

Assignment -4

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Maximum Marks	2 Marks

Question-1:

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

Solution:

```
#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 "rdegk" //IBM ORGANITION ID
#define DEVICE_TYPE "weather1" //Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "weather1" //Device ID mentioned in ibm watson IOT Platform
#define TOKEN " _oa-3bajxqvCrO(6kW " //Token
String data3; float dist;

//----- 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/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

int LED = 4;
int trig = 5;
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];
    }
data3="";
}

```

Reference:

<https://wokwi.com/projects/347311168141918803>

WOKWI

SAVE

SHARE

sketch.ino

Docs

sketch.ino

diagram.json

libraries.txt

Library Manager

```

64  /*
65  */ creating the String in in form JSON to update the data to ibm cloud
66  */
67  String object;
68  if (dist <100)
69  {
70    digitalWrite(LED,HIGH);
71    Serial.println("object is near");
72    object = "Near";
73  }
74  else
75  {
76    digitalWrite(LED,LOW);
77    Serial.println("no object found");
78    object = "No";
79  }
80
81  String payload = "{\"distance\":";
82  payload += dist;
83  payload += "," " \"object\":\":";
84  payload += object;
85  payload += "\"}";
86
87
88  Serial.print("Sending payload: ");
89  Serial.println(payload);
90
91
92

```

Simulation

00:59.614 98%

object is near

Sending payload: {"distance":59.51,"object":"Near"}

Publish ok

Distance in cm59.51

object is near

Sending payload: {"distance":59.51,"object":"Near"}

Publish ok

IBM Watson IoT Platform

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ID: rdegyk

Back

Device Drilldown - weather1

Connection Information

Recent Events

State

Device Information

Metadata

Diagnostics

Connection Logs

Device Actions

Recent Events

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":59.51,"object":"Near"}	json	a few seconds ago
Data	{"distance":59.51,"object":"Near"}	json	a few seconds ago
Data	{"distance":2.01,"object":"Near"}	json	a few seconds ago
Data	{"distance":347.01,"object":"No"}	json	a few seconds ago
Data	{"distance":403.49,"object":"No"}	json	a few seconds ago

0 Simulations running