Assignment - 4

Question-1:

Write code and Connection in wokwi for ultrasonic sensor. Whenever distance is less than 100cms send “alert” to the ibm cloud and display in device recent events.

Solution:

Program:

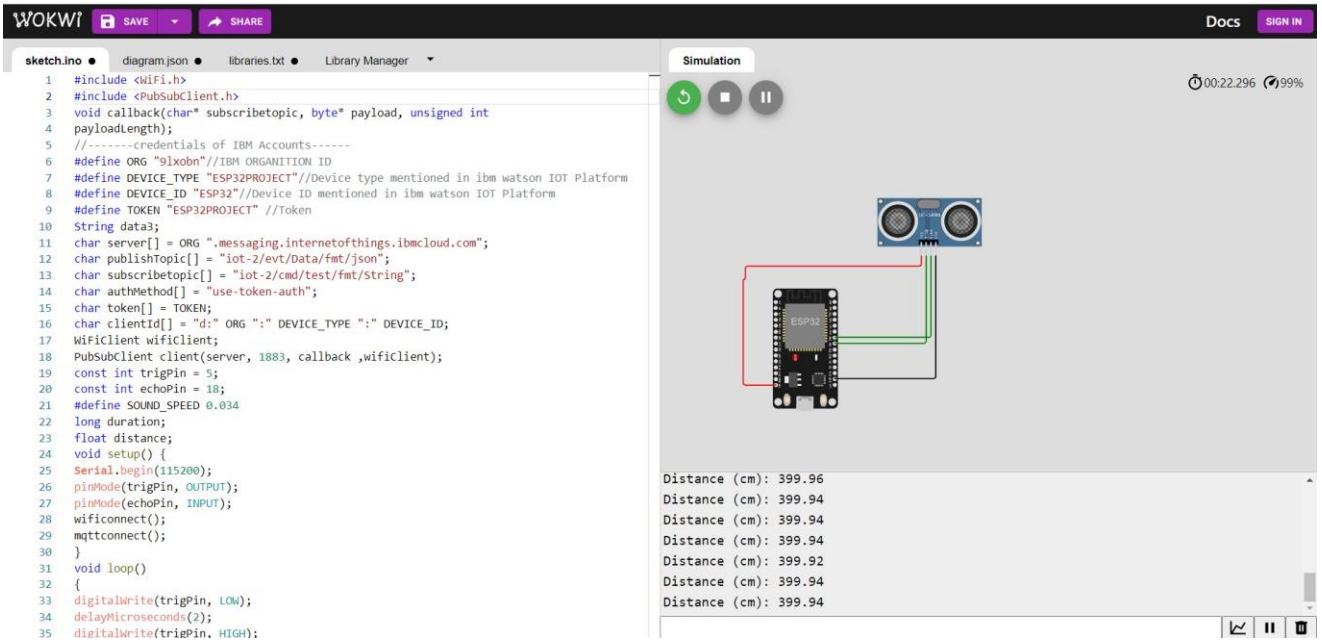
```
#include <WiFi.h>
#include <WiFiClient.h>
#include <PubSubClient.h>
const int trigPin = 5;
const int echoPin = 18;
//define sound speed in cm/uS
#define  SOUND_SPEED  0.034
#define CM_TO_INCH 0.393701
long duration;
float distanceCm;
float distanceInch;

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
  //-------credentials of IBM Accounts------

#define ORG “b31tni”//IBM ORGANITION ID
#define DEVICE_TYPE "Assignment4"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "assignment"//Device ID mentioned in ibm watson IOT
Platform#define TOKEN "6r?TKCIuy+okJ?9B+7" //Token
String data3;



//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event
perform and format in which data to be send
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd REPRESENT command
type AND COMMAND IS TEST OF FORMAT 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, callback ,wifiClient);
void setup() {
```

```
  Serial.begin(115200); // Starts the serial communication
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
  pinMode(echoPin, INPUT); // Sets the echoPin as an Input
  Serial.println();
  wificonnect();
  mqttconnect();

}

void loop() {
  //   Clears   the   trigPin
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  // Sets the trigPin on HIGH state for 10 micro seconds
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);

  // Reads the echoPin, returns the sound wave travel time in microseconds
  duration = pulseIn(echoPin, HIGH);

  // Calculate the distance
  distanceCm = duration * SOUND_SPEED/2;
  // Convert to inches
  distanceInch = distanceCm * CM_TO_INCH;

  // Prints the distance in the Serial Monitor
  Serial.print("Distance (cm): ");
  Serial.println(distanceCm);
  Serial.print("Distance (inch): ");
  Serial.println(distanceInch);

  PublishData(distanceCm);
  delay(1000); if
  (!client.loop()) {
    mqttconnect();
  }
}
void PublishData(float Cm) {
  mqttconnect();//function
  call for connecting to ibm
  /* creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"Distance (cm)\":";
  payload += Cm; payload += "}";



  Serial.print("Sending payload: ");
```

```
  Serial.println(payload);

if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud
 then it will print publish ok in Serial monitor or else it will print publish
 failed
  } 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() //function defination for wificonnect
 {
  Serial.println();
  Serial.print("Connecting to ");

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

Wokwi Simulation:



IoT Watson Platform: