

ASSIGNMENT - 4

DATE	28 October 2022
TEAM ID	PNT2022TMID10141
Maximum mark	2 marks

QUESTION :

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.

Upload document with wokwi share link and images of ibm cloud

WOKWI CODE AND IMPLEMENTATION LINK:

<https://wokwi.com/projects/346506498129527380>

```
34 void setup()
35 {
36
37   Serial.begin(115200);
38   pinMode(trig, OUTPUT);
39   pinMode(echo, INPUT);
40   pinMode(LED, OUTPUT);
41   delay(10);
42
43   wificonnect();
44
45   mqttconnect();
46
47 }
48
49 void loop()// Recursive Function
50 {
51
52   delayMicroseconds(10);
53   digitalWrite(trig, LOW);
54   digitalWrite(trig, LOW);
55   digitalWrite(trig,HIGH);
56   float dur= pulseIn(echo,HIGH);
57   float dist = (dur* 0.0343)/2;
58   Serial.print ("Distance in cm : ");
59   Serial.println(dist);
60
61   PublishData(dist);
62
63   delay(1000);
64
65   if (!client.loop()) {
66     mqttconnect();
67   }
```

```
68   }
69 }
70
71 void PublishData(float dist) {
72   mqttconnect();
73
74   String object;
75
76   if (dist<100)
77   {
78     digitalWrite(LED, HIGH);
79     Serial.println("object is near");
80     object = "ALERT! object is near";
81   }
82
83   else
84   {
85     digitalWrite(LED,LOW);
86     Serial.println("no object found");
87     object ="No object found";
88   }
89
90   String payload="{\"distance\": ";
91   payload += dist;
92   payload += ", \"object\": \"";
93   payload += object;
94   payload += "\"}";
95
96   Serial.print("Sending payload: ");
97   Serial.println(payload);
98
99   if (client.publish(publishTopic, (char*) payload.c_str()))
100   {
101     Serial.println("Publish ok"); // if it sucessfully upload
102   }
```

sketch.ino

diagram.json

libraries.txt

Library Manager

```
103     else {
104         Serial.println("Publish failed");
105     }
106 }
107
108 void mqttconnect() {
109     if (!client.connected()) {
110         Serial.print("Reconnecting client to ");
111         Serial.println(server);
112         while (!client.connect(clientId, authMethod, token)) {
113             Serial.print(".");
114             delay(500);
115         }
116
117         initManagedDevice();
118         Serial.println();
119     }
120 }
121
122
123 void wificonnect() //function definition for wificonnect
124 {
125     Serial.println();
126     Serial.print("Connecting to ");
127
128     WiFi.begin("Wokwi-GUEST", "", 6); //passing the wifi credentials to establish the connection
129     while (WiFi.status() != WL_CONNECTED) {
130         delay(500);
131         Serial.print(".");
132     }
133     Serial.println("");
134     Serial.println("WiFi connected");
135     Serial.println("IP address: ");
136     Serial.println(WiFi.localIP());
137 }
```

sketch.ino

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Library Manager

```
138
139 void initManagedDevice() {
140
141     if (client.subscribe(subscribetopic)) {
142         Serial.println(subscribetopic);
143         Serial.println("subscribe to cmd OK");
144     }
145     else {
146         Serial.println("subscribe to cmd FAILED");
147     }
148 }
149
150 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
151 {
152     Serial.print("callback invoked for topic: ");
153     Serial.println(subscribetopic);
154     for (int i = 0; i < payloadLength; i++) {
155         //Serial.print((char)payload[i]);
156         // data3 += (char)payload[i];
157     }
158
159     // Serial.println("data: "+ data3);
160     //if(data3=="lighton")
161     {
162         //Serial.println(data3);
163         digitalWrite(LED,HIGH);
164
165     }
166
167     //else
168     {
169         //Serial.println(data3);
170         digitalWrite(LED,LOW);
171     }
172 }
```

OUTPUT:

When the distance is less than 100 cms, send an “alert” message to IBM Watson IoT Platform.

