

**ASSIGNMENT – 4**  
**WOKWI SIMULATION**

Assignment Date	4 <sup>th</sup> November 2022
Student Name	Aathira S
Student Roll Number	960219106001
Maximum Marks	2 Marks

**Question-1:**

Write a code and make a connection in WOKWI for ultrasonic sensor. Whenever distance is less than 100 , send “alert” to IBM cloud and display in device recent events.

**PROGRAM**

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "1be6ey"
#define DEVICE_TYPE "b11m3e-device"
#define DEVICE_ID "b11m3edeviceid1"
#define TOKEN "SJmK4i0jsT67bZb)P@"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Aathira/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");
}

}

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");
}

}

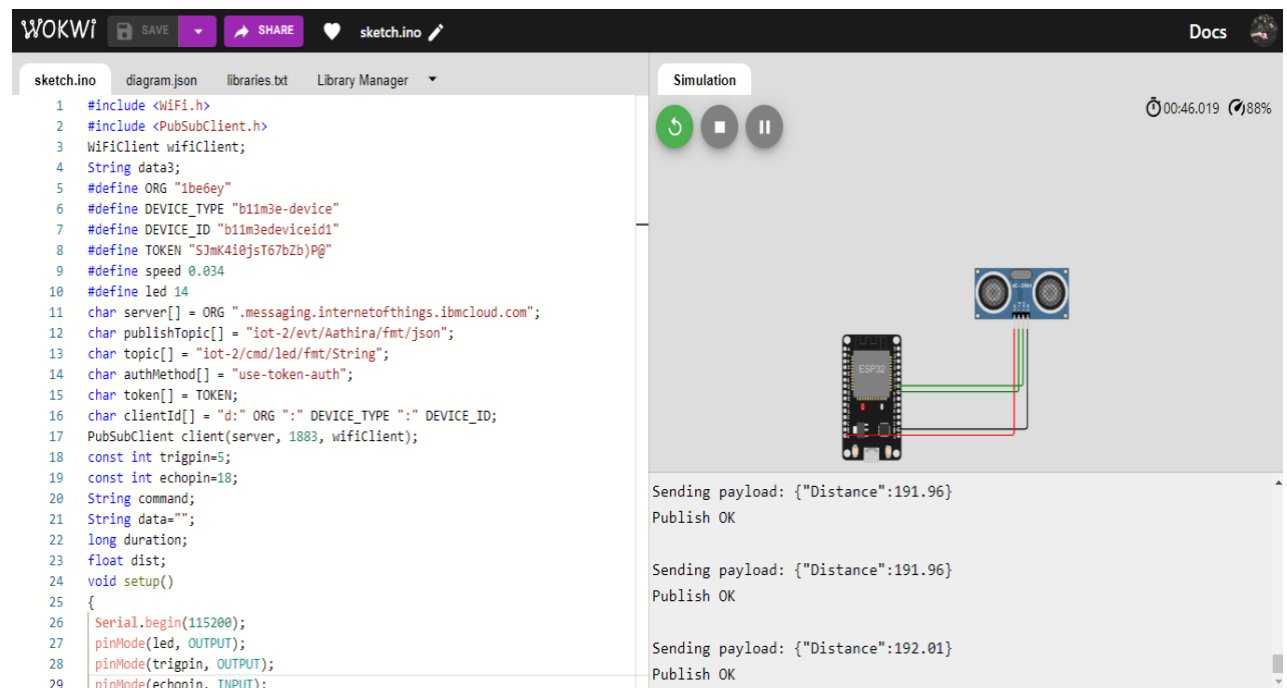
}

}

```

## OUTPUT:

## WOKWI SIMULATION



The image shows the Wokwi simulation environment. On the left, the sketch code is displayed, which includes headers for WiFi and PubSubClient, defines for device ID, token, and pins, and logic for publishing distance data to an IoT topic. On the right, the simulation window shows a virtual circuit with an ESP8266 module connected to a buzzer. The simulation status bar at the top right indicates a runtime of 00:46.019 and 88% completion. The console output at the bottom shows the sequence of events: sending a payload, successful publication, and the next iteration of the loop.

