

Assignment -4

Question-1:

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

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

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

#define ORG "f59trs" //IBM ORGANITION ID
#define DEVICE_TYPE "ultrasonicsensor" //Device type mentioned in ibm watson
IOT Platform
#define DEVICE_ID "distancedetection" //Device ID mentioned in ibm watson
IOT Platform
#define TOKEN "AIGMGaaF01nawa1QA3" //Token
String data3;
float dist;

//----- 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 performed
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; //clientid

// -
WiFiClient wifiClient; // creating the instance for wifi client
PubSubClient client(server, 1883, callback, wifiClient);
//calling the predefined client id by passing parameter like server id, port and
wificredential

int LED = 4; int
trig = 5; int echo =
18; void setup()
{
  Serial.begin(115200);
  pinMode(trig, OUTPUT);
  pinMode(echo, INPUT);
  pinMode(LED, OUTPUT);
  delay(10); wificonnect();
  mqttconnect();
}
```

```

void loop()// Recursive Function
{

digitalWrite(trig,LOW);
digitalWrite(trig,HIGH);
delayMicroseconds(10);
digitalWrite(trig,LOW);
float dur = pulseIn(echo,HIGH);float dist
= (dur * 0.0343)/2; Serial print
("Distancein cm");Serial println(dist);


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 in form JSon to update the data toibm
cloud */
String object;
if (dist <100)
{
    digitalWrite(LED,HIGH);
    Serial println("object is near");object =
    "Near";
}
else
{
    digitalWrite(LED,LOW); Serial println("no
object found");object = "No";
}

String payload = "{\"distance\":";payload +=
dist;
payload += ", \"object\":\":";payload +=
object;
payload += "\"}";

Serial print("Sending payload: ");
Serial println(payload);

```

```

        if (client.publish(publishTopic, (char*) payload.c_str())) {
            Serial.println("Publish ok");// if it sucessfully upload dataon 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 credentialsto 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
    intpayloadLength) {

