

Assignment 4

Assignment Date	28 October 2022
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Maximum Marks	2 Marks

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

```
#include <WiFi.h> //library for wifi
#include <PubSubClient.h> //library for MQTT
const int T=4;
const int E=18;
long length;
float Distance;
void callback(char* subscribtopic, byte* payload, unsigned int payloadLength);

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

#define ORG "6e8heb" //IBM ORGANITION ID
#define DEVICE_TYPE "ultrasonicdevice" //Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345" //Device ID mentioned in ibm watson IOT Platform
#define TOKEN "0Md1@wQs0RvOEyoz5r" //Token
String data;

//----- 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 subscribtopic[] = "iot-2/cmd/test/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);
  pinMode(T,OUTPUT);
  pinMode(E,INPUT);
  Serial.println();
  wificonnect();
  mqttconnect();
}

void loop() // Recursive Function
{
  digitalWrite(T,LOW);
  delay(1000);
  digitalWrite(T,HIGH);
```

```

delay(1000);
digitalWrite(T,LOW);
length=pulseIn(E,HIGH);
Distance=length*(0.034/2);
Serial.print("Distance in Cm:");
Serial.println(Distance);
if(Distance<100)
{
    Serial.println("!!ALERT!!");
    delay(1000);
    PublishData(Distance);
    delay(1000);
    if (!client.loop()) {
        mqttconnect();
    }
}
delay(1000);
}

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

void PublishData(float dist) {
    mqttconnect();//function call for connecting to ibm
    /*
        creating the String in in form JSon to update the data to ibm cloud
    */
    String payload = "{\"Distance\":";
    payload += dist;
    payload += "\",\"!!ALERT!!\": \""Distance is less than 100 cm\"";
    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());
}

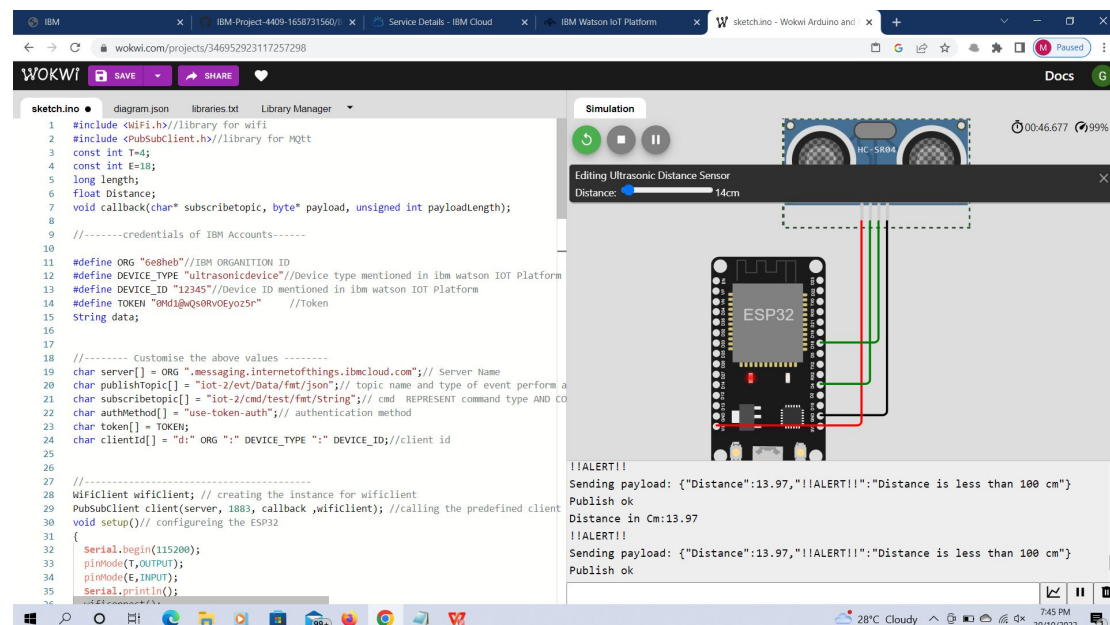
void initManagedDevice() {
    if (client.subscribe(subscribetopic)) {
        Serial.println((subscribetopic));
        Serial.println("subscribe to cmd OK");
    } else {
        Serial.println("subscribe to cmd FAILED");
    }
}

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]);
        data += (char)payload[i];
    }

    Serial.println("data: "+ data);
    data="";
}

```

OUTPUT



Wokwi simulation link:

<https://wokwi.com/projects/346952923117257298>

Recent Events in IBM cloud:

IBM

IBM-Project-4409-1658731560/...

Service Details - IBM Cloud

IBM Watson IoT Platform

sketch,uno - Wokwi Arduino and ...

6e8heb.internetofthings.ibmcloud.com/dashboard/devices/browse

gowtham.s2019ece@sece.ac.in
ID: 6e8heb

IBM Watson IoT Platform

BrowseActionDevice TypesInterfaces

Add Device

Search by Device ID

Device Simulator

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
12345	Connected	ultrasonicdevice	Device	Oct 29, 2022 9:42 PM	

IdentityDevice InformationRecent EventsStateLogs

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{\"Distance\":13.97,\"!ALERT!\":...\"Distance is less th...	json	a few seconds ago
Data	{\"Distance\":41.96,\"!ALERT!\":...\"Distance is less th...	json	a few seconds ago
Data	{\"Distance\":47.97,\"!ALERT!\":...\"Distance is less th...	json	a few seconds ago
Data	{\"Distance\":92.97,\"!ALERT!\":...\"Distance is less th...	json	a minute ago

28°C Cloudy

7:45 PM
30/10/2022