

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 for assignment:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "ejslcl"//IBM ORGANITION ID
#define DEVICE_TYPE "PNT2022TMID29903"//Device type mentioned in ibm
#define DEVICE_ID "123456378"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "87654321" //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": "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" ] ]
  ]
}

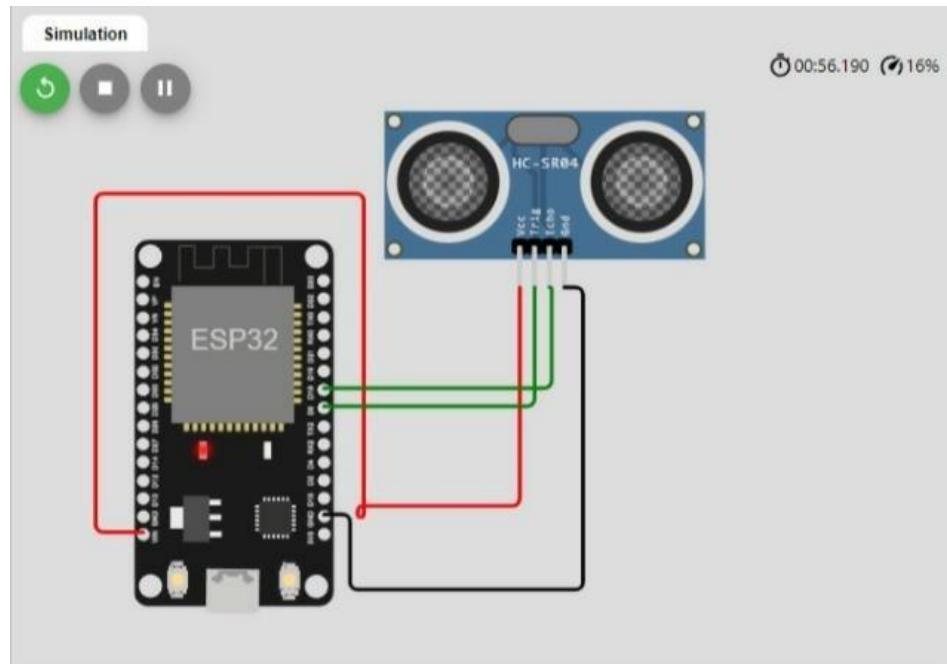
```

```
]
}
```

Wokwi simulation link:

<https://wokwi.com/projects/346955867831140948>

Circuit diagram:



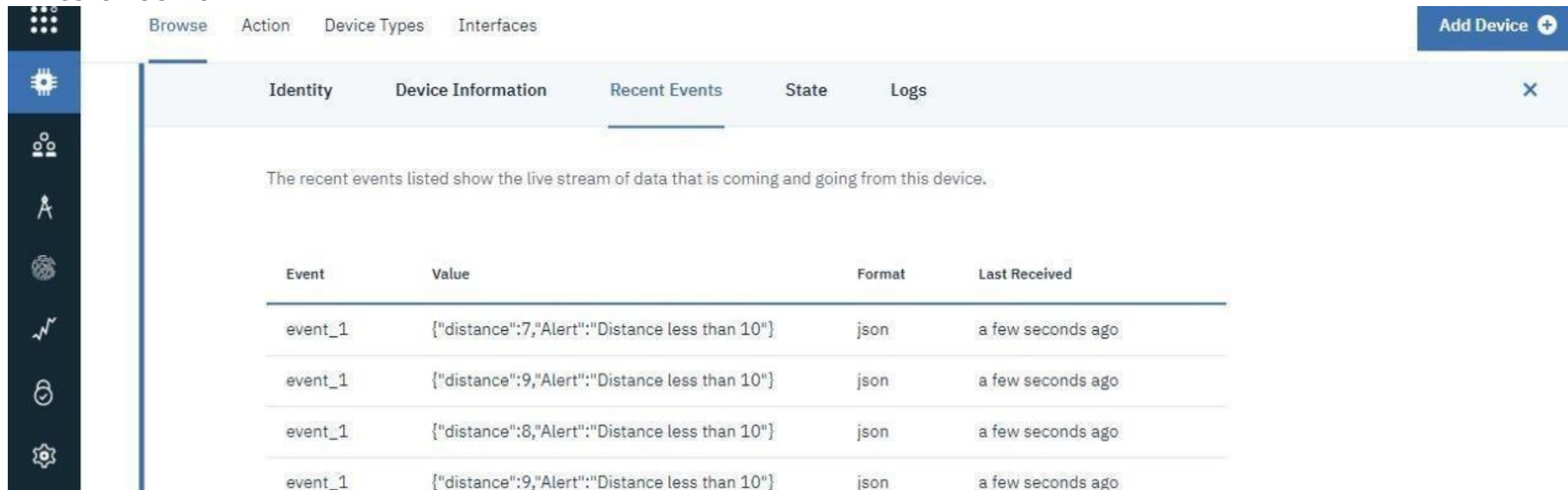
Output:

Wokwi output:

```
Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to x6tr0c.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 COLUD OUTPUT:



The screenshot displays the IBM Cloud IoT Platform interface. On the left is a dark sidebar with various icons. The main area has a top navigation bar with tabs: 'Browse', 'Action', 'Device Types', and 'Interfaces'. Below this is a sub-navigation bar with tabs: 'Identity', 'Device Information', 'Recent Events' (which is selected), 'State', and 'Logs'. A blue 'Add Device +' button is in the top right corner. The 'Recent Events' tab shows a message: 'The recent events listed show the live stream of data that is coming and going from this device.' Below this is a table with four columns: 'Event', 'Value', 'Format', and 'Last Received'. The table contains four rows of data, all with 'event_1' in the 'Event' column and 'a few seconds ago' in the 'Last Received' column.

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

