

Assignment -4
ESP32 Programming with IBM Cloud

Assignment Date	25 October 2022
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Student Roll Number	2116191001077
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 "5jl5s"//IBM ORGANITION ID
#define DEVICE_TYPE "abcd"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "@TcizfW(zVdn9iXU5h" //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 += "\"}";
}

```

```

}

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");
  }
}

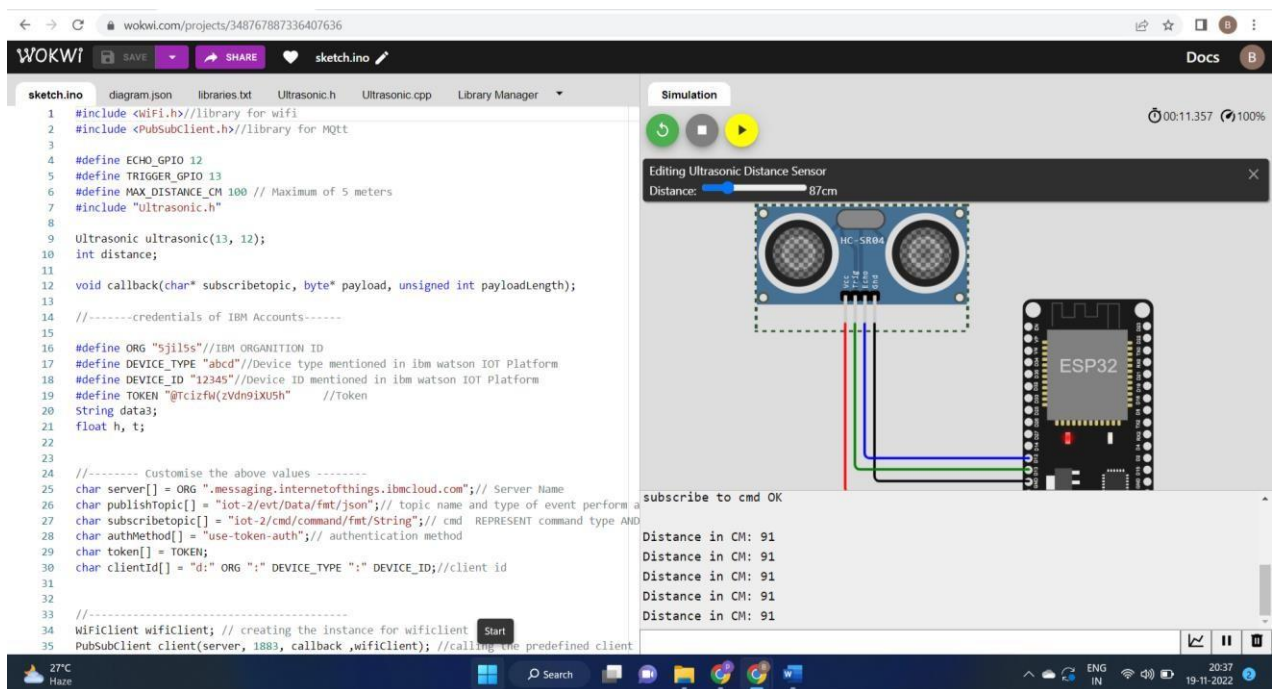
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
  Serial.print("callback invoked for topic: ");
  Serial.println(subscribetopic);
}

