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>
#include <ArduinoJson.h>
WiFiClient wifiClient;
#define ORG "vg9s67"
#define DEVICE_TYPE "sethuass0004"
#define DEVICE_ID "ass04"
#define TOKEN "1234567890"
#define speed 0.034
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/abcd_1/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
void publishData();
const int trigpin=5;
const int echopin=18;
String command;
String data="";
String lat="14.167589";
String lon="80.248510";
String name="point2";
String icon="";
long duration;
int dist;
void setup()
{
Serial.begin(115200);
pinMode(trigpin, OUTPUT);
pinMode(echopin, INPUT);
wifiConnect();
mqttConnect();
}
void loop() {
```

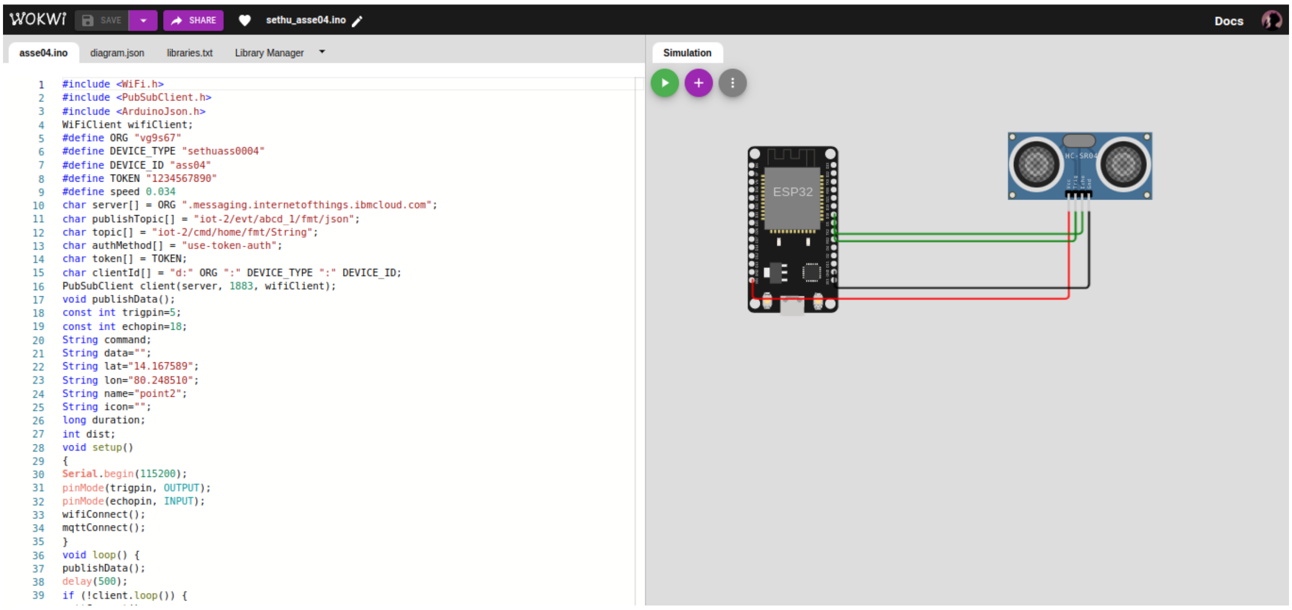
```
publishData();
delay(500);
if (!client.loop()) {
mqttConnect();
}
}
void wifiConnect() {
Serial.print("Connecting to "); Serial.print("Wifi");
WiFi.begin("Wokwi-GUEST", "", 6);
while (WiFi.status() != WL_CONNECTED) {
delay(500);
Serial.print(".");
}
Serial.print("WiFi connected, IP address: "); Serial.println(WiFi.localIP());
}
void mqttConnect() {
if (!client.connected()) {
Serial.print("Reconnecting MQTT client to "); Serial.println(server);
while (!client.connect(clientId, authMethod, token)) {
Serial.print(".");
delay(1000);
}
initManagedDevice();
Serial.println();
