

ASSIGNMENT – 4

Ultrasonic sensor simulation in Wokwi

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Project Name	Real Time Water Quality Monitoring and Control System

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* subscribtopic, byte* payload, unsigned int
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "ksus4d"//IBM ORGANITION ID
#define DEVICE_TYPE "Sensordata"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "Selva 18"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "Realtimewater"//Token
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribtopic[] = "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 = "";
}

```



Device ID

Status

Device Type

Class ID

Date Added

▼

sensor_data_1

Connected

ESP32

Device

Nov 14, 2022 7:57 PM

→

...

Identity

Device Information

Recent Events

State

Logs

×

✓

Showing Raw Data | No Interfaces Available

Property	Value	Type	Event	Last Received
pH	13	Number	demo	a few seconds ago
turbid	530	Number	demo	a few seconds ago
temp	69	Number	demo	a few seconds ago

Items per page 50

▼

1 – 1 of 1 item

1 of 1 page

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1

▼

>

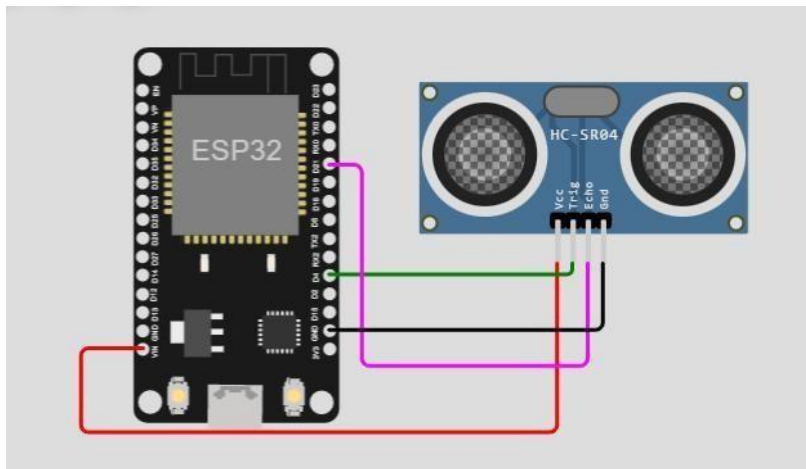


Search by Device ID

Device Simulator

<input type="checkbox"/>	Device ID	Status	Device Type	Class ID	Date Added	
▼	■	sensor_data_1	Connected	ESP32	Device	Nov 14, 2022 7:57 PM → ...
Identity Device Information Recent Events State Logs X						
The recent events listed show the live stream of data that is coming and going from this device.						
Event		Value	Format	Last Received		
demo		{"pH":13,"turbid":219,"temp":47}	json	a few seconds ago		
demo		{"pH":13,"turbid":18,"temp":64}	json	a few seconds ago		
demo		{"pH":7,"turbid":887,"temp":54}	json	a few seconds ago		
demo		{"pH":12,"turbid":478,"temp":91}	json	a few seconds ago		
demo		{"pH":9,"turbid":76,"temp":40}	json	a few seconds ago		

```
{
  "version": 1,
  "author": "SRIHARAN V",
  "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" ] ]
  ]
}
```



```
Measured distance: 177.24
Measured distance: 177.16
Measured distance: 177.26
Measured distance: 177.16
Measured distance: 177.24
Measured distance: 177.16
Measured distance: 177.26
```