

# ASSIGNMENT 4

## Ultrasonic sensor simulation in Wokwi

**Team ID :** PNT2022TMID29941

**IBM ID :** IBM-Project-31889-1660205917

**Question :**

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.

**Code:**

```
#include <WiFi.h>
#include <PubSubClient.h>
#include <ArduinoJson.h>
WiFiClient wifiClient;
#define ORG "6hr21b"
#define DEVICE_TYPE "assessment044"
#define DEVICE_ID "assess044"
#define TOKEN "1234567890"
#define speed 0.034
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/abcd_1/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
void publishData();
const int trigpin=5;
const int echopin=18;
String command;
String data="";
String lat="14.167589";
String lon="80.248510";
String name="point2";
String icon="";
long duration;
int dist;
void setup()
{
  Serial.begin(115200);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  wifiConnect();
  mqttConnect();
}
void loop() {
  publishData();
```

```

delay(500);
if (!client.loop()) {
  mqttConnect();
}
}

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

void mqttConnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting MQTT client to "); Serial.println(server);
    while (!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(1000);
    }
    initManagedDevice();
    Serial.println();
  }
}

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

void publishData()
{
  digitalWrite(trigpin, LOW);
  digitalWrite(trigpin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigpin, LOW);
  duration=pulseIn(echopin, HIGH);
  dist=duration*speed/2;
  if(dist<100){
    dist=100-dist;
    icon="fa-trash";
  }else{
    dist=0;
    icon="fa-trash-o";
  }
  DynamicJsonDocument doc(1024);
  String payload;
  doc["Name"]=name;

```

```

doc["Latitude"]=lat;
doc["Longitude"]=lon;
doc["Icon"]=icon;
doc["FillPercent"]=dist;
serializeJson(doc, payload);
delay(3000);
Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);
if (client.publish(publishTopic, (char*) payload.c_str())) {
  Serial.println("Publish OK");
} else {
  Serial.println("Publish FAILED");
}
}
}

```

diagram.json:

```

{
  "version": 1,
  "author": "Divya Selvakumar",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -167.12, "left": 63.69, "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": -54.66, "left": -160.76, "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "ultrasonic1:VCC", "esp:VIN", "red", [ "v101.24", "h-228.44" ] ],
    [ "ultrasonic1:TRIG", "esp:D5", "green", [ "v33.9", "h-138.33" ] ],
    [ "ultrasonic1:ECHO", "esp:D18", "green", [ "v25.24", "h-145.56" ] ],
    [ "ultrasonic1:GND", "esp:GND.1", "black", [ "v88.57", "h-152.78" ] ]
  ]
}

```

Simulation & Output:

WOKWI

SAVE

SHARE

ass 4 divya.ino

Docs

diagram.json

libraries.txt

divya.ino

wokwi-project.txt

Library Manager

```

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8 #define TOKEN "1234567890"
9 #define speed 0.034
10 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
11 char publishTopic[] = "iot-2/evt/abcd_1/fmt/json";
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13 char authMethod[] = "use-token-auth";
14 char token[] = TOKEN;
15 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
16 PubSubClient client(server, 1883, wifiClient);
17 void publishData();
18 const int trigpin=5;
19 const int echopin=18;
20 String command;
21 String data="";
22 String lat="14.167589";
23 String lon="80.248510";
24 String name="point2";
25 String icon="";
26 long duration;
27 int dist;
28 void setup()
29 {
30   Serial.begin(115200);
31   pinMode(trigpin, OUTPUT);
32   pinMode(echopin, INPUT);
33   wifiConnect();
34   mqttConnect();
35 }
36 void loop() {
37   publishData();
38   delay(500);
39   if (!client.loop()) {

```

Simulation

04:51.728 101%

Editing Ultrasonic Distance Sensor

Distance: 239cm

Publish OK

Sending payload:

{ "Name": "point2", "Latitude": "14.167589", "Longitude": "80.248510", "Icon": "fa-trash-o", "FillPercent": 0 }

Publish OK

Sending payload:

{ "Name": "point2", "Latitude": "14.167589", "Longitude": "80.248510", "Icon": "fa-trash-o", "FillPercent": 0 }

Publish OK

IBM Watson IOT connection:

IBM Watson IoT Platform

kiruthikas028.ece@dgct.ac.in

ID: 6hr21b

Browse

Action

Device Types

Interfaces

Add Device

Search by Device ID

Device Simulator

| Device ID | Status       | Device Type   | Class ID | Date Added            | Descriptive Location |
|-----------|--------------|---------------|----------|-----------------------|----------------------|
| assess044 | Connected    | assessment044 | Device   | Nov 13, 2022 2:05 PM  |                      |
| mainprj   | Disconnected | sprint004     | Device   | Nov 13, 2022 12:28 PM |                      |

Identity

Device Information

Recent Events

State

Logs

Device ID

assess044

Device Type

assessment044

Date Added

Nov 13, 2022 2:05 PM

Added By

kiruthikas028.ece@dgct.ac.in

Connection Status

Connected

Connection Time: Nov 13, 2022 2:15 PM

Client Address: 50.31.197.64 Insecure

## Cloud output:

The screenshot displays the IBM Watson IoT Platform interface. At the top, the header shows 'IBM Watson IoT Platform' and a user profile for 'kiruthikas028.ece@dgct.ac.in' with ID '6hr21b'. The main navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A sidebar on the left contains icons for various IoT functions. The main content area shows a list of devices, with 'assess044' selected. Below the device list, a tabbed interface shows 'Recent Events' for the selected device. A message states: 'The recent events listed show the live stream of data that is coming and going from this device.' Below this message is a table of recent events.

| Event  | Value  | Format | Last Received     |
|--------|--|--------|-------------------|
| abcd_1 | {"Name":"point2","Latitude":"14.167589","Longit... | json   | a few seconds ago |
| abcd_1 | {"Name":"point2","Latitude":"14.167589","Longit... | json   | a few seconds ago |
| abcd_1 | {"Name":"point2","Latitude":"14.167589","Longit... | json   | a few seconds ago |
| abcd_1 | {"Name":"point2","Latitude":"14.167589","Longit... | json   | a few seconds ago |
| abcd_1 | {"Name":"point2","Latitude":"14.167589","Longit... | json   | a few seconds ago |