

ASSIGNMENT - 4

Date	30 October 2022
Team ID	PNT2022TMID01115
Name	Hazardous Area Monitoring for Industrial Plant powered by IoT

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");
  }

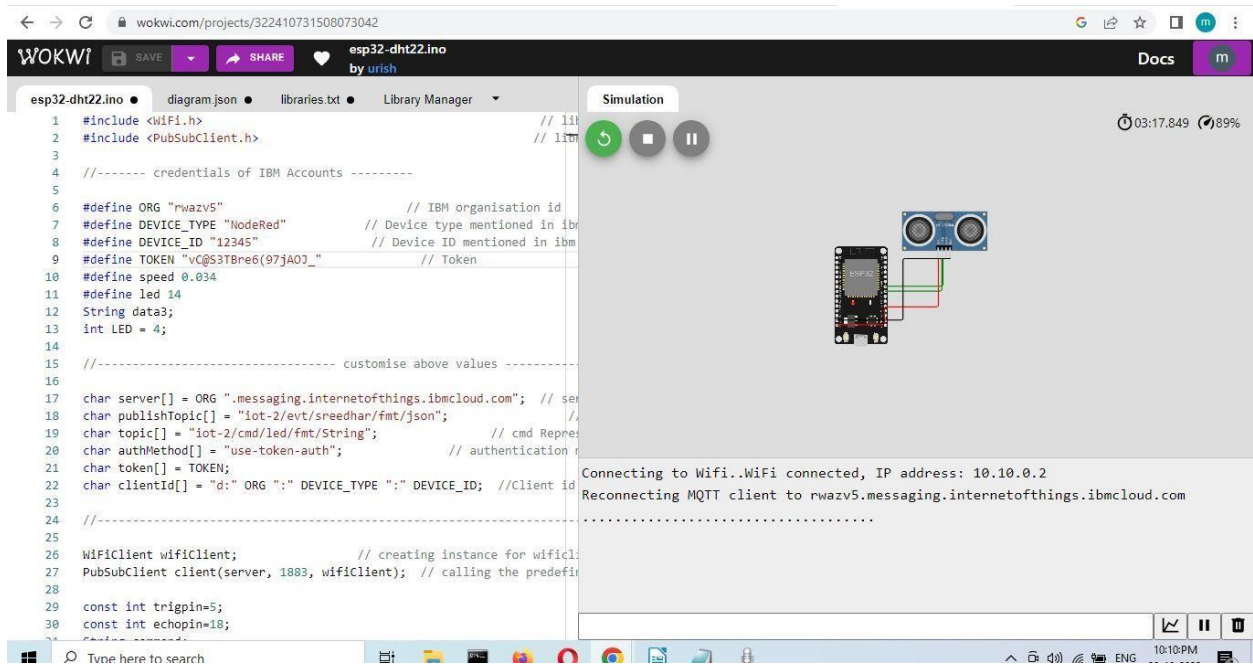
}

}

```

OUTPUT :

Code simulation on wokwi



Data sent to IBM Cloud with distance

The screenshot shows the IBM Watson IoT Platform dashboard. The 'Recent Events' tab is selected, displaying a table of events. The table has columns for Event, Value, Format, and Last Received. The events show a stream of data with the key 'distance' and value '{\"distance\":141.32}'.

Event	Value	Format	Last Received
distance	{\"distance\":141.32}	json	a few seconds ago
distance	{\"distance\":141.32}	json	a few seconds ago
distance	{\"distance\":141.32}	json	a few seconds ago
distance	{\"distance\":141.32}	json	a few seconds ago
distance	{\"distance\":141.32}	json	a few seconds ago

1 Simulation running

