Assignment 4

Assignment Date	14 November 2022
Student Name	V. THIRUMURUGAN
Maximum Marks	2 Marks

Question-1:

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.

Solution:

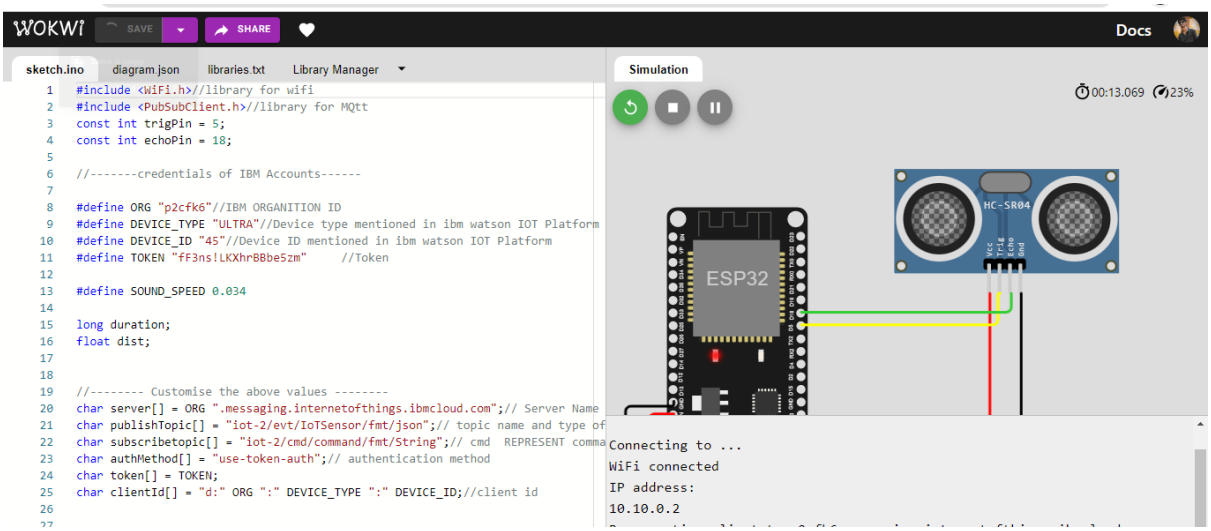
```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
const int trigPin = 5;
const int echoPin = 18;

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

#define ORG "p2cfk6"//IBM ORGANITION ID
#define DEVICE_TYPE "ULTRA"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "45"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "fF3ns!LKXhrBBbe5zm"      //Token

#define SOUND_SPEED 0.034

long duration;
float dist;


//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "iot-2/cmd/command/fmt/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, wifiClient); //calling the predefined
client id by passing parameter like server id,portand wificredential

void setup()// configureing the ESP32
{
  Serial.begin(115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  delay(10);
  Serial.println();
```

```
  wificonnect();
  mqttconnect();
}

void loop()// Recursive Function
{

  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  dist = duration * SOUND_SPEED/2;

  // Prints the distance in the Serial Monitor
  Serial.print("Distance: ");
  Serial.print(dist);
  Serial.println(" cm");
  delay(1000);

  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 form JSon to update the data to ibm cloud
  */
  if(dist<100)
  {
  String payload = "{\"Alert! Distance is less than 100\":";
  payload += dist;
  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");
  }
   }
   else{
     String payload = "{\"Distance\":";
     payload += dist;
```

```
     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);
    }
     Serial.println();
  }
}
void wificonnect() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials
toestablish 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())
  ;
}
```

WOKWI LINK: https://wokwi.com/projects/348325320874525266

Wokwi simulation Output:



OUTPUT IN IBM CLOUD (DEVICE RECENT EVENTS):