

ASSIGNMENT-4

| | |
|--------------|------------------|
| Date | 26 October 2022 |
| TeamID | PNT2022TMID06950 |
| Name | RAM SRI HARI S |
| MaximumMarks | 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.

CODE:

```
1  #include <WiFi.h> //library for wifi
2  #include <PubSubClient.h> //library for MQTT
3
4
5  void callback(char* subscribtopic, byte* payload, unsigned int payloadLength);
6
7  //-----credentials of IBM Accounts-----
8
9  #define ORG "4hn0jp" //IBM ORGANITION 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)ZSegV&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 subscribtopic[] = "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);
```

esp32-blink.ino • diagram.json • libraries.txt • Library Manager ▼

```
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
98
99 if (client.publish(publishTopic, (char*) payload.c_str())) {
100     Serial.println("Publish ok");// if it sucessfully 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 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 defination for wificonnect
120 {
121     Serial.println();
122     Serial.print("connecting to ");
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());

```

```

esp32-blink.ino • diagram.json • libraries.txt • Library Manager ▼
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       // if(data3=="Near") {
159       //     Serial.println("Near");
160       // }
161       // }
162   }

```

esp32-blink.ino ●

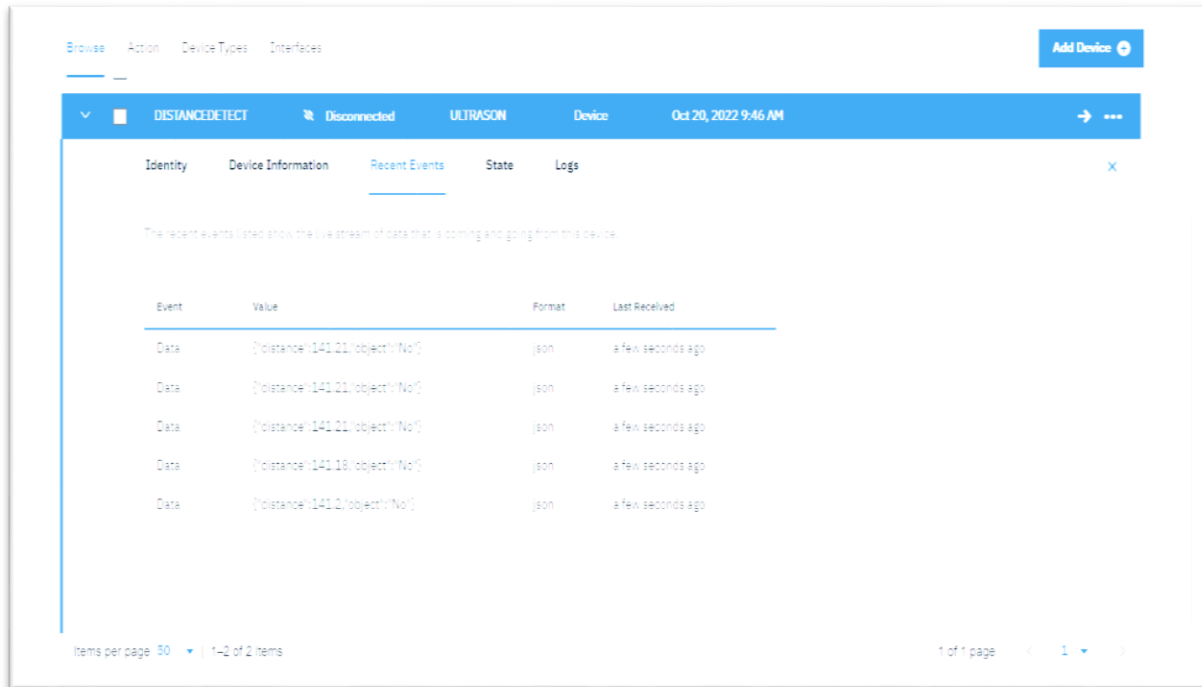
diagram.json ●

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 }
```

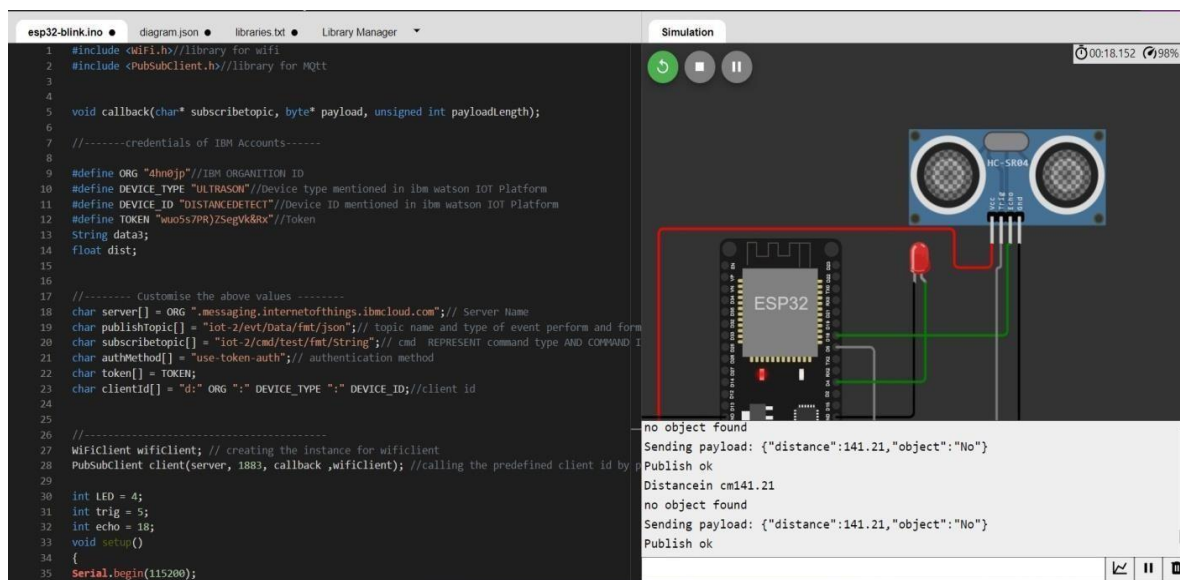
OUTPUT:



The screenshot shows the IBM Cloud IoT Platform console. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A blue bar at the top of the main content area displays the device name 'DISTANCEDETECT', its status 'Disconnected', type 'ULTRASON', and a timestamp 'Oct 20, 2022 9:46 AM'. Below this, a tabbed interface shows 'Identity', 'Device Information', 'Recent Events' (selected), 'State', and 'Logs'. A message states: 'The recent events listed show the live stream of data that is coming and going from this device.' A table with the following columns is shown: Event, Value, Format, and Last Received. It contains five rows of data, all with the same value: '{\"distance\":141.21,\"object\":\"No\"}'. The bottom of the console shows 'Items per page 50' and '1-2 of 2 items'.

| 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 |

Data send to the IBMcloud device when the objectics far



