Assignment -4

ESP32 Programming

Assignment Date	1 November 2022
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Maximum Marks	2 Marks

Assignment 4:

Write code and connections in wokwi for the ultrasonic sensor.

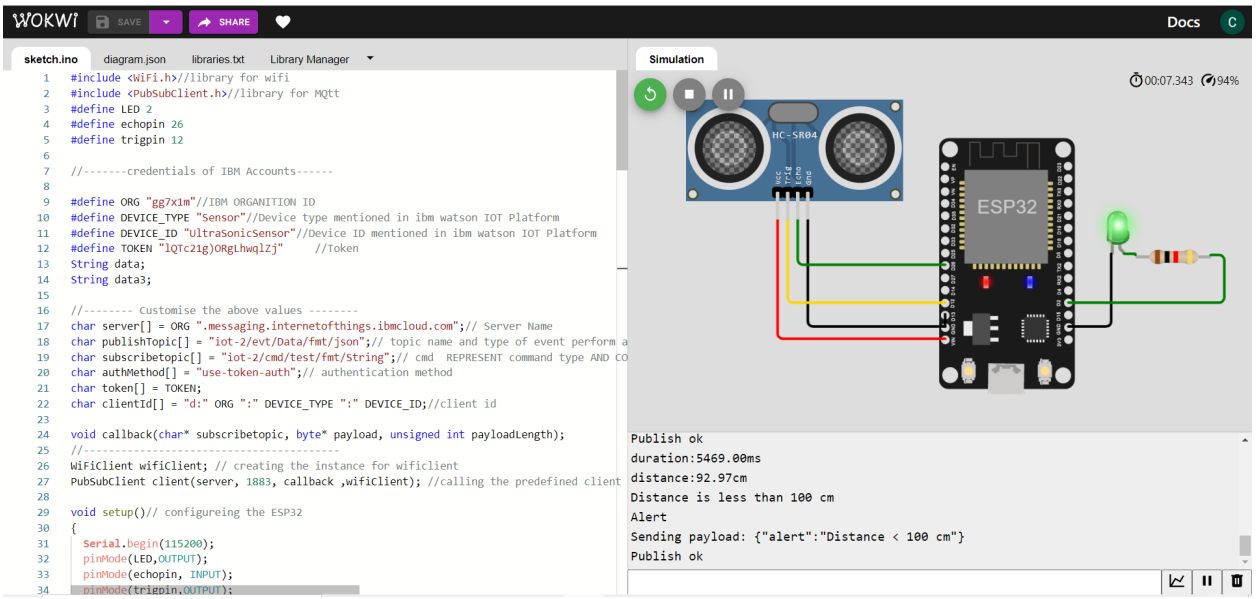
Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