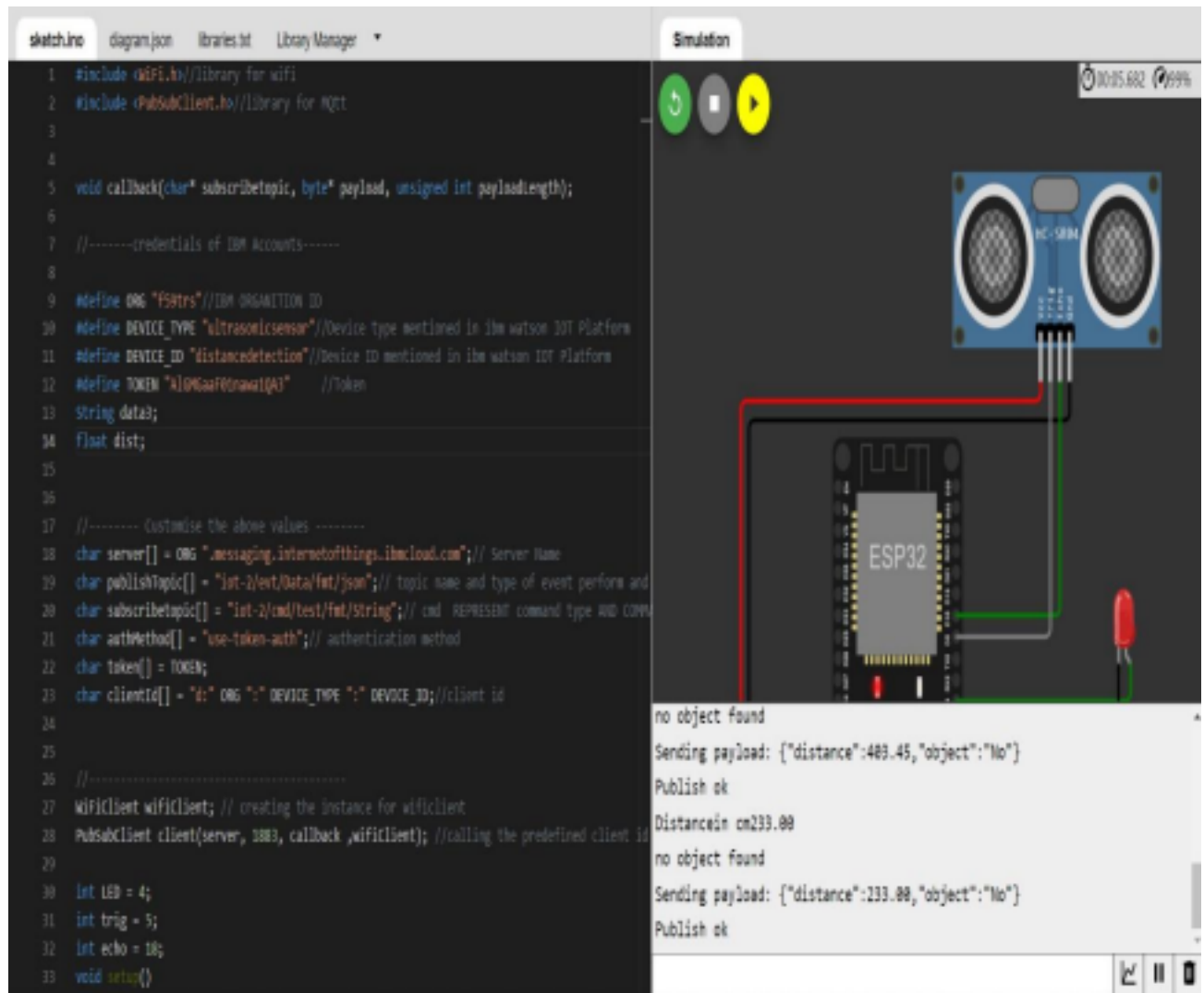
        Serial.print("callback invoked for topic: ");
        Serial.println(subscribetopic);
        for (int i = 0; i < payloadLength; i++) {

```

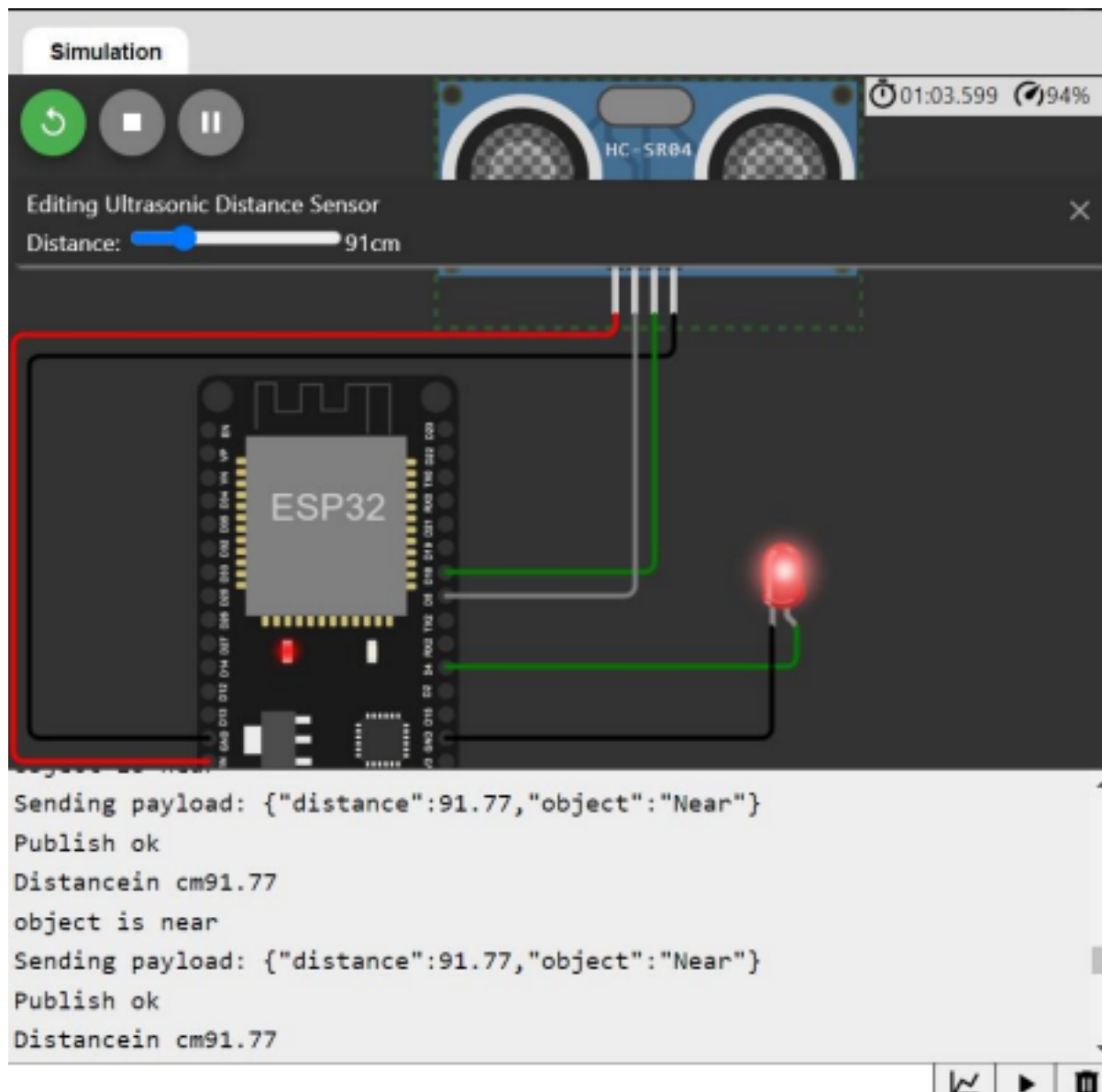
```
        //Serial.print((char)payload[i]);data3 +=  
        (char)payload[i];  
    }  
  
    // Serial.println("data: " + data3);  
    // if(data3=="Near")  
    // {  
    // Serial.println(data3);  
    // digitalWrite(LED,HIGH);  
  
    // }  
  
    // else  
    // {  
    // Serial.println(data3);  
    // digitalWrite(LED,LOW);  
  
    // }  
    data3="";  
}
```

OUTPUT:

When object is not near to the ultrasonic sensor



Data sent to the IBM cloud device when the object is far



Data sent to the IBM cloud device when the object is near