The image displays a Wokwi simulation of an ESP32 microcontroller connected to an Ultrasonic Distance Sensor. The code in the sketch.ino file is as follows:

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for mqtt
3
4 void callback(char *topic, byte *payload, unsigned int payloadlength);
5
6 //-----credentials of IBM Accounts -----
7
8 #define ORG "te1vcf" //IBM ORGANIZATION ID
9 #define DEVICE_TYPE "weather_device" //Device type mentioned in ibm watson IOT Platform
10 #define DEVICE_ID "weather_today" //Device ID mentioned in ibm watson IOT Platform
11 #define TOKEN "o)I@W6UYkIfCQvAq39" //Token
12
13
14
15 float dist;
16
17 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
18 char publishTopic[] = "iot-2/evt/Data1/fmt/json"; // topic name and type of event perform
19 char subscribTopic[] = "iot-2/cmd/test/fmt/string"; // cmd REPRESENT command type AND CO
20 char authMethod[] = "use-token-auth"; // authentication method
21 char token[] = TOKEN;
22 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
23
24 WiFiClient wificlient; // creating the instance for wificlient
25
26 PubSubClient client(server,1883, callback,wificlient); //calling the predefined client
27
28 int LED = 4;
29
30 int trig =5;
31
32 int echo= 18;
33
34 void setup()
35 {
```

The simulation shows the sensor reading a distance of 42cm. The console output indicates that an alert message is being sent to the IBM Watson IoT Platform:

```
object is near
Sending payload: {"distance":42.34,"object":"ALERT! object is near"}
Publish ok
Distance in cm : 42.33
object is near
Sending payload: {"distance":42.33,"object":"ALERT! object is near"}
Publish ok
```

The IBM Watson IoT Platform dashboard shows the device "weather_today" is connected. The "Recent Events" tab displays the following data:

Event	Value	Format	Last Received
Data1	{"distance":42.34,"object":"ALERT! object is near"}	json	a few seconds ago
Data1	{"distance":42.34,"object":"ALERT! object is near"}	json	a few seconds ago
Data1	{"distance":42.33,"object":"ALERT! object is near"}	json	a few seconds ago
Data1	{"distance":42.33,"object":"ALERT! object is near"}	json	a few seconds ago
Data1	{"distance":42.34,"object":"ALERT! object is near"}	json	a few seconds ago

When the object is far(greater than 100 cms) , send “ no object found” to the IBM Watson IOT Platform.

W sketchino - Wokwi Arduino and x esp32bm/sketchino at main - f... x Untitled document - Google Do... x Untitled document - Google Do... x IBM Watson IoT Platform x +

https://wokwi.com/projects/346506498129527380

WOKWI SAVE SHARE

sketchino diagram.json libraries.txt Library Manager

```

1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for Mqtt
3
4 void callback(char "subscribetopic, byte *payload, unsigned int payloadLength);
5
6 //-----credentials of IBM Accounts -----
7
8 #define ORG "te1vcf" //IBM ORGANIZATION ID
9 #define DEVICE_TYPE "weather_device" //device type mentioned in ibm watson IOT Platform
10 #define DEVICE_ID "weather_today" //Device ID mentioned in ibm watson IOT Platform
11 #define TOKEN "o1@6Uvk1fCQvAQ39" //Token
12
13
14 float dist;
15
16 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
17 char publishTopic[] = "iot-2/evt/Data1/fmt/json"; // topic name and type of event perform
18 char subscribetopic[] = "iot-2/cmd/test/fmt/string"; // cmd REPRESENT command type AND CO
19 char authMethod[] = "use-token-auth"; // authentication method
20 char token[] = TOKEN;
21 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID"; //client id
22
23 WiFiClient wificlient; // creating the instance for wificlient
24
25 PubSubClient client (server,1883, callback,wificlient); //calling the predefined client
26
27
28 int LED = 4;
29
30 int trig =5;
31
32 int echo= 18;
33
34 void setup()
35 {

```

Simulation

04:29.440 89%

Editing Ultrasonic Distance Sensor

Distance: 141cm

no object found

Sending payload: {"distance":142.19,"object":"No object found"}

Publish ok

Distance in cm : 142.19

no object found

Sending payload: {"distance":142.19,"object":"No object found"}

Publish ok

25°C 25-10-2022

W sketchino - Wokwi Arduino and x IBM Watson IoT Platform x esp32bm/sketchino at main - f... x Untitled document - Google Do... x Untitled document - Google Do... x +

https://te1vcf.internetofthings.ibmcloud.com/dashboard/devices/browse

weather_today Connected weather_device Device Oct 7, 2022 11:22 AM

Identity Device Information Recent Events State Logs

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

Event	Value	Format	Last Received
Data1	{"distance":142.19,"object":"No object found"}	json	a few seconds ago
Data1	{"distance":142.19,"object":"No object found"}	json	a few seconds ago
Data1	{"distance":142.22,"object":"No object found"}	json	a few seconds ago

25°C Mostly clear 22:24 25-10-2022