

ASSIGNMENT-4

DISTANCE DETECTION USING ULTRASONIC SENSOR

Date	22 October 2022
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Maximum Marks	2Marks

Question1:

Write code and connections in work for ultrasonic sensor. Whenever distance is less than 100cms send "alert" to IBM cloud and display in device recent events.

WOKWILINK:

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

CODE:

```
1 #include <Arduino.h> //library for arduino
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 "ibm" //IBM ORGANIZATION ID
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 "uamsh7PRjCuegVAdAa" //Token
13 #define data1;
14 float dist;
15
16
17 //----- Customize the above values -----
18 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
19 char publishTopic[] = "iot://evt/data/twt/jsm"; // Topic Name and type of event perform and format in which data to be send
20 char subscribeTopic[] = "iot://cmd/test/twt/string"; // cmd - REPAIRMAN command type AND COMMAND IS TEXT OF FLOAT STRING
21 char authMethod[] = "user-token-auth"; // authentication method
22 char token[] = TOKEN;
23 char clientId[] = "dt:" 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,port and wifiClient
29
30 int led = 4;
31 int trig = 9;
32 int echo = 18;
33 void setup()
34 {
35   Serial.begin(115200);
```

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```
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
100 if (client.publish(publishTopic, (char*) payload.c_str())) {
101     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
102 } else {
103     Serial.println("Publish failed");
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 definition for wifi connect
120 {
121     Serial.println();
122     Serial.print("Connecting to ");
123
124     WiFi.begin("wotai-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());

```

```
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());
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 }
```

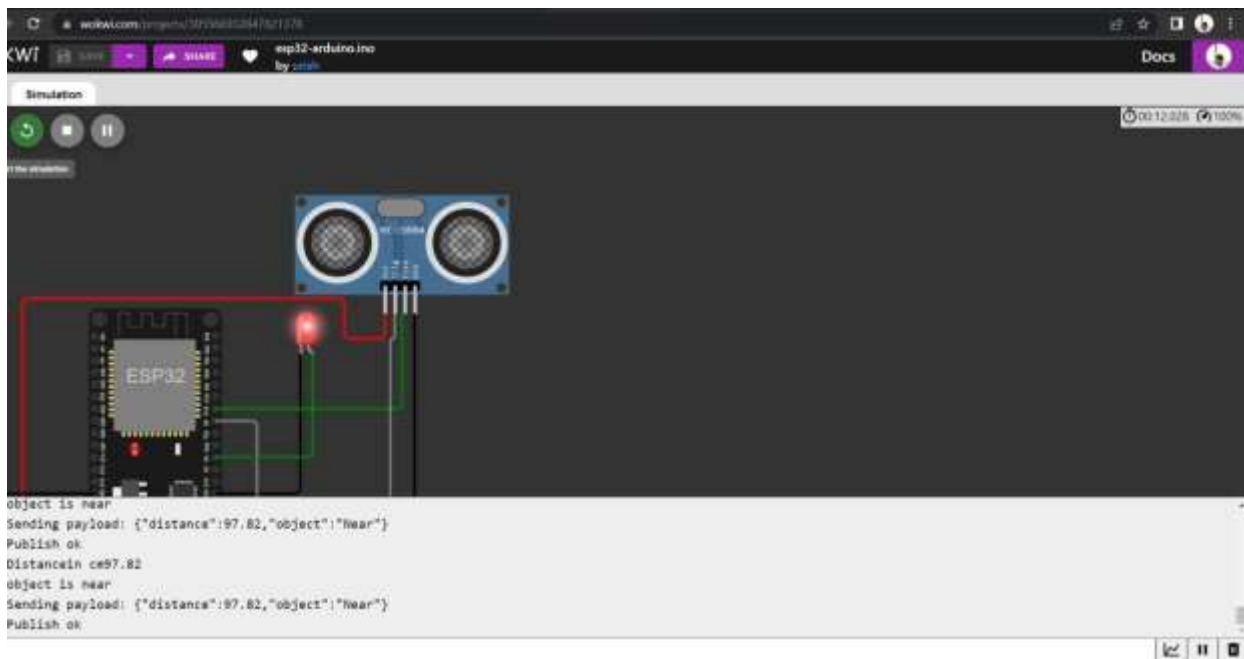
OUTPUT:

```
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 the account -----
7
8 #define MSG "demo" //The username ID
9 #define DEVICE_TYPE "ULTRASONIC" //device type mentioned in the custom IoT Platform
10 #define DEVICE_ID "DISTANCEDETECT" //device ID mentioned in the custom IoT Platform
11 #define TOKEN "a4a6790125agk80a" //token
12
13 String data;
14
15 void setup()
16 {
17   //----- initialize the above values -----
18   char server[] = MSG; //messaging.internetofthings.ibmcloud.com // server name
19   char publishTopic[] = "iot-3/evt/data/evt/json"; // topic name and type of event, payload and type
20   char subscribeTopic[] = "iot-3/rd/data/rdt/string"; // cmd. whenever command type rd is received
21   char authMethod[] = "mqtt-tls"; // authentication method
22   char token[] = TOKEN;
23   char clientId[] = "d/" MSG "/" DEVICE_TYPE "/" DEVICE_ID; //client ID
24
25   //-----
26   //-----
27   //-----
28   PubSubClient client(server, 1883, callback, authMethod, token, clientId); //calling the predefined client ID by
29
30   int LED = 4;
31   int trig = 5;
32   int echo = 18;
33   void setup()
34   {
35     Serial.begin(115200);
36
37     no object found
38     Sending payload: {"distance":141.21,"object":"No"}
39     Publish ok
40     Distancein cm141.21
41     no object found
42     Sending payload: {"distance":141.21,"object":"No"}
43     Publish ok
```

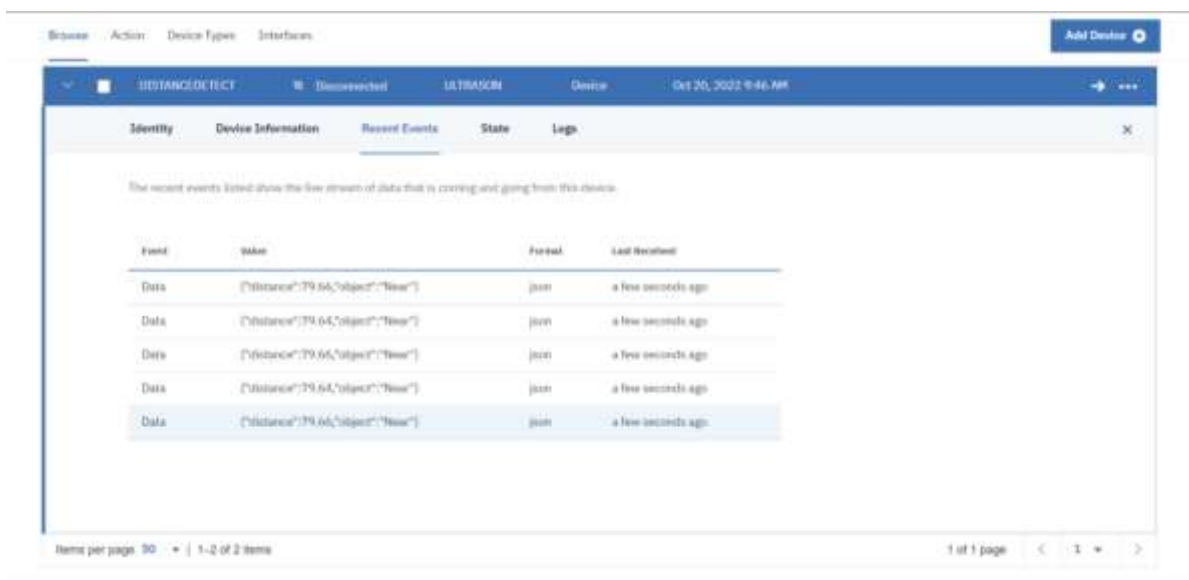
DatasendtotheIBMclouddevicewhentheobjectisfar

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



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