

PROJECT TITLE: Real-Time River Water Quality Monitoring and Control System

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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 "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 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 ");

```

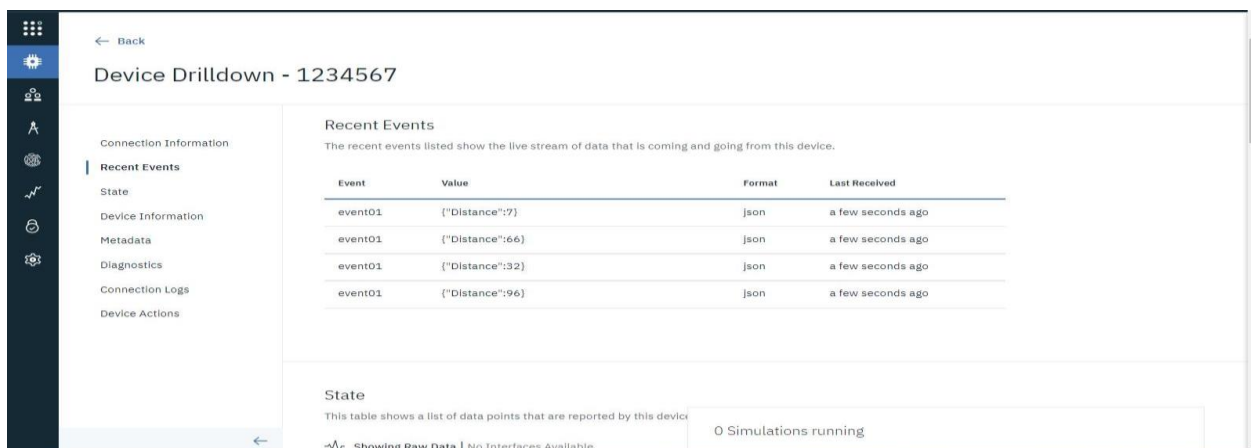
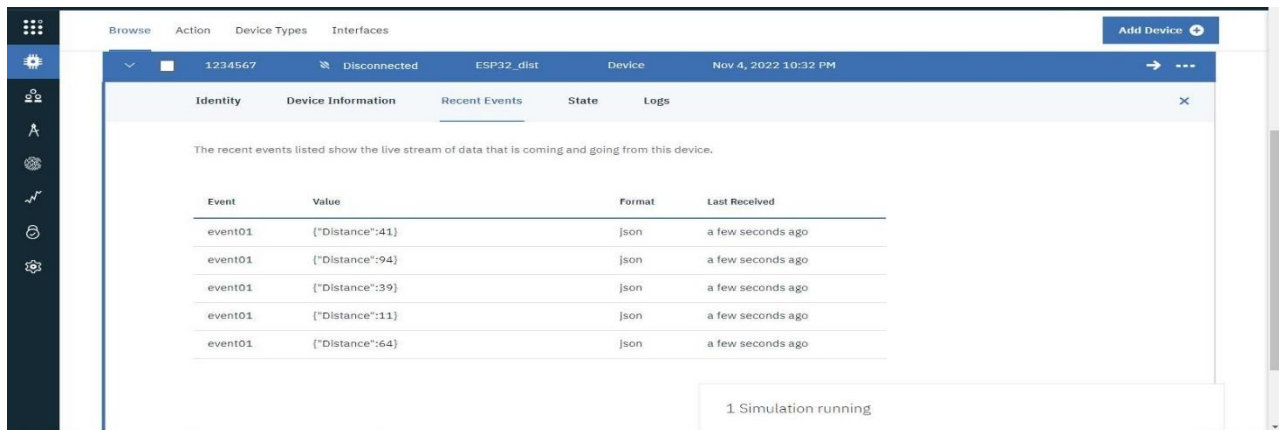
```

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="";
}

```



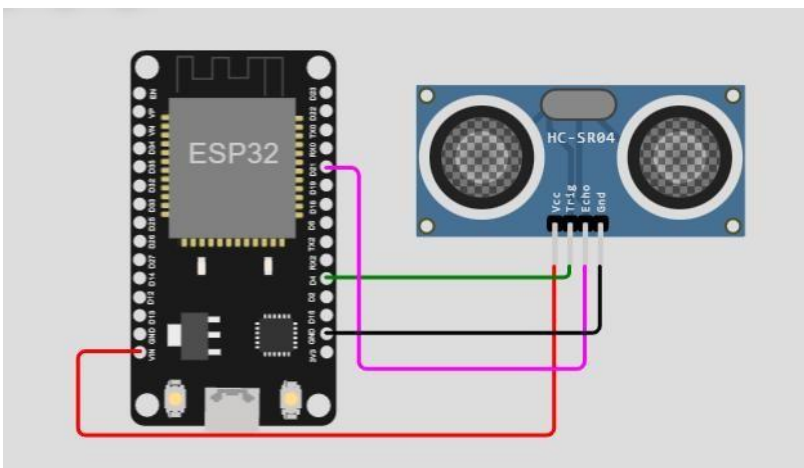
JSON FILE:

```
{
  "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

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