Assignment -4

Distance Detection Using Ultrasonic Sensor

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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.

WOKWI LINK: https://wokwi.com/projects/346502216516895315

CODE:

```
#include <WiFi.h>//library for wifi #include
<PubSubClient.h>//library for MQtt


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

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

#define ORG "f59trs"//IBM ORGANITION ID
#define DEVICE_TYPE "ultrasonicsensor"//Device type mentioned inibm watson IOT
Platform
#define DEVICE_ID "distancedetection"//Device ID mentioned in ibmwatson IOT
Platform
#define TOKEN "AlGMGaaF01nawa1QA3"            //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 andtype 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 methodchar token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//clientid


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

```
PubSubClient client(server, 1883, callback ,wifiClient);
//calling the predefined client id by passing parameter likeserver id,portand
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;
```

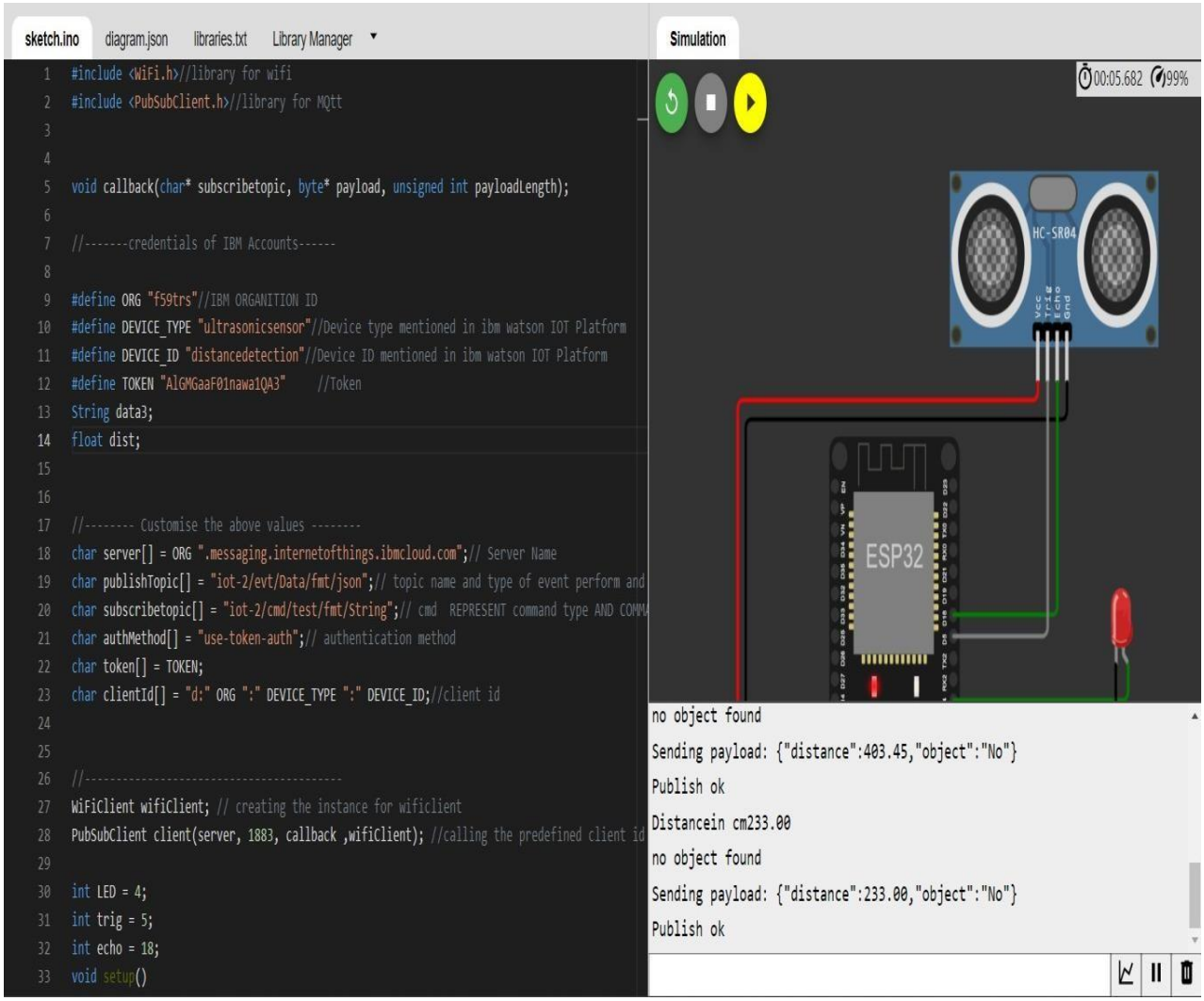
```
    if (dist <100)
    {
        digitalWrite(LED,HIGH);
        Serial.println("object is near");object =
        "Near";
    }
    else
    {
        digitalWrite(LED,LOW); Serial.println("no
        object found");object = "No";
    }

