

ASSIGNMENT 4

Ultrasonic Sensor Simulation InWokwi

Code:

Sketch.ino:

```
#include<WiFi.h>
#include<PubSubClient.h>
void callback(char* subscribtopic, byte* payload, unsignedint
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "kotoq5"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibmwatson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibmwatson IOT Platform
#define TOKEN "12345678"//Token
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
charpublishTopic[] = "iot-2/evt/Data/fmt/json";
charsubscribtopic[] = "iot-2/cmd/test/fmt/String";
charauthMethod[] = "use-token-auth";
char token[] = TOKEN;
charclientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClientwificlient;
PubSubClientclient(server, 1883, callback ,wificlient);
constinttrigPin = 5;
constintechoPin = 18;
#define SOUND_SPEED 0.034
long duration;
float distance;
voidsetup() {
  Serial.begin(115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  wificonnect();
  mqttconnect();
}
voidloop()
{
  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);
}
voidPublishData(floatdist) {
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");
}
}
voidmqttconnect() {
if (!client.connected()) {
Serial.print("Reconnecting client to ");
Serial.println(server);
while (!!!client.connect(clientId, authMethod, token)) {
Serial.print(".");
delay(500);
}
initManagedDevice();
Serial.println();
}
}
voidwificonnect()
{
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": "BENHER CHRISTOPHER",
  "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" ]
    ]
  ]
}

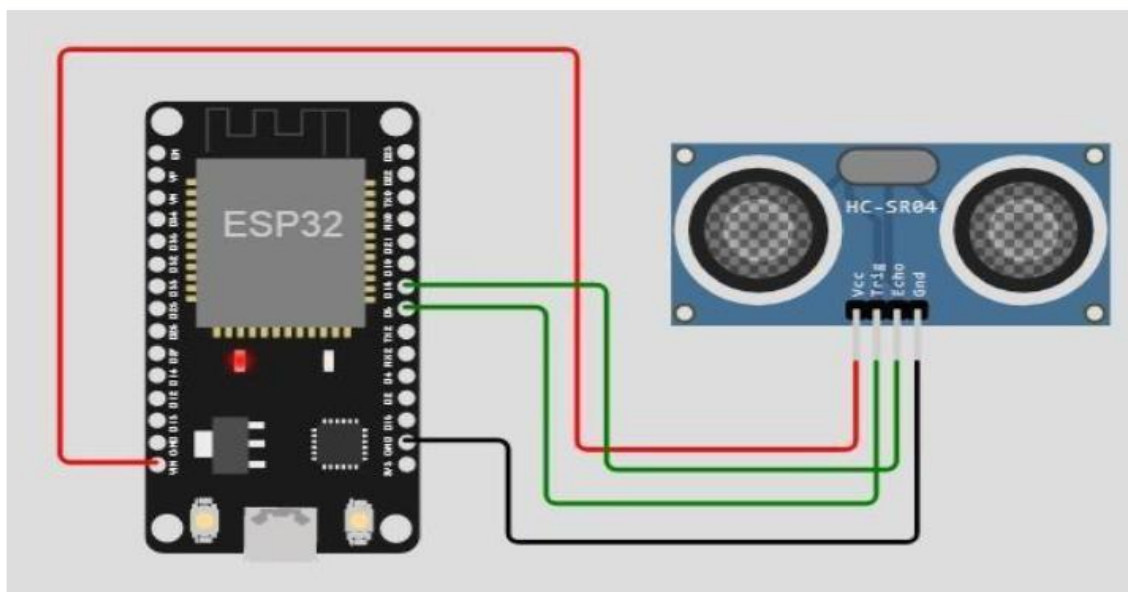
```

```

],
[ "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:

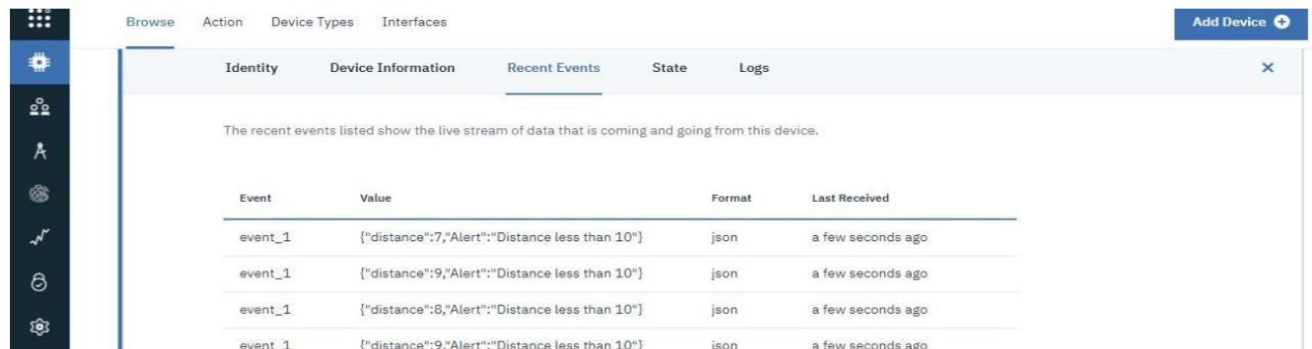
```

Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to ytluse.messaging.internetofthings.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 shows 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'. A blue 'Add Device' button with a plus icon is in the top right. The main content area has tabs for 'Identity', 'Device Information', 'Recent Events' (which is selected), 'State', and 'Logs'. Below the 'Recent Events' tab, a message states: 'The recent events listed show the live stream of data that is coming and going from this device.' Below this message is a table with four columns: 'Event', 'Value', 'Format', and 'Last Received'. The table contains four rows of data, all with 'event_1' in the 'Event' column and 'json' in the 'Format' column. The 'Value' column contains JSON objects with 'distance' and 'Alert' fields. The 'Last Received' column shows 'a few seconds ago' for each entry.

| 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 |

Wokwi Simulation Link:

<https://wokwi.com/projects/347642470644843091>