

## ASSIGNMENT-4

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Maximum Marks	2 Marks

### Problem Statement:

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.

CODE :

```
1  #include <WiFi.h> //library for wifi
2  #include <PubSubClient.h> //library for MQTT
3
4
5  void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
6
7  //-----credentials of IBM Accounts-----
8
9  #define ORG "4hn0jp" //IBM ORGANITION ID
10 #define DEVICE_TYPE "ULTRASON" //Device type mentioned in ibm watson IOT Platform
11 #define DEVICE_ID "DISTANCEDETECT" //Device ID mentioned in ibm watson IOT Platform
12 #define TOKEN "wuo5s7PR)ZSegV&R&x" //Token
13 String data3;
14 float dist;
15
16
17 //----- Customise the above values -----
18 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
19 char publishTopic[] = "iot-2/evt/Data/fmt/json"; // topic name and type of event perform and format in which data to be send
20 char subscribetopic[] = "iot-2/cmd/test/fmt/String"; // cmd REPRESENT command type AND COMMAND IS TEST OF FORMAT STRING
21 char authMethod[] = "use-token-auth"; // authentication method
22 char token[] = TOKEN;
23 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
24
25
26 //-----
27 WiFiClient wificlient; // creating the instance for wificlient
28 PubSubClient client(server, 1883, callback ,wificlient); //calling the predefined client id by passing parameter like server id,portand wificredential
29
30 int LED = 4;
31 int trig = 5;
32 int echo = 18;
33 void setup()
34 {
35   Serial.begin(115200);
```

```

36 pinMode(trig,OUTPUT);
37 pinMode(echo,INPUT);
38 pinMode(LED, OUTPUT);
39 delay(10);
40 wificonnect();
41 mqttconnect();
42 }
43 void loop()// Recursive Function
44 {
45
46     digitalWrite(trig,LOW);
47     digitalWrite(trig,HIGH);
48     delayMicroseconds(10);
49     digitalWrite(trig,LOW);
50     float dur = pulseIn(echo,HIGH);
51     float dist = (dur * 0.0343)/2;
52     Serial.print ("Distancein cm");
53     Serial.println(dist);
54
55
56     PublishData(dist);
57     delay(1000);
58     if (!client.loop()) {
59         mqttconnect();
60     }
61 }
62
63
64
65 /*.....retrieving to Cloud.....*/
66
67 void PublishData(float dist) {
68     mqttconnect();//function call for connecting to ibm
69     /*
70     | creating the String in in form JSon to update the data to ibm cloud

```

```

70     | creating the String in in form JSon to update the data to ibm cloud
71     */
72     String object;
73     if (dist <100)
74     {
75         digitalWrite(LED,HIGH);
76         Serial.println("object is near");
77         object = "Near";
78     }
79     else
80     {
81         digitalWrite(LED,LOW);
82         Serial.println("no object found");
83         object = "No";
84     }
85
86     String payload = "{\"distance\": ";
87     payload += dist;
88     payload += ", " "\"object\": \"";
89     payload += object;
90     payload += "\"}";
91
92
93     Serial.print("Sending payload: ");
94     Serial.println(payload);
95
96
97
98

```

```

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98
99 if (client.publish(publishTopic, (char*) payload.c_str())) {
100     Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print publish ok in Serial monitor or else it will print publish failed
101 } else {
102     Serial.println("Publish failed");
103 }
104
105 }
106 void mqttconnect() {
107     if (!client.connected()) {
108         Serial.print("Reconnecting client to ");
109         Serial.println(server);
110         while (!client.connect(clientId, authMethod, token)) {
111             Serial.print(".");
112             delay(500);
113         }
114
115         initManagedDevice();
116         Serial.println();
117     }
118 }
119 void wificonnect() //function defination for wificonnect
120 {
121     Serial.println();
122     Serial.print("connecting to ");
123
124     WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
125     while (WiFi.status() != WL_CONNECTED) {
126         delay(500);
127         Serial.print(".");
128     }
129     Serial.println("");
130     Serial.println("WiFi connected");
131     Serial.println("IP address: ");
132     Serial.println(WiFi.localIP());

```

```

esp32-blink.ino • diagram.json • libraries.txt • Library Manager
142     }
143
144 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
145 {
146
147     Serial.print("callback invoked for topic: ");
148     Serial.println(subscribetopic);
149     for (int i = 0; i < payloadLength; i++) {
150         //Serial.print((char)payload[i]);
151         data3 += (char)payload[i];
152     }
153
154     // Serial.println("data: "+ data3);
155     // if(data3=="Near")
156     // {
157     //     Serial.println(data3);
158     //     digitalWrite(LED,HIGH);
159
160     // }
161
162     // else
163     // {
164     //     Serial.println(data3);
165     //     digitalWrite(LED,LOW);
166
167     // }
168     data3="";
169
170
171 }

```

# OUTPUT

The screenshot shows the Arduino IDE interface with a simulation window. The code on the left is for an ESP32 connected to an HC-SR04 ultrasonic sensor. The simulation window on the right displays a virtual circuit diagram with an ESP32 module and an HC-SR04 sensor. Below the diagram, the serial monitor shows the following output:

```
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distancein cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
```

## IBM CLOUD SERVICE:

The screenshot shows the IBM Cloud IoT Platform console. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A sidebar on the left contains various icons. The main content area displays a table of device data for a device named 'DISTANCEDETECT'. The table has columns for 'Event', 'Value', 'Format', and 'Last Received'. The data shows a series of 'Data' events with JSON payloads containing distance and object status.

Event	Value	Format	Last Received
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.18,"object":"No"}	json	a few seconds ago
Data	{"distance":141.2,"object":"No"}	json	a few seconds ago

Items per page: 50 | 1-2 of 2 items