The screenshot shows the Arduino IDE with a project named 'esp32-blink.ino'. The code is for an ESP32 connected to an HC-SR04 ultrasonic sensor. It configures the sensor and sends data to IBM Cloud IoT Platform. The serial monitor shows the output: 'no object found', 'Sending payload: {\"distance\":141.21,\"object\":\"No\"}', and 'Publish ok'.

```
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5 void callback(char* topic, byte* payload, unsigned int payloadLength);
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7 //-----credentials of IBM Accounts-----
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9 #define ORG \"dhn0jp\" //IBM ORGANIZATION 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 \"wuo557PR)ZsegV&Rk\" //Token
13 String data3;
14 float dist;
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17 //----- Customise the above values -----
18 char server[] = ORG \".messaging.internetofthings.ibmcloud.com\"; // Server Name
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20 char subscribTopic[] = \"iot-2/cmd/test/fmt/String\"; // cmd REPRESENT command type AND COMMAND ID
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
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30 int LED = 4;
31 int trig = 5;
32 int echo = 18;
33 void setup()
34 {
35   Serial.begin(115200);
```

Data sent to the IBMCloud Device when the object is near

Browse Action Device Types Interfaces Add Device

DISTANCEDETECT **Disconnected** **ULTRASON** **Device** **Oct 20, 2022 9:46 AM** → ...

Identity Device Information Recent Events State Logs ×

The following events are listed along the timeline of data that is coming and going from this device.

| Event | Value | Format | Last Received |
|-------|--------------------------------------|--------|-------------------|
| Data | [{"distance":79.66,"object":"Near"}] | json | a few seconds ago |
| Data | [{"distance":79.64,"object":"Near"}] | json | a few seconds ago |
| Data | [{"distance":79.66,"object":"Near"}] | json | a few seconds ago |
| Data | [{"distance":79.64,"object":"Near"}] | json | a few seconds ago |
| Data | [{"distance":79.66,"object":"Near"}] | json | a few seconds ago |

Items per page: 50 1-2 of 2 items 1 of 1 page 1

When object is near to the ultrasonic sensor

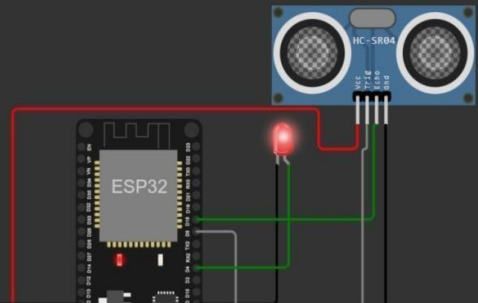
wokwi.com/projects/305566932847821378

esp32-arduino.ino by urish

Simulation

00:12.028 100%

Start the simulation



```
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
Distance in cm 97.82
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
```