

ASSIGNMENT-4

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DISTANCE DETECTION USING ULTRASONIC SENSOR

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.

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 ORGAMITION 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)ZSegVk&Rx" //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

```

```

98
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         initManagedDevice();
116         Serial.println();
117     }
118 }
119 void wificonnect() //Function definition for wificonnect
120 {
121     Serial.println();
122     Serial.print("Connecting to ");
123
124     WiFi.begin("Mokul-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());

```

```

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);

```

```

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 }

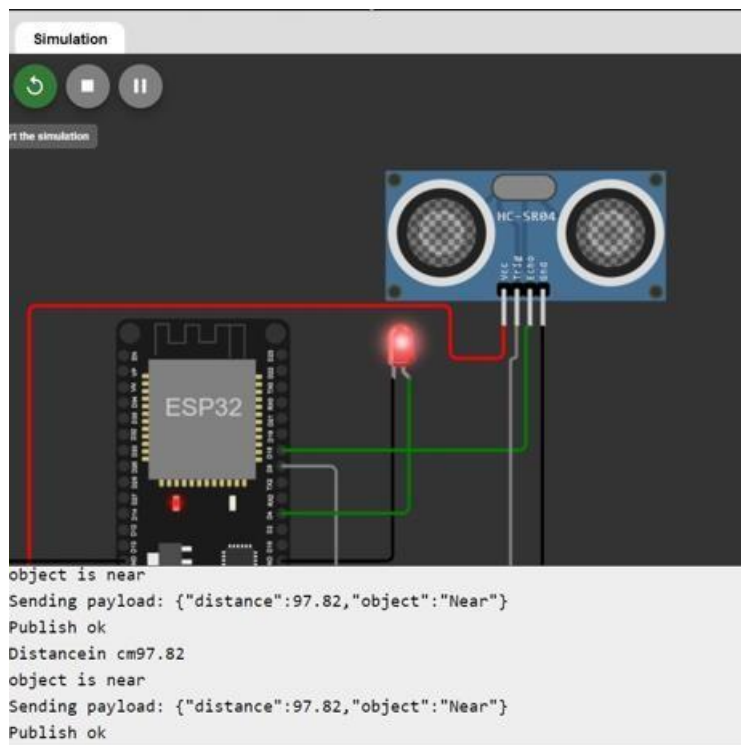
```

Output:

The screenshot shows a web interface for a device named 'DISTANCEDETECT'. The interface includes a sidebar with navigation icons and a main content area with tabs for 'Identity', 'Device Information', 'Recent Events', 'State', and 'Logs'. The 'Recent Events' tab is active, displaying a table of recent data events. The table has columns for 'Event', 'Value', 'Format', and 'Last Received'. The events listed are all 'Data' events with a value of '{"distance":141.21,"object":"No"}' or '{"distance":141.18,"object":"No"}', a format of 'json', and a last received time of 'a few seconds ago'.

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

When object is near to the ultrasonic sensor



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

