

#### Assignment -4

Assignment Date	26 November 2022
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#### QUESTION:

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

#### PROGRAM:

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

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

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

#define ORG "flqws8" //IBM ORGANITION ID
#define DEVICE_TYPE "raspberry_pi" //Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345678" //Device ID mentioned in ibm watson IOT Platform
#define TOKEN "0987654321" //Token
String data3;
float dist;
//----- Customise the above values -----
char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
char publishTopic[] = "iot-2/evt/event_1/fmt/json"; // topic name and type of event perform and format in which data to be send
char subscribetopic[] = "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, port and wificredential

int LED = 14;
int trig = 13;
int echo = 18;
void setup()
{
  Serial.begin(115200);
```

```

pinMode(trig,OUTPUT);
pinMode(echo,INPUT);
pinMode(LED, OUTPUT);
delay(10);
wificonnect();
mqttconnect();
}
void loop()// Recursive Function
{

digitalWrite(trig,LOW);
digitalWrite(trig,HIGH);
delayMicroseconds(10);
digitalWrite(trig,LOW);
float dur = pulseIn(echo,HIGH);
float dist = (dur * 0.0343)/2;
Serial.print ("Distancein cm");
Serial.println(dist);


PublishData(dist);
delay(1000);
if (!client.loop()) {
    mqttconnect();
}
}

/*.....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 object;
    if (dist <100)
    {
        digitalWrite(LED,HIGH);
        Serial.println("object is near");
        object = "Near";
    }
    else
    {
        digitalWrite(LED,LOW);
        Serial.println("no object found");
        object = "No";
    }

    String payload = "{\"distance\":";
    payload += dist;
    payload += "," " \"object\":";

```

```

payload += object;
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=="Near")
    // {
    // Serial.println(data3);
    // digitalWrite(LED,HIGH);

    // }

    // else
    // {
    // Serial.println(data3);
    // digitalWrite(LED,LOW);

    // }
    data3="";

}

```

