

ASSIGNMENT-4

SMART WASTE MANAGEMENT SYSTEM FOR METROPOLITAN CITIES

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Date	22 November 2022
Team ID	PNT2022TMIT38443
Maximum Marks	2 Marks

Question1:

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* topic, byte* payload, unsigned int payloadlength);
6
7 //-----credentials of IBM Account-----
8
9 #define ORG "demoip"/iot orgname:demoip
10 #define DEVICE_TYPE "ULTRASONIC"/device type mentioned in the Watson IoT Platform
11 #define DEVICE_ID "ULTRASONICDETECT"/Device ID mentioned in the Watson IoT Platform
12 #define TOKEN "waa55799j2segvklms"/Token
13 String data;
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/out/data/fmt/json"; // topic name and type of event, format in which data to be send
20 char subscribeTopic[] = "iot-2/cmd/test/fmt/string"; // the REPRESANT command type and response in text or 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 pubsubClient by passing parameter like server id,port and wifiClient
29
30 int LID = 4;
31 int trig = 5;
32 int echo = 16;
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

```

```

esp32-blink.ino  ●  diagram.json  ●  libraries.txt  ●  Library Manager  ●
99     if (client.publish(publishTopic, (char*) payload.c_str())) {
100         Serial.println("Publish ok");// if it successfully 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
107 void mqttconnect() {
108     if (!client.connected()) {
109         Serial.print("Reconnecting client to ");
110         Serial.println(server);
111         while (!client.connect(clientId, authMethod, token)) {
112             Serial.print(".");
113             delay(500);
114         }
115
116         initManagedDevice();
117         Serial.println();
118     }
119 }
120 void wificonnect() //function definition for wificonnect
121 {
122     Serial.println();
123     Serial.print("Connecting to ");
124
125     WiFi.begin("wskw1-guest", "", 4); //passing the wifi credentials to establish the connection
126     while (WiFi.status() != WL_CONNECTED) {
127         delay(500);
128         Serial.print(".");
129     }
130     Serial.println("");
131     Serial.println("Wifi connected");
132     Serial.println("IP address: ");
133     Serial.println(WiFi.localIP());

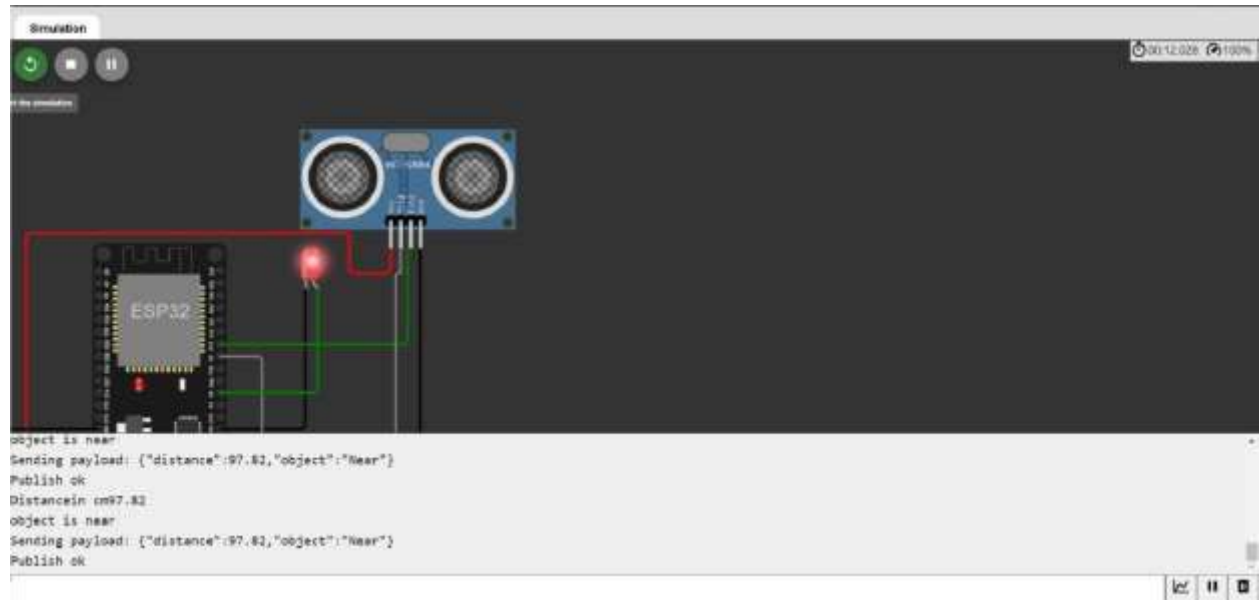
```

```
123
124   WiFi.begin("Wokwi-GUEST", ""); //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());
133 }
134
135 void initManagedDevice() {
136     if (client.subscribe(subscribetopic)) {
137         Serial.println(subscribetopic);
138         Serial.println("subscribe to cmd OK");
139     } else {
140         Serial.println("subscribe to cmd FAILED");
141     }
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     // }
```

```
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:

when object is near to the ultrasonic sensor



Data sent to the IBM Cloud Device when the object is near

