

## ASSIGNMENT 4

Date	October 2022
Team ID	PNT2022TMID38325
Project Name	Smart Solution for Railways

### QUESTION :

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

### CODE :

```
#include <WiFi.h> //library for wifi
#include <PubSubClient.h> //library for MQTT
WiFiClient wifiClient;
String data3;
#define ORG "msn3bx"
#define DEVICE_TYPE "Priyanka"
#define DEVICE_ID "Priyanka_Assignment_4"
#define TOKEN "12345678"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";

char publishTopic[] = "iot-2/evt/Priyanka/fmt/json";
char topic[] = "iot-2/cmd/status/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=19;
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");
}
}
if(dist>100){
String payload = "{\"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 :

1) When Distance greater than 100 cm

The screenshot displays the WOKWI IoT simulator interface. On the left, the code for the ESP32 device is shown, which includes MQTT client libraries and defines a device named 'Priyanka'. The code publishes distance data to an MQTT topic. On the right, the simulation shows the device publishing a payload of {\"Distance\":163.95} to the MQTT topic.

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 WiFiClient wificlient;
4 String data3;
5 #define ORG "msn3bx"
6 #define DEVICE_TYPE "Priyanka"
7 #define DEVICE_ID "Priyanka_Assignment_4"
8 #define TOKEN "12345678"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12
13 char publishTopic[] = "iot-2/evt/Priyanka/fmt/json";
14 char topic[] = "iot-2/cmd/status/fmt/String";
15 char authMethod[] = "use-token-auth";
16 char token[] = TOKEN;
17 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
18 PubSubClient client(server, 1883, wificlient);
19
20 const int trigpin=19;
21 const int echopin=18;
22 String command;
23 String data="";
24 long duration;
25 float dist;
26
27 void setup()
28 {
29   Serial.begin(115200);
30   pinMode(led, OUTPUT);
```

Publish OK

Sending payload: {\"Distance\":163.95}

Publish OK

Sending payload: {\"Distance\":163.95}

Publish OK

## IBM RECENT EVENTS

The screenshot shows the IBM Watson IoT Platform interface. The 'Recent Events' section displays a table of data received from the device 'Priyanka'. The table has four columns: Event, Value, Format, and Last Received. The events show distance measurements in JSON format, received a few seconds ago.

Event	Value	Format	Last Received
Priyanka	{\"Distance\":163.95}	json	a few seconds ago
Priyanka	{\"Distance\":163.95}	json	a few seconds ago
Priyanka	{\"Distance\":163.95}	json	a few seconds ago
Priyanka	{\"Distance\":163.96}	json	a few seconds ago
Priyanka	{\"Distance\":163.95}	json	a few seconds ago

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## 2) When distance less than 100

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 WiFiClient wifiClient;
4 String data3;
5 #define ORG "msn3bx"
6 #define DEVICE_TYPE "Priyanka"
7 #define DEVICE_ID "Priyanka_Assignment_4"
8 #define TOKEN "12345678"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12
13 char publishTopic[] = "iot-2/evt/Priyanka/fmt/json";
14 char topic[] = "iot-2/cmd/status/fmt/String";
15 char authMethod[] = "use-token-auth";
16 char token[] = TOKEN;
17 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
18 PubSubClient client(server, 1883, wifiClient);
19
20 const int trigpin=19;
21 const int echopin=18;
22 String command;
23 String data="";
24 long duration;
25 float dist;
26
27 void setup()
28 {
29   Serial.begin(115200);
30   pinMode(led, OUTPUT);
```

Simulation

00:08.381 62%

Sending payload: {"Alert Distance":79.97}  
Publish OK

Sending payload: {"Alert Distance":79.95}  
Publish OK

## IBM RECENT EVENTS

IBM Watson IoT Platform

412619106012@smartinternz.com  
ID: msn3bx

Browse Action Device Types Interfaces

Add Device +

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

Event	Value	Format	Last Received
Priyanka	{"Alert Distance":79.97}	json	a few seconds ago
Priyanka	{"Alert Distance":79.97}	json	a few seconds ago
Priyanka	{"Alert Distance":79.97}	json	a few seconds ago
Priyanka	{"Alert Distance":79.97}	json	a few seconds ago
Priyanka	{"Alert Distance":79.97}	json	a few seconds ago

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