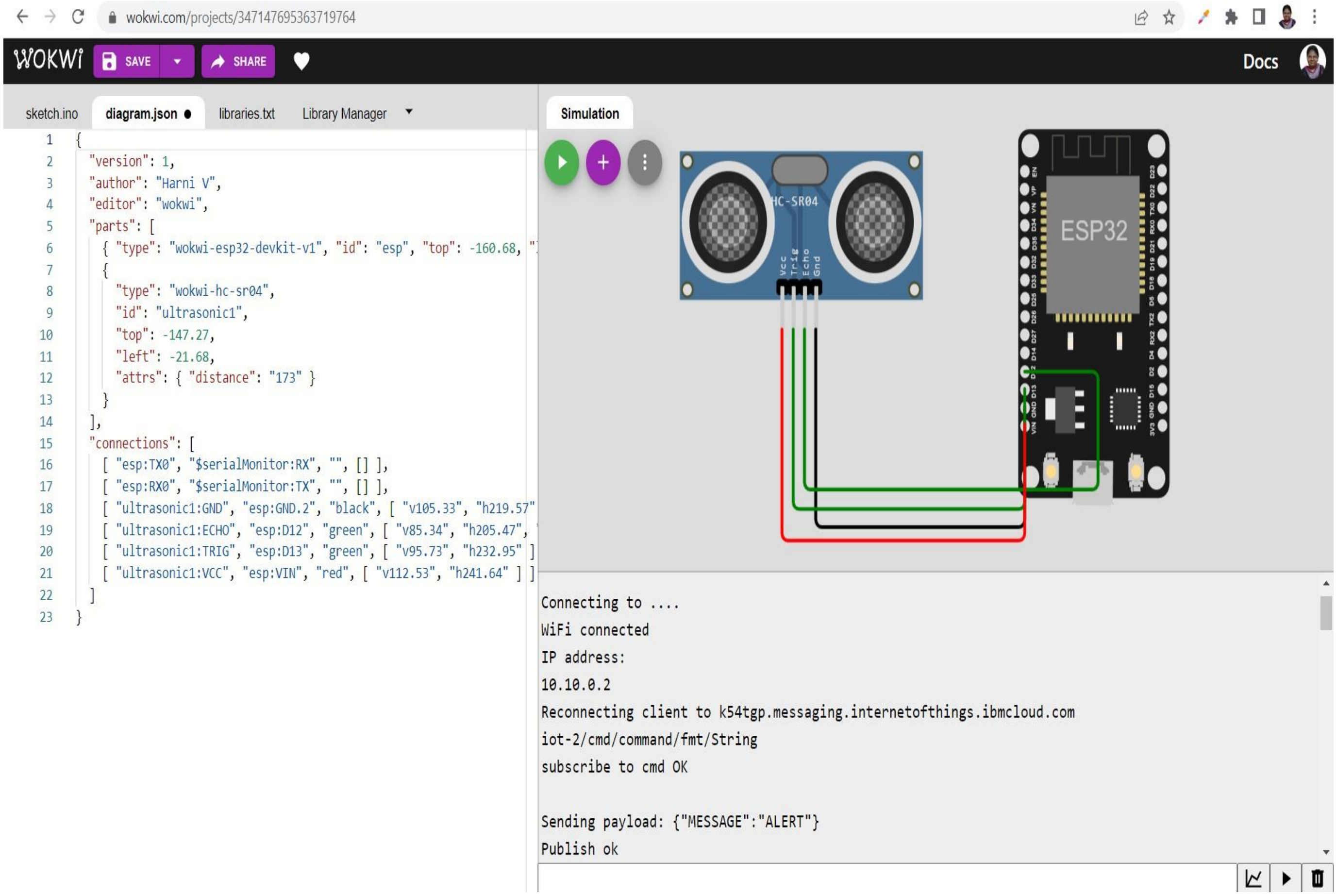
ASSIGNMENT - 4

Date	28 September 2022
Student Name	Fathima D
Student Roll Number	917719D022
Maximum Marks	2 marks

Question:
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.

