

Assignment -4
ESP32 Programming with IBM Cloud

Assignment Date	24 October 2022
Student Name	Mr. Thilak K
Student Roll Number	2019504599
Maximum Marks	2 Marks

Question-1:

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

Upload document with wokwi share link and images of ibm cloud.

Solution:

```
#include <WiFi.h> //library for wifi
#include <PubSubClient.h> //library for MQTT

#define ECHO_GPIO 12
#define TRIGGER_GPIO 13
#define MAX_DISTANCE_CM 100 // Maximum of 5 meters
#include "Ultrasonic.h"

Ultrasonic ultrasonic(13, 12);
int distance;

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

//-----credentials of IBM Accounts-----

#define ORG "bxddo9" //IBM ORGANITION ID
#define DEVICE_TYPE "ESP32" //Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "Assign4" //Device ID mentioned in ibm watson IOT Platform
#define TOKEN "45625689713" //Token
String data3;
float h, t;

//----- Customise the above values -----
char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json"; // topic name and type of event perform and
format in which data to be send
char subscribetopic[] = "iot-2/cmd/command/fmt/String"; // cmd REPRESENT command type AND
COMMAND IS TEST OF FORMAT STRING
char authMethod[] = "use-token-auth"; // authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id

//-----
WiFiClient wificlient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wificlient); //calling the predefined client id by
passing parameter like server id,portand wificredential

void setup() // configureing the ESP32
{
```

```

    Serial.begin(115200);
    delay(10);
    Serial.println();
    wificonnect();
    mqttconnect();
}

void loop()// Recursive Function
{

    distance = ultrasonic.read(CM);
    if(distance < 100){
        Serial.print("Distance in CM: ");
        Serial.println(distance);
        PublishData(distance);
        delay(1000);
        if (!client.loop()) {
            mqttconnect();
        }

    }

    delay(1000);

}

/*.....retrieving to Cloud.....*/

void PublishData(float temp) {
    mqttconnect();//function call for connecting to ibm
    /*
        creating the String in in form JSon to update the data to ibm cloud
    */
    String payload = "{\"Alert Distance\":\"";
    payload += temp;
    payload += "\"}";

    Serial.print("Sending payload: ");
    Serial.println(payload);

    if (client.publish(publishTopic, (char*) payload.c_str())) {
        Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will
        print publish ok in Serial monitor or else it will print publish failed
    } else {
        Serial.println("Publish failed");
    }
}

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

```

```

        initManagedDevice();
        Serial.println();
    }
}
void wificonnect() //function defination for wificonnect
{
    Serial.println();
    Serial.print("Connecting to ");

    WiFi.begin("Wokwi-GUEST", "", 6); //passing the wifi credentials to establish the connection
    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);
    if(data3=="lighton")
    {
        Serial.println(data3);
    }
    else
    {
        Serial.println(data3);
    }
    data3="";
}

```

WOKWI

SAVE

SHARE

sketch.ino

diagram.json

libraries.txt

Ultrasonic.h

Ultrasonic.cpp

Library Manager

```

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5 #define TRIGGER_GPIO 13
6 #define MAX_DISTANCE_CM 100 // Maximum of 5 meters
7 #include "Ultrasonic.h"
8
9 Ultrasonic ultrasonic(13, 12);
10 int distance;
11
12 void callback(char* subscribetopic, byte* payload, unsigned int payloadlength);
13
14 //-----credentials of IBM Accounts-----
15
16 #define ORG "bxdd09" //IBM ORGANITION ID
17 #define DEVICE_TYPE "ESP32" //Device type mentioned in ibm watson IOT Platform
18 #define DEVICE_ID "Assign4" //Device ID mentioned in ibm watson IOT Platform
19 #define TOKEN "45625689713" //Token
20 String data3;
21 float h, t;
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24 //----- Customise the above values -----
25 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
26 char publishTopic[] = "iot-2/evt/Data/fmt/json"; // topic name and type of event perform a
27 char subscribetopic[] = "iot-2/cmd/command/fmt/String"; // cmd REPRESENT command type AND

```

Simulation

Publish ok

Distance in CM: 28

IBM Watson IoT Platform

Browse

Action

Device Types

Interfaces

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
Data	{"Alert Distance":28}	json	a few seconds ago
Data	{"Alert Distance":28}	json	a few seconds ago
Data	{"Alert Distance":28}	json	a few seconds ago
Data	{"Alert Distance":28}	json	a few seconds ago
Data	{"Alert Distance":28}	json	a few seconds ago

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27 char subscribetopic[] = "iot-2/cmd/command/fmt/String"; // cmd REPRESENT command type AND
28 char subMethod[] = "use token auth"; // authentication method

```

Simulation

Publish ok

Distance in CM: 67

Editing payload: {"Alert Distance":67,00}

IBM Watson IoT Platform

Browse

Action

Device Types

Interfaces

Q

Search by Device ID

Dev

	Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
>	123	Disconnected	raspberrypi	Device	Oct 22, 2022 11:15 PM	
▼	Assign4	Connected	ESP32	Device	Oct 24, 2022 10:41 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
Data	{"Alert Distance":72}	json	a few seconds ago
Data	{"Alert Distance":81}	json	4 minutes ago

Wokwi share link:
<https://wokwi.com/projects/346418713648431699>