

**Assignment -4**  
**Wokwi & IBM Cloud**

Assignment Date	28 October 2022
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Maximum Marks	2 Marks

**Question-1:**

Write code and connections in wokwi for ultrasonic sensor. Whenever the distance is less than 100 cms sent "alert" to ibm cloud and display in device recent events.

**Solution:**

**Code:**

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "4t8j18"
#define DEVICE_TYPE "ultra_sonic"
#define DEVICE_ID "ultrasonic"
#define TOKEN "9360644653"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/manimd/fmt/json";
char topic[] = "iot-2/cmd/led/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);

const int trigpin=5;
const int echopin=18;
String command;
String data="";

long duration;
float dist;

void setup()
{
  Serial.begin(115200);
  pinMode(led, OUTPUT);
```

```

    pinMode(trigpin, OUTPUT);
    pinMode(echopin, INPUT);
    wifiConnect();
    mqttConnect();
}

void loop() {
    bool isNearby = dist < 100;
    digitalWrite(led, isNearby);

    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(500);
        }
        initManagedDevice();
        Serial.println();
    }
}

void initManagedDevice() {
    if (client.subscribe(topic)) {
        // Serial.println(client.subscribe(topic));
        Serial.println("IBM 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){
    String payload = "{\"Alert Distance\":\"";
    payload += dist;
    payload += "\"}";

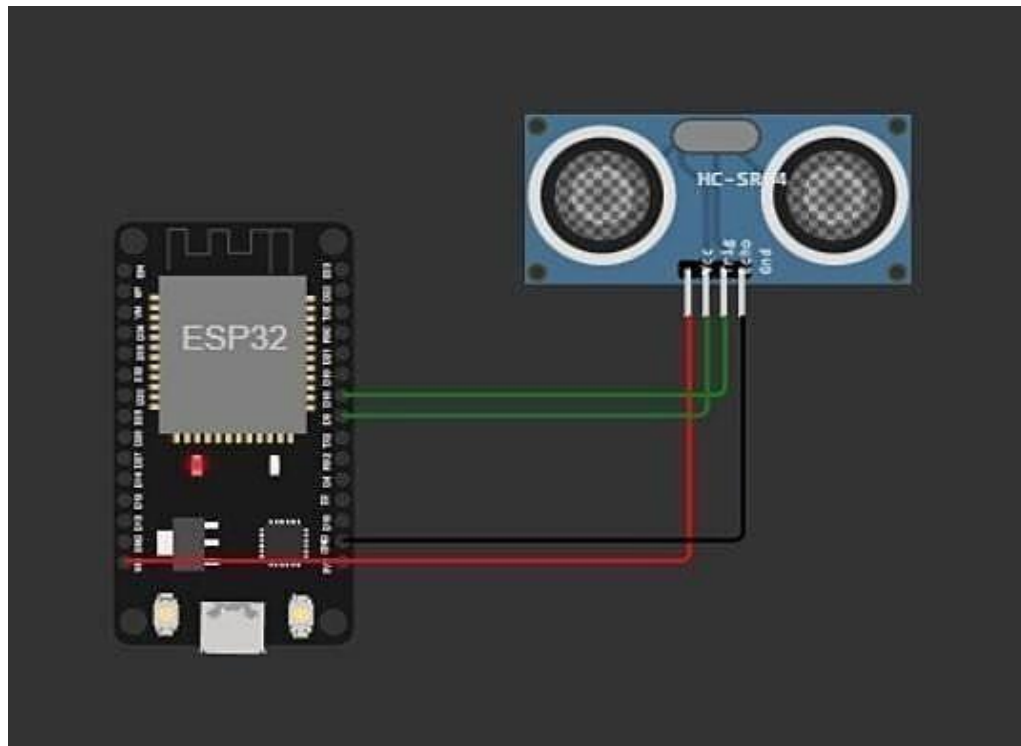
    Serial.print("\n");
    Serial.print("Sending payload: ");
    Serial.println(payload);
    if (client.publish(publishTopic, (char*) payload.c_str())) {
        Serial.println("Publish OK");
    }
}

if(dist>100){
    String payload = "{\"Distance\":\"";
    payload += dist;
    payload += "\"}";

    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");
    }
}

}
```

Connections:



Output:(wokwi):

The screenshot displays the Wokwi web interface for a project. The left pane shows the sketch code, and the right pane shows the simulation output.

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 WiFiClient wificlient;
4 String data;
5 #define ORG "4t8j18"
6 #define DEVICE_TYPE "ultra_sonic"
7 #define DEVICE_ID "ultrasonic"
8 #define TOKEN "9360644653"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/manimd/fmt/json";
13 char topic[] = "iot-2/cmd/led/fmt/String";
14 char authMethod[] = "use-token-auth";
15 char token[] = TOKEN;
16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 PubSubClient client(server, 1883, wificlient);
18
19
20
21 const int trigpin=5;
22 const int echopin=18;
23 String command;
24 String data="";
25
26 long duration;
27 float dist;
28
```

The simulation output on the right shows a series of messages:

```
Simulation
Publish OK
Sending payload: {"Alert Distance":68.93}
Publish OK
Sending payload: {"Alert Distance":68.99}
Publish OK
Sending payload: {"Alert Distance":68.95}
Publish OK
Sending payload: {"Alert Distance":68.95}
Publish OK
Sending payload: {"Alert Distance":68.95}
Publish OK
Sending payload: {"Alert Distance":68.95}
Publish OK
Sending payload: {"Alert Distance":68.95}
Publish OK
Sending payload: {"Alert Distance":68.95}
Publish OK
```

Link: <https://wokwi.com/projects/347209761694941779>

# Output:(IBM Cloud)

Service Details - IBM Cloud

IBM Watson IoT Platform

sketch.ino - Wokwi Arduino and

4t8j18.internetofthings.ibmcloud.com/dashboard/devices/browse

Paused

IBM Watson IoT Platform

dhnapriya.19cs018@nandhaengg.org  
ID: 4t8j18

Browse

Action

Device Types

Interfaces

Add Device

ultrasonic

Connected

ultra\_sonic

Device

Nov 2, 2022 3:36 PM

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
manimd	{"Alert Distance":68.95}	json	a few seconds ago
manimd	{"Alert Distance":68.95}	json	a few seconds ago
manimd	{"Distance":138.96}	json	a few seconds ago
manimd	{"Distance":138.96}	json	a few seconds ago
manimd	{"Distance":138.96}	json	a few seconds ago

Type here to search

Rain...

03:41

02-11-2022