Link: https://wokwi.com/projects/347147230691459666

Circuit Diagram:

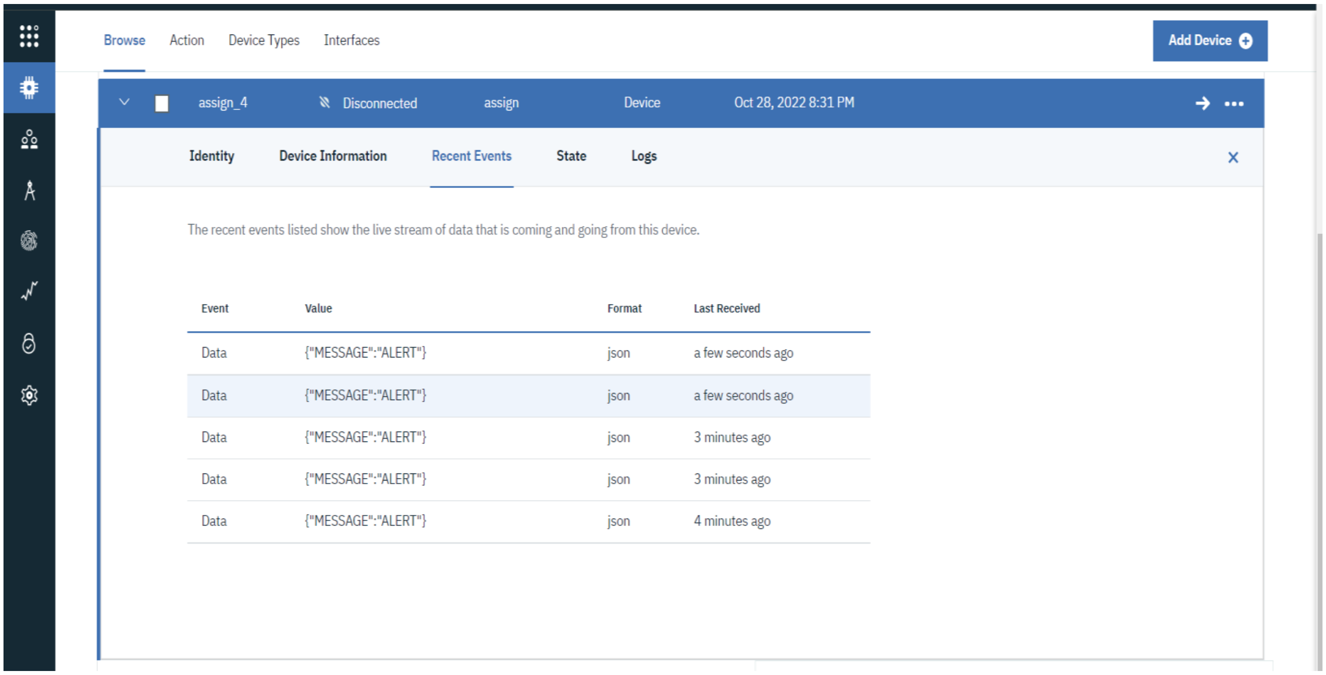


```
{
  "version": 1,
  "author": "Harni V",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -160.68, "
    {
      "type": "wokwi-hc-sr04",
      "id": "ultrasonic1",
      "top": -147.27,
      "left": -21.68,
      "attrs": { "distance": "173" }
    }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "ultrasonic1:GND", "esp:GND.2", "black", [ "v105.33", "h219.57"
    [ "ultrasonic1:ECHO", "esp:D12", "green", [ "v85.34", "h205.47",
    [ "ultrasonic1:TRIG", "esp:D13", "green", [ "v95.73", "h232.95" ]
    [ "ultrasonic1:VCC", "esp:VIN", "red", [ "v112.53", "h241.64" ] ]
  ]
}
```

```
Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to k54tgp.messaging.internetofthings.ibmcloud.com
iot-2/cmd/command/fmt/String
subscribe to cmd OK

Sending payload: {"MESSAGE":"ALERT"}
Publish ok
```

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#define TrigPIN 15
#define EchoPIN 4
#define MINDIST 100
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
//-------credentials of IBM Accounts------
#define ORG "k54tgp"//IBM ORGANITION ID
#define DEVICE_TYPE "4545"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "9999"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678"     //Token
String data3;
float h, t;
//-------- 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 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()// configureing the ESP32
{
  Serial.begin(115200);
  pinMode(TrigPIN, OUTPUT);
  digitalWrite(TrigPIN, LOW);
  pinMode(EchoPIN, INPUT);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
}

void loop()// Recursive Function
{
  unsigned long t1;
  unsigned long t2;
  unsigned long pulse_Width;
  float distance;

  digitalWrite(TrigPIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TrigPIN, LOW);
  pulse_Width = pulseIn(EchoPIN,HIGH);

  distance= pulse_Width *0.034 / 2;

  if(distance<100)
  {
    PublishData();
  }

  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}
/*...retrieving to Cloud...*/

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

     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)
{

}
```

OUTPUT:



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

Event	Value	Format	Last Received
Data	{"MESSAGE":"ALERT"}	json	a few seconds ago
Data	{"MESSAGE":"ALERT"}	json	a few seconds ago
Data	{"MESSAGE":"ALERT"}	json	3 minutes ago
Data	{"MESSAGE":"ALERT"}	json	3 minutes ago
Data	{"MESSAGE":"ALERT"}	json	4 minutes ago