

ASSIGNMENT 4

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Ultrasonic sensor simulation in Wokwi

Question: Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an "Alert" to 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 "91xobn"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32PROJECT"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "ESP32"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "ESP32PROJECT" //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="";
}

```

Diagram json

```

{
  "version": 1,
  "author": "1914L14-karnica shivani R. S.",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 23.33, "left": -106,
      "attrs": {} },

```

```

{ "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": -15.04, "left": 86.5,
  "attrs": {} }
],
"connections": [
[ "esp:TX0", "$serialMonitor:RX", "", [] ],
[ "esp:RX0", "$serialMonitor:TX", "", [] ],
[ "ultrasonic1:VCC", "esp:VIN", "red", [ "v168.58", "h-279.11", "v-66" ] ],
[ "ultrasonic1:GND", "esp:GND.1", "black", [ "v0" ] ],
[ "ultrasonic1:TRIG", "esp:D5", "green", [ "v0" ] ],
[ "ultrasonic1:ECHO", "esp:D18", "green", [ "v0" ] ]
]
}

```

libraries.txt:

```

# Wokwi Library List
# See https://docs.wokwi.com/guides/libraries

```

PubSubClient

Library Manager:

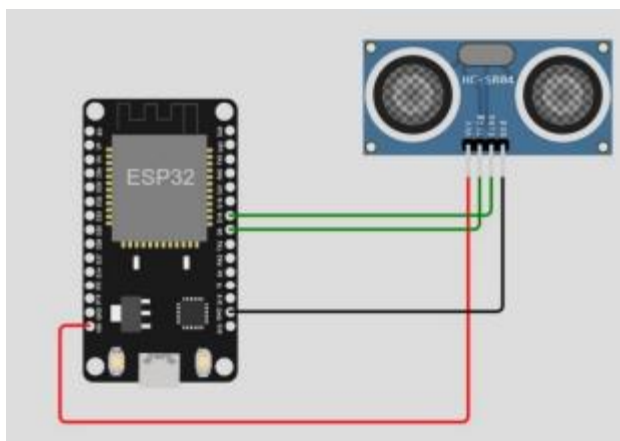
Installed Libraries:

PubSubClient

Wokwi simulation link:

<https://wokwi.com/projects/347580348160279122>

Circuit diagram:



Output:

```
Distance (cm): 399.94
Distance (cm): 399.94
Distance (cm): 142.95
Distance (cm): 72.96
ALERT!!
Sending payload: {"Distance":72.96,"ALERT!!":"Distance less than 100cms"}
Publish ok
```

IBM cloud output



The screenshot shows the IBM Cloud IoT Platform console. The left sidebar contains navigation icons. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A 'Add Device' button is on the right. The main content area is titled 'Recent Events' and contains a table of device events.

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