

# ASSIGNMENT 4

## 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": "19BEC4089 Karthick M",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 46, "left": 102, "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": -14.23, "left": -163.17, "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "ultrasonic1:VCC", "esp:VIN", "red", [ "v0" ] ],
    [ "ultrasonic1:TRIG", "esp:D5", "green", [ "v181.9", "h3", "v4.67", "h334", "v-127.33" ] ],

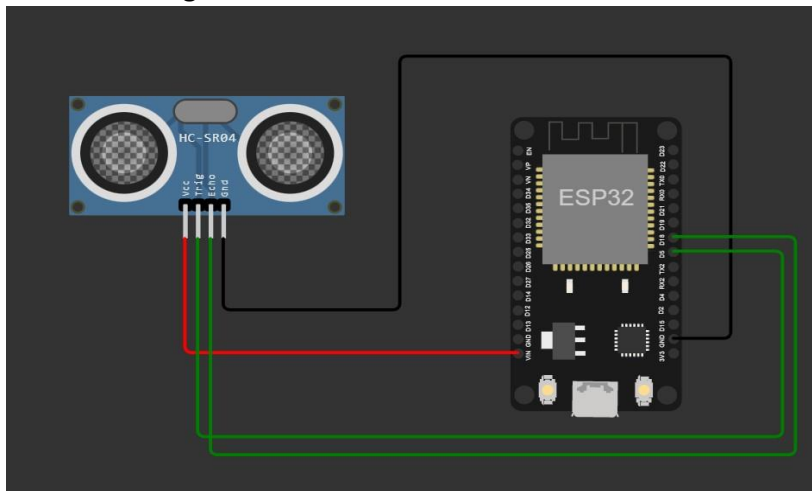
```

```
[ "ultrasonic1:ECHO", "esp:D18", "green", [ "v209.9", "h363.11", "v-1.33" ] ],
[
  "ultrasonic1:GND", "esp:GND.1", "black", [ "v76.56", "h119.89", "v-154", "h183.33", "v190.67",
"h-1.33" ]
]
]
}
```

**Wokwi simulation link:**

<https://wokwi.com/projects/347201578279633490>

**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 displays the IBM Cloud IoT Platform interface. On the left is a dark sidebar with icons for navigation. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces', along with an 'Add Device' button. The main content area is titled 'Recent Events' and contains a table of live data streams.

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