

Name: Aravinth S (737819ITL109)

Code:

```
#include <WiFi.h>

#include <WiFiClient.h>

#include <PubSubClient.h>

const char* ssid = "Wokwi-GUEST";

const char* password = "";

#define ORG "z69c1z"

#define DEVICE_TYPE "esp32"

#define DEVICE_ID "ass4"

#define TOKEN "esp32ambi"

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";

char authMethod[] = "use-token-auth";

char token[] = TOKEN;

char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

char pubTopic1[] = "iot-2/evt/status1/fmt/json";

WiFiClient wifiClient;

PubSubClient client(server, 1883, NULL, wifiClient);

const int trigPin = 13;

const int echoPin = 12;

long lastMsg = 0;

void setup() {

  Serial.begin(115200); // Starts the serial communication

  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output

  pinMode(echoPin, INPUT); // Sets the echoPin as an Input

  Serial.println();

  Serial.print("Connecting to ");

  Serial.print(ssid);

  WiFi.begin(ssid, password);

  while (WiFi.status() != WL_CONNECTED) {

    delay(500);
```

```

    Serial.print(".");
}

Serial.println("");

Serial.print("WiFi connected, IP address: ");
Serial.println(WiFi.localIP());

if (!client.connected()) {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!client.connect(clientId, authMethod, token)) {
        Serial.print(".");
        delay(500);
    }
    Serial.println("Bluemix connected");
}
}

void loop() {
    // Clears the trigPin
    digitalWrite(trigPin, LOW);
    delayMicroseconds(2);
    // Sets the trigPin on HIGH state for 10 micro seconds
    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);
    // Reads the echoPin, returns the sound wave travel time in microseconds
    long duration = pulseIn(echoPin, HIGH);
    // Calculate the distance
    float distanceCm = duration * 0.034/2;
    // Prints the distance in the Serial Monitor
    Serial.print("Distance (cm): ");
    Serial.println(distanceCm);
    delay(3000);
}

```

```

client.loop();

String payload = "{\"d\":{\"Name\":\"\" DEVICE_ID \"\"";

    payload += "\",\"Distance\":\"";

    payload += distanceCm;

    payload += "\"}";

if (client.publish(pubTopic1, (char*) payload.c_str())) {

    Serial.println("Publish ok");

} else {

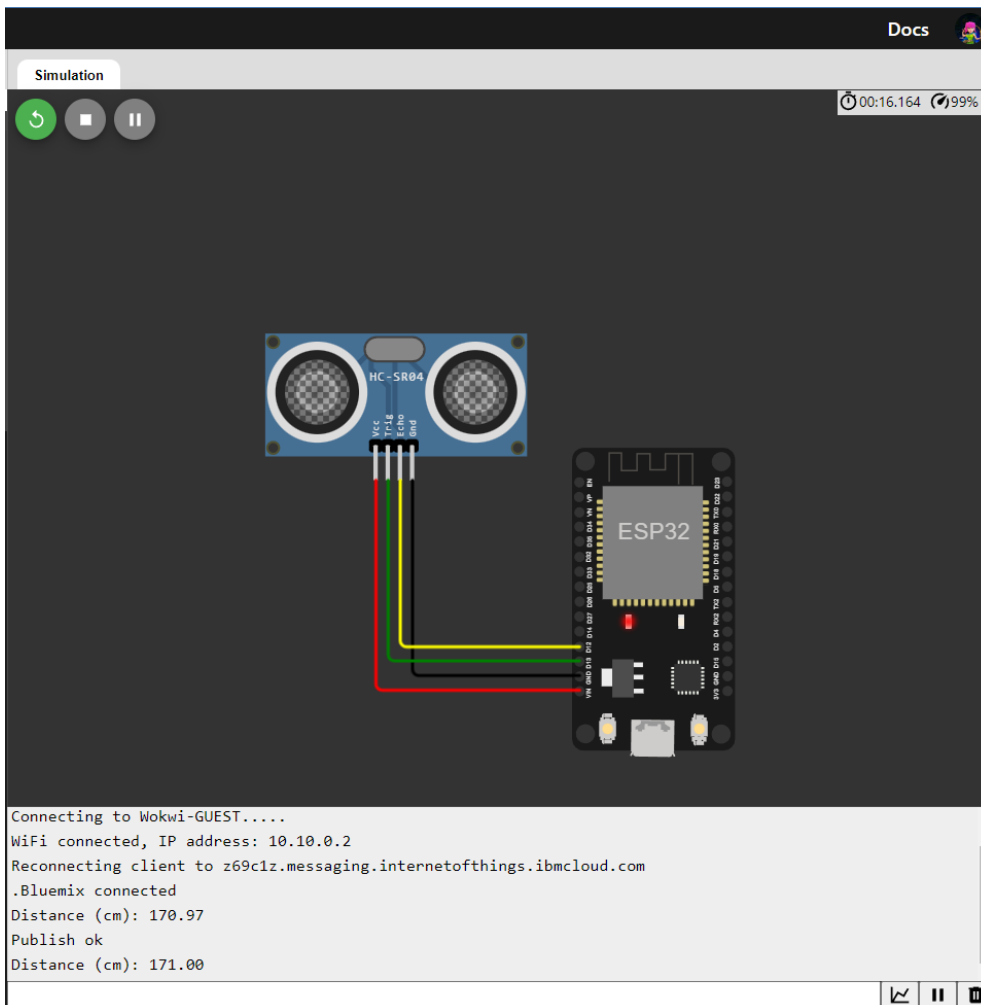
    Serial.println("Publish failed");

}

}

