

Assignment -4

Assignment Date	31 Oct 2022
Student Name	D.VIJAYARAJ
Student Roll Number	2127190701127
Maximum Marks	2 Marks

Question-1:

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>
#include <ArduinoJson.h>

WiFiClient wifiClient;

#define ORG "zbskhc"
#define DEVICE_TYPE "RaspberryPi"
#define DEVICE_ID "NT"
#define TOKEN "h4JYF?vLc4ZtTlCTjC"
#define speed 0.034
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/abcd_1/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

PubSubClient client(server, 1883, wifiClient);

void publishData();
const int trigpin=5;
const int echopin=18;
String command;
String data="";
String lat="14.167589";
String lon="80.248510";
String name="point2";
String icon="";
long duration;
int dist;
void setup()
{
  Serial.begin(115200);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  wifiConnect();
  mqttConnect();
}

void loop() {
  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());
}

/*while (!client.connected()) { Serial.println("Connecting to MQTT...");
  if (client.connect("ESP32Client", mqttUser, mqttPassword ))
    { Serial.println("connected " + String(client.state())); client.subscribe(topic, "XXXX"); }
  else { Serial.print("failed with state ");
    Serial.print(client.state());
    delay(2000); }
*/
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("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){
    dist=100-dist;
    icon="fa-trash";
  }else{
    dist=0;
    icon="fa-trash-o";
  }
}

```

```
DynamicJsonDocument doc(1024);
String payload;
doc["Name"]=name;
doc["Latitude"]=lat;
doc["Longitude"]=lon;
doc["Icon"]=icon;
doc["FillPercent"]=dist;
serializeJson(doc, payload);
delay(3000);
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");
}
}
```

Wokwi Share link:- “<https://wokwi.com/projects/347553708259672660>”

Output:

The screenshot shows the Wokwi IoT Platform interface. The left pane displays the Arduino sketch code for an ESP32 connected to an HC-SR04 ultrasonic sensor. The code includes the necessary libraries, defines the device type and ID, and sets up the MQTT client to publish data to the IBM Watson IoT Platform. The right pane shows the simulation results, indicating that the device is connected to the network and publishing data.

