

#### Assignment -4

Assignment Date	31 October 2022
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Maximum Marks	2 Marks

#### Question-1:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cm send "alert" to IBM cloud and display in device recent events.

WOWKI LINK:

<https://wokwi.com/projects/347013247322292820>

#### Solution:

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "q89p8f"
#define DEVICE_TYPE "Assignment-4"
#define DEVICE_ID "UdhayID"
#define TOKEN "5DXyNJ4qxfI!@JXZtV"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/manimd/fmt/json";
char topic[] = "iot-2/cmd/led/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
```

```
const int trigpin=5;
const int echopin=18;
String command;
String data="";
```

```
long duration;
float dist;
```

```
void setup()
{
```

```

Serial.begin(115200);
pinMode(led, OUTPUT);
pinMode(trigpin, OUTPUT);
pinMode(echopin, INPUT);
wifiConnect();
mqttConnect();
}

void loop() {
    bool isNearby = dist < 100;
    digitalWrite(led, isNearby);

    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(500);
        }
        initManagedDevice();
        Serial.println();
    }
}

void initManagedDevice() {
    if (client.subscribe(topic)) {
        // Serial.println(client.subscribe(topic));
        Serial.println("IBM 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){
        String payload = "{\"Alert Distance\":\"";
        payload += dist;
        payload += "\"}";

        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");
        }

    }

}
```

## Output:

The screenshot shows the Wokwi IoT simulator interface. On the left, the 'sketch.ino' file is open, displaying the following code:

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 WiFiClient wifiClient;
4 String data3;
5 #define ORG "q89p8f"
6 #define DEVICE_TYPE "Assignment-4"
7 #define DEVICE_ID "UdhayID"
8 #define TOKEN "5DXyN34qxfl@JXZtv"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/manimd/fmt/json";
13 char topic[] = "iot-2/cmd/led/fmt/String";
14 char authMethod[] = "use-token-auth";
15 char token[] = TOKEN;
16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 PubSubClient client(server, 1883, wifiClient);
18
19
20
21 const int trigpin=5;
22 const int echopin=18;
23 String command;
24 String data="";
25
26 long duration;
27 float dist;
```

On the right, the 'Simulation' window shows a virtual circuit with an ESP32 module and an HC-SR04 ultrasonic sensor. The sensor is connected to the ESP32's pins. The simulation is running, and the output console shows the following messages:

```
Publish OK
Sending payload: {"Distance":138.96}
Publish OK
Sending payload: {"Distance":138.96}
Publish OK
```

The screenshot shows the IBM Watson IoT Platform dashboard. The top navigation bar includes 'Service Details - IBM Cloud' and 'IBM Watson IoT Platform'. The main content area displays the 'Browse' tab for the device 'UdhayID'. The device is connected and has a status of 'Connected'. The device type is 'Assignment-4' and the class ID is 'Device'. The date added is 'Oct 31, 2022 2:38 PM'. Below the device information, there is a section for 'Recent Events' showing a list of events:

Event	Value	Format	Last Received
manimd	{"Distance":138.96}	json	a few seconds ago
manimd	{"Distance":138.96}	json	a few seconds ago
manimd	{"Distance":138.96}	json	a few seconds ago
manimd	{"Distance":138.96}	json	a few seconds ago
manimd	{"Distance":138.96}	json	a few seconds ago