ASSIGNMENT 4

ESP 32 AND **ULTRASONIC SENSOR** DATA SENDS TO **IBM CLOUD**

PROJECT	IoT ENABLED - REAL TIME WATER QUALITY MONITORING AND CONTROL SYSTEM
NAME	KOUSHIKKARAN K
PROJECT ID	PNT2022TMID46026
DATE	22 OCT 2022

QUESTION:

Write a code and connections in wowki for the ultrasonic sensor.

Whenever the distance is less than 100cms send an "alert" to IBM cloud and display in the device receive recent events.

Upload documents with wowki share link and images of IBM cloud

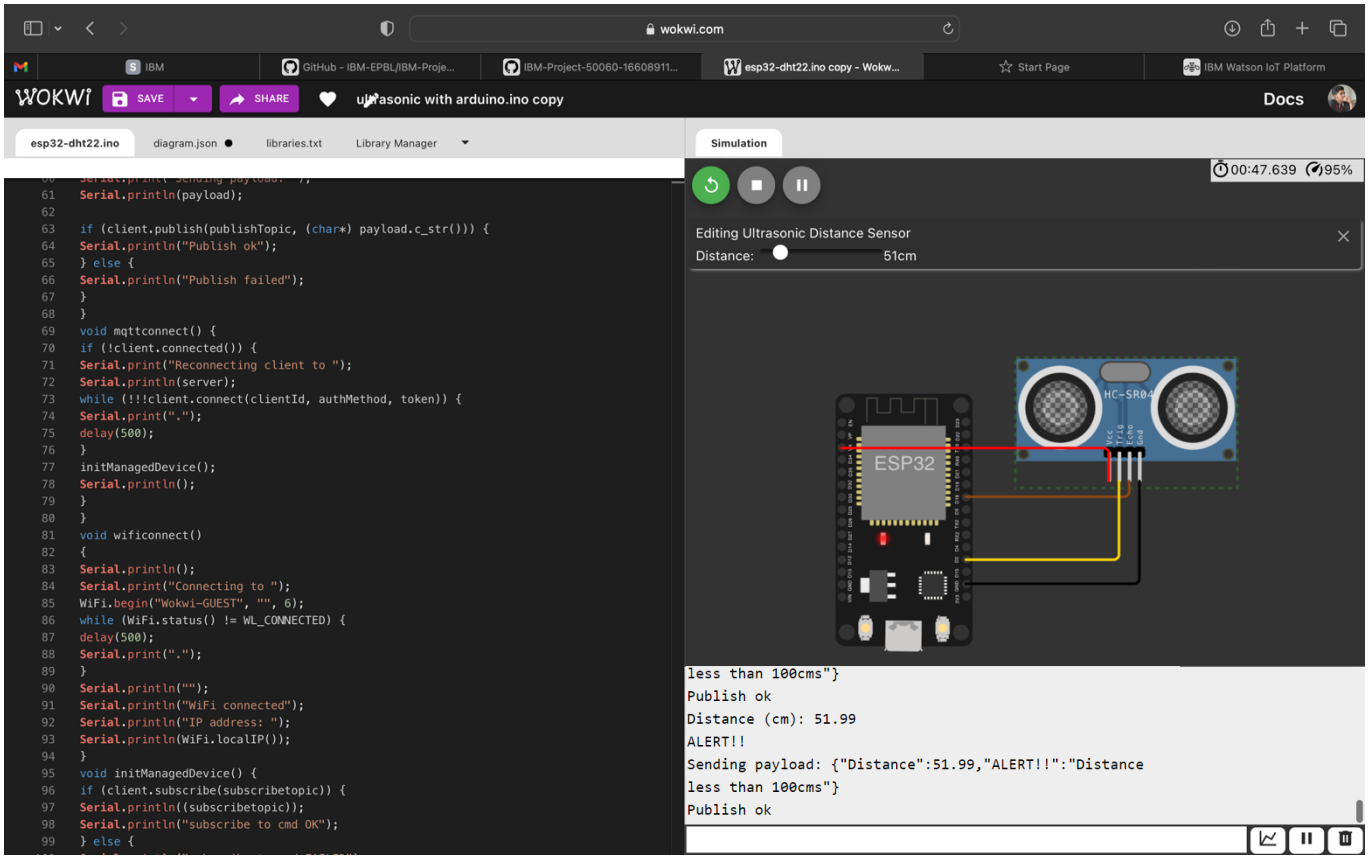
PROGRAM:

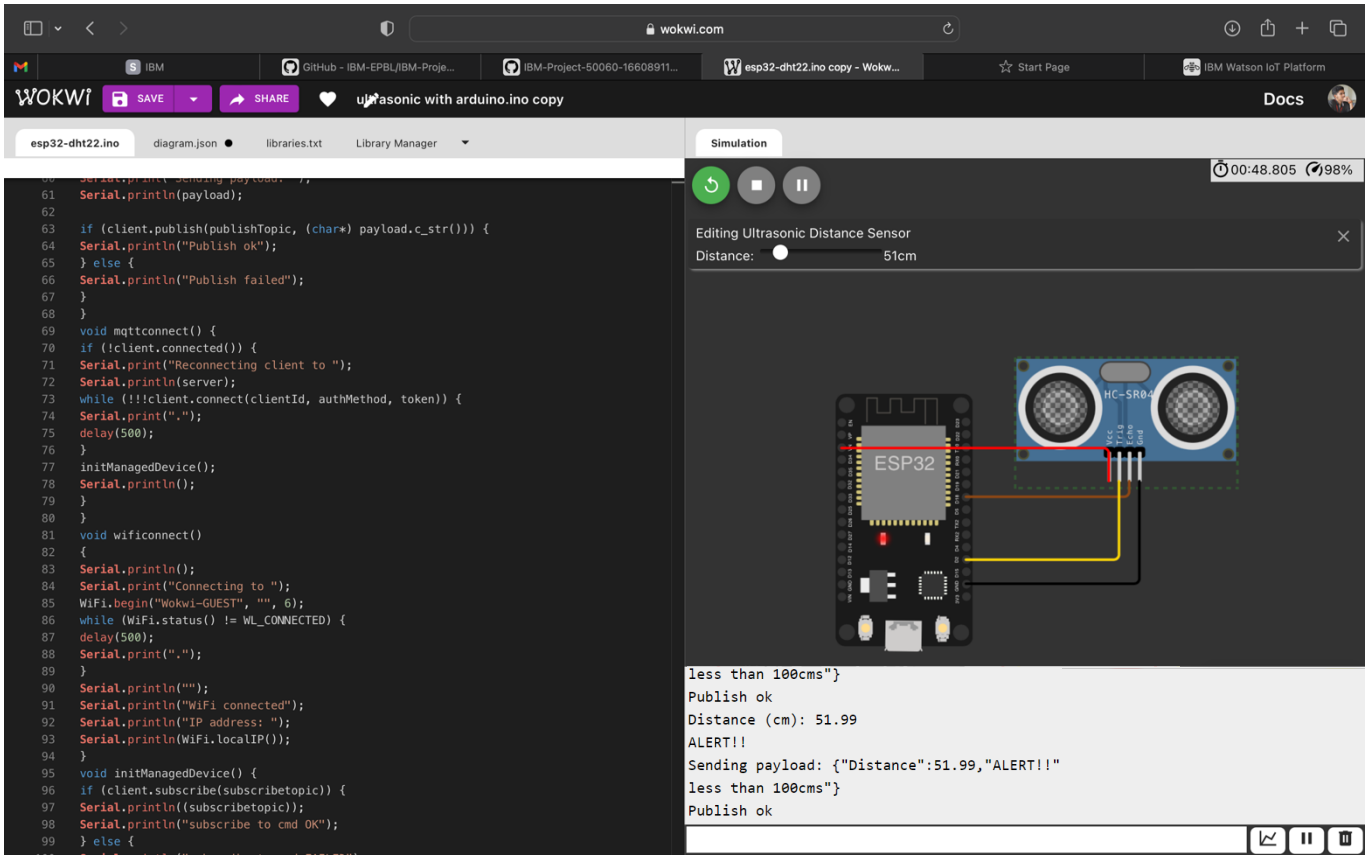
```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//-------credentials of IBM Accounts------
#define ORG "5vyvsk"//IBM ORGANITION ID
#define DEVICE_TYPE "REAL_TIME_WATER_QUALITY"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "PNT2022TMID47600"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "8vsl8edAhw2kYeYulZ" //Token
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "iot-2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);
const int trigPin = 2;
const int echoPin = 18;
#define SOUND_SPEED 0.034
long duration;
float distance;
void setup() {
Serial.begin(115200);
pinMode(trigPin, OUTPUT);
```