    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);
```

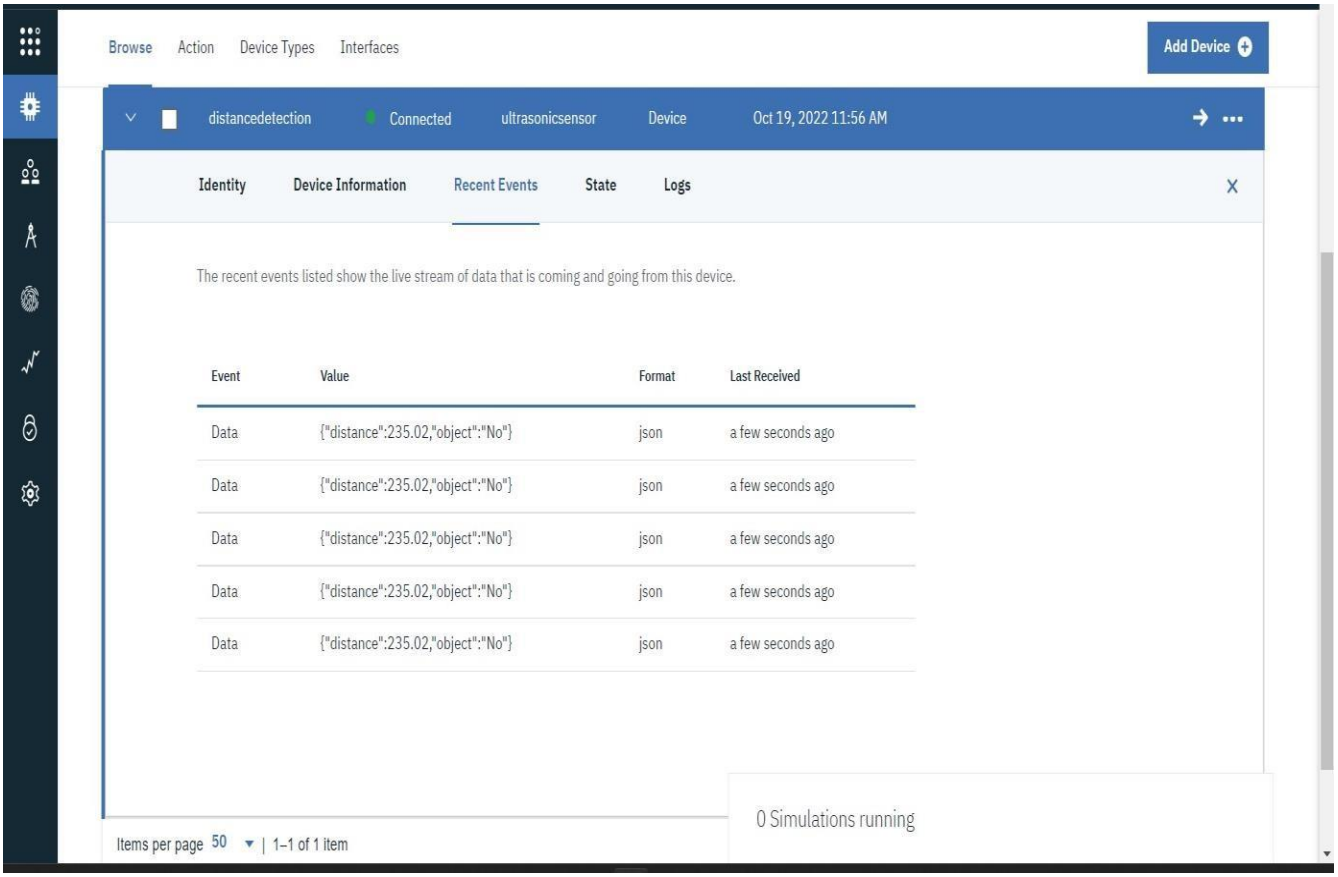
```
// digitalWrite(LED,LOW);