```

Wokwi Output:



The image shows a Wokwi simulation environment. At the top, there's a 'Simulation' tab and a 'Docs' button. Below the tab, there are three circular buttons: a green play button, a grey square button, and a grey pause button. In the top right corner, a timer shows '00:16.164' and a battery icon indicates '99%'.

The main area displays a circuit diagram. On the left is an HC-SR04 ultrasonic sensor module with two circular sensors. On the right is an ESP32 microcontroller board. Wires connect the sensor's VCC pin to the ESP32's VCC pin, the sensor's GND pin to the ESP32's GND pin, and the sensor's Trig pin to the ESP32's D4 pin. The sensor's Echo pin is connected to the ESP32's D5 pin.

At the bottom, a terminal window shows the following output:

```

Connecting to Wokwi-GUEST.....
WiFi connected, IP address: 10.10.0.2
Reconnecting client to z69c1z.messaging.internetofthings.ibmcloud.com
.Bluemix connected
Distance (cm): 170.97
Publish ok
Distance (cm): 171.00

```

IBM output:

Browse
Action
Device Types
Interfaces

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Search by Device ID
 Device Simulator ☒

<input type="checkbox"/>	Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location	Added By	Device Class												
<input checked="" type="checkbox"/>	ass4	Connected	esp32	Device	Nov 19, 2022 10:51 PM		aravinta.19@kongu.edu	→ ...												
<div> Identity Device Information Recent Events State Logs </div> <div> The recent events listed show the live stream of data that is coming and going from this device. <table> <thead> <tr> <th>Event</th> <th>Value</th> <th>Format</th> <th>Last Received</th> </tr> </thead> <tbody> <tr> <td>status1</td> <td>{"d":{"Name":"ass4","Distance":171}}</td> <td>json</td> <td>a few seconds ago</td> </tr> <tr> <td>status1</td> <td>{"d":{"Name":"ass4","Distance":170.97}}</td> <td>json</td> <td>a few seconds ago</td> </tr> </tbody> </table> </div>									Event	Value	Format	Last Received	status1	{"d":{"Name":"ass4","Distance":171}}	json	a few seconds ago	status1	{"d":{"Name":"ass4","Distance":170.97}}	json	a few seconds ago
Event	Value	Format	Last Received																	
status1	{"d":{"Name":"ass4","Distance":171}}	json	a few seconds ago																	
status1	{"d":{"Name":"ass4","Distance":170.97}}	json	a few seconds ago																	
> <input type="checkbox"/>	w_dev1	Disconnected	wc_dev	Device	Oct 9, 2022 1:20 PM		aravinta.19@kongu.edu													

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0 Simulations running

Wokwi link: <https://wokwi.com/projects/347991481303171666>