

Assignment-4

Distance Detection Using Ultrasonic Sensor

Assignment Date	29 October 2022
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Team ID	PNT2022TMID24432
Maximum Marks	2 Marks

Question-1:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100cms send "alert" to ibm cloud and display in device recent events.

WOKWI LINK: <https://wokwi.com/projects/346518948162830932>

CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

#define ORG "f59trs"
#define DEVICE_TYPE "ultrasonicsensor"
#define DEVICE_ID "distancedetection"
#define TOKEN "AlGMGaaF01nawa1QA3"
String data3;
float dist;

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);

int LED = 4;
int trig = 5;
int echo = 18;
void setup()
{
  Serial.begin(115200);
  pinMode(trig,OUTPUT);
```

```

pinMode(echo, INPUT);
pinMode(LED, OUTPUT);
delay(10);
wificonnect();
mqttconnect();
}
void loop()
{
    digitalWrite(trig, LOW);
    digitalWrite(trig, HIGH);
    delayMicroseconds(10);
    digitalWrite(trig, LOW);
    float dur = pulseIn(echo, HIGH);
    float dist = (dur * 0.0343)/2;
    Serial.print("Distance in cm :");
    Serial.println(dist);

    PublishData(dist);
    delay(1000);
    if (!client.loop()) {
        mqttconnect();
    }
}

void PublishData(float dist) {
    mqttconnect();
    String object;
    if (dist < 100)

```

```

if (dist < 100)
{
    digitalWrite(LED, HIGH);
    Serial.println("object is near");
    object = "Near";
}
else
{
    digitalWrite(LED, LOW);
    Serial.println("no object found");
    object = "No";
}

String payload = "{\"distance\": ";
payload += dist;
payload += ", \"object\": \"";
payload += object;
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");
    }
}

```

```

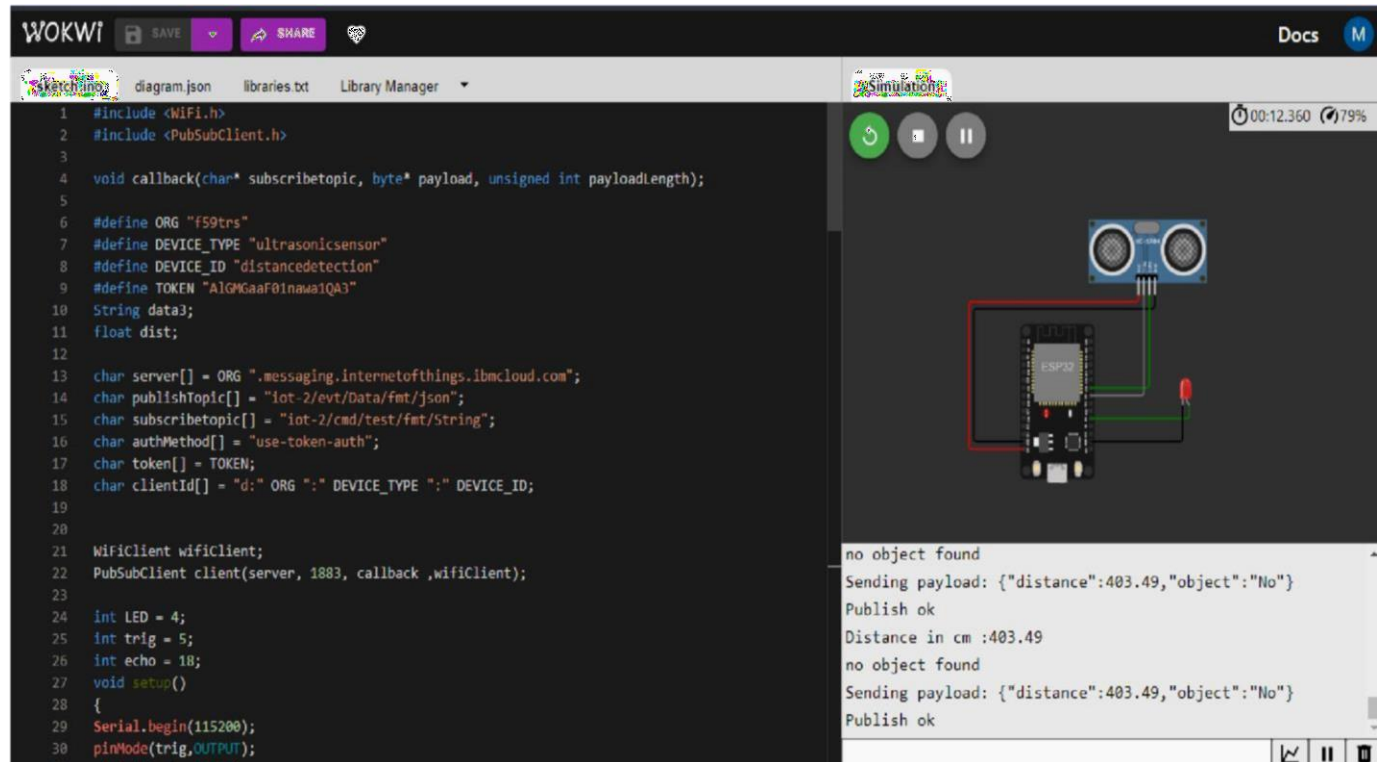
        Serial.println("subscribe to cmd FAILED");
    }
}

