

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Date : 28/03/2022 | | | | | | | |
|  | CSLR61 : EMBEDDED SYSTEMS  **LAB-6** | | | | | |  |
|  |  | | | | |  | |
|  | | |  |  | | | |
|  | | | Roll no. : 106119100Name : Rajneesh PandeySection : CSE-B |  | | | |
|  | |  | | |  | | |

1. Interface an ultrasonic sensor and display the distance measured in a screen and glow red, blue and green led if the distance is

close, moderate and far respectively. Play different tones for different cases.

Code

// 106119100 Lab6-1 Interface an ultrasonic sensor

#define F(x) x ? HIGH : LOW

const int red = 3;

const int blue = 4;

const int green = 5;

const int speaker = 10;

const int ping = 7;

void setup()

{

    // initialize serial communication:

    Serial.begin(9600);

    pinMode(red, OUTPUT);

    pinMode(blue, OUTPUT);

    pinMode(green, OUTPUT);

    pinMode(speaker, OUTPUT);

}

void displayLight(int code)

{

    digitalWrite(red, F(code == 0));

    digitalWrite(blue, F(code == 1));

    digitalWrite(green, F(code == 2));

}

void playTone(long duration, int freq)

{

    duration \*= 1000;

    int period = (1.0 / freq) \* 100000;

    long elapsed\_time = 0;

    while (elapsed\_time < duration)

    {

        digitalWrite(speaker, HIGH);

        delayMicroseconds(period / 2);

        digitalWrite(speaker, LOW);

        delayMicroseconds(period / 2);

        elapsed\_time += (period);

    }

}

void loop()

{

    long duration, inches, cm;

    pinMode(ping, OUTPUT);

    digitalWrite(ping, LOW);

    delayMicroseconds(2);

    digitalWrite(ping, HIGH);

    delayMicroseconds(5);

    digitalWrite(ping, LOW);

    pinMode(ping, INPUT);

    duration = pulseIn(ping, HIGH);

    inches = microsecondsToInches(duration);

    cm = microsecondsToCentimeters(duration);

    Serial.print(inches);

    Serial.print("in, ");

    Serial.print(cm);

    Serial.print("cm");

    Serial.println();

    if (cm < 50)

    {

        displayLight(0);

        playTone(300, 100);

    }

    else if (cm < 150)

    {

        displayLight(1);

        playTone(300, 200);

    }

    else

    {

        displayLight(2);

        playTone(300, 300);

    }

    delay(100);

}

long microsecondsToInches(long microseconds)

{

    return microseconds / 74 / 2;

}

long microsecondsToCentimeters(long microseconds)

{

    return microseconds / 29 / 2;

}

Output

Graphical user interface, website

Description automatically generated

Graphical user interface, website

Description automatically generated

Graphical user interface

Description automatically generated

2. Interface a PIR sensor with Arduino and blink a led if any movement is captured by the sensor and count the number of

movements. Make a buzzer when movement detected

Code:

// 106119100 Interface a PIR sensor with Arduino

#define F(x) x ? HIGH : LOW

const int led = 4;

const int pir = 3;

const int speaker = 10;

int totalMovements = 0;

bool isMoving = false;

void setup()

{

    Serial.begin(9600);

    pinMode(led, OUTPUT);

    pinMode(pir, INPUT);

    pinMode(speaker, OUTPUT);

}

void playTone(long duration, int freq)

{

    duration \*= 1000;

    int period = (1.0 / freq) \* 100000;

    long elapsed\_time = 0;

    while (elapsed\_time < duration)

    {

        digitalWrite(speaker, HIGH);

        delayMicroseconds(period / 2);

        digitalWrite(speaker, LOW);

        delayMicroseconds(period / 2);

        elapsed\_time += (period);

    }

}

void loop()

{

    int pirStat = digitalRead(pir);

    if (pirStat == HIGH)

    {

        if (!isMoving)

        {

            playTone(300, 300);

            totalMovements += 1;

            Serial.print("Total movements: ");

            Serial.print(totalMovements);

            Serial.print("\n");

            isMoving = true;

        }

        digitalWrite(led, HIGH);

    }

    else

    {

        isMoving = false;

        digitalWrite(led, LOW);

    }

}

Output:

Graphical user interface, diagram

Description automatically generated

A picture containing diagram

Description automatically generated