ASSIGNMENT 4
REAL TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM

Date	20 October 2022
Team ID	PNT2022TMID11003
Name	BHUVANESWARI.K
Student Roll Number	811519106026
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.

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 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)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 LCD = 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 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());
```

```
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);
```
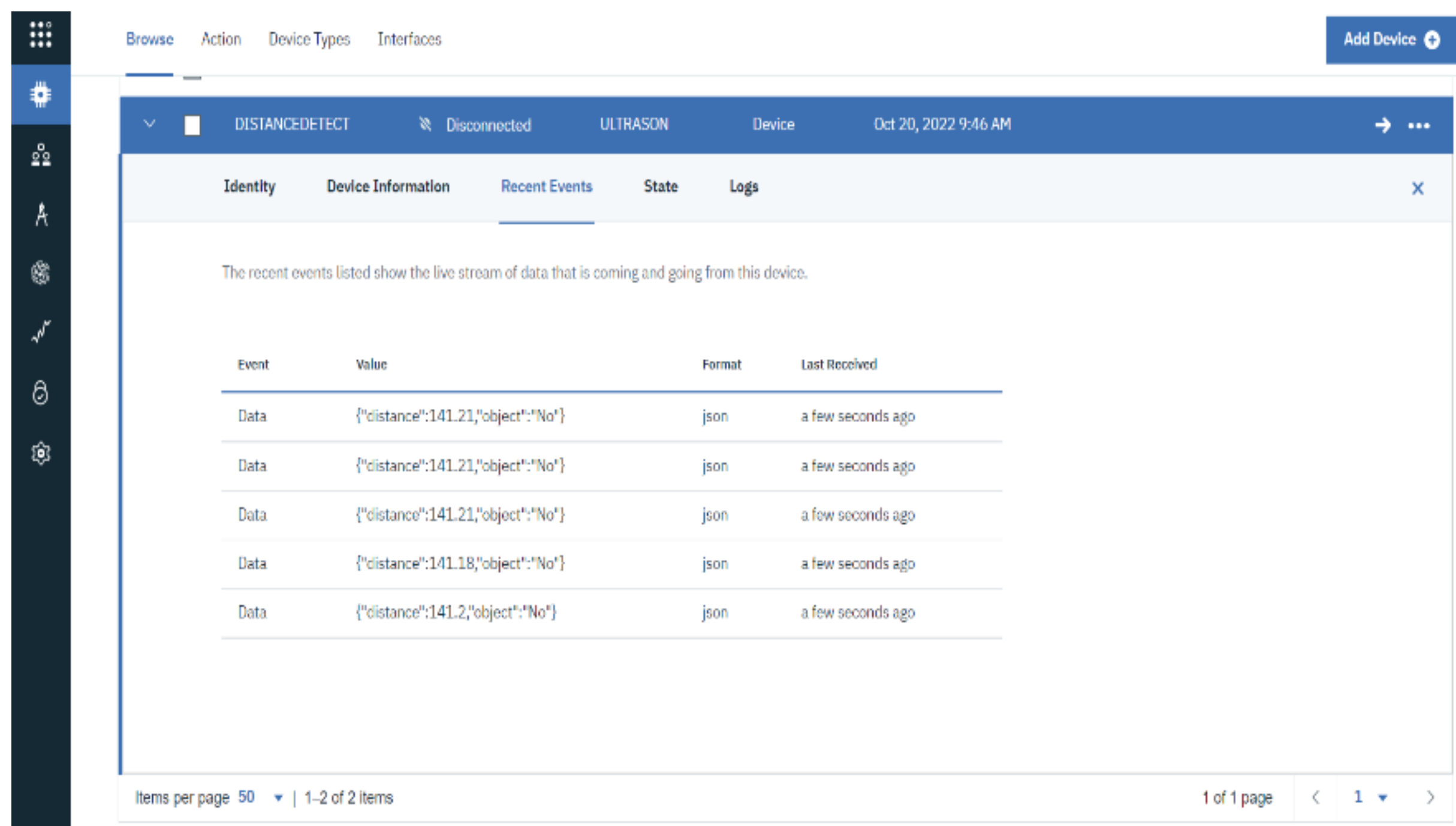
```
142   }
143
144   void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
145   {
146
147     Serial.print("callback invoked for topic: ");
148     Serial.println(subscribetopic);
149     for (int i = 0; i < payloadLength; i++) {
150       //Serial.print((char)payload[i]);