}
}
void initManagedDevice() {
if (client.subscribe(topic)) {
Serial.println(client.subscribe(topic));
Serial.println("subscribe to cmd OK");
} else {
Serial.println("subscribe to cmd FAILED");
}
}
void publishData()
{
digitalWrite(trigpin,LOW);
digitalWrite(trigpin,HIGH);
delayMicroseconds(10);
digitalWrite(trigpin,LOW);
duration=pulseIn(echopin,HIGH);
dist=duration*speed/2;
if(dist<100){
dist=100-dist;
icon="fa-trash";
}else{
dist=0;
icon="fa-trash-o";
}
DynamicJsonDocument doc(1024);
String payload;
```

```
doc["Name"]=name;
doc["Latitude"]=lat;
doc["Longitude"]=lon;
doc["Icon"]=icon;
doc["FillPercent"]=dist;
serializeJson(doc, payload);
delay(3000);
Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);
if (client.publish(publishTopic, (char*) payload.c_str())) {
Serial.println("Publish OK");
} else {
Serial.println("Publish FAILED");
}
}
```

diagram.json:

```
{
"version": 1,
"author": "Sethupathi",
"editor": "wokwi",
"parts": [
{ "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -167.12, "left": 63.69, "attrs": {} },
{ "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": -54.66, "left": -160.76, "attrs": {} }
],
"connections": [
[ "esp:TX0", "$serialMonitor:RX", "", [] ],
[ "esp:RX0", "$serialMonitor:TX", "", [] ],
[ "ultrasonic1:VCC", "esp:VIN", "red", [ "v101.24", "h-228.44" ] ],