```

1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 WiFiClient wifiClient;
4 String data3;
5 #define ORG "1be6ey"
6 #define DEVICE_TYPE "b1m3e-device"
7 #define DEVICE_ID "b1m3edeviceid1"
8 #define TOKEN "Sjmk4i0jst67bZb)P@"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Aathira/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 const int trigpin=5;
19 const int echopin=18;
20 String command;
21 String data="";
22 long duration;
23 float dist;
24 void setup()
25 {
26   Serial.begin(115200);
27   pinMode(led, OUTPUT);
28   pinMode(trigpin, OUTPUT);
29   pinMode(echopin, INPUT);

```

Simulation controls: Run, Stop, Pause. Timer: 00:46.019, 88%.

Console Output:

```

Sending payload: {"Distance":191.96}
Publish OK

Sending payload: {"Distance":191.96}
Publish OK

Sending payload: {"Distance":192.01}
Publish OK

```

## When Distance < 100 :

WOKWI SAVE SHARE sketch.ino Docs

sketch.ino diagram.json libraries.txt Library Manager

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 WiFiClient wificlient;
4 String data3;
5 #define ORG "1be6ey"
6 #define DEVICE_TYPE "b11m3e-device"
7 #define DEVICE_ID "b11m3edeviceld1"
8 #define TOKEN "SjmK4i0jsT67bZb)P@"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Aathira/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 const int trigpin=5;
19 const int echopin=18;
20 String command;
21 String data="";
22 long duration;
23 float dist;
24 void setup()
25 {
26   Serial.begin(115200);
27   pinMode(led, OUTPUT);
28   pinMode(trigpin, OUTPUT);
29   pinMode(echopin, INPUT);
30 }
```

Simulation 02:17.707 96%

Editing Ultrasonic Distance Sensor  
Distance: 59cm

ESP32

Publish OK

Sending payload: {"Alert Distance":58.97}  
Publish OK

Sending payload: {"Alert Distance":58.99}  
Publish OK

## When Distance > 100 :

WOKWI SAVE SHARE sketch.ino Docs

sketch.ino diagram.json libraries.txt Library Manager

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 WiFiClient wificlient;
4 String data3;
5 #define ORG "1be6ey"
6 #define DEVICE_TYPE "b11m3e-device"
7 #define DEVICE_ID "b11m3edeviceld1"
8 #define TOKEN "SjmK4i0jsT67bZb)P@"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Aathira/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 const int trigpin=5;
19 const int echopin=18;
20 String command;
21 String data="";
22 long duration;
23 float dist;
24 void setup()
25 {
26   Serial.begin(115200);
27   pinMode(led, OUTPUT);
28   pinMode(trigpin, OUTPUT);
29   pinMode(echopin, INPUT);
30 }
```

Simulation 00:17.167 100%

Editing Ultrasonic Distance Sensor  
Distance: 266cm

ESP32

Sending payload: {"Distance":265.95}  
Publish OK

Sending payload: {"Distance":265.96}  
Publish OK

Sending payload: {"Distance":265.96}  
Publish OK

## IBM CLOUD OUTPUT :

The screenshot displays the IBM Watson IoT Platform interface. At the top, the header shows 'IBM Watson IoT Platform' on the left, a search bar, and user information '960219106001@smartinternz.com' and 'ID: 1be6ey' on the right. Below the header, a navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces', along with an 'Add Device' button. The main content area shows details for a device named 'b11m3e-device' with ID 'b11m3edeviceid1'. The device status is 'Disconnected'. Below this, there are tabs for 'Identity', 'Device Information', 'Recent Events', 'State', and 'Logs'. The 'Recent Events' tab is selected, showing a message: 'The recent events listed show the live stream of data that is coming and going from this device.' Below this message is a table with the following data:

Event	Value	Format	Last Received
Aathira	{"Alert Distance":58.99}	json	a few seconds ago
Aathira	{"Alert Distance":58.99}	json	a few seconds ago
Aathira	{"Alert Distance":58.99}	json	a few seconds ago
Aathira	{"Alert Distance":58.99}	json	a few seconds ago
Aathira	{"Alert Distance":58.99}	json	a few seconds ago

## WOKWI LINK :

<https://wokwi.com/projects/347403089346560594>