//    }
data3="";


}
```

OUTPUT:

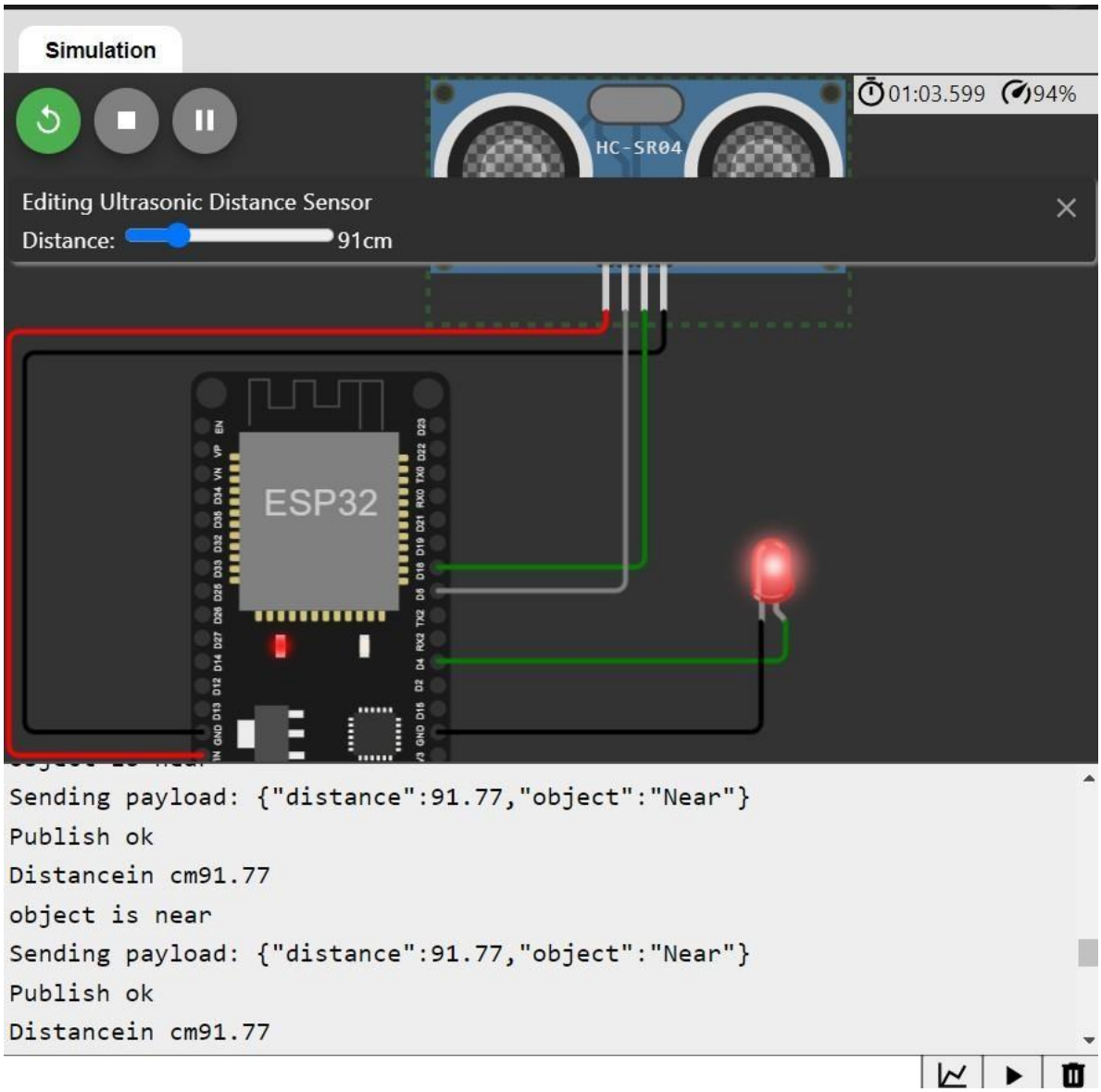
When object is not near to the ultrasonic sensor



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



When object is nearer to the ultrasonic sensor



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