

# ASSIGNMENT 4

## Ultrasonic sensor simulation in wowki

The image displays two screenshots from a computer screen, illustrating the setup for an ultrasonic sensor simulation.

**Top Screenshot: IBM Watson IoT Platform**

The interface shows the "Device Drilldown - ESP32" page. The "Device Credentials" section is active, displaying the following information:

Field	Value
Organization ID	sbg7eg
Device Type	ESP32_sensor
Device ID	ESP32
Authentication Method	use-token-auth
Authentication Token	fc*R@kqF1g8XtLyg4

A warning message states: "Authentication tokens are non-recoverable. If you misplace this token, you will need to re-register the device to generate a new authentication token." A link "Find out how to add these credentials to your device" is provided.

**Bottom Screenshot: Wokwi Simulation Environment**

The Wokwi interface shows a sketch of an ESP32 microcontroller connected to an HC-SR04 ultrasonic sensor. The "Simulation" window is open, displaying the following log output:

```
Connecting to ..
WiFi connected
IP address:
10.10.0.2
Reconnecting client to sbg7eg.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe.to.cmd.OK
```

WOKWI

sketch.ino

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* topic, byte* payload, unsigned int
4 payloadLength);
5 //-----credentials of IBM Accounts-----
6 #define ORG "sbg7eg"//IBM ORGANIZATION ID
7 #define DEVICE_TYPE "ESP32_sensor"//Device type mentioned in ibm watson IOT Platform
8 #define DEVICE_ID "ESP32"//Device ID mentioned in ibm watson IOT Platform
9 #define TOKEN "fcRkqF!jg8Xtlyg4" //Token
10 String data;
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/data/fmt/json";
13 char subscribeTopic[] = "iot-2/cmd/test/fmt/String";
14 char authMethod[] = "use-token-auth";
15 char token[] = TOKEN;
16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 WiFiClient wificlient;
18 PubSubClient client(server, 1883, callback, wificlient);
19 const int trigPin = 5;
20 const int echoPin = 18;
21 #define SOUND_SPEED 0.034
22 long duration;
23 float distance;
24 void setup() {
25   Serial.begin(115200);
26   pinMode(trigPin, OUTPUT);
27   pinMode(echoPin, INPUT);
28   wificlient;
29   mqttconnect();
30 }
31 void loop()
32 {
33   digitalWrite(trigPin, LOW);
34   delayMicroseconds(2);
```

Simulation

10.10.0.2  
Reconnecting client to sbg7eg.messaging.internetofthings.ibmcloud.com  
iot-2/cmd/test/fmt/String  
subscribe to cmd OK

Distance (cm): 400.01  
Distance (cm): 399.96

WOKWI

sketch.ino

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* topic, byte* payload, unsigned int
4 payloadLength);
5 //-----credentials of IBM Accounts-----
6 #define ORG "sbg7eg"//IBM ORGANIZATION ID
7 #define DEVICE_TYPE "ESP32_sensor"//Device type mentioned in ibm watson IOT Platform
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10 String data;
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29   mqttconnect();
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32 {
33   digitalWrite(trigPin, LOW);
34   delayMicroseconds(2);
```

Simulation

Distance (cm): 72.98  
ALERT!!  
Sending payload: {"Distance":72.98,"ALERT!!":"Distance less than 100cms"}  
Publish ok  
Distance (cm): 72.96  
ALERT!!  
Sending payload: {"Distance":72.96,"ALERT!!":"Distance less than 100cms"}  
Publish ok  
Distance (cm): 72.96

IBM Watson IoT Platform

shinedavid2002@gmail.com  
ID: sbg7eg

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
Data	("Distance":89.98,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	("Distance":89.96,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	("Distance":89.98,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	("Distance":89.96,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	("Distance":89.98,"ALERT!":"Distance less than ...	json	a few seconds ago

Items per page 50 | 1-2 of 2 items

1 Simulation running

IBM Watson IoT Platform

shinedavid2002@gmail.com  
ID: sbg7eg

Browse Action Device Types Interfaces

Add Device

Search by Device ID

Device Simulator

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
15548	Disconnected	15548_device	Device	18 Nov 2022 23:56	
ESP32	Connected	ESP32_sensor	Device	19 Nov 2022 14:58	

Identity Device Information Recent Events State Logs

Device ID: ESP32

Device Type: ESP32\_sensor

Date Added: 19 Nov 2022 14:58

Added By: shinedavid2002@gmail.com

Connection Status: Connected

Connection Time: 19 Nov 2022 16:07

Client Address: 50.31.197.64 Insecure

Items per page 50 | 1-2 of 2 items

1 Simulation running

The screenshot shows the IBM Watson IoT Platform interface. A modal window titled "Event Payload" is open, displaying the following information:

- Event Name:** Data
- Time Received:** 19 Nov 2022 16:21
- Event Payload (JSON):**

```
{
  "Distance": 89.98,
  "ALERT!!": "Distance less than 100cms"
}
```

The background interface shows the "IBM Watson IoT Platform" dashboard. The "Device Information" tab is selected, and a table of recent events is visible. The table has columns "Event" and "Value". The first row shows "Data" with the value '{"Distance":89.98}'. The status bar at the bottom indicates "1 Simulation running".