

**Assignment - 4**  
**Wokwi Ultrasonic Simulation**

|                     |                   |
|---------------------|-------------------|
| Assignment Date     | 2nd November 2022 |
| Student Name        | L Nitish          |
| Student Roll Number | 311119106035      |
| Maximum Marks       | 2 Marks           |

**Question-1:**

Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an "Alert" to IBM cloud and display in the device recent events.

**Solution:**

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

//-----credentials of IBM Accounts-----
#define ORG "ut4tn5"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "LSmB7(R9?FKljjqO4h" //Token
String data3;

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "iot-2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);

const int trigPin = 5;
const int echoPin = 18;
#define SOUND_SPEED 0.034
long duration;
float distance;
```

```

void setup() {
  Serial.begin(115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  wificonnect();
  mqttconnect();
}

```

```

void loop()
{
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = duration * SOUND_SPEED/2;
  Serial.print("Distance (cm): ");
  Serial.println(distance);
  if(distance<100)
  {
    Serial.println("ALERT!!");
    delay(1000);
    PublishData(distance);
    delay(1000);
    if (!client.loop()) {
      mqttconnect();
    }
  }
  delay(1000);
}

```

```

void PublishData(float dist) {
  mqttconnect();
  String payload = "{\"Distance\": ";
  payload += dist;
  payload += ", \"ALERT!!\": \"\" \"Distance less than 100cms\"";
  payload += "}";
  Serial.print("Sending payload: ");
  Serial.println(payload);
  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");
  } else {
    Serial.println("Publish failed");
  }
}

```

```

void mqttconnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(500);
    }
    initManagedDevice();
    Serial.println();
  }
}

```

```

void wificonnect()
{
  Serial.println();
  Serial.print("Connecting to ");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}

```

```

void initManagedDevice() {
  if (client.subscribe(subscribetopic)) {
    Serial.println(subscribetopic);
    Serial.println("subscribe to cmd OK");
  } else {
    Serial.println("subscribe to cmd FAILED");
  }
}

```

```

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
  Serial.print("callback invoked for topic: ");

```

```

Serial.println(subscribetopic);
for (int i = 0; i < payloadLength; i++) {
  //Serial.print((char)payload[i]);
  data3 += (char)payload[i];
}
Serial.println("data: "+ data3);
data3="";
}

```

## OUTPUT:

**Wokwi Simulation Link:** <https://wokwi.com/projects/347238364999582290>

Simulation

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⋮

```

Distance (cm): 121.97
Distance (cm): 82.94
ALERT!!
Sending payload: {"Distance":82.94,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 75.99
ALERT!!

```

Device ID

Status

Device Type

Class ID

Date Added

Descriptive Location

Added By

Device Class

12345

Connected

ESP32

Device

Nov 2, 2022 11:05 PM

nitishmagendran@gmail.com

Identity

Device Information

Recent Events

State

Logs

The recent events listed show the live stream of data that is coming and going from this device.

| Event | Value  | Format | Last Received     |
|-------|--|--------|-------------------|
| Data  | {"Distance":82.94,"ALERT!!":"","Distance less than ... | json   | a few seconds ago |
| Data  | {"Distance":44.95,"ALERT!!":"","Distance less than ... | json   | a few seconds ago |
| Data  | {"Distance":44.95,"ALERT!!":"","Distance less than ... | json   | a few seconds ago |
| Data  | {"Distance":40.97,"ALERT!!":"","Distance less than ... | json   | a few seconds ago |
| Data  | {"Distance":40.99,"ALERT!!":"","Distance less than ... | json   | a few seconds ago |