

Assignment-4

Assignment Date	25 October 2022
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Maximum Marks	2 Marks

Question-4:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events. Upload document with wokwi share link and images of IBM cloud

PROGRAM:

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "948e13"
#define DEVICE_TYPE "NodeMCU"
#define DEVICE_ID "502645"
#define TOKEN "F1eqrGOoNLATFjk?Sz"
#define speed 0.034

#define led 14

char server[] = ORG
".messaging.internetofthings.ibmcloud.com"; char
publishTopic[] = "iot-2/evt/shreedharen/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;
```

```
Stringcommand;
```

```
String data="";
```

```
long duration;
```

```
floatdist;
```

```
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,LO
W);
    digitalWrite(trigpin,HIG
H);
    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(publishT
opic,(char*) payload.c_str())) {
            Serial.println("Publish OK");
        }else {
            Serial.println("Publish FAILED");
        }

    }

}

```

Connection:

The screenshot shows the Wokwi web IDE interface. The top navigation bar includes tabs for 'Sign in to Wokwi', 'ibm Assignment 4 - nagaraj0506', and 'esp32-dht22.ino - Wokwi Arduino'. The main workspace is divided into two panes. The left pane, titled 'esp32-dht22.ino', contains the following code:

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 WiFiClient wifiClient;
4 String data3;
5 #define ORG "3yngbh"
6 #define DEVICE_TYPE "Assignment"
7 #define DEVICE_ID "1234"
8 #define TOKEN "234567890"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/shreedharen/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="";
```

The right pane, titled 'Simulation', shows a visual representation of the hardware. An ESP32 development board is connected to an HC-SR04 ultrasonic sensor module. The connections are as follows: the sensor's VCC pin is connected to the ESP32's 5V pin, the sensor's GND pin is connected to the ESP32's GND pin, the sensor's Trig pin is connected to the ESP32's pin 5, and the sensor's Echo pin is connected to the ESP32's pin 18. The sensor module is labeled 'HC-SR04'.

The bottom status bar shows the system tray with icons for network, volume, and battery, along with the time '02:37 PM' and date '10-11-2022'.

Output:

Output: (IBM Cloud)

The screenshot displays the IBM Watson IoT Platform interface in a Mozilla Firefox browser. The address bar shows the URL <https://948e13.internetofthings.ibmcloud.com/dashboard/devices/browse>. The user is logged in as 731719106008@smartinternz.com with ID 948e13.

The main dashboard area has tabs for **Browse**, **Action**, **Device Types**, and **Interfaces**. A sidebar on the left contains icons for various functions. A top right button says **Add Device**.

A table lists devices with columns: **Device ID**, **Status**, **Device Type**, **Class ID**, and **Date Added**.

Device ID	Status	Device Type	Class ID	Date Added
502645	Disconnected	NodeMCU	Device	Nov 8, 2022 4:12 PM
NodeMCU_1	Connected	NodeMCU	Device	Nov 10, 2022 9:54 AM

The **NodeMCU_1** device is selected, and its details are shown in a modal window. The modal has tabs for **Identity**, **Device Information**, **Recent Events**, **State**, and **Logs**. The **Recent Events** tab is active, showing a message: **Showing Raw Data | No Interfaces Available**.

Below this message is a table of recent events:

Property	Value	Type	Event	Last Received
randomNumber	88	Number	event_1	a few seconds ago
temp	26	Number	event_1	a few seconds ago
hum	96	Number	event_1	a few seconds ago

At the bottom of the modal, it says **Items per page 50 | 1-2 of 2 items**. A status box at the bottom right of the modal indicates **1 Simulation running**.

Link: <https://wokwi.com/projects/347928353937818196>