

Assignment -4

Assignment Date	02 November 2022
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Maximum Marks	2 Marks
Team ID	PNT2022TMID30274

Question:

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.

Code:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribtopic, byte* payload, unsigned int
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "qsvkr1"//IBM ORGANITION ID
#define DEVICE_TYPE "2k19ece002"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "2k19ece002"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "Arshaath" //Token
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribtopic[] = "iot-2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);
const int trigPin = 25;
const int echoPin = 14;
#define SOUND_SPEED 0.034
long duration;
float distance;
void setup() {
  Serial.begin(115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  wificonnect();
  mqttconnect();
}
void loop()
{
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
```

```

duration = pulseIn(echoPin, HIGH);
distance = duration * SOUND_SPEED/2;
Serial.print("Distance (cm): ");
Serial.println(distance);
if(distance<100)
{
Serial.println("ALERT!!");
delay(1000);
PublishData(distance);
delay(1000);
if (!client.loop()) {
mqttconnect();
}
}
delay(1000);
}

void PublishData(float dist) {
mqttconnect();
String payload = "{\"Distance\":\"";
payload += dist;
payload += "\",\"ALERT!!\":\"\"Distance less than 100cms\"";
payload += "\"}";
Serial.print("Sending payload: ");
Serial.println(payload);
if (client.publish(publishTopic, (char*) payload.c_str())) {
Serial.println("Publish ok");
} 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()
{
Serial.println(); Serial.print("Connecting to ");
WiFi.begin("Wokwi-GUEST", "", 6); 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);
  data3="";
}

```

Wokwi Output:

The screenshot displays the Wokwi IDE interface. On the left, the 'sketch.ino' file is open, showing the following code:

```

1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* subscribetopic, byte* payload, unsigned int
4 payloadLength);
5 //-----credentials of IBM Accounts-----
6 #define ORG "qsvkrl"//IBM ORGANITION ID
7 #define DEVICE_TYPE "2k19ece002"//Device type mentioned in ibm watson IOT Platform
8 #define DEVICE_ID "2k19ece002"//Device ID mentioned in ibm watson IOT Platform
9 #define TOKEN "Arshaath" //Token
10 String data3;
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Data/fmt/json";
13 char subscribetopic[] = "iot-2/cmd/test/fmt/String";
14 char authMethod[] = "use-token-auth";
15 char token[] = TOKEN;
16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 WiFiClient wifiClient;
18 PubSubClient client(server, 1883, callback ,wifiClient);
19 const int trigPin = 25;
20 const int echoPin = 14;
21 #define SOUND_SPEED 0.034
22 long duration;
23 float distance;
24 void setup() {
25   Serial.begin(115200);
26   pinMode(trigPin, OUTPUT);
27   pinMode(echoPin, INPUT);
28   wifiConnect();
29   mqttconnect();
30 }
31 void loop()
32 {
33   digitalWrite(trigPin, LOW);
34   delayMicroseconds(2);
35   digitalWrite(trigPin, HIGH);
36   delayMicroseconds(10);
37   digitalWrite(trigPin, LOW);
38   duration = pulseIn(echoPin, HIGH);

```

On the right, the 'Simulation' window shows a visual representation of the hardware: an ESP32 microcontroller board connected to an HC-SR04 ultrasonic sensor. The sensor's VCC pin is connected to the ESP32's 5V pin, GND to GND, and the trig and echo pins to digital pins 25 and 14 respectively.

The console output at the bottom shows the following sequence of events:

```

Publish ok
Distance (cm): 99.98
ALERT!!
Sending payload: {"Distance":99.98,"ALERT!!":"Distance less than 100cms"}
Publish ok
Reconnecting client to qsvkrl.messaging.internetofthings.ibmcloud.com

```

IBM Cloud Alert:

← → ↻ qsvkrlinternetofthings.ibmcloud.com/dashboard/devices/browse

IBM Watson IoT Platform 611219106002@smartinternz.com ID: qsvkrl

Browse Action Device Types Interfaces Add Device +

Identity Device Information **Recent Events** State Logs X

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":99.98,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":99.98,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":99.98,"ALERT!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":99.98,"ALERT!":"Distance less than ...	json	2 minutes ago
Data	{"Distance":99.98,"ALERT!":"Distance less than ...	json	2 minutes ago

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Wokwi Share Link:

<https://wokwi.com/projects/347278397539353172>