

Task: 3

DISTANCE CALCULATION OF OBJECT

08.03.2022

USING ULTRASONIC SENSOR

Problem definition:

Construct a circuit to calculate the distance of an object placed at a distance using ultrasonic sensor and indicate reading range with buzzer and display the distance of the object using serial monitor.

Tools used:

Software - Arduino

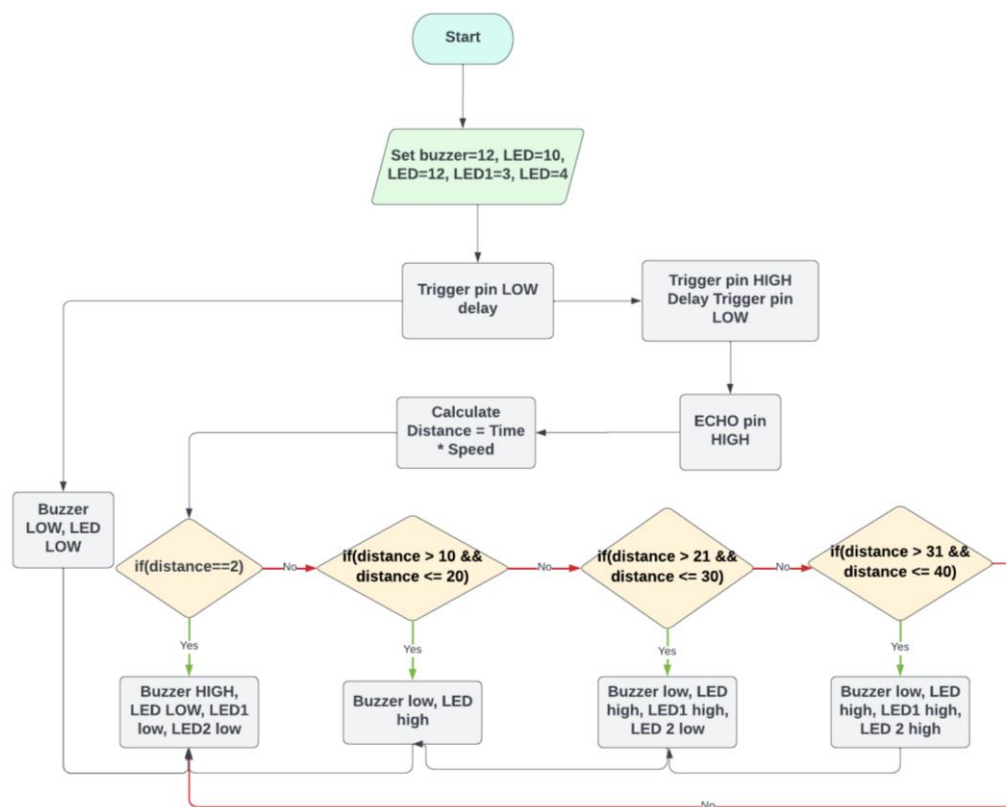
Hardware –Buzzer and ultrasonic sensor

Board - Arduino UNO

Sensor description:

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity.

Flow chart:



Source code:

```
const int trigPin = 7;
const int echoPin = 6;
const int buzzer = 12;
const int LED= 10;
const int LED1 = 3;
const int LED2 = 4;
long time;
int distance;
void setup() {
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(buzzer, OUTPUT);
  pinMode(LED, OUTPUT);
```

```

pinMode(LED1, OUTPUT);
pinMode(LED2, OUTPUT);
Serial.begin(9600);
}
void loop() {
    // digitalWrite(buzzer, LOW);
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
time = pulseIn(echoPin, HIGH);
distance = time * 0.034 / 2;

if(distance == 2)
{
    Serial.println(distance);
    Serial.print("cm \n");
    digitalWrite(buzzer, HIGH);
    digitalWrite(LED, LOW);
    digitalWrite(LED1, LOW);
    digitalWrite(LED2, LOW);
    delay(1000);
}
if(distance > 10 && distance <= 20)
{
    Serial.println(distance);
    Serial.print("cm \n");
    digitalWrite(buzzer, LOW);

