Problem statement :

IoT Gas leakage monitoring and alerting system.

Domain : Internet of Things

Assignment 4: Distance detection using ultrasonic sensor

By,
SARANYA. M – 623519106035
SRIPRIYA. S – 623519106042
SOUNDARYA .P – 623519106037
SANTHOSH .S – 623519106033

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;
```

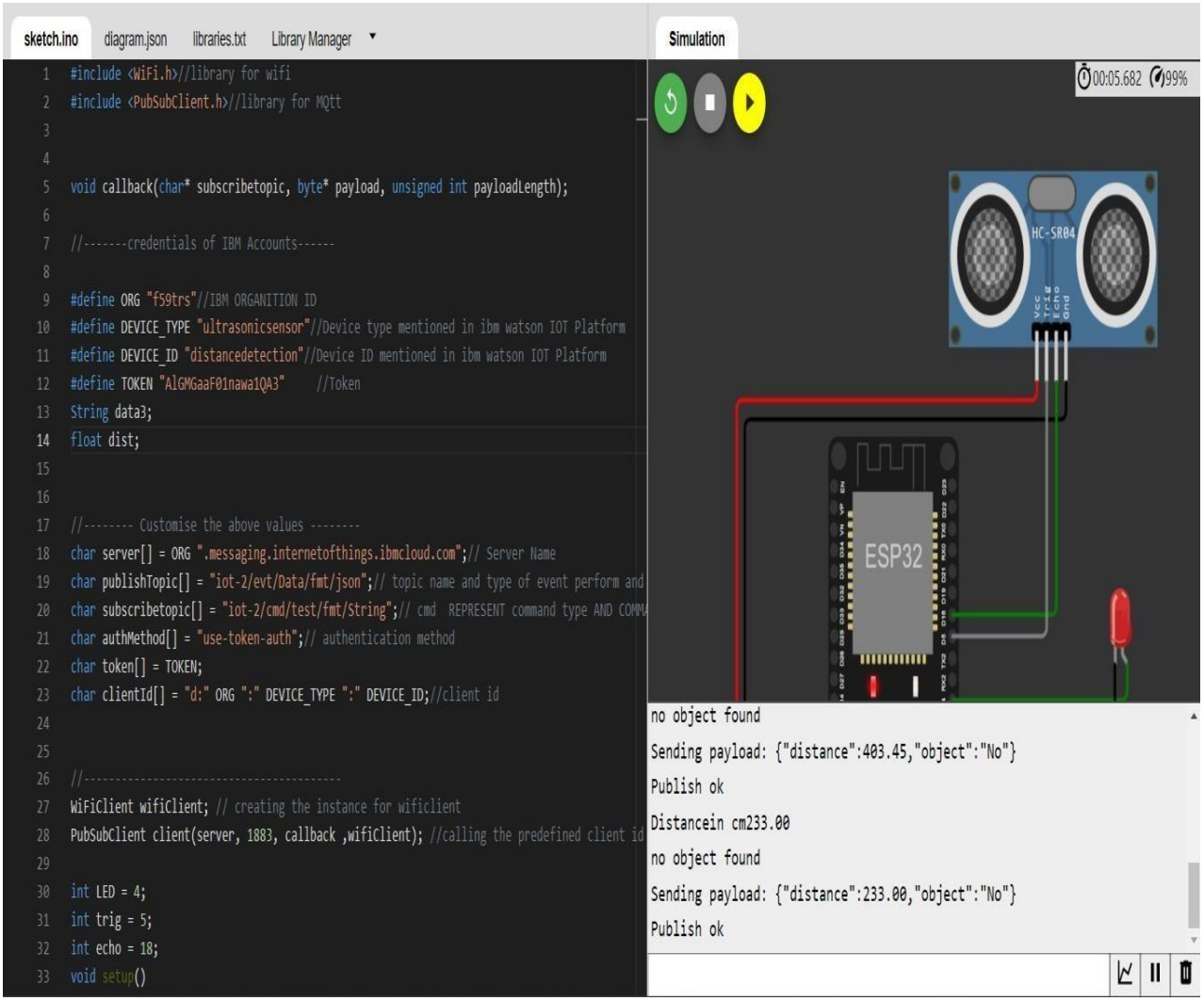
```
  if (dist <100)
  { digitalWrite(LED,HIGH);
    Serial.println("object is near");object =
    "Near";
  } else
  { digitalWrite(LED,LOW); Serial.println("no
    object found");object = "No";
  }

