

ASSIGNMENT- 4

DISTANCE DETECTION USING ULTRASONIC SENSOR

Date	20 October 2022
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Student Roll Number	7376191EC130
Maximum Marks	2 Marks

Question1 :

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.

WOKWI LINK :

<https://wokwi.com/projects/305566932847821378>

CODE :

```
1 #include <Arduino.h> //library for arduino
2 #include <Wire.h> //library for i2c
3
4
5 void callback(char* subscription, byte* payload, unsigned int payloadLength);
6
7 //-----credentials of IBM Account-----
8
9 #define IBM_HOST "mqtts://iot-000000000000.us-east-1.amazonaws.com" //Server Name
10 #define DEVICE_TYPE "ultrasonic" //Device Type mentioned in the Watson IoT Platform
11 #define DEVICE_ID "DISTANCEDETECT" //Device ID mentioned in the Watson IoT Platform
12 #define TOKEN "mqtts://mqtts://mqtts://mqtts" //Token
13 #define DATA;
14 #define ALERT;
15
16
17 //-----Customize the above values-----
18
19 char server[] = IBM_HOST; //messaging.internetofthings.us-east-1.amazonaws.com // Server Name
20 char publishTopic[] = "iot-000000000000.us-east-1.amazonaws.com" // Topic Name and type of event perform and format in which data to be send
21 char subscribeTopic[] = "iot-000000000000.us-east-1.amazonaws.com" // Topic Name and type of event perform and format in which data to be send
22 char authMethod[] = "aws-iot-token" // authentication method
23 char token[] = "token";
24 char clientId[] = "id:" IBM_HOST "/" DEVICE_TYPE "/" DEVICE_ID; //client id
25
26
27 //-----
28 //MQTTClient client; //Creating the instance for MQTTClient
29 MQTTClient client(server, token, callback, clientId); //Creating the MQTTClient by passing parameter like server id, token and authentication
30
31 int led = 4;
32 int trig = 5;
33 int echo = 6;
34 void setup()
35 {
36   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 ("Distance in 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 the 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

```

esp32-0link.ino • chapters_3.ino • libraries.ino • library manager

```

99
100     if (client.publish(topic, (char*) payload.c_str())) {
101         Serial.println("publish ok"); // if it successfully send data to the cloud then it will print publish ok in serial monitor or else it will print publish failed
102     } else {
103         Serial.println("publish failed");
104     }
105 }
106
107 void setup() {
108     if (!client.connected()) {
109         Serial.println("connecting client to ");
110         Serial.println(server);
111         while (!client.connect(clientID, authMethod, token)) {
112             Serial.println("");
113             delay(100);
114         }
115
116         initMessageDevice();
117         Serial.println();
118     }
119 }
120
121 void wifiConnect() //function definition for wifi connect
122 {
123     Serial.println();
124     Serial.println("connecting to ");
125
126     WiFi.begin("ssid-8888", "", 0); //passing the wifi credentials to establish the connection
127     while (WiFi.status() != WL_CONNECTED) {
128         delay(100);
129         Serial.print(".");
130     }
131     Serial.println("");
132     Serial.println("wifi connected");
133     Serial.println("IP address: ");
134     Serial.println(WiFi.localIP());