```
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2 #include <PubSubClient.h>
3 #include <ArduinoJson.h>
4
5 WiFiClient wifiClient;
6
7 #define ORG "zbskhc"
8 #define DEVICE_TYPE "RaspberryPi"
9 #define DEVICE_ID "NT"
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11 #define speed 0.034
12 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
13 char publishTopic[] = "iot-2/evt/abcd_1/fmt/json";
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16 char token[] = TOKEN;
17 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
18
19 PubSubClient client(server, 1883, wifiClient);
20
21 void publishData();
22 const int trigpin=5;
23 const int echopin=18;
24 String command;
25 String data="";
26 String lat="14.167589";
27 String lon="80.248510";
28 String name="point2";
29 String icon="";
30 long duration;
31 int dist;
32 void setup()
33 {
34   {
35     Serial.begin(115200);
36     pinMode(trigpin, OUTPUT);
37     pinMode(echopin, INPUT);
38     wifiConnect();
39     mqttConnect();
40   }
41 }
```

Simulation

Connecting to Wifi...WiFi connected, IP address: 10.10.0.2
Reconnecting MQTT client to zbskhc.messaging.internetofthings.ibmcloud.com
1
subscribe to cmd OK

Sending payload: {"Name":"point2","Latitude":"14.167589","Longitude":"80.248510","Icon":"fa-trash-o","FillPercent":0}
Publish OK

Sending payload: {"Name":"point2","Latitude":"14.167589","Longitude":"80.248510","Icon":"fa-trash-o","FillPercent":0}
Publish OK

Sending payload: {"Name":"point2","Latitude":"14.167589","Longitude":"80.248510","Icon":"fa-trash-o","FillPercent":0}

The screenshot shows the IBM Watson IoT Platform dashboard. The top navigation bar includes links for Browse, Action, Device Types, and Interfaces. The main content area displays the details for a device named 'NT', which is connected. The 'Recent Events' tab is selected, showing a list of events with columns for Event, Value, Format, and Last Received. The events are listed in a table, showing the device's location and status.

Event	Value	Format	Last Received
abcd_1	{"Name":"point2","Latitude":"14.167589","Longi...	json	a few seconds ago
abcd_1	{"Name":"point2","Latitude":"14.167589","Longi...	json	a few seconds ago
abcd_1	{"Name":"point2","Latitude":"14.167589","Longi...	json	a few seconds ago
abcd_1	{"Name":"point2","Latitude":"14.167589","Longi...	json	a few seconds ago
abcd_1	{"Name":"point2","Latitude":"14.167589","Longi...	json	a few seconds ago

Items per page 50 | 1-1 of 1 item

1 of 1 page

1 Simulation running

WhatsApp

Chat with mentor

Project Planning Phase - Google

IBM Watson IoT Platform

sketchino - Wokwi Arduino and

zbskhc.internetofthings.ibmcloud.com/dashboard/devices/browse

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GENERAL

Imported

BookmarksBAR

CFA

Train Timings

WhatsApp

NB 001 Buy, Techni...

NB 001 Sell, Technic...

SmartInternz

Home | Income Tax...

ValuePickr - Separa...

Google

IBM Watson IoT Platform

2019ec0593@svce.ac.in
ID: zbskhc

Browse

Action

Device Types

Interfaces

Device ID

Status

Device Type

NT

Connected

RaspberryPi

Identity

Device Information

Recent Events

The recent events listed show the live stream of data that is coming a

Event	Value
abcd_1	{"Name":"point2","Latitude":"","14.167589","Long
abcd_1	{"Name":"point2","Latitude":"","14.167589","Long
abcd_1	{"Name":"point2","Latitude":"","14.167589","Long
abcd_1	{"Name":"point2","Latitude":"","14.167589","Long
abcd_1	{"Name":"point2","Latitude":"","14.167589","Long

Items per page 50 | 1--1 of 1 item

Event Payload

Event Name abcd_1
Time Received 11 Nov 2022 10:38 AM

```
1- {  
2  "Name": "point2",  
3  "Latitude": "14.167589",  
4  "Longitude": "80.248510",  
5  "Icon": "fa-trash-o",  
6  "FillPercent": 0  
7 }
```

Added By 2019ec0593@svce.ac.in

Device Class

1 Simulation running

sketch.zip

Show all

ENG IN

10:39

11-11-2022

WhatsApp

Chat with mentor

Project Planning Phase - Google

IBM Watson IoT Platform

sketchino - Wokwi Arduino and

zbskhc.internetofthings.ibmcloud.com/dashboard/devices/browse

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GENERAL

Imported

BookmarksBAR

CFA

Train Timings

WhatsApp

NB 001 Buy, Techni...

NB 001 Sell, Technic...

SmartInternz

Home | Income Tax...

ValuePickr - Separa...

Google

IBM Watson IoT Platform

2019ec0593@svce.ac.in
ID: zbskhc

Browse

Action

Device Types

Interfaces

Device ID

Status

Device Type

NT

Connected

RaspberryPi

Identity

Device Information

Recent Events

The recent events listed show the live stream of data that is coming a

Event	Value
abcd_1	{"Name":"point2","Latitude":"","14.167589","Long
abcd_1	{"Name":"point2","Latitude":"","14.167589","Long
abcd_1	{"Name":"point2","Latitude":"","14.167589","Long
abcd_1	{"Name":"point2","Latitude":"","14.167589","Long
abcd_1	{"Name":"point2","Latitude":"","14.167589","Long

Items per page 50 | 1--1 of 1 item

Event Payload

Event Name abcd_1
Time Received 11 Nov 2022 10:38 AM

```
1- {  
2  "Name": "point2",  
3  "Latitude": "14.167589",  
4  "Longitude": "80.248510",  
5  "Icon": "fa-trash",  
6  "FillPercent": 20  
7 }
```

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Device Class

1 Simulation running

sketch.zip

Show all

ENG IN

10:39

11-11-2022