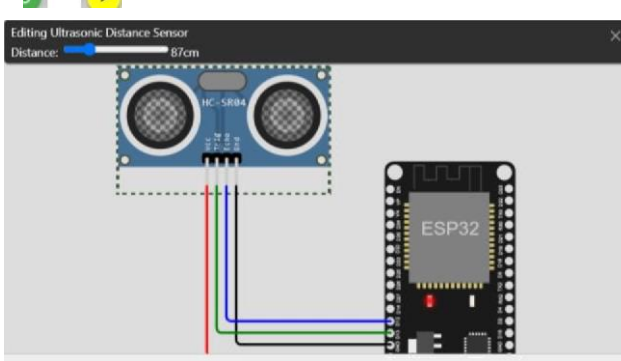
```

```

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="";
}

```





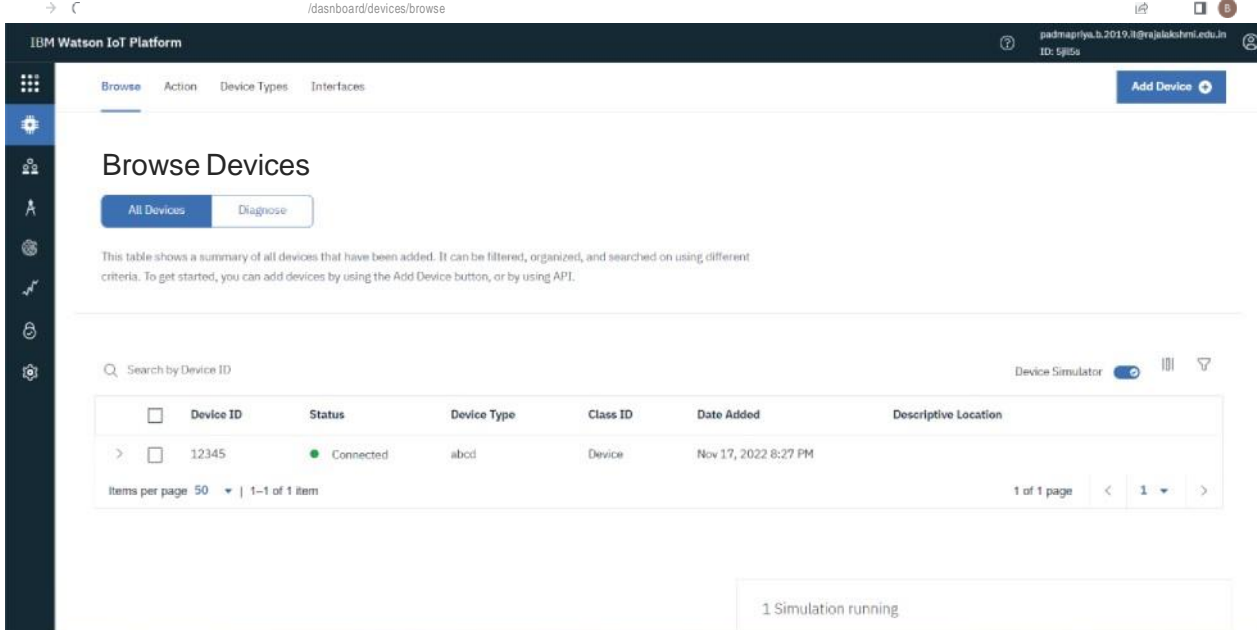
Editing Ultrasonic Distance Sensor
Distance: 87cm

```
ot-2/c...d/fw...ring...// cmd REPRESENT command type AND  
oken-a...v";// authentication method  
"i" [ ... ] ;//client id
```

Connecting to ...
WiFi connected
IP address:

```
33 //  
34 WiFiClient wifiClient; // creating the instance for wifiClient  
35 PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client
```

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«t-z/ccd/comena/ret/strln¥



IBM Watson IoT Platform

Dashboard/devices/browse

Browse Devices

All Devices Diagnose

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Search by Device ID

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
12345	Connected	abcd	Device	Nov 17, 2022 8:27 PM	

Items per page 50 | 1-1 of 1 item

1 Simulation running

IBM Watson IoT Platform

5jil5s.internetofthings.ibmcloud.com/dashboard/devices/browse

padmapriya.b.2019.it@rajalakshmi.edu.in
ID: 5jil5s

Browse Action Device Types Interfaces

Add Device +

Search by Device ID

Device Simulator ☒

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
12345	Connected	abcd	Device	Nov 17, 2022 8:27 PM	

Identity Device Information Recent Events State Logs

Device ID: 12345
Device Type: abcd
Date Added: Nov 17, 2022 8:27 PM
Added By: padmapriya.b.2019.it@rajalakshmi.edu.in
Connection Status: **Connected**
Connection Time: Nov 19, 2022 8:41 PM
Client Address: 50.31.197.64 Insecure

Items per page 50 | 1-1 of 1 item

1 Simulation running

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5jil5s.internetofthings.ibmcloud.com/dashboard/devices/browse

padmapriya.b.2019.it@rajalakshmi.edu.in
ID: 5jil5s

Browse Action Device Types Interfaces

Add Device +

Search by Device ID

Device Simulator ☒

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
12345	Disconnected	abcd	Device	Nov 17, 2022 8:27 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
event_1	{"randomNumber":60,"temp":75,"hum":88}	json	a few seconds ago

Items per page 50 | 1-1 of 1 item

1 of 1 page

1 Simulation running

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Wokwi share link:

<https://wokwi.com/projects/348767887336407636>