

## ASSIGNMENT 4

<b>Date</b>	<b>17 November 2022</b>
<b>Team ID</b>	<b>PNT2022TMID38324</b>
<b>Project Name</b>	<b>Gas Leakage Monitoring &amp; Alerting System for Industries</b>

### QUESTION :

Write code and connection in wokwi 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 "e06cdh"
#define DEVICE_TYPE "Saranya_Assignment_4"
#define DEVICE_ID "Saranya"
#define TOKEN "12345678"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";

char publishTopic[] = "iot-2/evt/Saranya_Assignment_4/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;

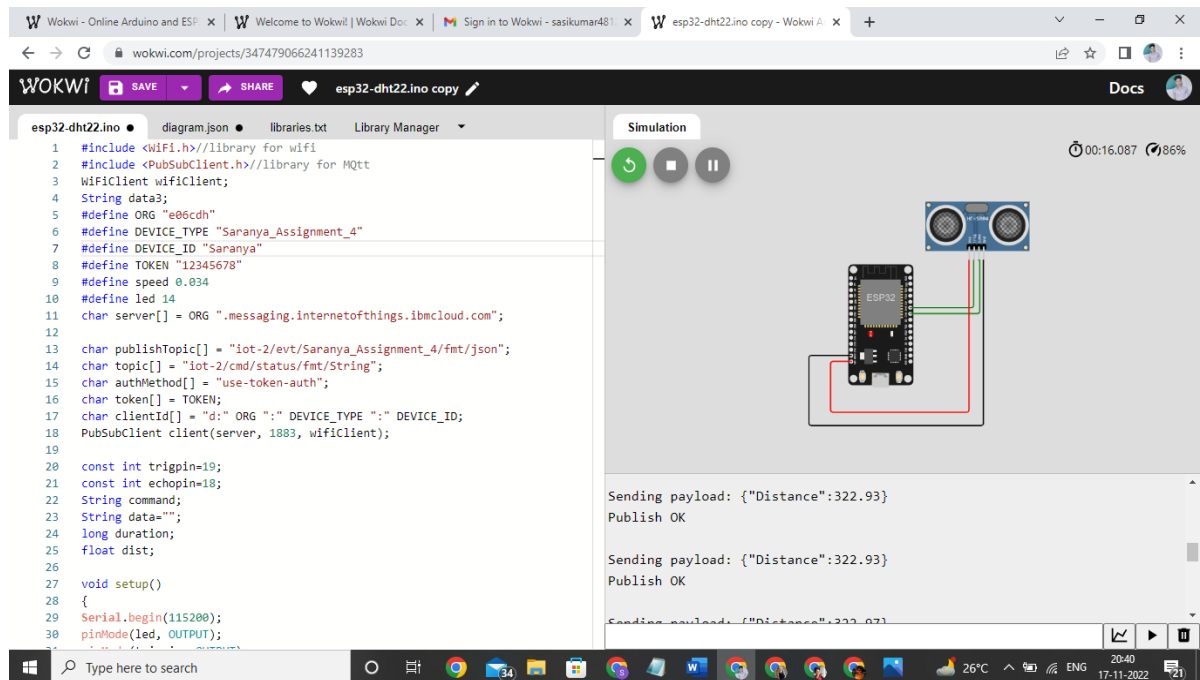
payload += "}";
Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);
if (client.publish(publishTopic, (char*) payload.c_str()))
{
Serial.println("Publish OK");
}
}
if(dist>100){
String payload = "{\"Distance\":\"";
payload += dist;
payload += "}";
Serial.print("\n");
Serial.print("Sending 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 shows the Wokwi online Arduino IDE interface. The code is for an IoT project using MQTT. The simulation shows the ESP32 sending JSON payloads to the MQTT broker.