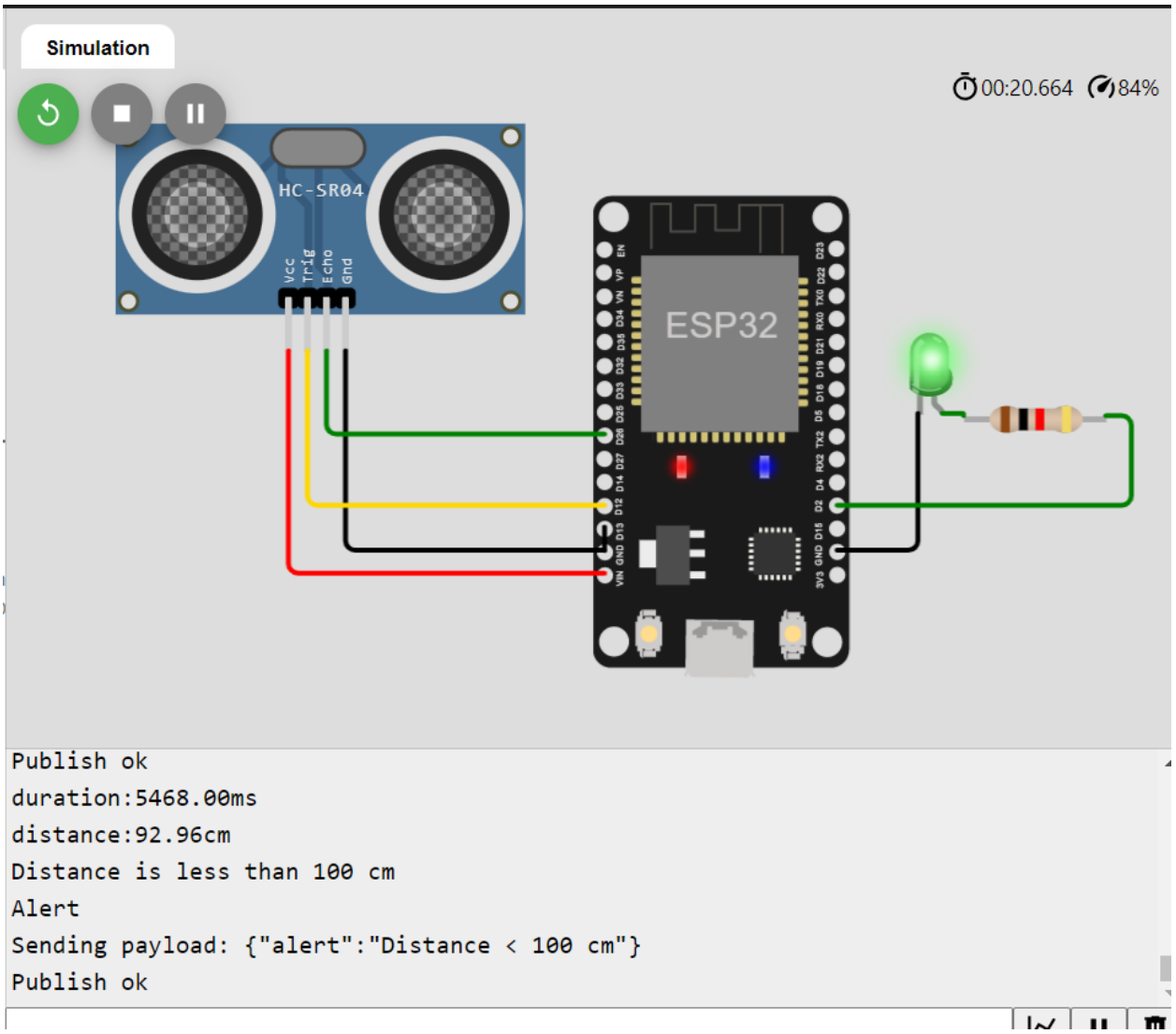
Upload document with wokwi share link and images of IBM cloud

My Completed Assignment Wokwi share link:

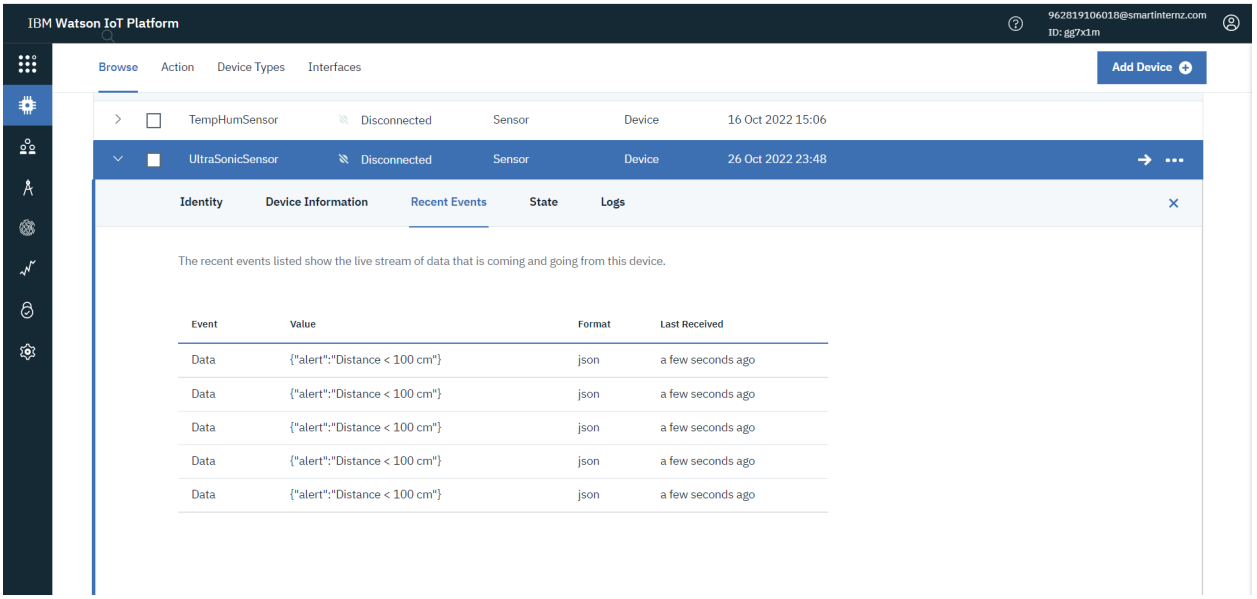
https://wokwi.com/projects/346605259691393619