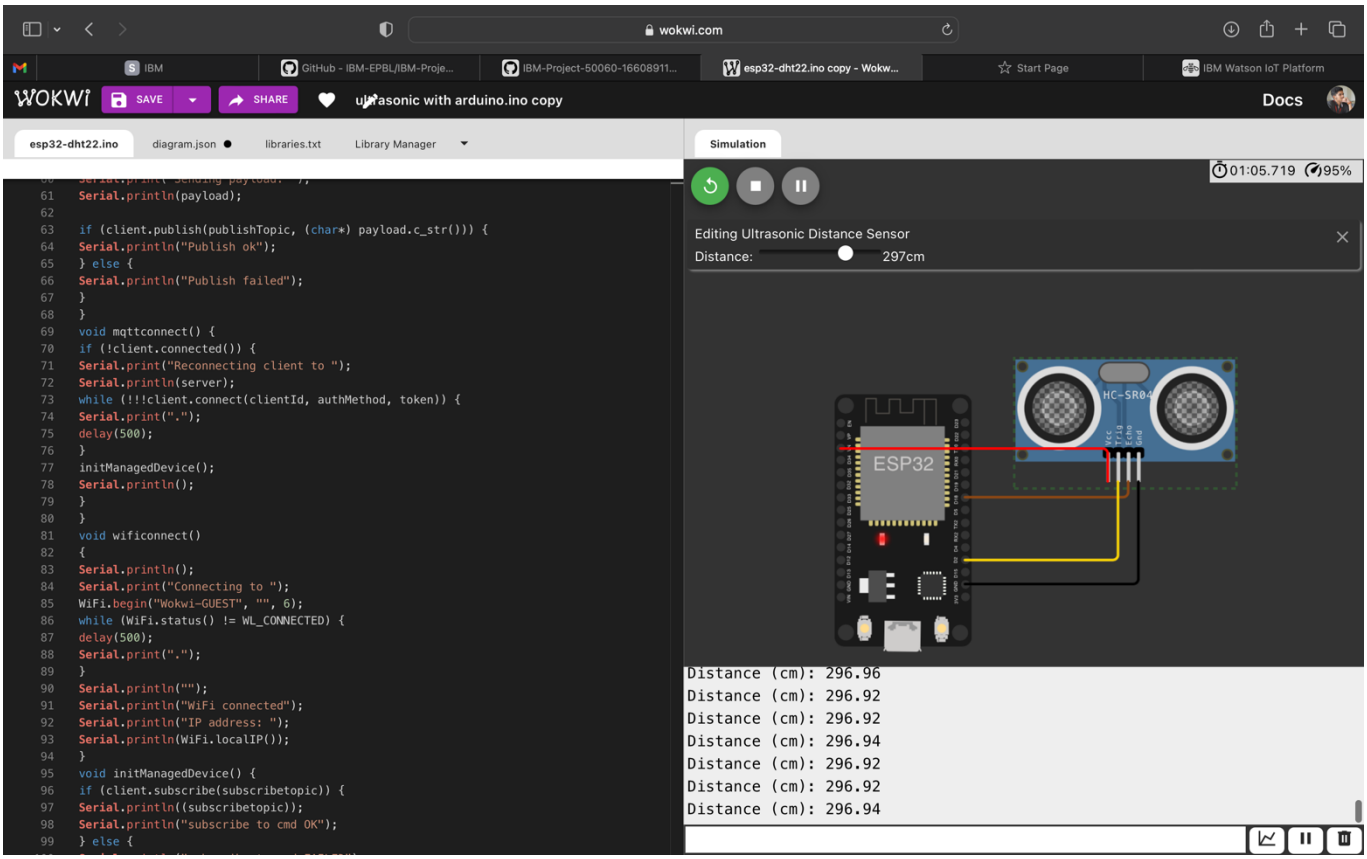
```
pinMode(echoPin, INPUT);
wificonnect();
mqttconnect();
}
void loop()
{
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = duration * SOUND_SPEED/2;
Serial.print("Distance (cm): ");
Serial.println(distance);
if(distance<100)
{
Serial.println("ALERT!!");
delay(1000);
PublishData(distance);
delay(1000);
if (!client.loop()) {
mqttconnect();
}
}
delay(1000);
}
void PublishData(float dist) {
mqttconnect();
String payload = "{\"Distance\":";
payload += dist;
payload += ",\"ALERT!!\":""\"Distance less than 100cms\"";
payload += "}";
Serial.print("Sending payload: ");
Serial.println(payload);

if (client.publish(publishTopic, (char*) payload.c_str())) {
Serial.println("Publish ok");
} else {
Serial.println("Publish failed");
}
}
void mqttconnect() {
if (!client.connected()) {
Serial.print("Reconnecting client to ");
Serial.println(server);
while (!!!client.connect(clientId, authMethod, token)) {
Serial.print(".");
delay(500);
}
initManagedDevice();
Serial.println();
}
}
void wificonnect()
{
Serial.println();
```

```
Serial.print("Connecting to ");
WiFi.begin("Wokwi-GUEST", "", 6);
while (WiFi.status() != WL_CONNECTED) {
delay(500);
Serial.print(".");
}
Serial.println("");
Serial.println("WiFi connected");
Serial.println("IP address: ");
Serial.println(WiFi.localIP());
}
void initManagedDevice() {
if (client.subscribe(subscribetopic)) {
Serial.println((subscribetopic));
Serial.println("subscribe to cmd OK");
} else {
Serial.println("subscribe to cmd FAILED");
}
}
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
Serial.print("callback invoked for topic: ");
Serial.println(subscribetopic);
for (int i = 0; i < payloadLength; i++) {
//Serial.print((char)payload[i]);
data3 += (char)payload[i];
}
Serial.println("data: "+ data3);
data3="";
}
```

