

delay(1000);

tone(buzzer,1000);

digitalWrite(redPin, HIGH);

delay(1000);

enterPassword();

digitalWrite(redPin, LOW);

delay(1000);

}

}

}

else if((val==HIGH)){

digitalWrite(yellowPin, LOW);

delay(1000);

tone(buzzer,1000);

digitalWrite(redPin, HIGH);

delay(1000);

lcd.clear();

enterPassword();

digitalWrite(redPin, LOW);

delay(1000);

}

else if((currentDistance2 < initialDistance2)){

digitalWrite(yellowPin, LOW);

delay(1000);

tone(buzzer,1000);

digitalWrite(redPin, HIGH);

delay(1000);

lcd.clear();

enterPassword();

digitalWrite(redPin, LOW);

delay(1000);

}

}

if (alarmActivated==false) {

if (screenOffMsg == 0 ){

lcd.clear();

lcd.setCursor(0,0);

lcd.print("A-Activate");

lcd.setCursor(0,1);

lcd.print("B-Change Pass");

screenOffMsg = 1;

}

keypressed = myKeypad.getKey();

if (keypressed =='A'){ //If A is pressed, activate the alarm

tone(buzzer, 1000, 200);

activateAlarm = true;

}

else if (keypressed =='B') { //if B is pressed then the change password process starts

lcd.clear();

int i=1;

tone(buzzer, 2000, 100);

tempPassword = "";

lcd.setCursor(0,0);

lcd.print("Current Password"); //current password is printed on LCD

lcd.setCursor(0,1);

lcd.print(">");

passChangeMode = true;

passChanged = true;

while(passChanged) {

keypressed = myKeypad.getKey();

if (keypressed != NO\_KEY){

if (keypressed == '0' || keypressed == '1' || keypressed == '2' || keypressed == '3' ||

keypressed == '4' || keypressed == '5' || keypressed == '6' || keypressed == '7' ||

keypressed == '8' || keypressed == '9' ) {

tempPassword += keypressed;

lcd.setCursor(i,1);

lcd.print("\*");

i++;

tone(buzzer, 2000, 100);

}

}

if (i > 5 || keypressed == '#') { // if buttons pressed is more than 5 or # is pressed the screen resets

tempPassword = "";

i=1;

lcd.clear();

lcd.setCursor(0,0);

lcd.print("Current Password");

lcd.setCursor(0,1);

lcd.print(">");

}

if ( keypressed == '\*') {

i=1;

tone(buzzer, 2000, 100);

if (password == tempPassword) {

tempPassword="";

lcd.clear();

lcd.setCursor(0,0);

lcd.print("Set New Password");

lcd.setCursor(0,1);

lcd.print(">");

while(passChangeMode) {

keypressed = myKeypad.getKey();

if (keypressed != NO\_KEY){

if (keypressed == '0' || keypressed == '1' || keypressed == '2' || keypressed == '3' ||

keypressed == '4' || keypressed == '5' || keypressed == '6' || keypressed == '7' ||

keypressed == '8' || keypressed == '9' ) {

tempPassword += keypressed;

lcd.setCursor(i,1);

lcd.print("\*");

i++;

tone(buzzer, 2000, 100);

}

}

if (i > 5 || keypressed == '#') {

tempPassword = "";

i=1;

tone(buzzer, 2000, 100);

lcd.clear();

lcd.setCursor(0,0);

lcd.print("Set New Password");

lcd.setCursor(0,1);

lcd.print(">");

}

if ( keypressed == '\*') {

i=1;

tone(buzzer, 2000, 100);

password = tempPassword;

passChangeMode = false;

passChanged = false;

screenOffMsg = 0;

}

}

}

}

}

}

}

}

void enterPassword() {

int k=5;

tempPassword = "";

activated = true;

passEnter=true;

lcd.clear();

lcd.setCursor(0,0);

lcd.print(" \*\*\* ALARM \*\*\* ");

lcd.setCursor(0,1);

lcd.print("Pass>");

while(activated) {

keypressed = myKeypad.getKey(); //while alarm is activated checking which keypressed

if (keypressed != NO\_KEY){

if (keypressed == '0' || keypressed == '1' || keypressed == '2' || keypressed == '3' ||

keypressed == '4' || keypressed == '5' || keypressed == '6' || keypressed == '7' ||

keypressed == '8' || keypressed == '9' ) {

tempPassword += keypressed;

lcd.setCursor(k,1);

lcd.print("\*");

k++;

