

Assignment -4
Python Programming

Assignment Date	19 September 2022
Student Name	Mr. Ragul Gandhi
Student Roll Number	312819106031
Maximum Marks	2 Marks

Question-1:

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

Solution:

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "j4rf38"
#define DEVICE_TYPE "Praveenkumar"
#define DEVICE_ID "123456"
#define TOKEN "12345678"
#define speed 0.034
#define led 14 char
server[] = ORG
".messaging.internetofthings.ibmcloud.com";
char publishTopic[] =
"iot2/evt/Praveenkumar/fmt/json"; char
topic[] = "iot2/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");
}

} 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");
    }

}

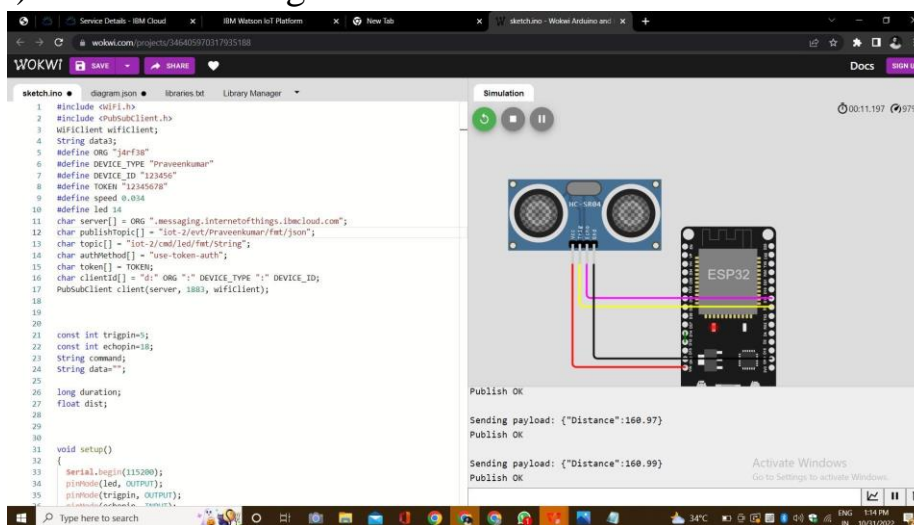
}

}

```

OUTPUT:-

i) When distance greater than 100 cm



IBM RECENT EVENTS

The screenshot shows the IBM Watson IoT Platform dashboard. The 'Recent Events' tab is selected, displaying a table of events for device 123456. The table has columns for Event, Value, Format, and Last Received. The events are all of type 'Distance' with a value of 160.97, received a few seconds ago.

Event	Value	Format	Last Received
Praveenkumar	("Distance":160.97)	json	a few seconds ago
Praveenkumar	("Distance":160.97)	json	a few seconds ago
Praveenkumar	("Distance":160.97)	json	a few seconds ago
Praveenkumar	("Distance":160.97)	json	a few seconds ago

ii) When distance less than 100

The screenshot shows the Wokwi IDE interface. On the left, the sketch code is displayed, which includes the Arduino IDE libraries and the MQTT client library. The code defines the device type as 'Praveenkumar' and the device ID as '123456'. It also defines the MQTT server, topic, and token. The code includes a setup function that initializes the serial port, LED, and trigpin. The main loop publishes the distance data to the MQTT topic.

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 WiFiClient wificlient;
4 String data;
5 #define ORG "j4rf38"
6 #define DEVICE_TYPE "Praveenkumar"
7 #define DEVICE_ID "123456"
8 #define TOKEN "12345678"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Praveenkumar/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;
28
29
30 void setup()
31 {
32   Serial.begin(115200);
33   pinMode(led, OUTPUT);
34   pinMode(trigpin, OUTPUT);
35 }
```

On the right, the simulation window shows the ESP32 connected to the Ultrasonic Distance Sensor. The distance is currently 54cm. The simulation is running, and the output window shows the following messages:

```
Publish OK
Sending payload: {"Alert Distance":53.96}
Publish OK
Sending payload: {"Alert Distance":53.96}
Publish OK
```

IBM RECENT EVENTS

The screenshot displays the IBM Watson IoT Platform interface. The main content area shows a table of recent events for a device with ID 123456. The device is connected and its status is 'Connected'. The events are listed in a table with columns: Event, Value, Format, and Last Received. The events are all of the type '*Alert Distance*:53.96' and are received in JSON format. The last received time for all events is 'a few seconds ago'.

Event	Value	Format	Last Received
Praveenkumar	(*Alert Distance*:53.96)	json	a few seconds ago
Praveenkumar	(*Alert Distance*:53.96)	json	a few seconds ago
Praveenkumar	(*Alert Distance*:53.96)	json	a few seconds ago
Praveenkumar	(*Alert Distance*:53.96)	json	a few seconds ago
Praveenkumar	(*Alert Distance*:53.96)	json	a few seconds ago

WOKWI LINK -

<https://wokwi.com/projects/346405970317935188>