

ASSIGNMENT-4

DISTANCE DETECTION USING ULTRASONIC SENSOR

Date	1 November 2022
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Maximum Marks	2 Marks

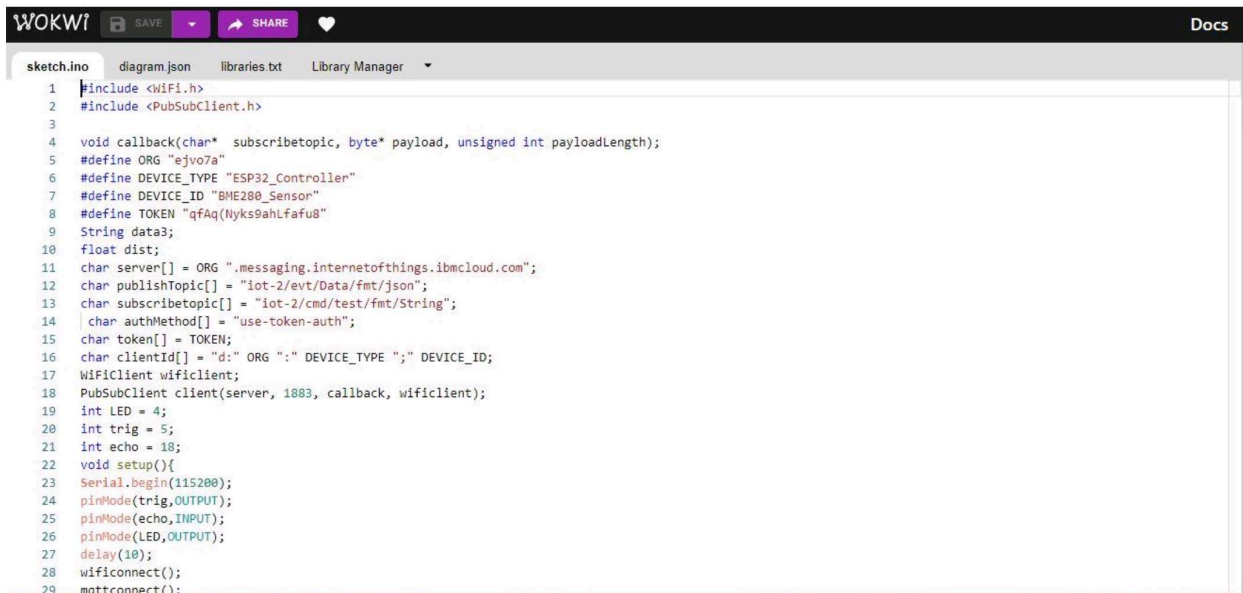
Question1 :

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 <WiFi.h>
2 #include <PubSubClient.h>
3
4 void callback(char* topic, byte* payload, unsigned int payloadLength);
5 #define ORG "ejvo7a"
6 #define DEVICE_TYPE "ESP32_Controller"
7 #define DEVICE_ID "BME280_Sensor"
8 #define TOKEN "qfAq(HyKs9ahLfafu8"
9 String data3;
10 float dist;
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Data/fmt/json";
13 char subscribetopic[] = "iot-2/cmd/test/fmt/String";
14 char authMethod[] = "use-token-auth";
15 char token[] = TOKEN;
16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 WiFiClient wificlient;
18 PubSubClient client(server, 1883, callback, wificlient);
19 int LED = 4;
20 int trig = 5;
21 int echo = 18;
22 void setup(){
23   Serial.begin(115200);
24   pinMode(trig,OUTPUT);
25   pinMode(echo,INPUT);
26   pinMode(LED,OUTPUT);
27   delay(10);
28   wificlient.connect();
29   mqttconnect();
```

sketch.ino

diagram.json

libraries.txt

Library Manager

```
28 wifiConnect();
29 mqttconnect();
30 }
31 void loop(){
32   digitalWrite(trig,LOW);
33   digitalWrite(trig,HIGH);
34   delayMicroseconds(10);
35   digitalWrite(trig,LOW);
36   float dur = pulseIn(echo,HIGH);
37   float dist = (dur * 0.0343)/2;
38   Serial.print("Distance in cm");
39   Serial.println(dist);
40   PublishData(dist);
41   delay(1000);
42   if (!client.loop()) {
43     mqttconnect();
44   }
45 }
46 void PublishData(float dist) {
47   mqttconnect();
48   String object;
49   if (dist < 100)
50   {
51     digitalWrite(LED,HIGH);
52     Serial.println("object is near");
53     object = "Near";
54   }
55   else
56   {
```

sketch.ino

diagram.json

libraries.txt

Library Manager