}

}

if (k > 9 || keypressed == '#'){// if # is pressed or the number of buttons pressed is greater then 9 then the screen resets

tempPassword = "";

k=5;

lcd.clear();

lcd.setCursor(0,0);

lcd.print(" \*\*\* ALARM \*\*\* ");

lcd.setCursor(0,1);

lcd.print("Pass>");

}

if ( keypressed == '\*') { // \* is entered at the end of the password to check if its the correct one

if ( tempPassword == password ) {

activated = false;

alarmActivated = false;

noTone(buzzer);

screenOffMsg = 0;

}

else if (tempPassword != password) {

lcd.setCursor(0,1);

lcd.print("Wrong! Try Again");

delay(2000);

lcd.clear();

lcd.setCursor(0,0);

lcd.print(" \*\*\* ALARM \*\*\* ");

lcd.setCursor(0,1);

lcd.print("Pass>");

}

}

}

}

// Custom function for the Ultrasonic sensor

long getDistance(){

// Clears the trigPin

digitalWrite(trigPin, LOW);

delayMicroseconds(2000);

// Sets the trigPin on HIGH state for 10 micro seconds

digitalWrite(trigPin, HIGH);

delayMicroseconds(10);

digitalWrite(trigPin, LOW);

// Reads the echoPinreturns the sound wave travel time in microseconds

duration = pulseIn(echoPin, HIGH);

// Calculating the distance

distance = microsecondsToCentimeters(duration);

Serial.println("distance "+distance);

return distance;

}

long microsecondsToCentimeters(long microseconds) {

// The speed of sound is 340 m/s or 29 microseconds per centimeter.

// The ping travels out and back, so to find the distance of the

// object we take half of the distance travelled.

return microseconds / 29 / 2;

}

long getDistance2(){

// Clears the trigPin

digitalWrite(trigPin2, LOW);

delayMicroseconds(2000);

// Sets the trigPin on HIGH state for 10 micro seconds

digitalWrite(trigPin2, HIGH);

delayMicroseconds(10);

digitalWrite(trigPin2, LOW);

// Reads the echoPin, returns the sound wave travel time in microseconds

duration2 = pulseIn(echoPin2, HIGH);

// Calculating the distance

distance2 = microsecondsToCentimeters(duration2);

Serial.println(distance);

return distance2;

}

int checkPassword(){

keypressed = myKeypad.getKey();

if(keypressed=='C'){

int k=5;

String passwordDeactive="0852";

tempPassword = "";

activated = true;

passEnter=true;

lcd.clear();

lcd.setCursor(0,0);

lcd.print(" \*\*\* ALARM \*\*\* ");

lcd.setCursor(0,1);

lcd.print("Pass>");

while(activated) {

keypressed = myKeypad.getKey();

if (keypressed != NO\_KEY){

if (keypressed == '0' || keypressed == '1' || keypressed == '2' || keypressed == '3' ||

keypressed == '4' || keypressed == '5' || keypressed == '6' || keypressed == '7' ||

keypressed == '8' || keypressed == '9' ) {

tempPassword += keypressed;

lcd.setCursor(k,1);

lcd.print("\*");

k++;

}

}

if (k > 9 || keypressed == '#') {

tempPassword = "";

k=5;

lcd.clear();

lcd.setCursor(0,0);

lcd.print(" \*\*\* ALARM \*\*\* ");

lcd.setCursor(0,1);

lcd.print("Pass>");

}

if ( keypressed == '\*') {

if ( tempPassword == passwordDeactive ) {

activated = false;

alarmActivated = false;

noTone(buzzer);

screenOffMsg = 0;

countdown=0;

}

if (tempPassword !=passwordDeactive) {

countdown=0;

tone(buzzer,700, 100); // Send 1KHz sound signal

lcd.clear();

enterPassword();

}

}

}

}

return countdown;

}