```

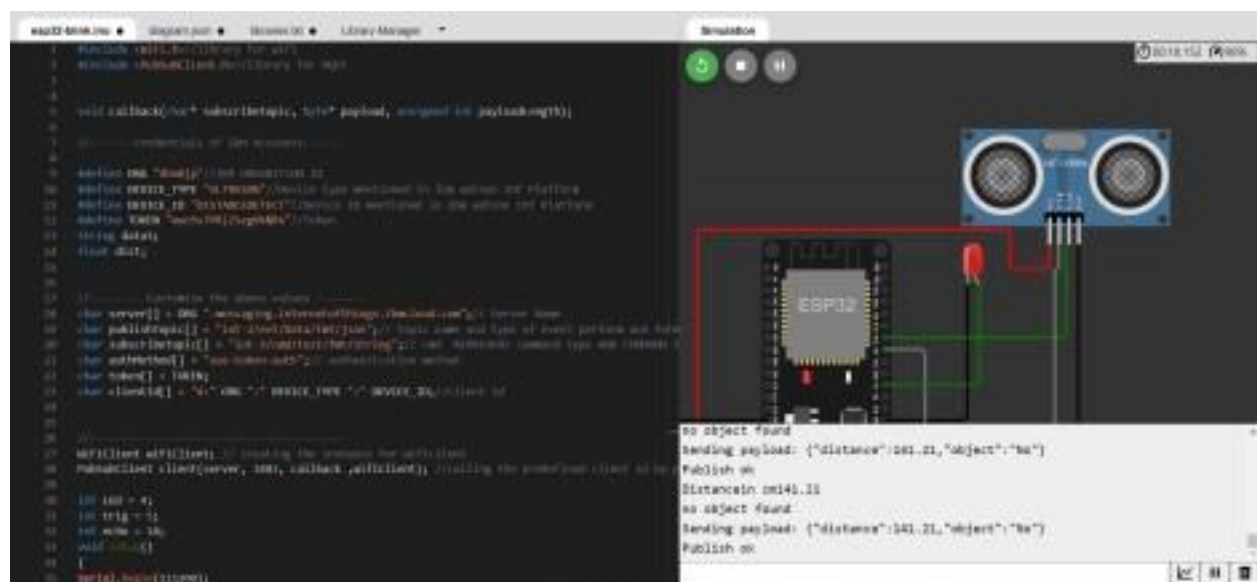
```
123
124   WiFi.begin("Wokwi-GUEST", "", 0); //passing the wifi credentials to establish the connection
125   while (WiFi.status() != WL_CONNECTED) {
126       delay(500);
127       Serial.print(".");
128   }
129   Serial.println("");
130   Serial.println("WiFi connected");
131   Serial.println("IP 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     data3="";
168 }
169
170
171

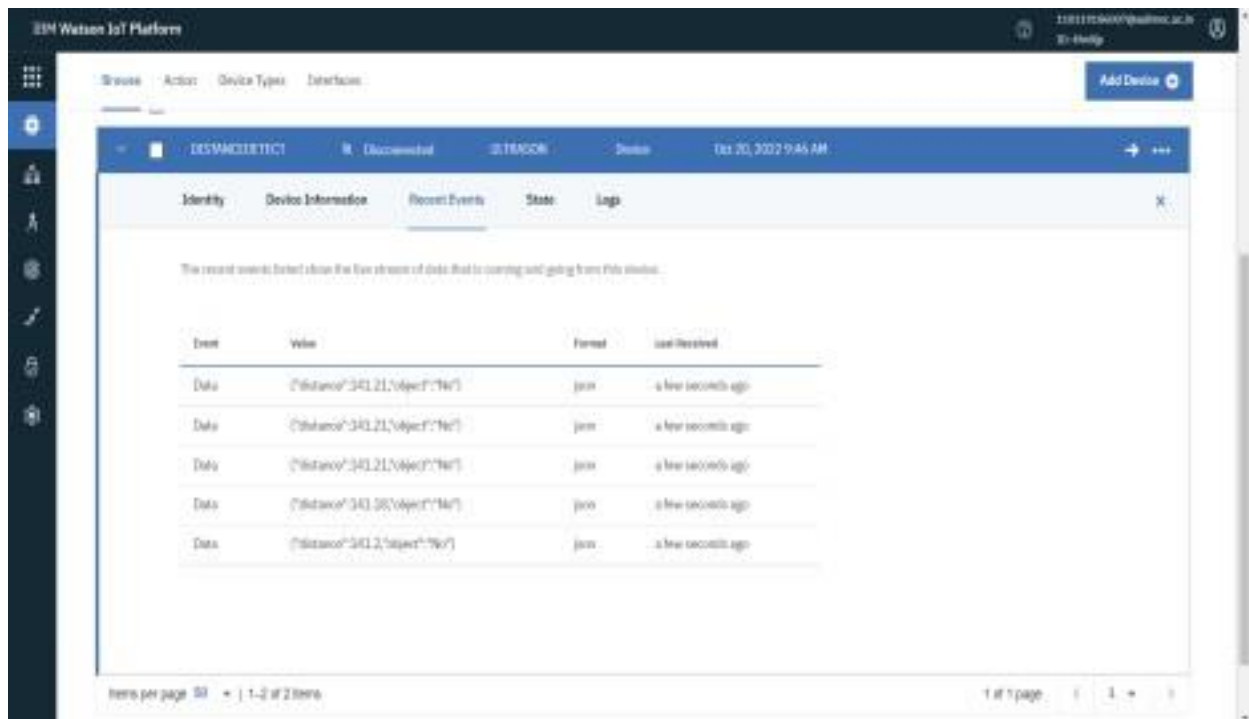
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OUTPUT:

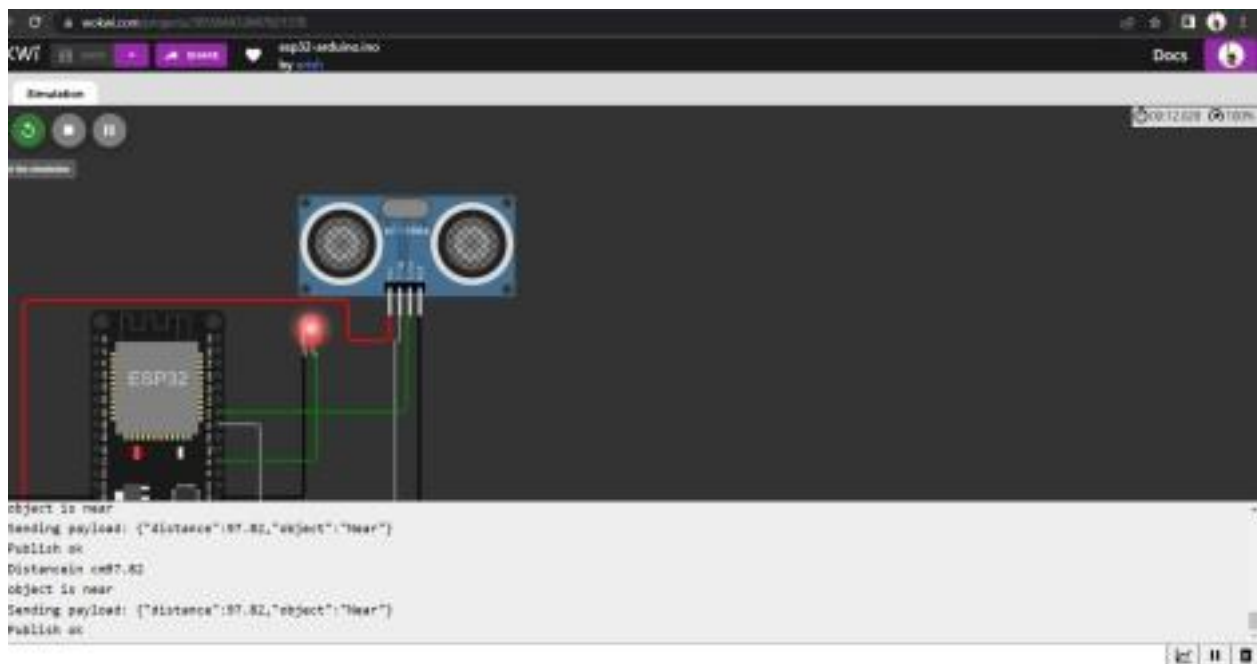


```

1 // Include the ESP32 library for WiFi
2 // Include the Arduino library for SPI
3
4 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
5 {
6     // Serial.println("callback invoked for topic: ");
7     // Serial.println(subscribetopic);
8     // for (int i = 0; i < payloadLength; i++) {
9     //     //Serial.print((char)payload[i]);
10     //     data3 += (char)payload[i];
11     // }
12     // Serial.println("data: "+ data3);
13     // if(data3=="Near")
14     // {
15     // Serial.println(data3);
16     // digitalWrite(LED,HIGH);
17     // }
18     // else
19     // {
20     // Serial.println(data3);
21     // digitalWrite(LED,LOW);
22     // }
23     data3="";
24 }
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when object is near to the ultrasonic sensor



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