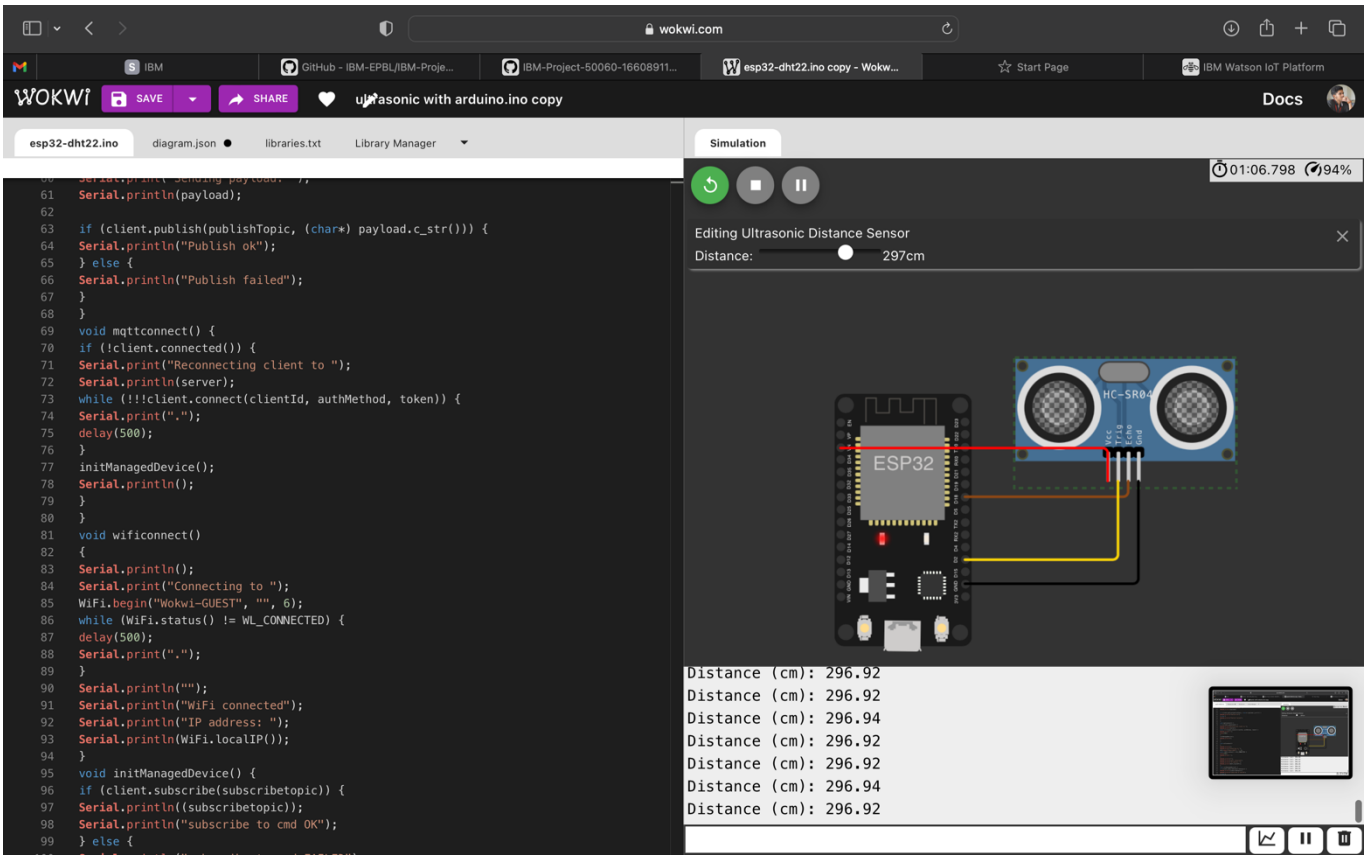
OUTPUT:


