ASSIGNMENT 4

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

PROJECT	IoT ENABLED - REAL TIME WATER QUALITY MONITORING AND CONTROL SYSTEM
NAME	KANNAN J S
PROJECT ID	PNT2022TMID47600
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:

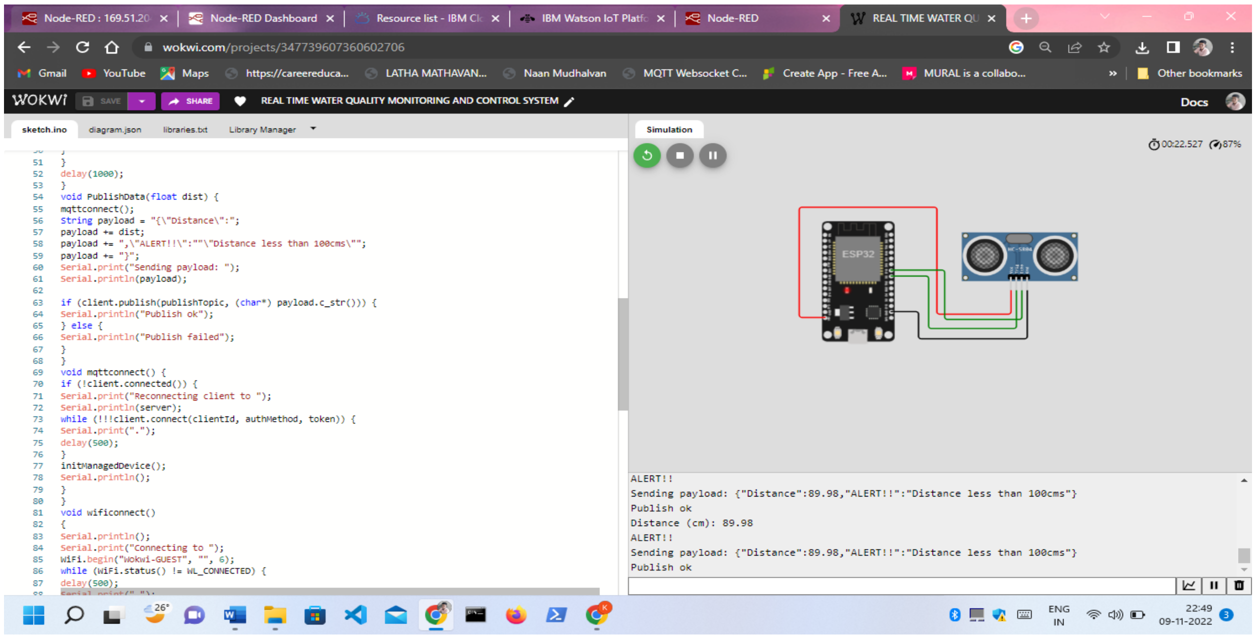
```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//-------credentials of IBM Accounts------
#define ORG "eqfbco"//IBM ORGANITION ID
#define DEVICE_TYPE "REAL_TIME_WATER_QUALITY_MONITORING"//Device type mentioned
in ibm watson IOT Platform
#define DEVICE_ID "PNT2022TMID47600A"//Device ID mentioned in ibm watson IOT
Platform
#define TOKEN "12345678" //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 = 5;
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:



```
}
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);

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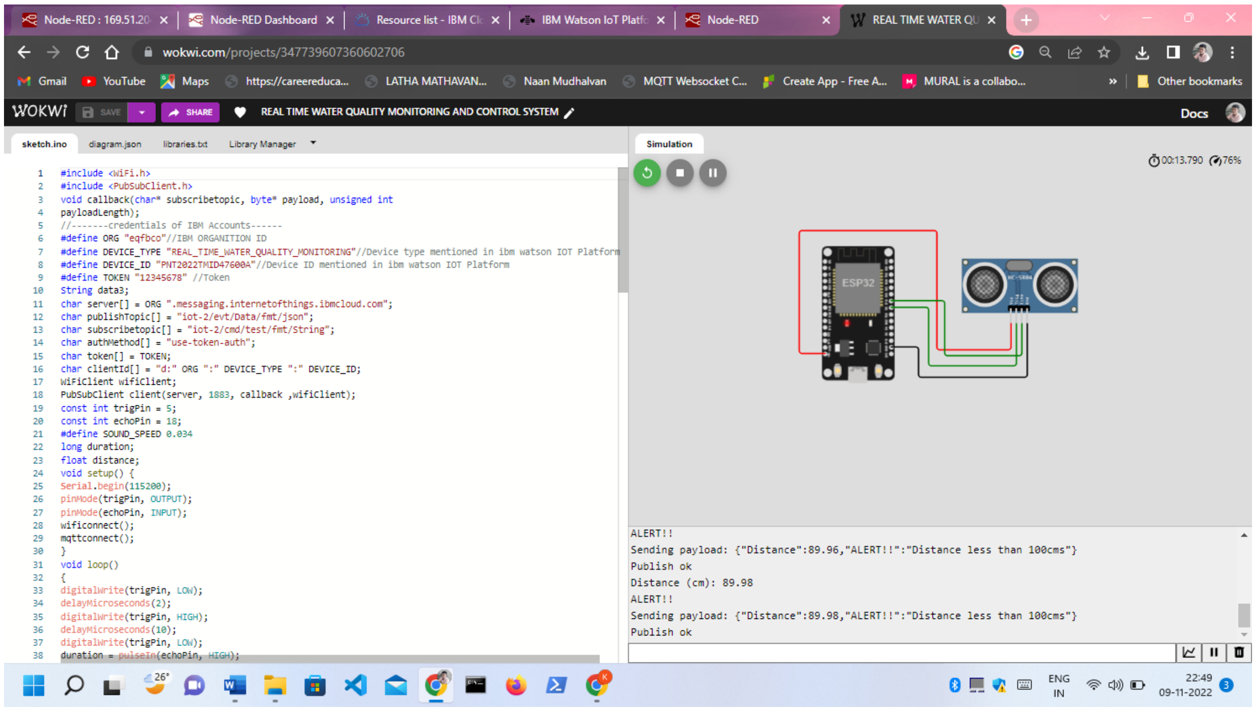
while (!!!client.connect(clientId, authMethod, token)) {
Serial.print(".");
delay(500);
}
initManagedDevice();
Serial.println();
}
}
void wificonnect()
{
Serial.println();
Serial.print("Connecting to ");
WiFi.begin("Wokwi-GUEST", "", 6);
while (WiFi.status() != WL_CONNECTED) {
delay(500);
```

