

## ASSIGNMENT 4

**Team ID: PNT2022TMID15932**

- 1. Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an “alert” to the IBM cloud and display in the device recent events.**

**Code:**

```
#include <WiFi.h>

#include <PubSubClient.h>

#include <ArduinoJson.h>

WiFiClient wifiClient;

#define ORG "noeto5"

#define DEVICE_TYPE "devicetype"

#define DEVICE_ID "deviceid"

#define TOKEN "token"

#define speed 0.034

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";

char publishTopic[] = "iot-2/evt/Data/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 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){  
    icon="fa-trash";
```

```
DynamicJsonDocument doc(1024);  
String payload;  
doc["Alert: Distance is less than 100cm"]=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");  
}  
}  
else{  
    icon="fa-trash-o";  
}  
  
}
```

**Wokwi Link:**

<https://wokwi.com/projects/346424392358560338>

## Output:

The screenshot shows the Wokwi simulation environment. On the left, the sketch code is displayed in the sketch.ino file. The code includes libraries for WiFi, PubSubClient, and ArduinoJson. It defines constants for the device ID, token, and speed. The main function sets up the WiFi client and publishes data to the IoT platform. The simulation output on the right shows the distance sensor reading and the resulting JSON payload sent to the IoT platform.

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 #include <ArduinoJson.h>
4
5 WiFiClient wifiClient;
6
7 #define ORG "noeto5"
8 #define DEVICE_TYPE "RaspberryPi"
9 #define DEVICE_ID "12345"
10 #define TOKEN "12345678"
11 #define speed 0.034
12
13 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
14 char publishTopic[] = "iot-2/evt/Data/fmt/json";
15 char topic[] = "iot-2/cmd/home/fmt/String";
16 char authMethod[] = "use-token-auth";
17 char token[] = TOKEN;
18 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
19 PubSubClient client(server, 1883, wifiClient);
20 void publishData();
21
22 const int trigpin=5;
23 const int echopin=18;
24 String command;
25 String data="";
26 String icon="";
27
28 long duration;
29 int dist;
```

Simulation output:

```
Editing Ultrasonic Distance Sensor
Distance: 48cm

Publish OK

Sending payload: {"Alert: Distance is less than 100cm":1}
Publish OK

Sending payload: {"Alert: Distance is less than 100cm":48}
Publish OK
```

The screenshot shows the IBM Watson IoT Platform dashboard. The device details for the device ID 12345 are displayed, showing it is connected and the last update was on 11 Oct 2022 10:25. The recent events section shows a list of events with their values, formats, and last received times.

| Event | Value                                     | Format | Last Received     |
|-------|---|--------|-------------------|
| Data  | {"Alert: Distance is less than 100cm":48} | json   | a few seconds ago |
| Data  | {"Alert: Distance is less than 100cm":1}  | json   | a few seconds ago |
| Data  | {"Alert: Distance is less than 100cm":1}  | json   | a few seconds ago |
| Data  | {"Alert: Distance is less than 100cm":96} | json   | a few seconds ago |
| Data  | {"Alert: Distance is less than 100cm":96} | json   | a few seconds ago |