wokwi.com
WOKWI
SAVE
SHARE
ultrasonic with arduino.ino copy
Docs
esp32-dht22.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:47.639
95%
Editing Ultrasonic Distance Sensor
Distance:
51cm
ESP32
HC-SR04
61 Serial.println(payload);
63 if (client.publish(publishTopic, (char*) payload.c_str())) {
64 Serial.println("Publish ok");
66 Serial.println("Publish failed");
69 void mqttconnect() {
70 if (!client.connected()) {
71 Serial.print("Reconnecting client to ");
72 Serial.println(server);
73 while (!!!client.connect(clientId, authMethod, token)) {
74 Serial.print(".");
75 delay(500);
77 initManagedDevice();
78 Serial.println();
81 void wificonnect()
83 Serial.println();
84 Serial.print("Connecting to ");
85 WiFi.begin("Wokwi-GUEST", "", 6);
86 while (WiFi.status() != WL_CONNECTED) {
87 delay(500);
88 Serial.print(".");
90 Serial.println("");
91 Serial.println("WiFi connected");
92 Serial.println("IP address: ");
93 Serial.println(WiFi.localIP());
95 void initManagedDevice() {
96 if (client.subscribe(subscribetopic)) {
97 Serial.println((subscribetopic));
98 Serial.println("subscribe to cmd OK");
99 } else {
less than 100cms"}
Publish ok
Distance (cm): 51.99
ALERT!!
Sending payload: {"Distance":51.99,"ALERT!!":"Distance
less than 100cms"}
Publish ok


wokwi.com
WOKWI
SAVE
SHARE
ultrasonic with arduino.ino copy
Docs
esp32-dht22.ino
diagram.json
libraries.txt
Library Manager
Simulation
00:48.805
98%
Editing Ultrasonic Distance Sensor
Distance:
51cm
ESP32
HC-SR04
61 Serial.println(payload);
63 if (client.publish(publishTopic, (char*) payload.c_str())) {
64 Serial.println("Publish ok");
66 Serial.println("Publish failed");
69 void mqttconnect() {
70 if (!client.connected()) {
71 Serial.print("Reconnecting client to ");
72 Serial.println(server);
73 while (!!!client.connect(clientId, authMethod, token)) {
74 Serial.print(".");
75 delay(500);
77 initManagedDevice();
78 Serial.println();
81 void wificonnect()
83 Serial.println();
84 Serial.print("Connecting to ");
85 WiFi.begin("Wokwi-GUEST", "", 6);
86 while (WiFi.status() != WL_CONNECTED) {
87 delay(500);
88 Serial.print(".");
90 Serial.println("");
91 Serial.println("WiFi connected");
92 Serial.println("IP address: ");
93 Serial.println(WiFi.localIP());
95 void initManagedDevice() {
96 if (client.subscribe(subscribetopic)) {
97 Serial.println((subscribetopic));
98 Serial.println("subscribe to cmd OK");
99 } else {
less than 100cms"}
Publish ok
Distance (cm): 51.99
ALERT!!
Sending payload: {"Distance":51.99,"ALERT!!"
less than 100cms"}
Publish ok