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 WiFiClient wifiClient;
4 String data3;
5 #define ORG "e06cdh"
6 #define DEVICE_TYPE "Saranya_Assignment_4"
7 #define DEVICE_ID "Saranya"
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/Saranya_Assignment_4/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);
31 }
```

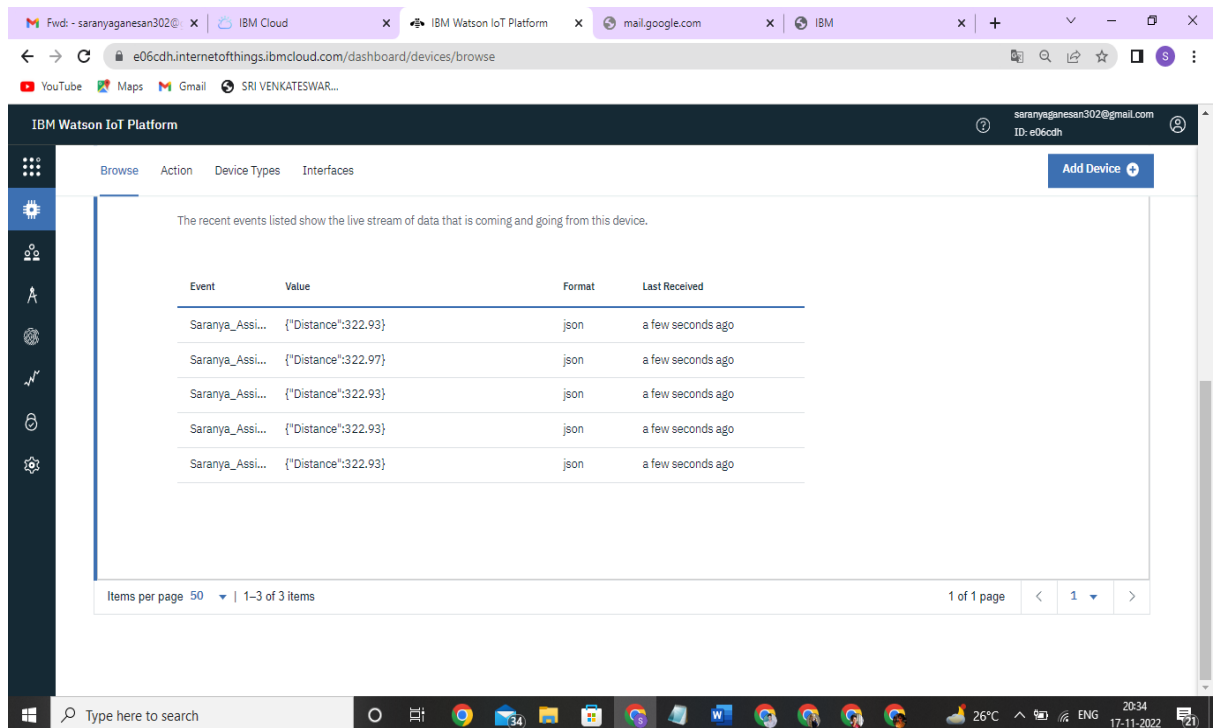
Simulation output:

```
Sending payload: {"Distance":322.93}
Publish OK

Sending payload: {"Distance":322.93}
Publish OK

Sending payload: {"Distance":322.93}
Publish OK
```

## ❖ IBM RECENT EVENTS



The screenshot shows the IBM Watson IoT Platform dashboard. The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Saranya_Assi...	{"Distance":322.93}	json	a few seconds ago
Saranya_Assi...	{"Distance":322.97}	json	a few seconds ago
Saranya_Assi...	{"Distance":322.93}	json	a few seconds ago
Saranya_Assi...	{"Distance":322.93}	json	a few seconds ago
Saranya_Assi...	{"Distance":322.93}	json	a few seconds ago

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## 2) When distance less than 100

The screenshot shows the Wokwi online Arduino IDE interface. The code in the editor is as follows:

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3 WiFiClient wificlient;
4 String data;
5 #define ORG "e06cdh"
6 #define DEVICE_TYPE "Saranya_Assignment_4"
7 #define DEVICE_ID "Saranya"
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/Saranya_Assignment_4/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);
```

The simulation window shows the following output:

```
Publish OK
Sending payload: {"Alert Distance":79.95}
Publish OK
Sending payload: {"Alert Distance":79.97}
Publish OK
```

## ❖ IBM RECENT EVENTS

The screenshot shows the IBM Watson IoT Platform dashboard. The 'Recent Events' tab is selected, displaying a table of events for the device 'Saranya\_Assignment\_4'.

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