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++) {
        data3 += (char)payload[i];
    }
    data3 = "";
}

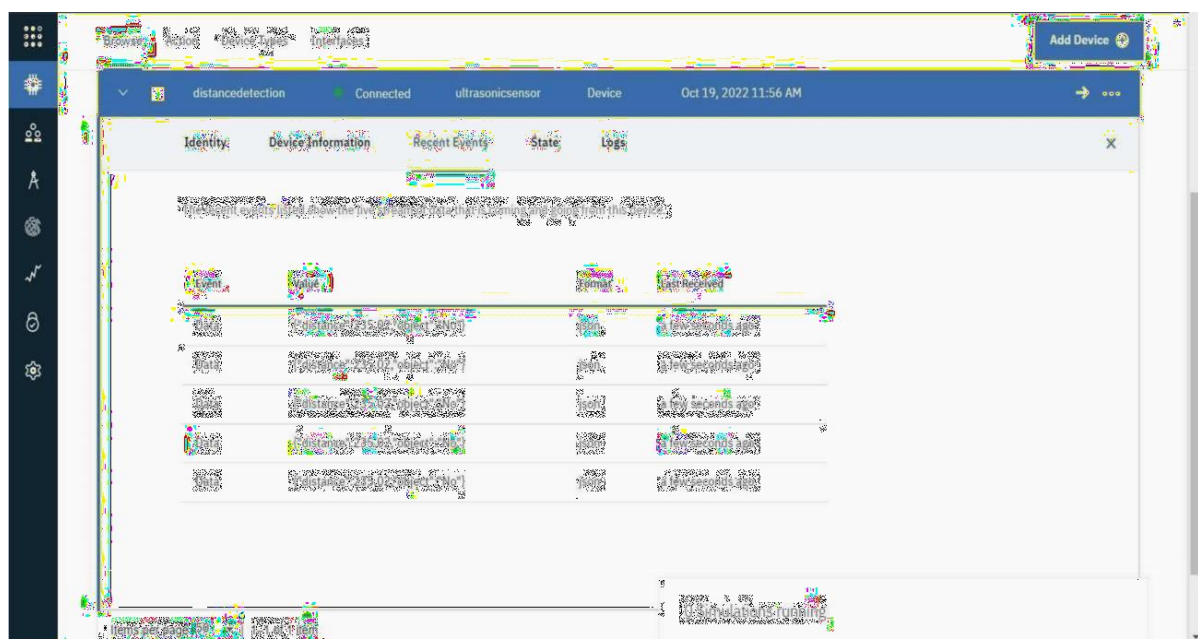
```

OUTPUT:

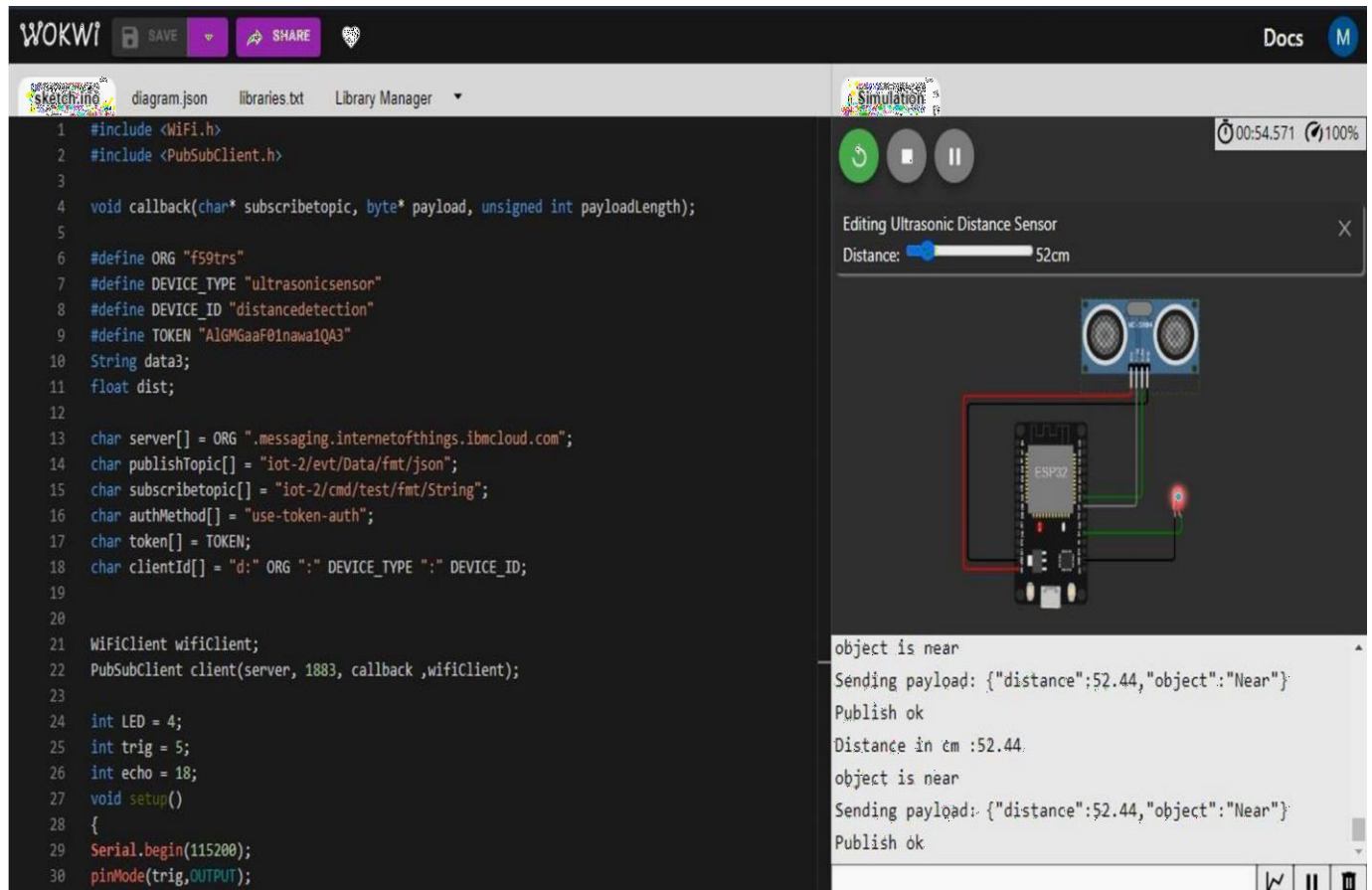
When object is not near to the ultrasonic sensor



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



When object is nearer to the ultrasonic sensor

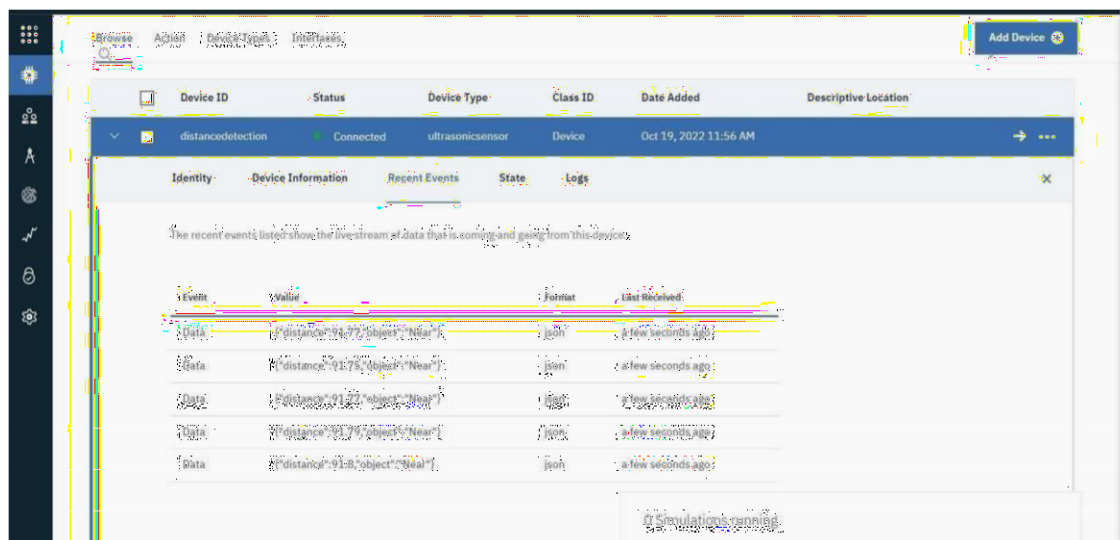


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2 #include <PubSubClient.h>
3
4 void callback(char* topic, byte* payload, unsigned int payloadLength);
5
6 #define ORG "f59trs"
7 #define DEVICE_TYPE "ultrasonicsensor"
8 #define DEVICE_ID "distancedetection"
9 #define TOKEN "AlGMGaaF01nawa1QA3"
