

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 0.034 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", "", [] ],

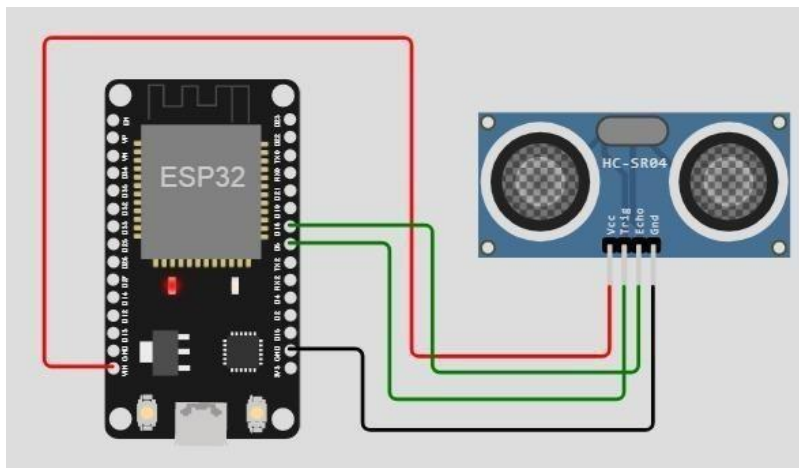
```

```
[
  "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/346508314441417298>

Circuit Diagram:



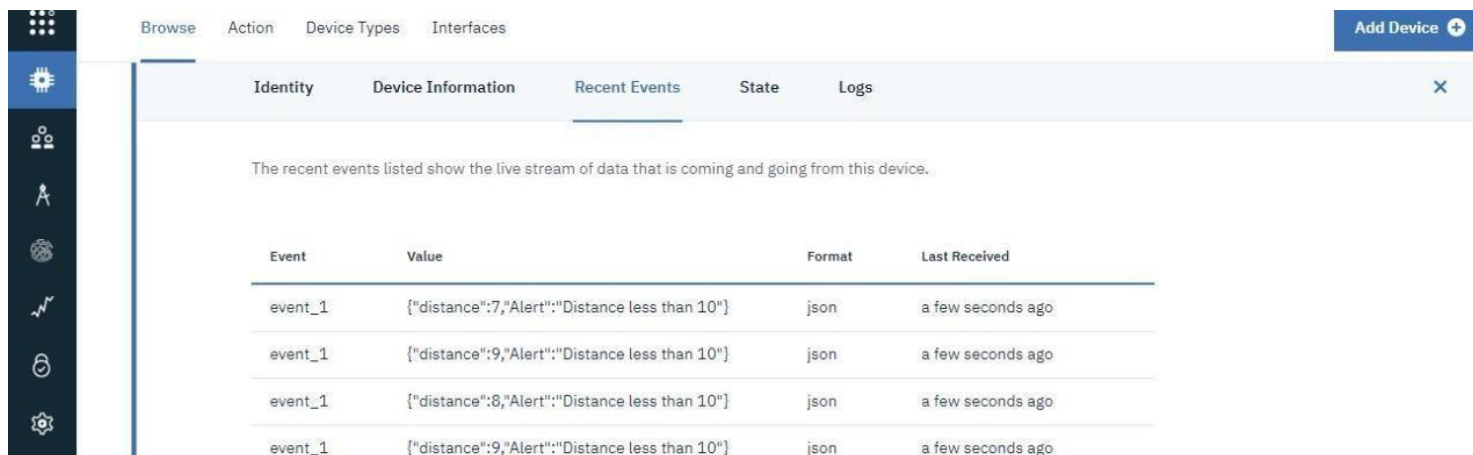
Output:

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:



The screenshot shows the IBM Cloud IoT Platform interface. On the left is a dark sidebar with icons for various functions. The main area has a top navigation bar with tabs: 'Browse', 'Action', 'Device Types', and 'Interfaces'. A blue 'Add Device +' button is in the top right. Below the navigation bar, there's a sub-header with tabs: 'Identity', 'Device Information', 'Recent Events' (which is selected), 'State', and 'Logs'. A close button 'X' is on the right of this sub-header. The main content area contains 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 lists four events, all labeled 'event_1', with JSON values containing distance and alert information, all in 'json' format, and all received 'a few seconds ago'.

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