

ASSIGNMENT-4

ESP32 AND ULTRASONIC SENSOR DATA SENDS TO IBM CLOUD

PROJECT	IoT ENABLED - REAL TIME WATER QUALITY MONITORING AND CONTROL SYSTEM
NAME	GAYATHRI S
PROJECT ID	PNT2022TMID47600
DATE	22 OCT 2022

QUESTION:

Write a code and connections in wowki for the ultrasonic sensor. Whenever the distance is less than 100cms send an “alert” to IBM cloud and display in the device receive recent events. Upload documents with wowki share link and images of IBM cloud.

PROGRAM:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "wbr1mx"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
```

```

#define DEVICE_ID "23456"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "?nJt2d&kHW*bIp!21z" //Token
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "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 = 4;
const int echoPin = 18;
#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="";
}

```

OUTPUT:

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

```

1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 void callback(char* subscribetopic, byte* payload, unsigned int
4 payloadLength);
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11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Data/fmt/json";
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17 WiFiClient wifiClient;
18 PubSubClient client(server, 1883, callback ,wifiClient);
19 const int trigPin = 4;
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22 long duration;
23 float distance;
24 void setup() {
25   Serial.begin(115200);
26   pinMode(trigPin, OUTPUT);
27   pinMode(echoPin, INPUT);
28   wifiConnect();

```

On the right, the 'Simulation' window shows a visual representation of the ESP32 and the HC-SR04 sensor connected by wires. Below the simulation, the serial output log displays the following messages:

```

100cms"}
Publish ok
Distance (cm): 53.99
ALERT!!
Sending payload: {"Distance":53.99,"ALERT!!":"Distance less than
100cms"}
Publish ok

```

The bottom of the image shows the Windows taskbar with the system clock indicating 12:39 on 16-11-2022.

WOKWI

sketch.ino diagram.json libraries.txt Library Manager

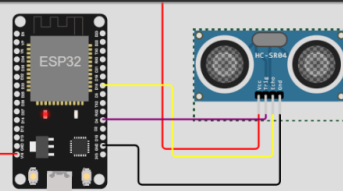
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25   Serial.begin(115200);
26   pinMode(trigPin, OUTPUT);
27   pinMode(echoPin, INPUT);
28   wifiConnect();
```

Simulation

00:18.345 77%

Editing Ultrasonic Distance Sensor

Distance: 54cm



Distance (cm): 53.99

ALERT!!

Sending payload: {"Distance":53.99,"ALERT!!":"Distance less than 100cms"}

Publish ok

Reconnecting client to wbr1mx.messaging.internetofthings.ibmcloud.com

Type here to search

31°C

12:40 16-11-2022

WOKWI

sketch.ino diagram.json libraries.txt Library Manager

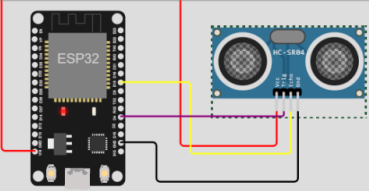
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16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 WiFiClient wificlient;
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19 const int trigPin = 4;
20 const int echoPin = 18;
21 #define SOUND_SPEED 0.034
22 long duration;
23 float distance;
24 void setup() {
25   Serial.begin(115200);
26   pinMode(trigPin, OUTPUT);
27   pinMode(echoPin, INPUT);
28   wificlient.connect();
```

Simulation

01:02:55 101%

Editing Ultrasonic Distance Sensor

Distance: 110cm



Sending payload: {"Distance":53.99,"ALERT!!":"Distance less than 100cms"}

Publish ok

Distance (cm): 109.99

Distance (cm): 109.99

Distance (cm): 109.99

Distance (cm): 109.99

Data uploaded to IOT Watson Platform

W GAYATHRI ASSIGN4 copy x Service Details - IBM Clou x IBM Watson IoT Platform x Naan Mudhalvan x Naan Mudhalvan x +

wbr1mx.internetofthings.ibmcloud.com/dashboard/devices/drilldown/ESP32:23456?returnTo=/devices/browse

911019106003@smartinternz.com ID: wbr1mx

← Back

Device Drilldown - 23456

Device Credentials

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":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago

Type here to search 31°C 12:39 16-11-2022

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wbr1mx.internetofthings.ibmcloud.com/dashboard/devices/drilldown/ESP32:23456?returnTo=/devices/browse

911019106003@smartinternz.com ID: wbr1mx

← Back

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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":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":54.01,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago

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wbr1mx.internetofthings.ibmcloud.com/dashboard/devices/drilldown/ESP32:23456?returnTo=/devices/browse

IBM Watson IoT Platform 911019106003@smartinternz.com ID: wbr1mx

← Back

Device Drilldown - 23456

Device Credentials

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":30.96,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":30.96,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":30.96,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":53.99,"ALERT!!":"Distance less than ...	json	a few seconds ago

Type here to search

31°C 12:42 16-11-2022

<https://wokwi.com/projects/348466610622693970>