```
ALERT!!
Sending payload: {"Distance":89.98,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 89.98
ALERT!!
Sending payload: {"Distance":89.98,"ALERT!!":"Distance less than 100cms"}
Publish ok
```



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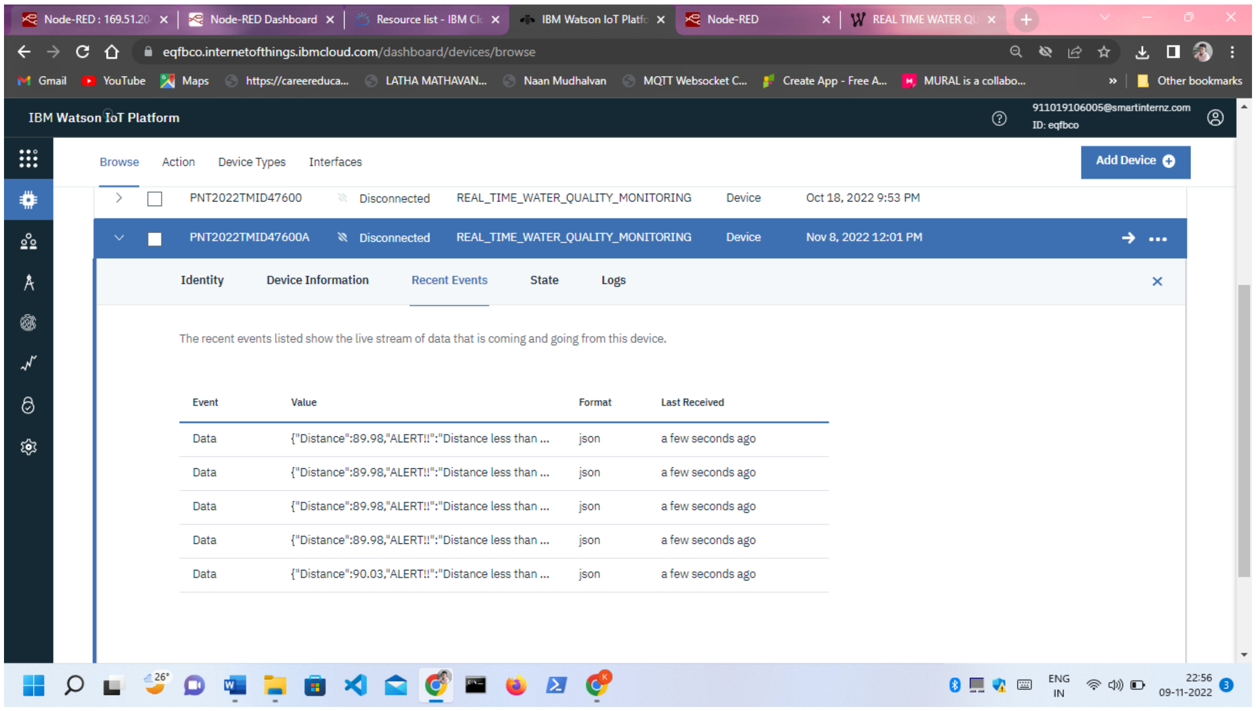
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
```

```
ALERT!!
Sending payload: {"Distance":89.96,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 89.98
ALERT!!
Sending payload: {"Distance":89.98,"ALERT!!":"Distance less than 100cms"}
Publish ok
```

IBM Watson IoT platform



eqfbco.internetofthings.ibmcloud.com/dashboard/devices/browse

911019106005@smartinternz.com
ID: eqfbco

PNT2022TMID47600	Disconnected	REAL_TIME_WATER_QUALITY_MONITORING	Device	Oct 18, 2022 9:53 PM
PNT2022TMID47600A	Disconnected	REAL_TIME_WATER_QUALITY_MONITORING	Device	Nov 8, 2022 12:01 PM

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":89.98,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":89.98,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":89.98,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":89.98,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":90.03,"ALERT!!":"Distance less than ...	json	a few seconds ago

Wowki link:

https://wokwi.com/projects/347739607360602706