  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="";
```

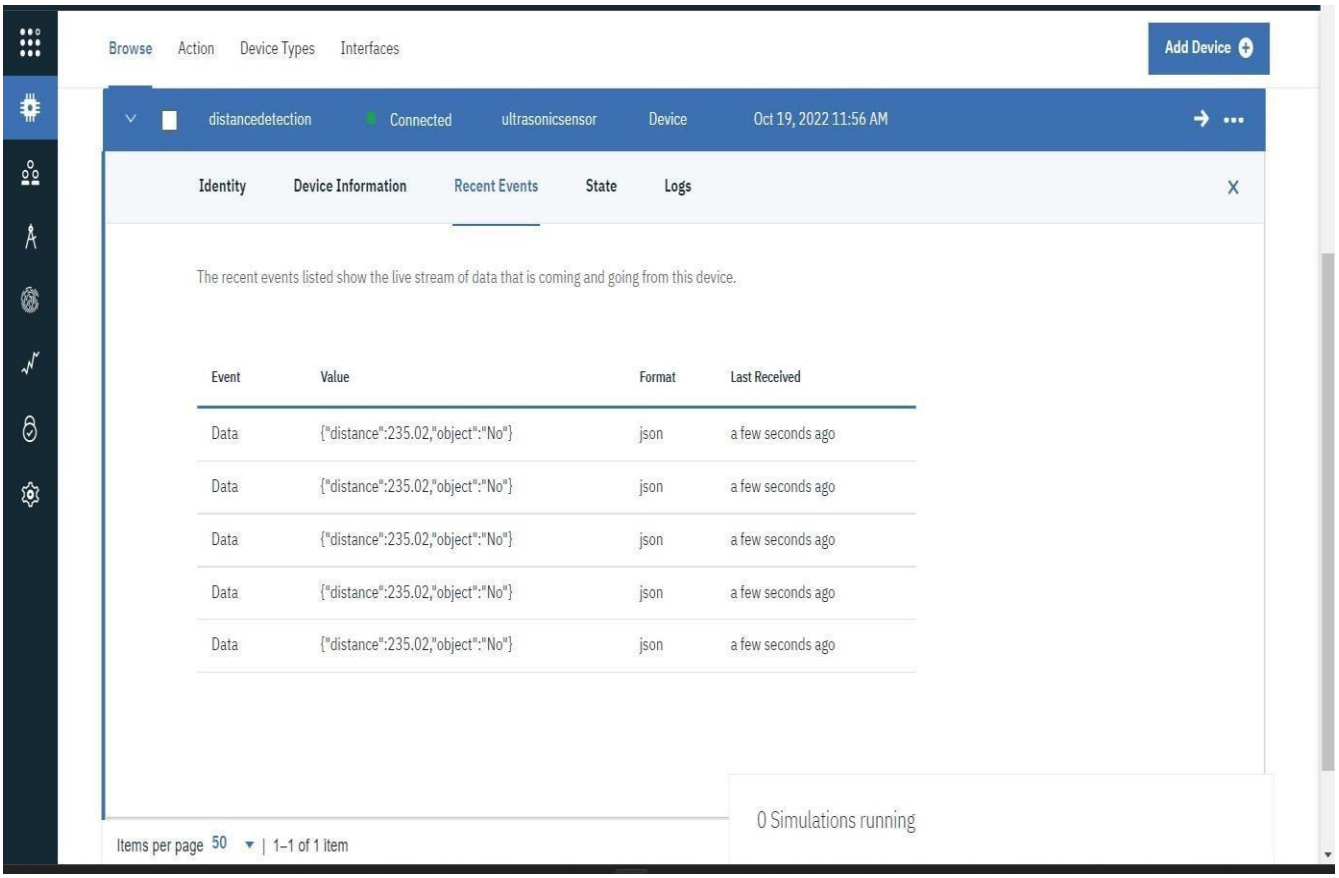
```
}
```

OUTPUT:

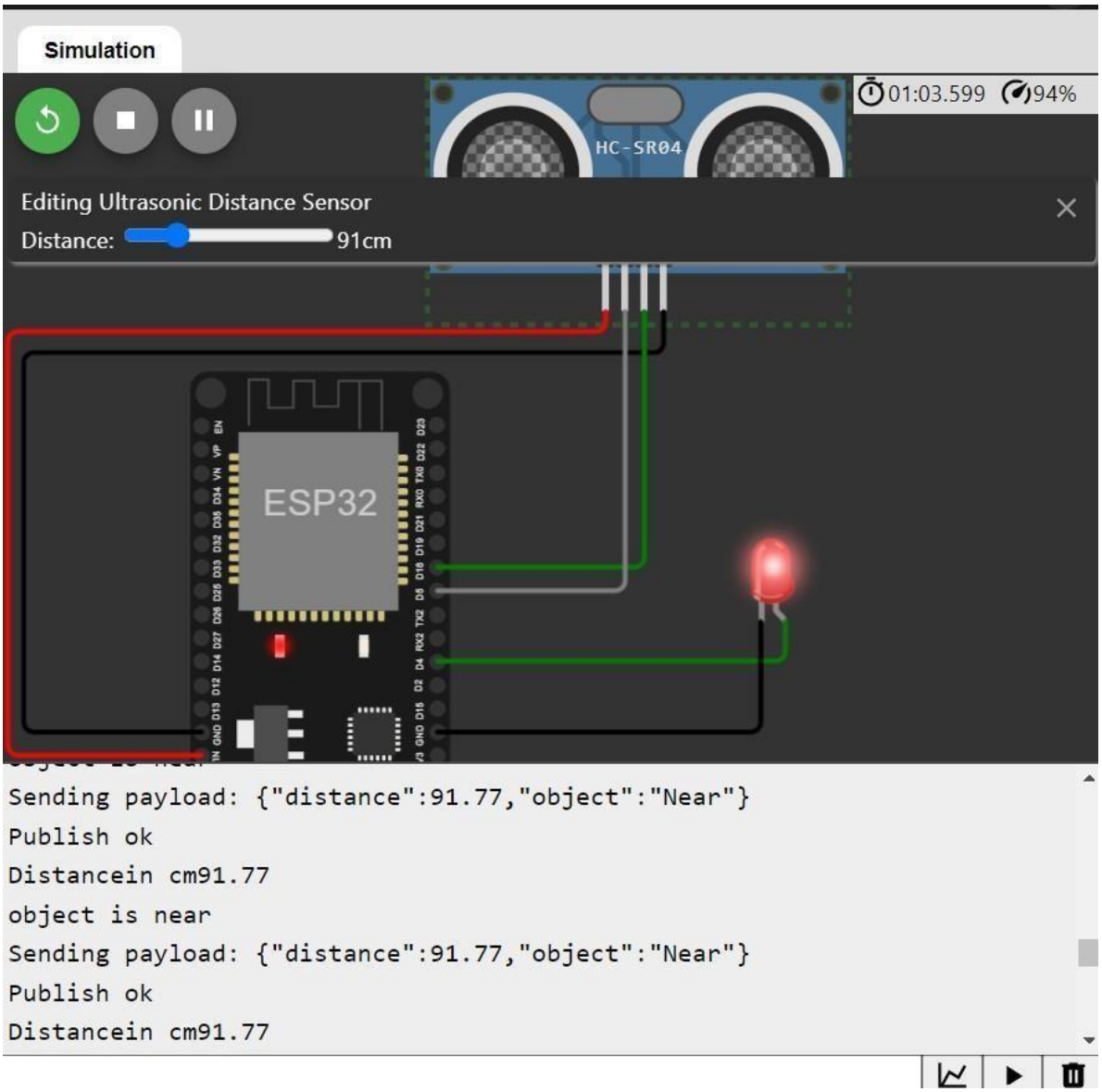
When object is not near to the ultrasonic sensor



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