ASSIGNMENT 4

Ultrasonic sensor simulation in Wokwi

Date	6th November 2022
Team ID	PNT2022TMID39386
Project Name	Hazardous area monitoring for industrial plant
Maximum Mark	2 marks

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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 0.034 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="";
}
```

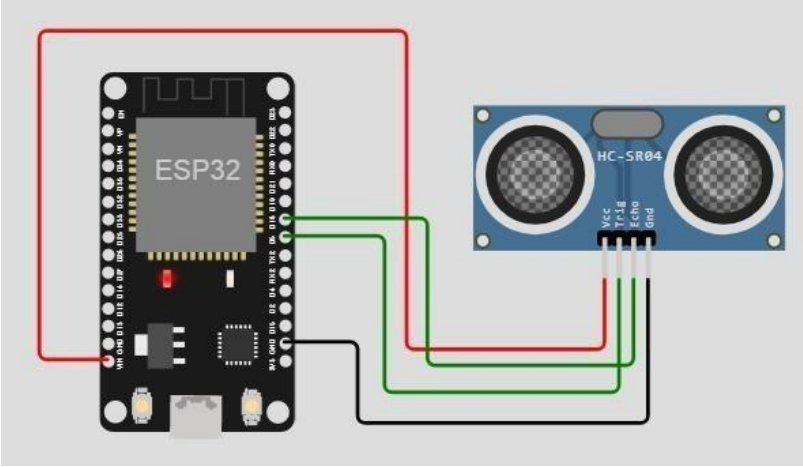
Diagram.json:

```
{
  "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/347230109877404243

Circuit Diagram:



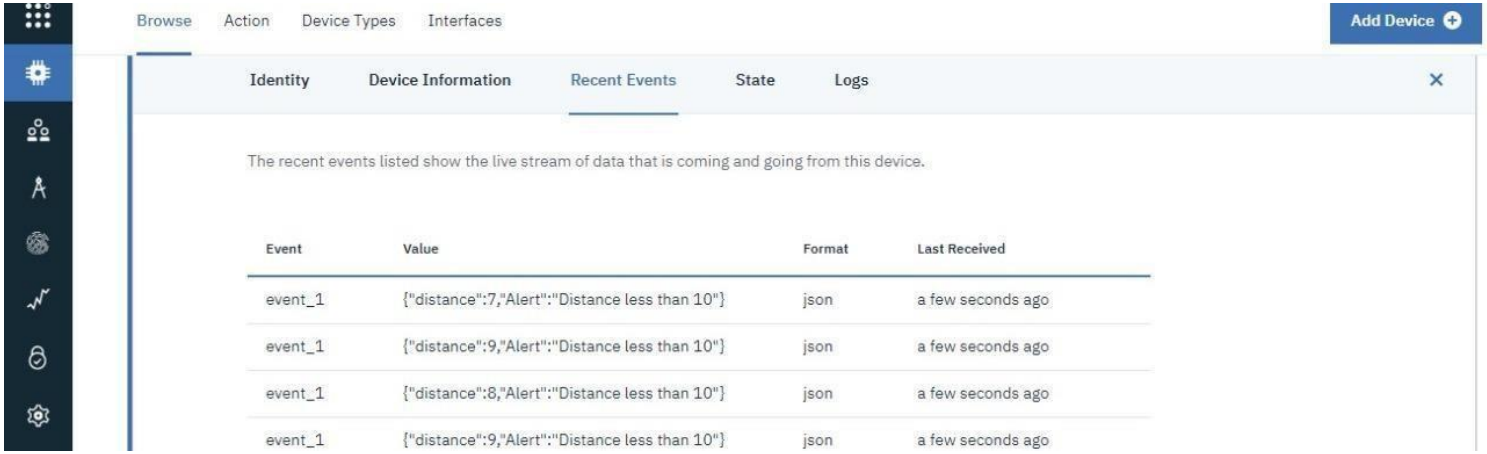
Output:

Wokwi 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:


Browse
Action
Device Types
Interfaces
Add Device
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
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