

Assignment -4

ESP32 Programming with IBM Cloud

Assignment Date	24 October 2022
Student Name	Mr. Bhuvanesh P
Student Roll Number	2019504013
Maximum Marks	2 Marks

Question:

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.

Code:

```
#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 "59pgzn"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT
Platform
#define TOKEN "765368429652" //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()// configuring 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 Link:

<https://wokwi.com/projects/347143045252121170>

WOKWI

SAVE SHARE

Docs

sketch.ino diagram.json libraries.txt Ultrasonic.h Ultrasonic.cpp

Library Manager

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3
4 #define ECHO_GPIO 12
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* subscribtopic, byte* payload, unsigned int payloadL
13
14 //-----credentials of IBM Accounts-----
15
16 #define ORG "59pgzn" //IBM ORGANITION ID
17 #define DEVICE_TYPE "ESP32" //Device type mentioned in ibm watson IOT Pla
18 #define DEVICE_ID "12345" //Device ID mentioned in ibm watson IOT Platform
19 #define TOKEN "765368429652" //Token
20 String data3;
21 float h, t;
22
23
24 //----- Customise the above values -----
25 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server
26 char publishTopic[] = "iot-2/evt/Data/fmt/json"; // topic name and type of
```

Simulation

00:16.540 99%

Editing Ultrasonic Distance Sensor

Distance: 48cm

Publish ok

Distance in CM: 50

Sending payload: {"Alert Distance":50.00}

Publish ok

Distance in CM: 50

Sending payload: {"Alert Distance":50.00}

Publish ok

IBM Watson IoT Platform

2019504013@smartinternz.com ID: 59pgzn

Browse Action Device Types Interfaces

Add Device

12345 Connected ESP32 Device Nov 1, 2022 9:25 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":50}	json	a few seconds ago
Data	{"Alert Distance":50}	json	a few seconds ago
Data	{"Alert Distance":50}	json	a few seconds ago
Data	{"Alert Distance":50}	json	a few seconds ago
Data	{"Alert Distance":48}	json	a few seconds ago

WOKWI

SAVE

SHARE

Docs

sketch.ino

diagram.json

libraries.txt

Ultrasonic.h

Ultrasonic.cpp

Library Manager

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```

Simulation

00:26.100

100%

Editing Ultrasonic Distance Sensor

Distance: 212cm

IP address: 10.10.0.2

Reconnecting client to 59pgzn.messaging.internetofthings.ibmcloud.com

iot-2/cmd/command/fmt/String

subscribe to cmd OK

IBM Watson IoT Platform

2019504013@smartinternz.com

ID: 59pgzn

Browse

Action

Device Types

Interfaces

Add Device

Device ID	Status	Device Type	Class ID	Date Added
12345	Disconnected	ESP32	Device	Nov 1, 2022 9:25 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":50}	json	a minute ago
Data	{"Alert Distance":50}	json	a minute ago
Data	{"Alert Distance":50}	json	a minute ago
Data	{"Alert Distance":50}	json	a minute ago
Data	{"Alert Distance":50}	json	a minute ago