ASSIGNMENT – 4

Ultrasonic sensor simulation in Wokwi

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Project Name	Real Time Water Quality Monitoring and Control System

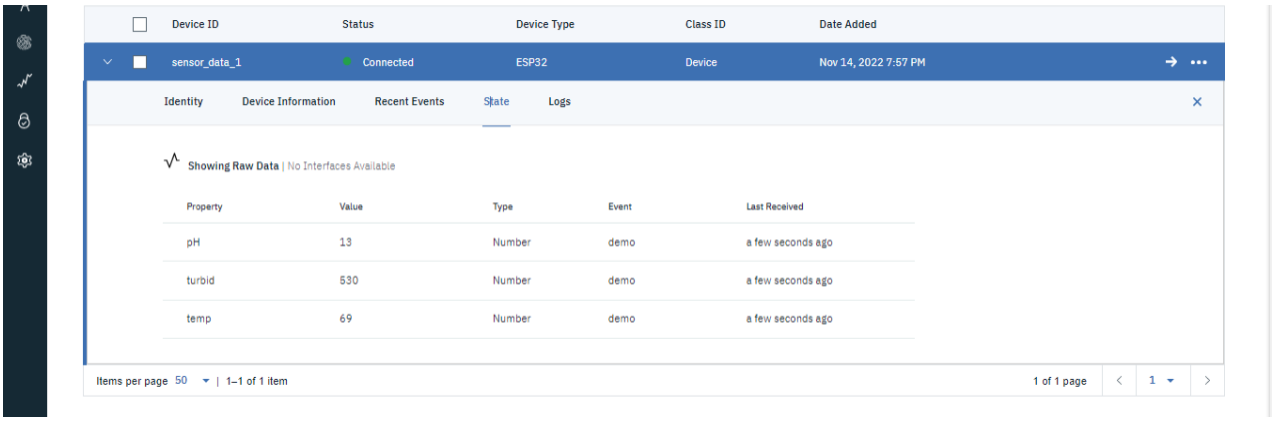
QUESTION:

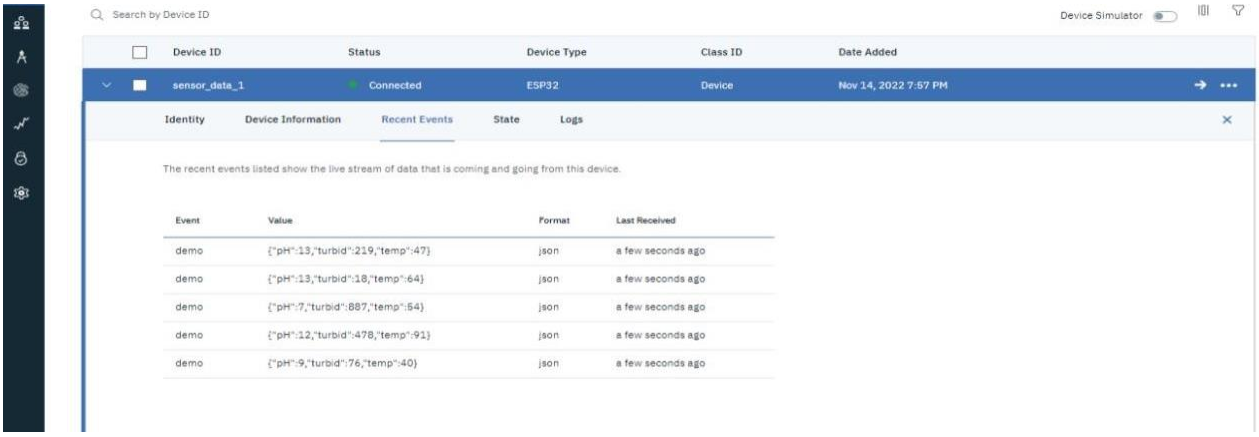
Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

```
#include  <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, 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 "Selva18"//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 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);
```

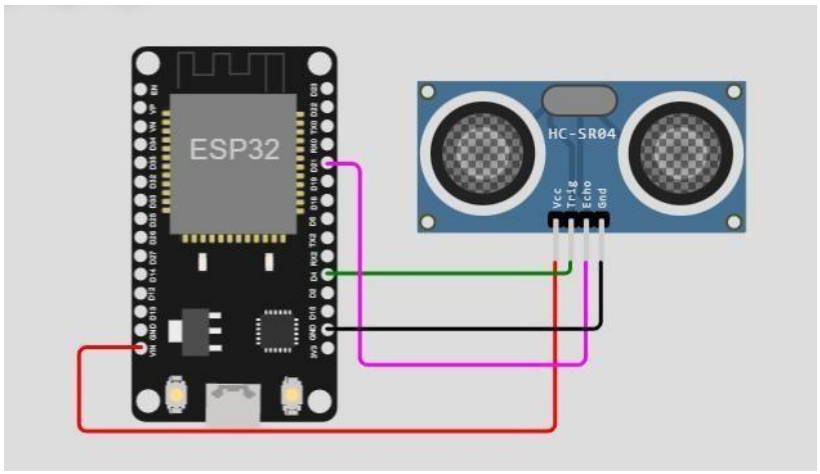
```
pinMode(echoPin, INPUT);
wificonnect();
mqttconnect();
}
void loop()
{
digitalWrite(trigPin,  LOW);
delayMicroseconds(2);
digitalWrite(trigPin,  HIGH);
delayMicroseconds(10);
digitalWrite(trigPin,  LOW);
duration = pulseIn(echoPin, HIGH);
distance = duration * SOUND_SPEED  / 2;
Serial.print("Distance (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 = "";
}
```


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
1


Search by Device ID
Device Simulator
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
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
```