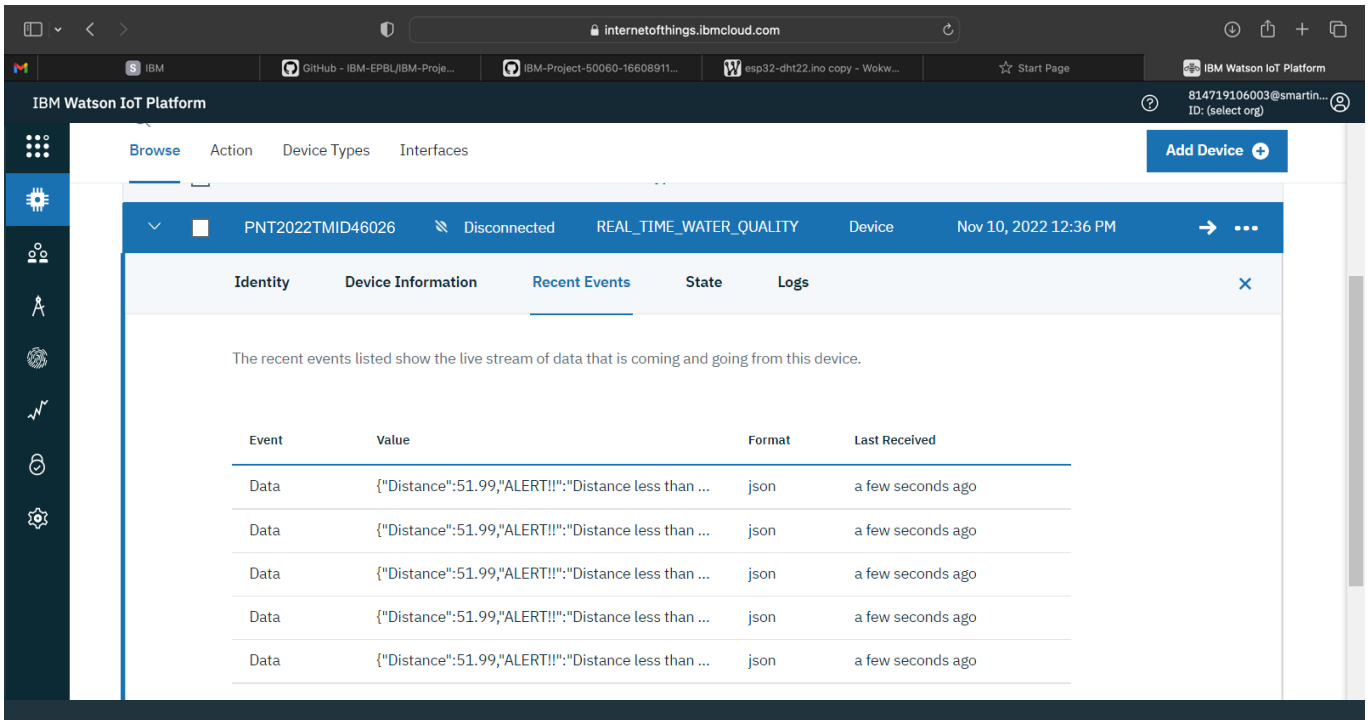


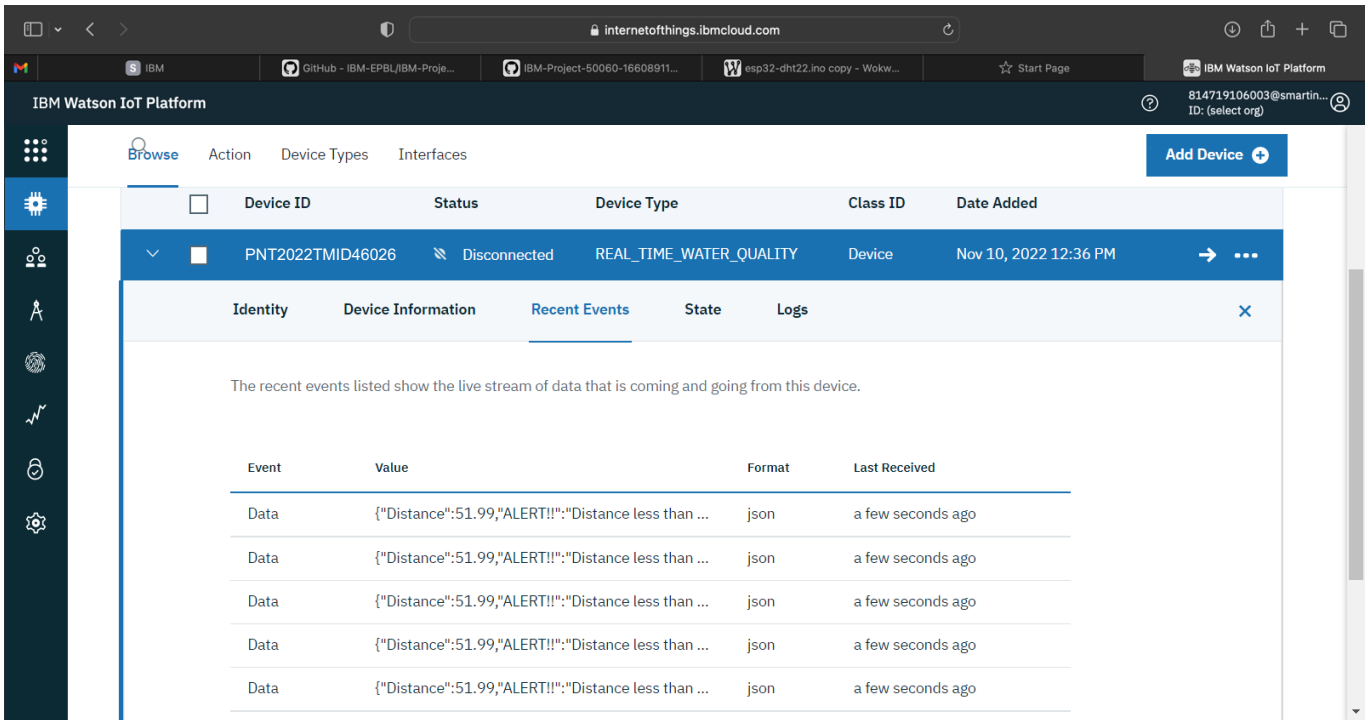

```
61  Serial.println(payload);
62
63  if (client.publish(publishTopic, (char*) payload.c_str())) {
64  Serial.println("Publish ok");
65  } else {
66  Serial.println("Publish failed");
67  }
68  }
69  void mqttconnect() {
70  if (!client.connected()) {
71  Serial.print("Reconnecting client to ");
72  Serial.println(server);
73  while (!!!client.connect(clientId, authMethod, token)) {
74  Serial.print(".");
75  delay(500);
76  }
77  initManagedDevice();
78  Serial.println();
79  }
80  }
81  void wificonnect()
82  {
83  Serial.println();
84  Serial.print("Connecting to ");
85  WiFi.begin("Wokwi-GUEST", "", 6);
86  while (WiFi.status() != WL_CONNECTED) {
87  delay(500);
88  Serial.print(".");
89  }
90  Serial.println("");
91  Serial.println("WiFi connected");
92  Serial.println("IP address: ");
93  Serial.println(WiFi.localIP());
94  }
95  void initManagedDevice() {
96  if (client.subscribe(subscribetopic)) {
97  Serial.println((subscribetopic));
98  Serial.println("subscribe to cmd OK");
99  } else {
```




