ASSIGNMENT 4

Ultrasonic sensor simulation in Wokwi

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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.

Code:

```
#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 "12345"//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";
```

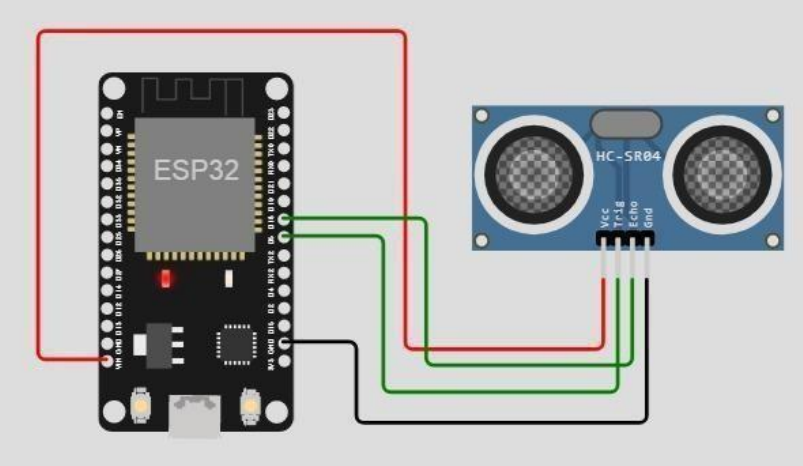
```
char subscribetopic[] = "iot-
2/cmd/test/fmt/String";char authMethod[] = "use-
token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClient wifiClient;
PubSubClient client(server, 1883, callback
,wifiClient);const int trigPin = 5;
const int echoPin =
18; #define SOUND_SPEED
0.034long 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(distanc
 e);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 tocmd 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="";
}
```

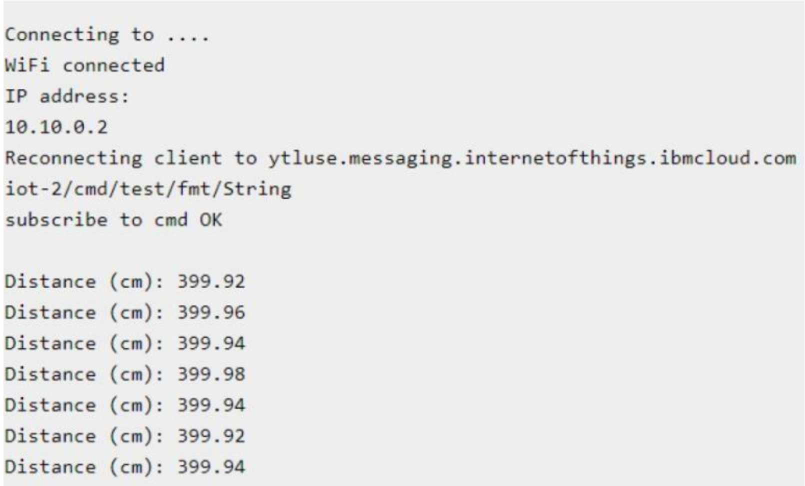
Diagram.json:

```
{
  "version": 1,
  "author":
  "sweetysharon",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67, "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17, "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "",
    [] ],[
      "esp:VIN",
      "ultrasonic1:VCC",
      "red",
      [ "h-37.16", "v-178.79", "h200", "v173.33", "h100.67" ]
    ],
    [ "esp:GND.1", "ultrasonic1:GND", "black", [ "h39.87", "v44.04", "h170" ] ],
    [ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],
    [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]

  ]
}
```

Circuit Diagram:

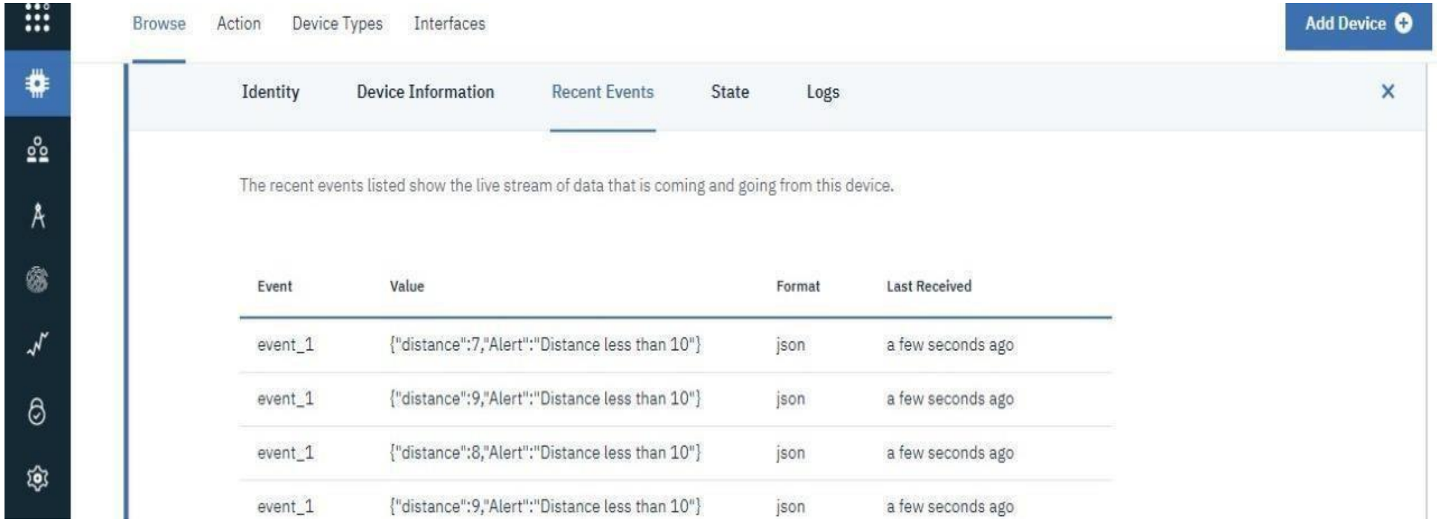


Output:



```
Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to ytluse.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 399.92
Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.98
Distance (cm): 399.94
Distance (cm): 399.92
Distance (cm): 399.94
```

IBM cloud output:



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

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