

# ASSIGNMENT 4

Assignment Date	03 November 2022
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Maximum Marks	2 Marks

## Ultrasonic sensor simulation in Wokwi

### 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:

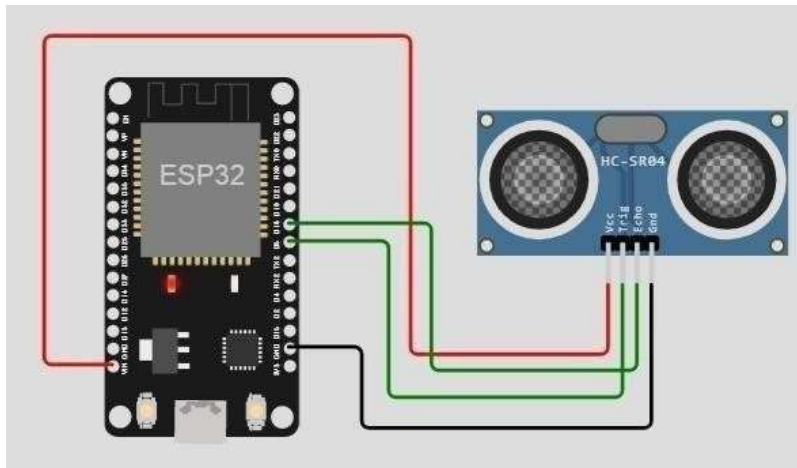
```

{
  "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" ] ]
  ]
}

```

```
}  
]
```

### Circuit Diagram:

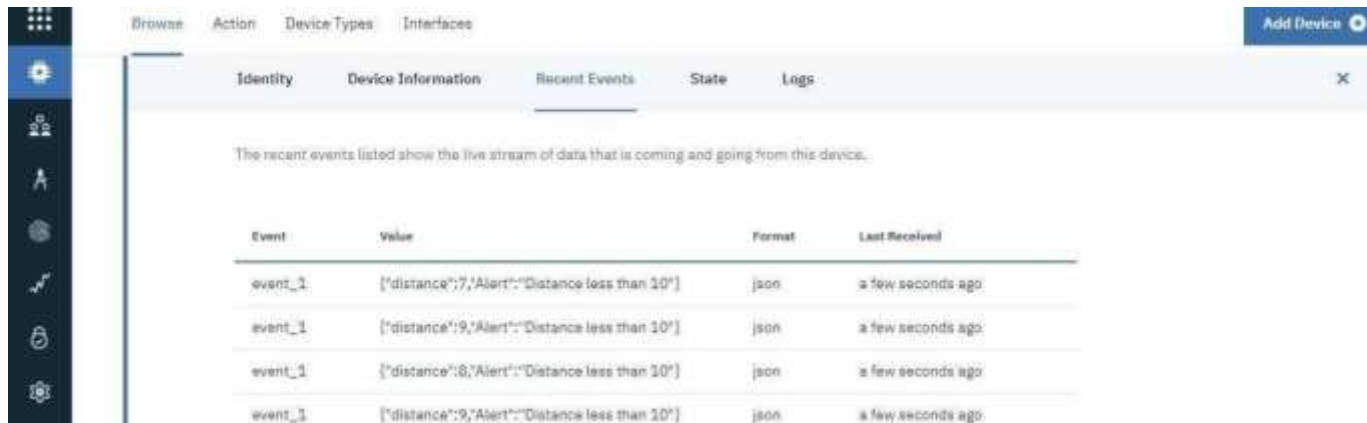


### Output:

Wokwi output:

```
Connecting to ....  
Wifi connected  
IP address:  
10.10.0.2  
Reconnecting client to ytluse.messaging.internetofthings.ibmccloud.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 console. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. The main content area has tabs for 'Identity', 'Device Information', 'Recent Events', 'State', and 'Logs'. The 'Recent Events' tab is selected, showing a table of events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. The events are listed as 'event\_1' with a JSON value containing distance and alert information, in 'json' format, 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