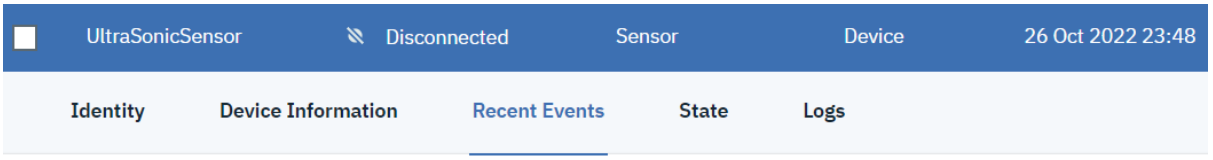
Circuit Diagram:




Simulation
00:20.664
84%
HC-SR04
Vcc
Trig
Echo
Gnd
ESP32
Publish ok
duration:5468.00ms
distance:92.96cm
Distance is less than 100 cm
Alert
Sending payload: {"alert":"Distance < 100 cm"}
Publish ok

Images of IBM cloud:





The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"alert":"Distance < 100 cm"}	json	a few seconds ago
Data	{"alert":"Distance < 100 cm"}	json	a few seconds ago
Data	{"alert":"Distance < 100 cm"}	json	a few seconds ago
Data	{"alert":"Distance < 100 cm"}	json	a few seconds ago
Data	{"alert":"Distance < 100 cm"}	json	a few seconds ago

Code:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#define LED 2
#define echopin 26
#define trigpin 12

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

#define ORG "gg7x1m"//IBM ORGANIZATION ID
#define DEVICE_TYPE "Sensor"//Device type mentioned in ibm
watson IOT Platform
#define DEVICE_ID "UltraSonicSensor"//Device ID mentioned in
ibm watson IOT Platform
#define TOKEN "lQTc21g)ORgLhwqlZj"      //Token
String data;
String data3;

//-------- Customize 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

void callback(char* subscribetopic, byte* payload, unsigned
int payloadLength);
//-------------------------------------
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()// configureing the ESP32
{
  Serial.begin(115200);
  pinMode(LED,OUTPUT);
  pinMode(echopin, INPUT);
  pinMode(trigpin,OUTPUT);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
}

void loop()// Recursive Function
{
  digitalWrite(trigpin,LOW);
  delayMicroseconds(10);
  digitalWrite(trigpin,HIGH);
  delayMicroseconds(10);
  digitalWrite(trigpin,LOW);
  double duration=pulseIn(echopin,HIGH);
  Serial.print("duration:");
  Serial.print(duration);
  Serial.println("ms");
  double distance=(duration*0.034)/2;
  Serial.print("distance:");
  Serial.print(distance);
  Serial.println("cm");
  if(distance<100)
  {
    digitalWrite(LED,HIGH);
  }
  else
  {
    digitalWrite(LED,LOW);
```

```
  }


  if (distance<100)
  {
    Serial.println("Distance is less than 100 cm");
    Serial.println("Alert");
    data="Distance < 100 cm";
    PublishData(data);
    delay(1000);
    if (!client.loop()) {
      mqttconnect();
  }
  }
}

/*.....................................retrieving to
Cloud.............................*/

void PublishData(String data) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to
ibm cloud
  */
  String payload = "{\"alert\":";
  payload +="\"";
  payload += data;
  payload +="\"";
  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);
    }


     Serial.println();
  }
}

void wificonnect() //function definition 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 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);
}
```