[ "ultrasonic1:TRIG", "esp:D5", "green", [ "v33.9", "h-138.33" ] ],
[ "ultrasonic1:ECHO", "esp:D18", "green", [ "v25.24", "h-145.56" ] ],
[ "ultrasonic1:GND", "esp:GND.1", "black", [ "v88.57", "h-152.78" ] ]
]
}
```

Simulation & Output:



```
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}
void loop() {
publishData();
delay(500);
if (!client.loop()) {
```
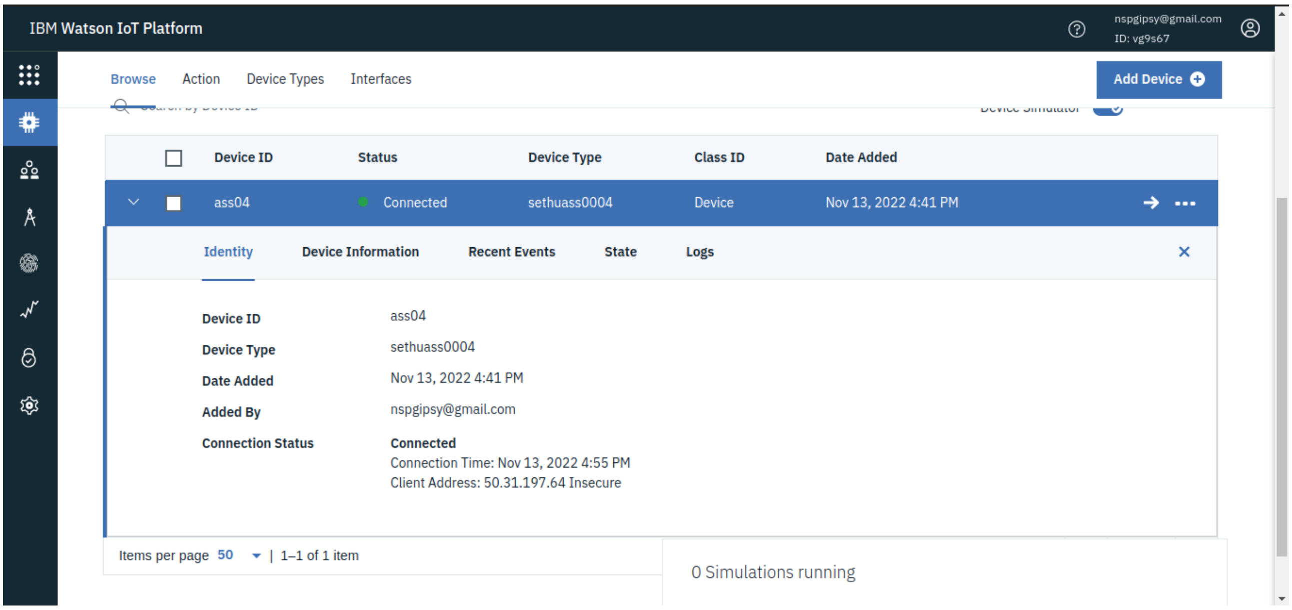

IBM Watson IOT connection:



□	Device ID	Status	Device Type	Class ID	Date Added
□	ass04	● Connected	sethuass0004	Device	Nov 13, 2022 4:41 PM

Device ID ass04

Device Type sethuass0004

Date Added Nov 13, 2022 4:41 PM

Added By nspgipsy@gmail.com

Connection Status **Connected**
Connection Time: Nov 13, 2022 4:55 PM
Client Address: 50.31.197.64 Insecure

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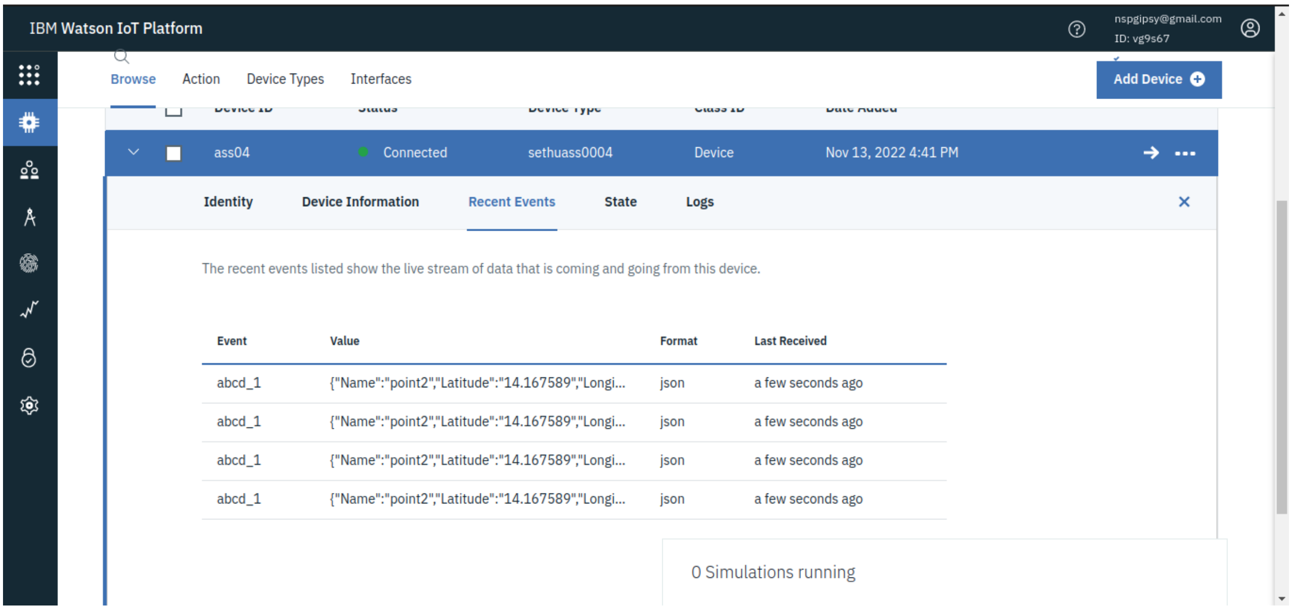
0 Simulations running

Cloud output:



The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
abcd_1	{"Name":"point2","Latitude":"14.167589","Longi...	json	a few seconds ago
abcd_1	{"Name":"point2","Latitude":"14.167589","Longi...	json	a few seconds ago
abcd_1	{"Name":"point2","Latitude":"14.167589","Longi...	json	a few seconds ago
abcd_1	{"Name":"point2","Latitude":"14.167589","Longi...	json	a few seconds ago

0 Simulations running