```
61  Serial.println(payload);
62
63  if (client.publish(publishTopic, (char*) payload.c_str())) {
64  Serial.println("Publish ok");
65  } else {
66  Serial.println("Publish failed");
67  }
68  }
69  void mqttconnect() {
70  if (!client.connected()) {
71  Serial.print("Reconnecting client to ");
72  Serial.println(server);
73  while (!!!client.connect(clientId, authMethod, token)) {
74  Serial.print(".");
75  delay(500);
76  }
77  initManagedDevice();
78  Serial.println();
79  }
80  }
81  void wificonnect()
82  {
83  Serial.println();
84  Serial.print("Connecting to ");
85  WiFi.begin("Wokwi-GUEST", "", 6);
86  while (WiFi.status() != WL_CONNECTED) {
87  delay(500);
88  Serial.print(".");
89  }
90  Serial.println("");
91  Serial.println("WiFi connected");
92  Serial.println("IP address: ");
93  Serial.println(WiFi.localIP());
94  }
95  void initManagedDevice() {
96  if (client.subscribe(subscribetopic)) {
97  Serial.println((subscribetopic));
98  Serial.println("subscribe to cmd OK");
99  } else {
```

IBM Watson IoT platform:





Wokwi link:

https://wokwi.com/projects/348689478640992850