

ASSIGNMENT - 4

Date	03 November 2022
Team ID	PNT2022TMID04704
Name	SMARTFARMER - IoT enabled smart farming applications

QUESTION:

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

CODE :

```
#include <WiFi.h> // library for WIFI
```

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

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

```
#define ORG "rwazv5" // IBM organisation id
```

```
#define DEVICE_TYPE "NodeRed" // Device type mentioned in ibm watson iot platform
```

```
#define DEVICE_ID "12345" // Device ID mentioned in ibm watson iot platform
```

```
#define TOKEN "vC@S3TBre6(97jAOJ_" // Token
```

```
#define speed 0.034
```

```
#define led 14 String
```

```
data3;
```

```
int LED = 4;
```

```
//----- customise above values -----
```

```
char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // server name
```

```
char publishTopic[] = "iot-2/evt/sreedhar/fmt/json"; // topic name and type of event perform and format  
in which data to be send
```

```
char topic[] = "iot-2/cmd/led/fmt/String"; // cmd Represent type and command is test format of strings
```

```
char authMethod[] = "use-token-auth"; // authentication method char
```

```
token[] = TOKEN;
```

```
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //Client id
```

```
//-----
```

```
WiFiClient wifiClient; // creating instance for wificlient
```

```
PubSubClient client(server, 1883, wifiClient); // calling the predefined client id by passing parameter like server id,port and wifi  
credential
```

```

const int trigpin=5; const
int echopin=18;
String command;
String data="";

long duration; float
dist;

void setup()
{
  Serial.begin(115200);
  pinMode(led, OUTPUT);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  wifiConnect(); mqttConnect();
}

void loop() { bool isNearby
= dist < 100;
digitalWrite(led, isNearby);

publishData();
delay(500);

if (!client.loop())
{
  mqttConnect(); // function call to connect to ibm
}
}

/* -----retrieving to cloud-----*/

void wifiConnect()
{
  Serial.print("Connecting to ");
  Serial.print("Wifi");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED)
  {
    delay(500);
    Serial.print(".");
  }
  Serial.print("WiFi connected, IP address: ");
  Serial.println(WiFi.localIP());
}

```

```

}

void mqttConnect()
{
  if (!client.connected())
  {
    Serial.print("Reconnecting MQTT client to ");
    Serial.println(server);
    while (!client.connect(clientId, authMethod, token))
    {
      Serial.print(".");
      delay(500);
    }
    initManagedDevice();
    Serial.println();
  }
}

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

void publishData()
{
  digitalWrite(trigpin,LOW);
  digitalWrite(trigpin,HIGH);
  delayMicroseconds(10); digitalWrite(trigpin,LOW);
  duration=pulseIn(echopin,HIGH);
  dist=duration*speed/2;
  if(dist<100)
  {
    digitalWrite(LED,HIGH); String
    payload = "{\"Alert Distance\":\"";
    payload += dist;
    payload += "\"}";

    Serial.print("\n");
  }
}

```

```

Serial.print("Sending payload: "); Serial.println(payload); if (client.publish(publishTopic, (char*)
payload.c_str())) // if data is uploaded to cloud successfully,prints publish ok else prints publish failed
{
    Serial.println("Publish OK");
}
}
if(dist>100)
{
    digitalWrite(LED,HIGH);
    String payload = "{\"Distance\":\"";
    payload += dist;
    payload += "\"}";

    Serial.print("\n");
    Serial.print("Sending payload: ");
    Serial.println(payload);
    if(client.publish(publishTopic, (char*)
    payload.c_str())) {
        Serial.println("Publish OK");
    }
    else
    {
        digitalWrite(LED,LOW);
        Serial.println("Publish FAILED");
    }

}
}

```

OUTPUT :

Code simulation on wokwi



Data sent to IBM Cloud with distance

