

ASSIGNMENT – 4

Ultrasonic sensor simulation in Wokwi

Assignment Date	25 October 2022
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Maximum Marks	2 Marks
Team ID	PNT2022TMID07826
Project Name	Real-Time River Water Quality Monitoring and Control System.

QUESTIONS:

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

CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "3yngbh"
#define DEVICE_TYPE "Assignment"
#define DEVICE_ID "1234"
#define TOKEN "234567890"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/shreedharen/fmt/json";
char topic[] = "iot-2/cmd/led/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
```

```
const int trigpin=5;
const int echopin=18;
String command;
String data="";
```

```
long duration;
float dist;
```

```

void setup()
{
  Serial.begin(115200);
  pinMode(led, OUTPUT);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  wifiConnect();
  mqttConnect();
}

void loop() {
  bool isNearby = dist < 100;
  digitalWrite(led, isNearby);

  publishData();
  delay(500);

  if (!client.loop()) {
    mqttConnect();
  }
}

void wifiConnect() {
  Serial.print("Connecting to "); Serial.print("Wifi");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.print("WiFi connected, IP address: "); Serial.println(WiFi.localIP());
}

void mqttConnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting MQTT client to "); Serial.println(server);
    while (!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(500);
    }
    initManagedDevice();
    Serial.println();
  }
}

void initManagedDevice() {
  if (client.subscribe(topic)) {
    // Serial.println(client.subscribe(topic));
    Serial.println("IBM subscribe to cmd OK");
  }
}

```

```

    } else {
        Serial.println("subscribe to cmd FAILED");
    }
}
void publishData()
{
    digitalWrite(trigpin,LOW);
    digitalWrite(trigpin,HIGH);
    delayMicroseconds(10);
    digitalWrite(trigpin,LOW);
    duration=pulseIn(echopin,HIGH);
    dist=duration*speed/2;
    if(dist<100){
        String payload = "{\"Alert Distance\":";
        payload += dist;
        payload += "}";

        Serial.print("\n");
        Serial.print("Sending payload: ");
        Serial.println(payload);
        if (client.publish(publishTopic, (char*) payload.c_str())) {
            Serial.println("Publish OK");
        }

    }
    if(dist>100){
        String payload = "{\"Distance\":";
        payload += dist;
        payload += "}";

        Serial.print("\n");
        Serial.print("Sending payload: ");
        Serial.println(payload);
        if(client.publish(publishTopic, (char*) payload.c_str())) {
            Serial.println("Publish OK");
        }else {
            Serial.println("Publish FAILED");
        }

    }

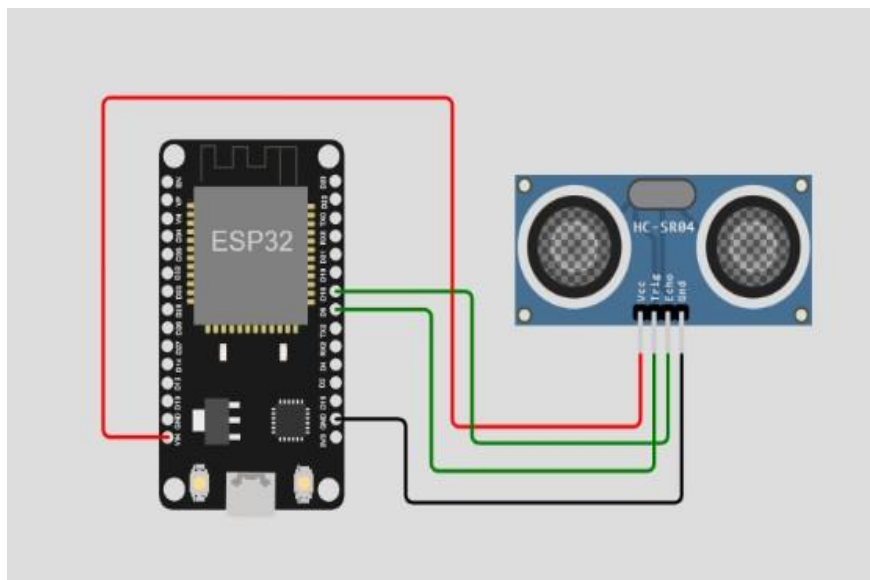
}
}

```

.json CODE:

```
WOKWI SAVE SHARE sketch.ino
diagram.json libraries.txt Library Manager
1 {
2   "version": 1,
3   "author": "Akshaya",
4   "editor": "wokwi",
5   "parts": [
6     { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 92.67, "left": 45.3
7     {
8       "type": "wokwi-hc-sr04",
9       "id": "ultrasonic1",
10      "top": 60.71,
11      "left": 185.64,
12      "attrs": { "distance": "139" }
13    }
14  ],
15  "connections": [
16    [ "esp:TX0", "$serialMonitor:RX", "", [ ] ],
17    [ "esp:RX0", "$serialMonitor:TX", "", [ ] ],
18    [ "ultrasonic1:TRIG", "esp:D5", "yellow", [ "v0" ] ],
19    [ "ultrasonic1:ECHO", "esp:D18", "magenta", [ "v0" ] ],
20    [ "ultrasonic1:VCC", "esp:VIN", "red", [ "v0" ] ],
21    [ "ultrasonic1:GND", "esp:GND.1", "black", [ "v0" ] ],
22    [ "esp:D12", "esp:D14", "green", [ "h0" ] ]
23  ]
24 }
```

CIRCUIT DIAGRAM:



Wokwi simulation link:

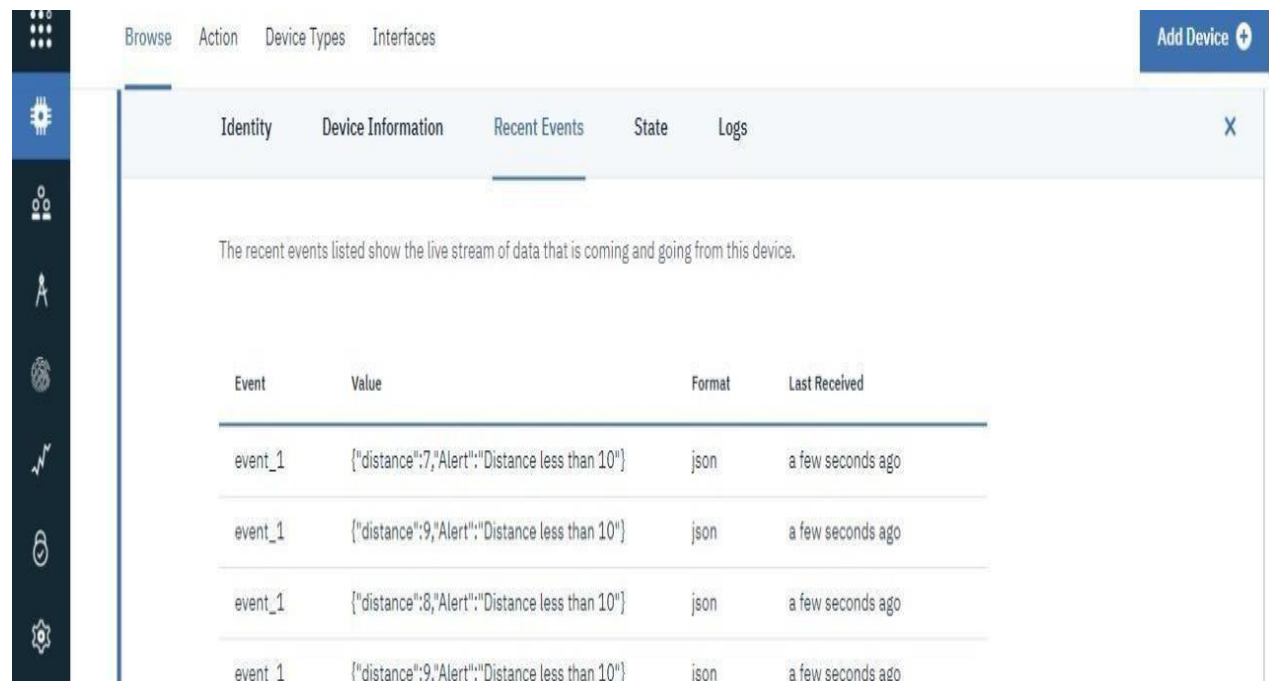
<https://wokwi.com/projects/347831540413104724>

WOKWI OUTPUT:

```
Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to ytluse.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 399.92
Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.98
Distance (cm): 399.94
Distance (cm): 399.92
Distance (cm): 399.94
```

IBM CLOUD OUTPUT:



The screenshot shows the IBM Cloud IoT Platform console. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A sidebar on the left contains various icons for device management. The main content area is titled 'Recent Events' and displays a table of live data streams. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. The data shows four consecutive events, each with a 'distance' value and an 'Alert' message indicating the distance is less than 10 inches.

Event	Value	Format	Last Received
event_1	{"distance":7,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":8,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago