Assignment -4

ESP32 to IBM IoT Watson platform

Assignment Date	04 November 2022
Student Name	Mr. Ranga krishna prasadh H
Student Roll Number	CITC1904106
Maximum Marks	2 Marks

Question:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cm send an "alert" to the IBM cloud and display in the device recent events. Upload document with wokwi share link and images of IBM cloud.

Solution:

Wokwi – ESP32 Code

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

float distance;
#define sound_speed 0.034
int trigpin=18;
int echopin=19;
int led=5;
int LED=9;
long duration;
String message;

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

//******IBM Account*******

#define ORG "94ab7c"//IBM ORGANITION ID
#define DEVICE_TYPE "esp32_node"//Device type in ibm watson IOT Platform
#define DEVICE_ID "Rk44"//Device ID in ibm watson IOT Platform
#define TOKEN "0N5KL!bS)bfY5VhsEH"
String data3;
float h, t;

//***** Formatting the 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/command/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); //calling the
predefined client id by passing parameter like server id,portand
wificredential

void setup()
{
  Serial.begin(115200);
  pinMode(trigpin,OUTPUT);
  pinMode(echopin,INPUT);
  pinMode(led,OUTPUT);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
}

void loop()
{

digitalWrite(trigpin,LOW);
digitalWrite(trigpin,HIGH);
delay(1000);
digitalWrite(trigpin,LOW);
duration=pulseIn(echopin,HIGH);
distance=duration*sound_speed/2;
Serial.println("distance"+String(distance)+"cm");
 if(distance<100)
 {
   message="Alert";
   digitalWrite(led,HIGH);
   } else
{
  message="Normal";
  digitalWrite(led,LOW);
  }
  delay(1000);
  PublishData(distance,message);
}

//*****Publish******
```

```
void PublishData(float d, String a)
{
  mqttconnect();

  //creating the String in in form JSon to update the data to ibm cloud

  DynamicJsonDocument doc(1024);
  String payload;
  doc["Distance:"]=d;
  doc["message:"]=a;
  serializeJson(doc, payload);
  Serial.print("Sending payload: ");
  Serial.println(payload);

  if (client.publish(publishTopic,(char*)  payload.c_str()))
  {
    Serial.println("Publish ok");// if upload sucessful
  }
  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 ");
```

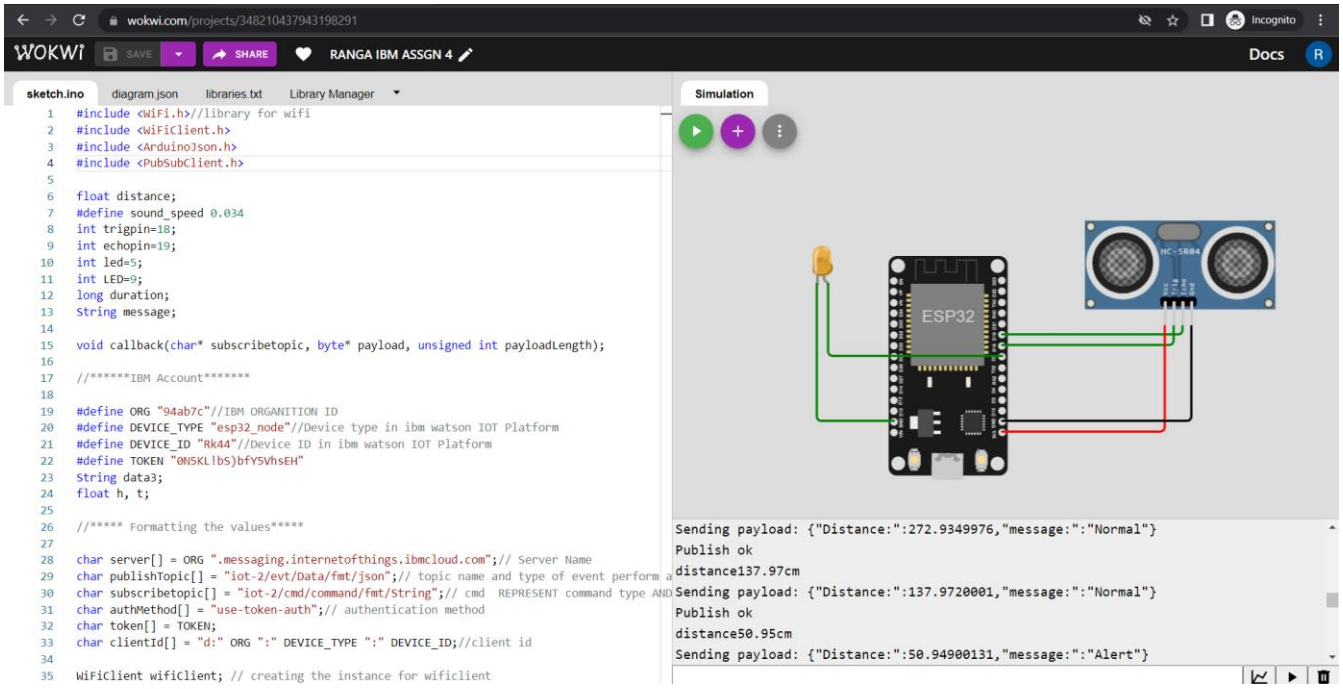
```
  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish
the connection
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}