```

```
digitalWrite(LED, HIGH);
delay(100);
}

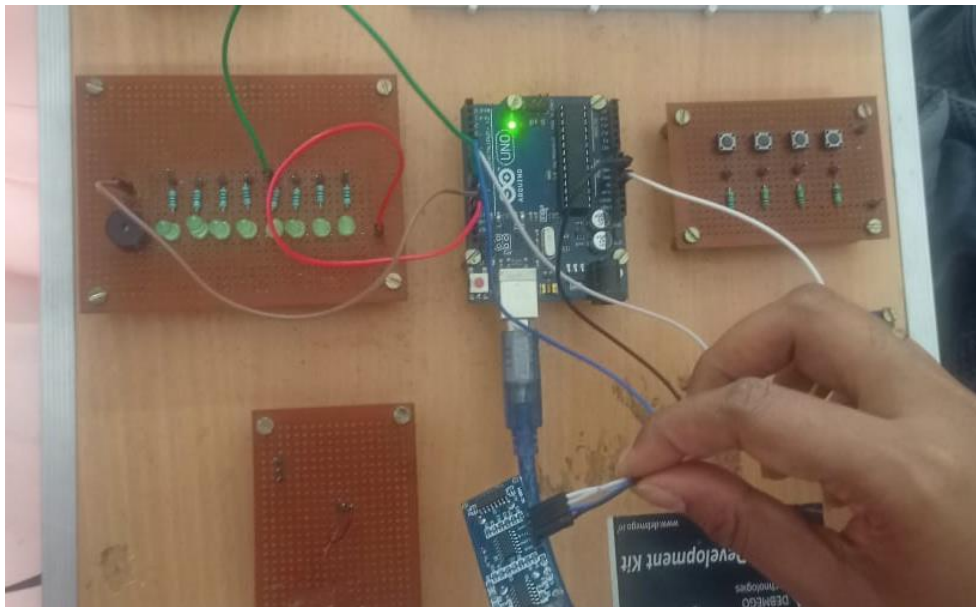
if(distance > 21 && distance <= 30)
{
    Serial.println(distance);
    Serial.print("cm \n");
    digitalWrite(buzzer, LOW);
    digitalWrite(LED, HIGH);
    digitalWrite(LED1, HIGH);
    digitalWrite(LED2, LOW);
    delay(100);
}

if(distance > 31 && distance <= 40)
{
    Serial.println(distance);
    Serial.print("cm \n");
    digitalWrite(buzzer, LOW);
    digitalWrite(LED, HIGH);
    digitalWrite(LED1, HIGH);
    digitalWrite(LED2, HIGH);
    delay(100);
}
else
{
    Serial.println(distance);
    digitalWrite(buzzer, LOW);
```

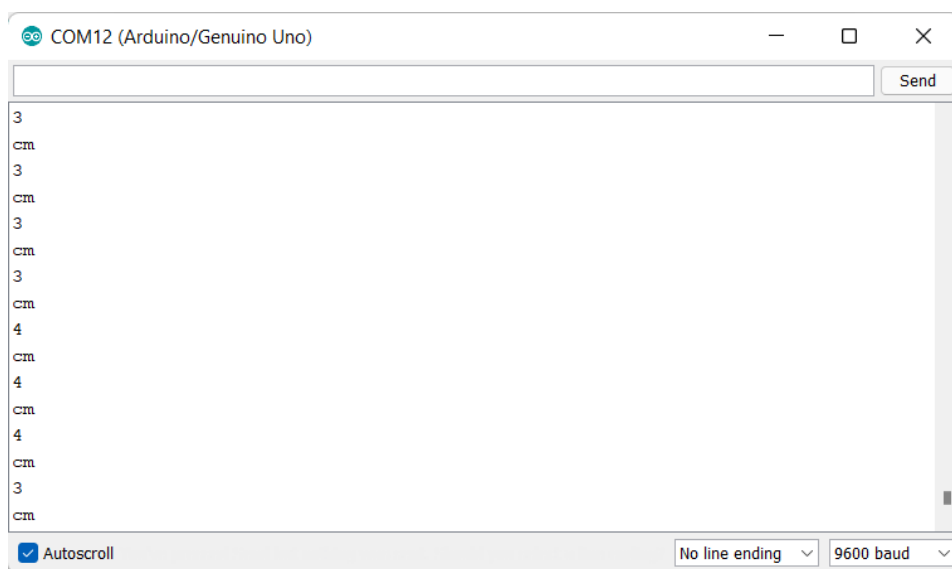
```
digitalWrite(LED , LOW);  
}  
}
```