```
56 {
57   digitalWrite(LED, LOW);
58   Serial.println("no object found");
59   object = "No";
60 }
61 String payload="{\"distance\": ";
62 payload + dist;
63 payload += ", \"object\": \"";
64 payload += object;
65 payload += "\"";
66 Serial.print("Sending payload: ");
67 Serial.println(payload);
68 if (client.publish(publishTopic, (char*) payload.c_str()))
69 {
70   Serial.println("Publish ok");
71 } else {
72   Serial.println("Publish failed");
73 }
74 }
75 void mqttconnect() {
76   if (!client.connected()) {
77     Serial.print("Reconnecting client to ");
78     Serial.println(server);
79     while (!client.connect(clientId, authMethod, token)) {
80       Serial.print(".");
81       delay(500);
82     }
83     initManagedDevice();
84     Serial.println();
```

sketch.ino

diagram.json

libraries.txt

Library Manager

```
86 }
87 void wificonnect()
88 {
89   Serial.println();
90   Serial.print("Connecting to ");
91   WiFi.begin("wokwi-GUEST", "", 6);
92   while (WiFi.status() != WL_CONNECTED) {
93     delay(500);
94     Serial.print(".");
95   }
96   Serial.println("");
97   Serial.println("WiFi connected");
98   Serial.println("IP address: ");
99   Serial.println(WiFi.localIP());
100 }
101 void initManagedDevice() {
102   if (client.subscribe(subscribetopic)) {
103     Serial.println((subscribetopic));
104     Serial.println("subscribe to cmd OK");
105   } else {
106     Serial.println("subscribe to cmd FAILED");
107   }
108 }
109 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
110 {
111   Serial.print("callback invoked for topic: ");
112   Serial.println(subscribetopic);
113   for (int i = 0; i < payloadLength; i++) {
```

sketch.ino

diagram.json

libraries.txt

Library Manager

```
101 void initManagedDevice() {
102     if (client.subscribe(subscribetopic)) {
103         Serial.println(subscribetopic);
104         Serial.println("subscribe to cmd OK");
105     } else {
106         Serial.println("subscribe to cmd FAILED");
107     }
108 }
109 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
110 {
111     Serial.print("callback invoked for topic: ");
112     Serial.println(subscribetopic);
113     for (int i = 0; i < payloadLength; i++) {
114         data3 += (char)payload[i];
115     }
116     data3="";
117 }
118 }
```

OUTPUT:

The Wokwi interface displays a sketch for an ESP32 connected to an HC-SR04 ultrasonic sensor. The sketch code is as follows:

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3
4 void callback(char* topic, byte* payload, unsigned int payloadLength)
5 {
6   #define ORG "ejvo7a"
7   #define DEVICE_TYPE "ESP32_Controller"
8   #define DEVICE_ID "BME280_Sensor"
9   #define TOKEN "qfAq(Nyks9ahLfafu8"
10   String data3;
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12   char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
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15   char authMethod[] = "use-token-auth";
16   char token[] = TOKEN;
17   char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
18   WiFiClient wificlient;
19   PubSubClient client(server, 1883, callback, wificlient);
20   int LED = 4;
21   int trig = 5;
22   int echo = 18;
23   void setup()
24   {
25     Serial.begin(115200);
26     pinMode(trig, OUTPUT);
27     pinMode(echo, INPUT);
28     pinMode(LED, OUTPUT);
29     delay(10);
30     wificlient.connect();
31     mqttconnect();
32   }
33 }
```

The simulation window shows the following output:

```
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distance in cm:141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
```