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];
  }
  Serial.println("data: "+ data3);
  if(data3=="lighton")
  {
     Serial.println(data3);
    digitalWrite(LED,HIGH);
  }
  else
  {
    Serial.println(data3);
    digitalWrite(LED,LOW);
  }
data3="";
}
```

Wokwi Circuit:

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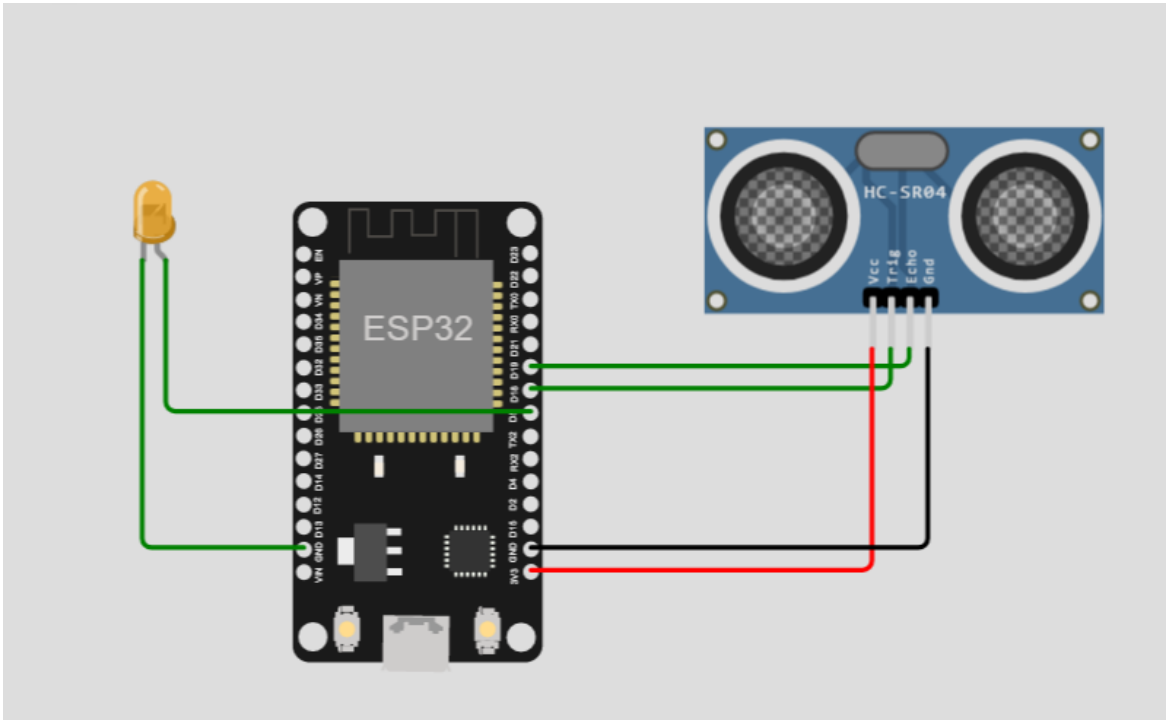
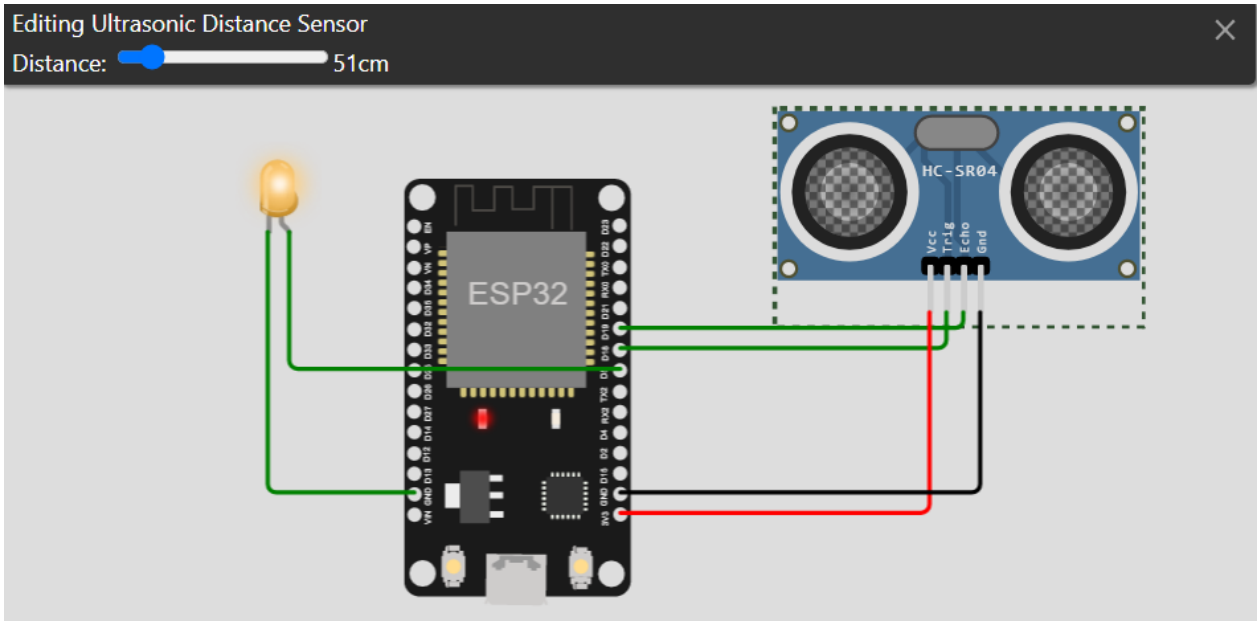
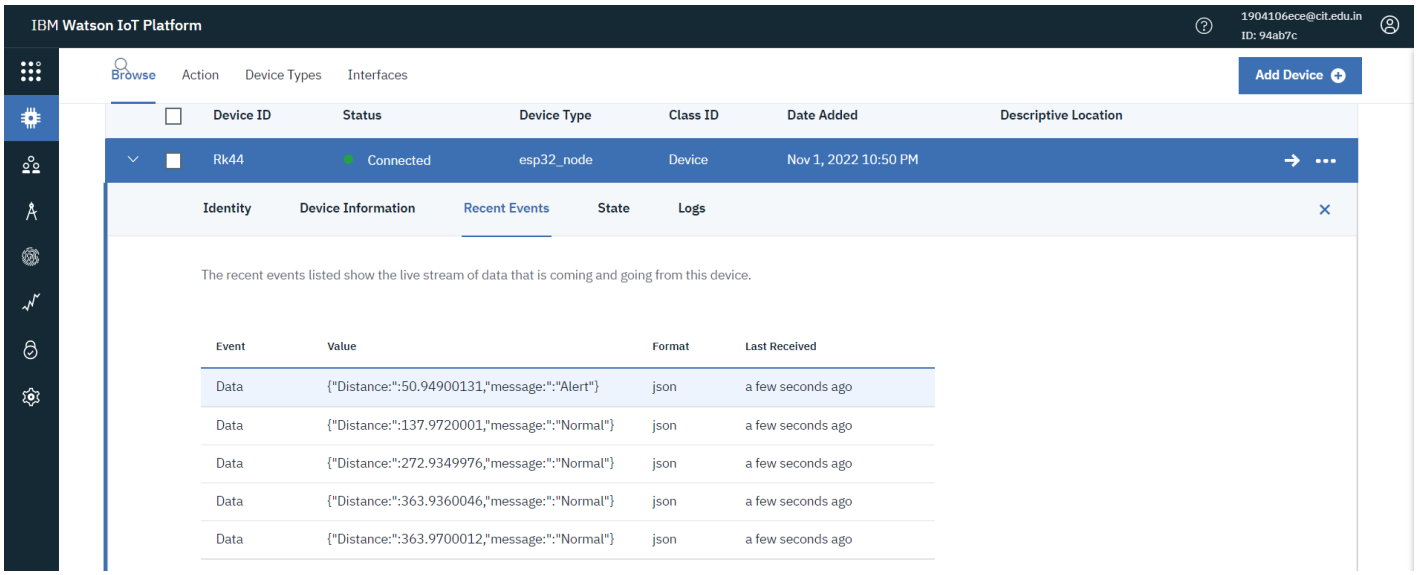


SIMULATION:

```
Connecting to ...
WiFi connected
IP address:
10.10.0.2
Reconnecting client to 94ab7c.messaging.internetofthings.ibmcloud.com
iot-2/cmd/command/fmt/String
subscribe to cmd OK

distance143.97cm
Sending payload: {"Distance:":143.9730072,"message:":"Normal"}
Publish ok
distance143.97cm
Sending payload: {"Distance:":143.9730072,"message:":"Normal"}
Publish ok
distance250.94cm
Sending payload: {"Distance:":250.9369965,"message:":"Normal"}
Publish ok
distance332.93cm
Sending payload: {"Distance:":332.928009,"message:":"Normal"}
Publish ok
distance185.98cm
Sending payload: {"Distance:":185.9799957,"message:":"Normal"}
Publish ok
Sending payload: {"Distance:":50.94900131,"message:":"Alert"}
Publish ok
distance50.95cm
Sending payload: {"Distance:":50.94900131,"message:":"Alert"}
Publish ok
```



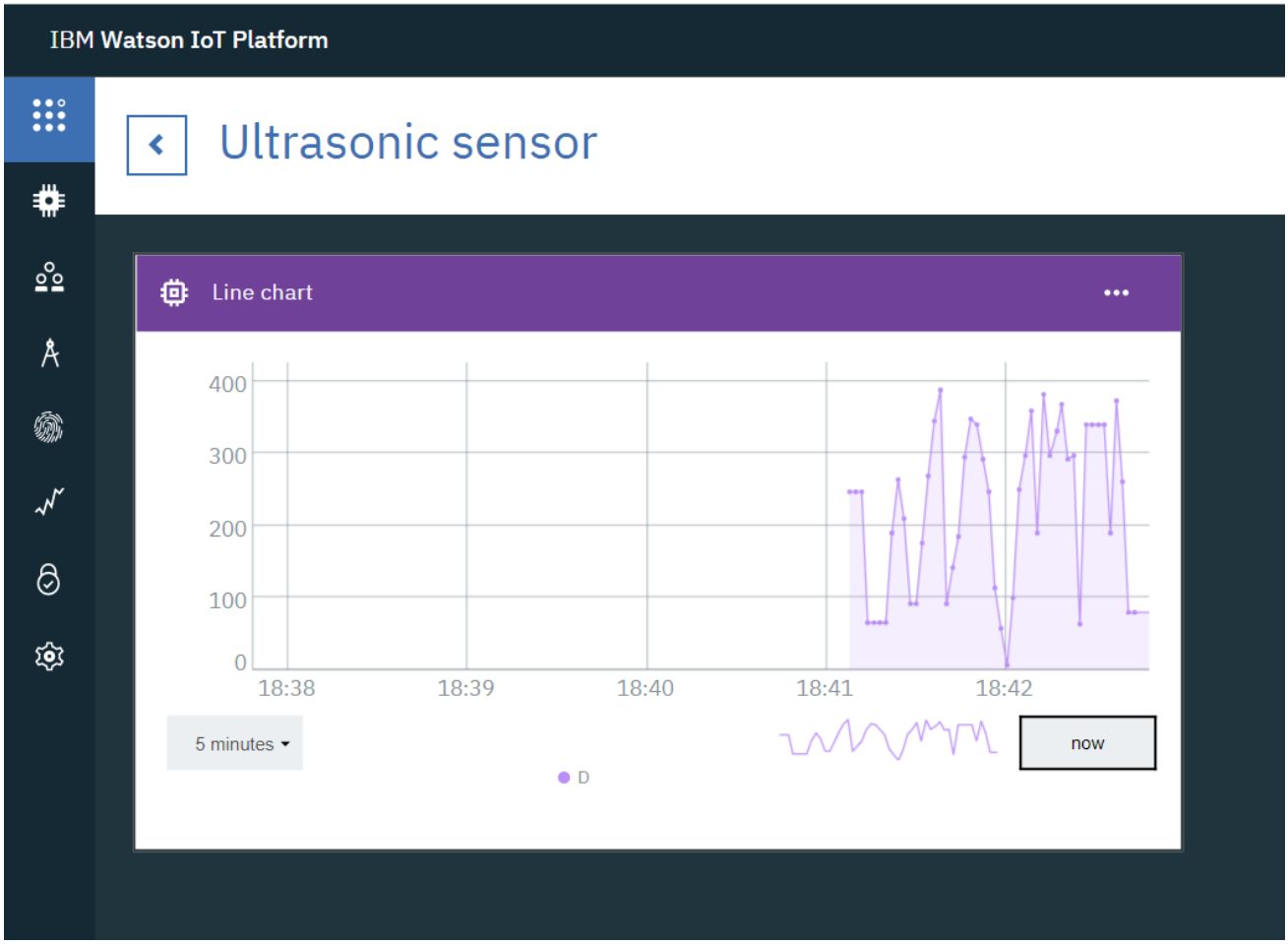


Event Payload

Event Name Data

Time Received Nov 13, 2022 5:10 PM

```
{
  "Distance:": 25.97599983,
  "message:": "Alert"
}
```



WOKWI URL: https://wokwi.com/projects/348210437943198291