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   }
```
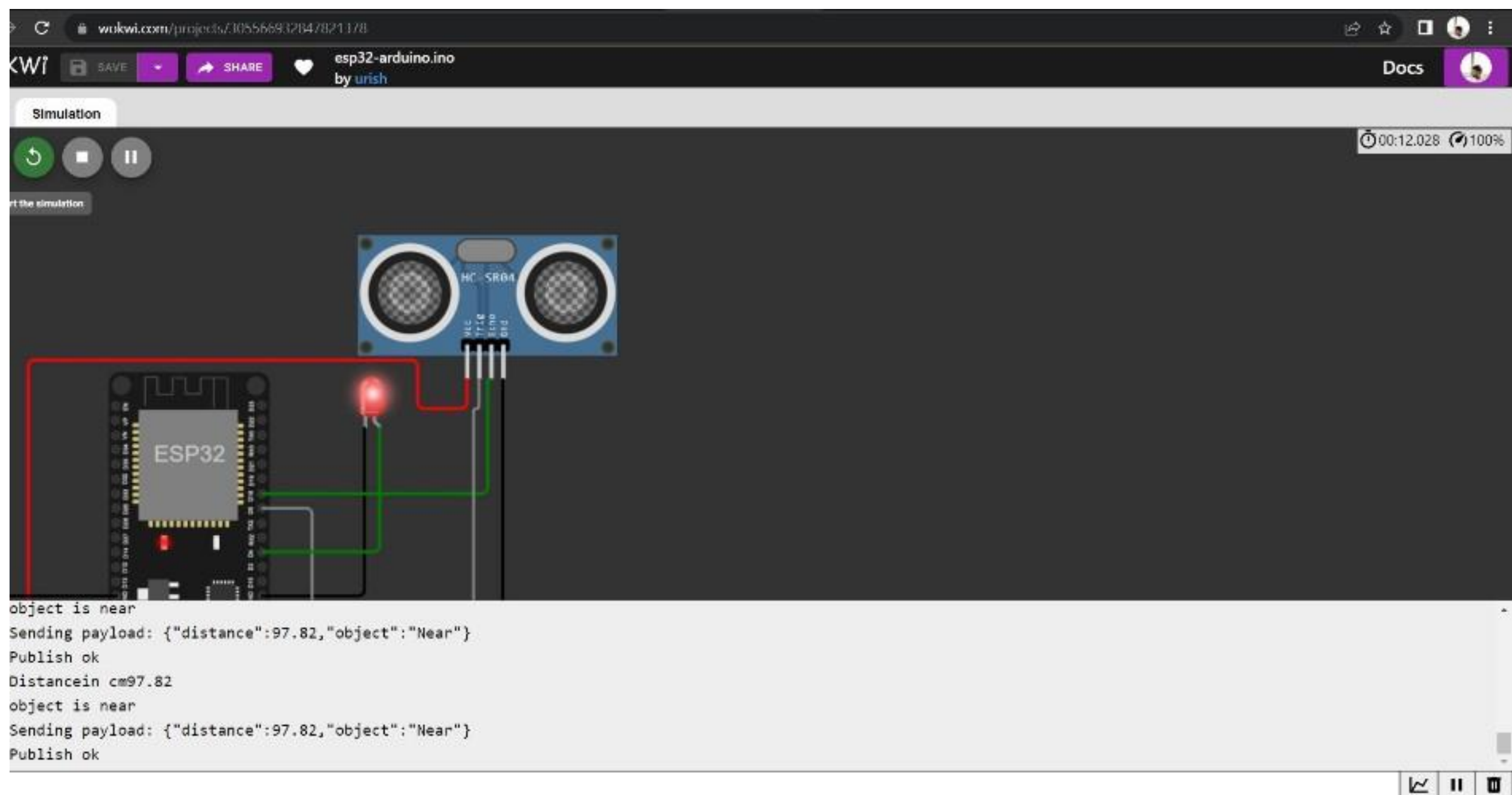
OUTPUT:
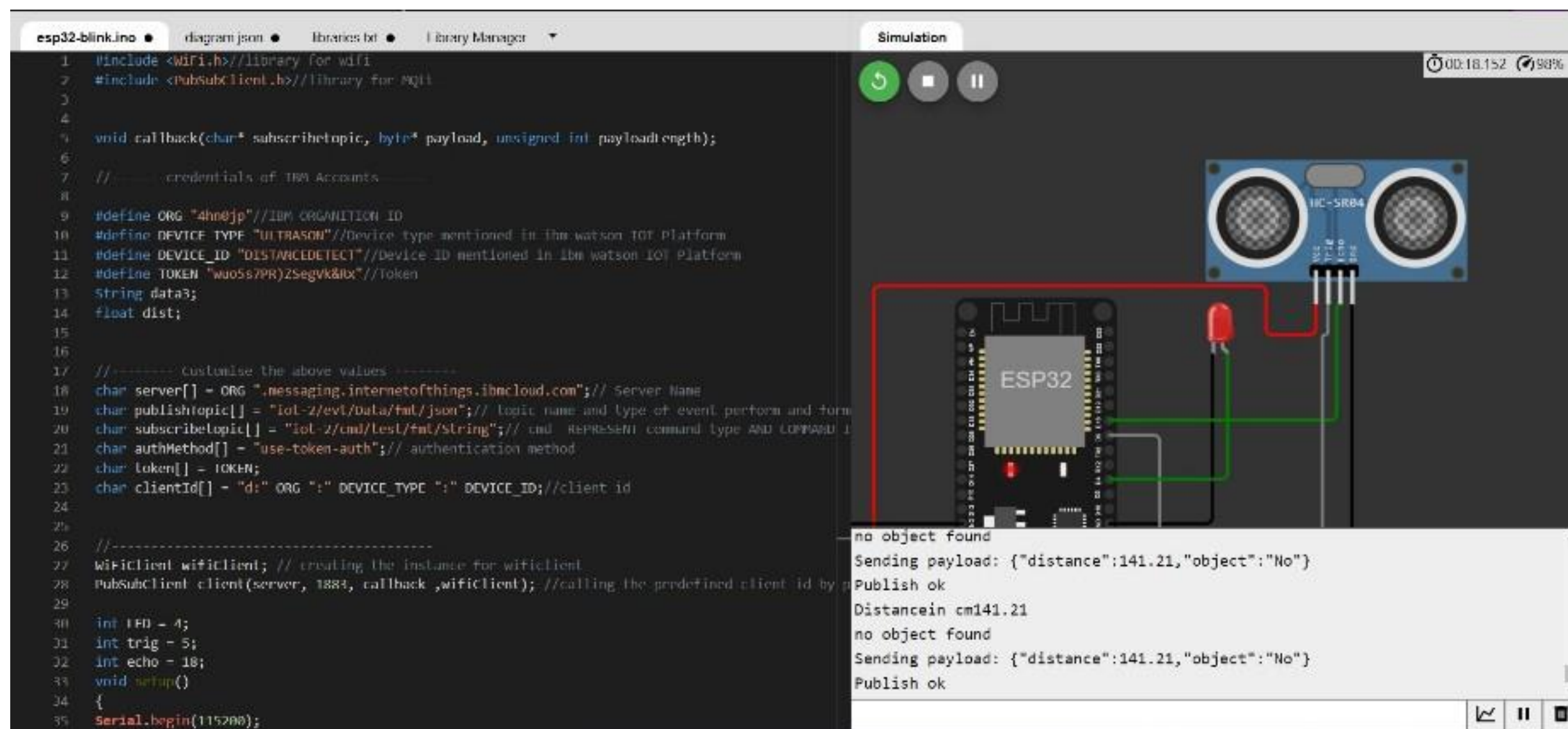
Data send to the IBM cloud device when the object is far

when object is near to the ultrasonic sensor


```
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
Distancein cm97.82
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
```

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