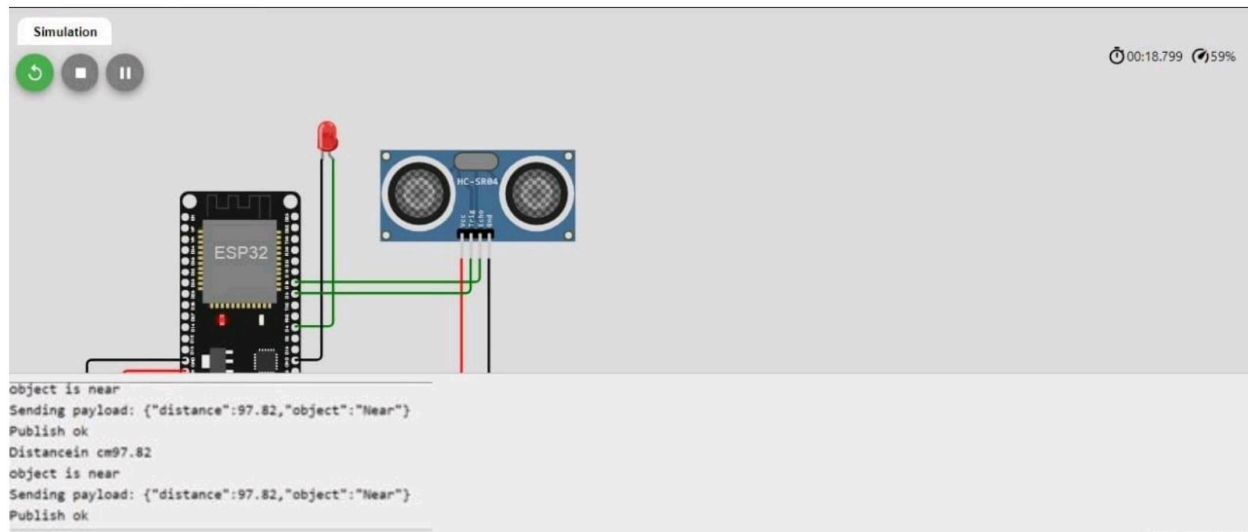
Data send to the IBM cloud device when the object is far

The IBM Watson IoT Platform interface shows the 'Recent Events' tab for a device named 'DISTANCEDETECT'. The device is disconnected and was last seen on Oct 20, 2022 9:46 AM. The recent events listed show the live stream of data that is coming and going from this device.

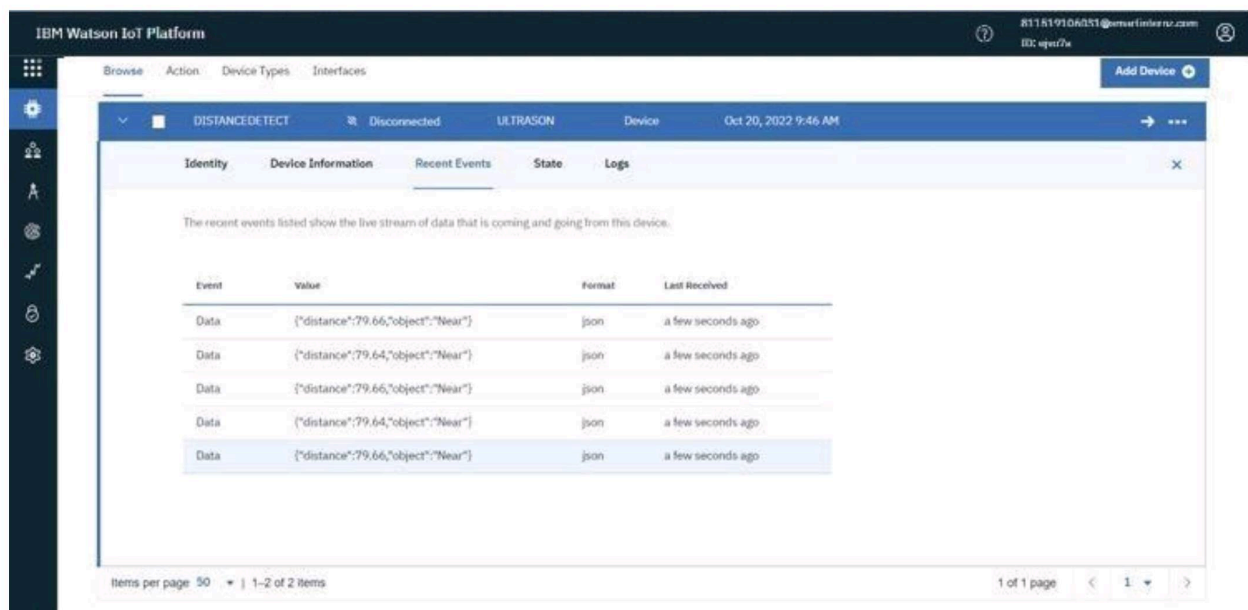
Event	Value	Format	Last Received
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.18,"object":"No"}	json	a few seconds ago
Data	{"distance":141.2,"object":"No"}	json	a few seconds ago

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when object is near to the ultrasonic sensor



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



<https://wokwi.com/projects/347049153413513812>