

## ASSIGNMENT – 4

### Ultrasonic sensor simulation in Wokwi

Date	05 NOVEMBER 2022
Team ID	PNT2022TMID20975
Project Name	Real Time Water Quality Monitoring and Control System
Maximum Marks	4 Marks

#### QUESTION:

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.

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "kotoq5"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "ESP32_dist"//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="";
}

```

IBM Watson IoT Platform

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ID: 84708c

Browse Action Device Types Interfaces

1234567 Disconnected ESP32\_dist Device Nov 4, 2022 10:32 PM

Identity Device Information **Recent Events** State Logs

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
event01	{"Distance":41}	json	a few seconds ago
event01	{"Distance":94}	json	a few seconds ago
event01	{"Distance":39}	json	a few seconds ago
event01	{"Distance":11}	json	a few seconds ago
event01	{"Distance":64}	json	a few seconds ago

1 Simulation running

Proposed Solution.pdf Solution Architect...pdf

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20:58 07-11-2022

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### Device Drilldown - 1234567

Connection Information

**Recent Events**

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
event01	{"Distance":7}	json	a few seconds ago
event01	{"Distance":66}	json	a few seconds ago
event01	{"Distance":32}	json	a few seconds ago
event01	{"Distance":96}	json	a few seconds ago

State

This table shows a list of data points that are reported by this device

0 Simulations running

Showing Raw Data | No Interfaces Available

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22:27 07-11-2022

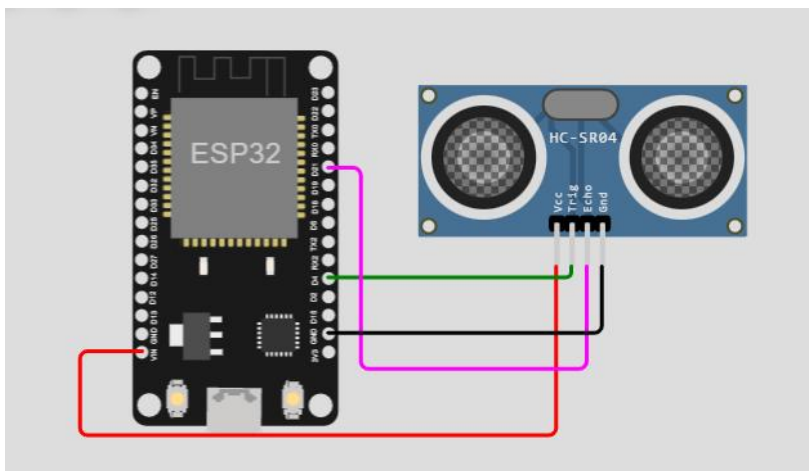
JSON FILE:

```
{
  "version": 1,
  "author": "PRAGADEESHVARAN S",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -56, "left": -120,
"attrs": { } },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": -36.04, "left": 27.5,
"attrs": { } }
  ]
}
```

```

    ],
    "connections": [
        [ "esp:TX0", "$serialMonitor:RX", "", [ ] ],
        [ "esp:RX0", "$serialMonitor:TX", "", [ ] ],
        [ "ultrasonic1:VCC", "esp:VIN", "red", [ "v87.91", "h-246.45", "v-36" ] ],
        [ "ultrasonic1:TRIG", "esp:D4", "green", [ "v0" ] ],
        [ "ultrasonic1:ECHO", "esp:D21", "magenta", [ "v53.24", "h-116.89", "v-88.67" ] ],
        [ "ultrasonic1:GND", "esp:GND.1", "black", [ "v0" ] ]
    ]
}

```



```
Connecting to ...
WiFi connected
IP address:
10.10.0.2
Reconnecting client to 84708c.messaging.internetofthings.ibmcloud.com
.....
Distance(cm): 395
Distance(cm): 395
Distance(cm): 395
Distance(cm): 395
Distance(cm): 395
Distance(cm): 395
Distance(cm): 395
```