

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

Assignment Date	2nd November 2022
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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