Sample input and output:

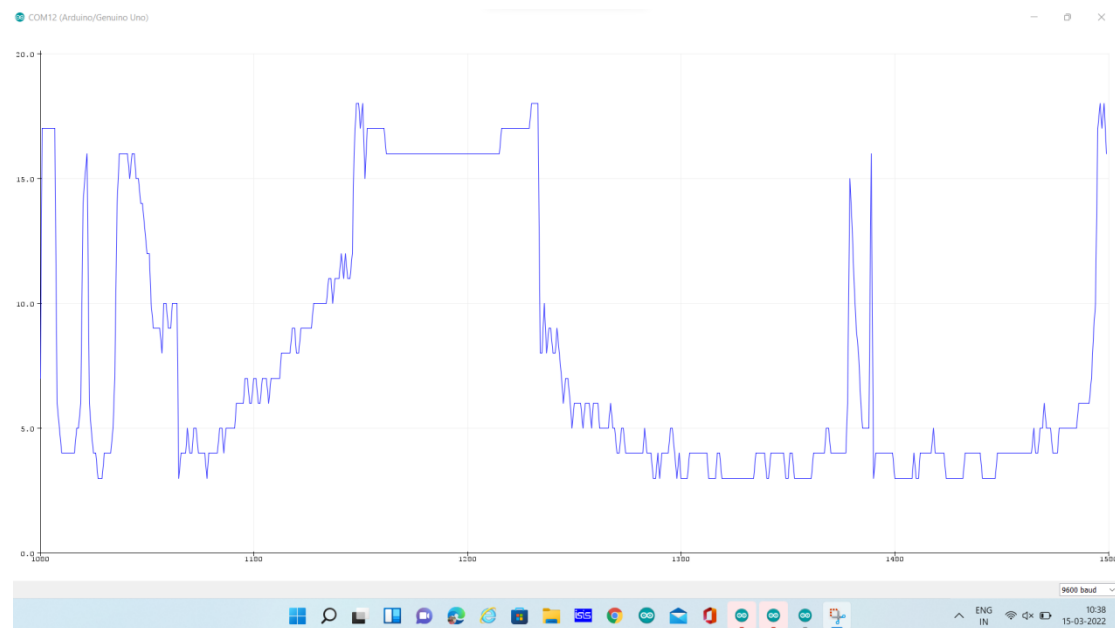
LED blinks and buzzer sound when the ultrasonic sensor detects the object.



Serial monitor of ultrasonic sensor:



Serial plotter of ultrasonic sensor:



Real time applications:

1. Ultrasonic sensor is used within food and beverage to measure liquid level in bottles.
2. Ultrasonic sensors detect the presence of people by sending out ultrasonic sound waves into a space and measuring the speed at which they return.
3. they can be used within manufacturing for an automated process and control maximizing efficiency on the factory floor.

Conclusion:

The circuit has been constructed using Aurdino UNO board using ultrasonic sensor and the outputs of the distance of object are shown in the output peripherals like LED and buzzer.