

# ASSIGNMENT 4

## ULTRASONIC SENSOR SIMULATION IN Wokwi

**DOMAIN: IOT**

### TEAM MEMBERS:

1. KEERTHANA K S – 513119106041
2. DHATCHAYINI A – 513119106015
3. KANNAN G - 513119106038
4. KEERTHANA R - 513119106042

### Question :

Write a code and connections in Wokwi for the ultrasonic sensor. Whenever the distance is less than 100cm, 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:

```

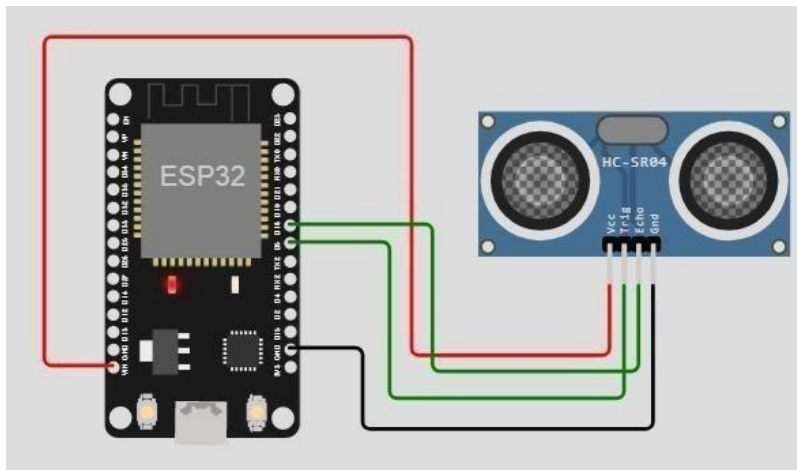
{
  "version": 1,
  "author": "sweetysharon",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67, "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17, "attrs": {} } ],
  "connections": [
    [ "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:



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