10 String data3;
11 float dist;
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13 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
14 char publishTopic[] = "iot-2/evt/Data/fmt/json";
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16 char authMethod[] = "use-token-auth";
17 char token[] = TOKEN;
18 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
19
20
21 WiFiClient wifiClient;
22 PubSubClient client(server, 1883, callback, wifiClient);
23
24 int LED = 4;
25 int trig = 5;
26 int echo = 18;
27 void setup()
28 {
29   Serial.begin(115200);
30   pinMode(trig, OUTPUT);
```

Editing Ultrasonic Distance Sensor
Distance: 52cm

object is near
Sending payload: {"distance":52.44,"object": "Near"}
Publish ok
Distance in cm :52.44
object is near
Sending payload: {"distance":52.44,"object": "Near"}
Publish ok

Data sent to the IBM cloud device when the object is near



Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
distancedetection	Connected	ultrasonicsensor	Device	Oct 19, 2022 11:56 AM	

Event	Value	Format	Last Received
/Data	{"distance":93.77,"object": "Near"}	json	a few seconds ago
/Data	{"distance":91.75,"object": "Near"}	json	a few seconds ago
/Data	{"distance":91.62,"object": "Near"}	json	a few seconds ago
/Data	{"distance":91.75,"object": "Near"}	json	a few seconds ago
/Data	{"distance":91.8,"object": "Near"}	json	a few seconds ago