Assignment 4: Ultra sonic sensor

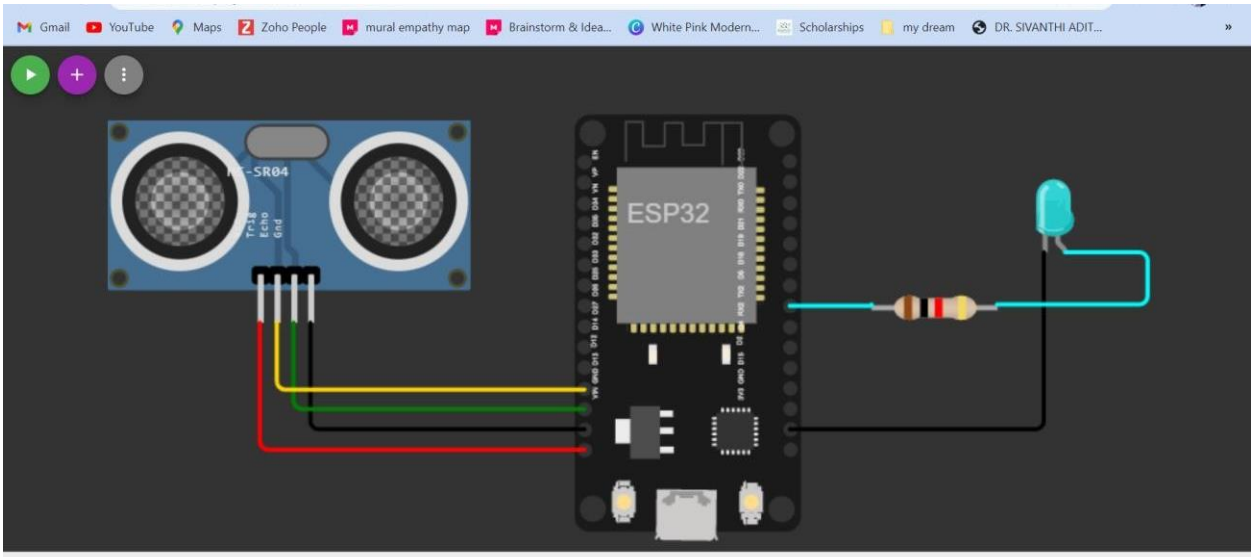
Program:

```
#include <WiFi.h>
#include <WiFiClient.h>
#include <PubSubClient.h>

const char* ssid = "Wokwi-GUEST";
const char* password = "";

#define ORG "4fvguz"
#define DEVICE_TYPE "ESP32"
#define DEVICE_ID "ultrasonic_sensor"
#define TOKEN "12345678"

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char pubTopic[] = "iot-2/evt/status1/fmt/json";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

WiFiClient wifiClient;
PubSubClient client(server, 1883, NULL, wifiClient);


#define ECHO_PIN 13
#define TRIG_PIN 12
#define LED_BUILTIN 5
#define DHT_PIN 15

void setup()
{
  Serial.begin(115200);
  pinMode(LED_BUILTIN, OUTPUT);
```

```
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);

  Serial.print("Connecting to ");
  Serial.print(ssid);
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED)
  {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");

  Serial.print("WiFi connected, IP address: ");
  Serial.println(WiFi.localIP());

  if (!client.connected())
  {
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while (!client.connect(clientId, authMethod, token))
    {
      Serial.print(".");
      delay(500);
    }
    Serial.println("Bluemix connected");
  }
}

float readDistanceCM() {
  digitalWrite(TRIG_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);
  int duration = pulseIn(ECHO_PIN, HIGH);
  return duration * 0.034 / 2;
}

void loop() {
  float distance = readDistanceCM();

  bool isNearby = distance < 100;
  digitalWrite(LED_BUILTIN, isNearby);
```

```
  Serial.print("Measured distance: ");
  Serial.println(readDistanceCM());

  if(distance<100)
  {
    String payload = "{\"d\":{\"Name\":\"" DEVICE_ID "\"";
    payload += ",\"Distance\":";
    payload += distance;
    payload += "}}";

    Serial.print("Sending value: ");
    Serial.println(payload);

    if (client.publish(pubTopic, (char*) payload.c_str()))
    {
      Serial.println("Publish Success");
    }
    else
    {
      Serial.println("Publish Failed");
    }

  }

  delay(100);
}
```

Connections:

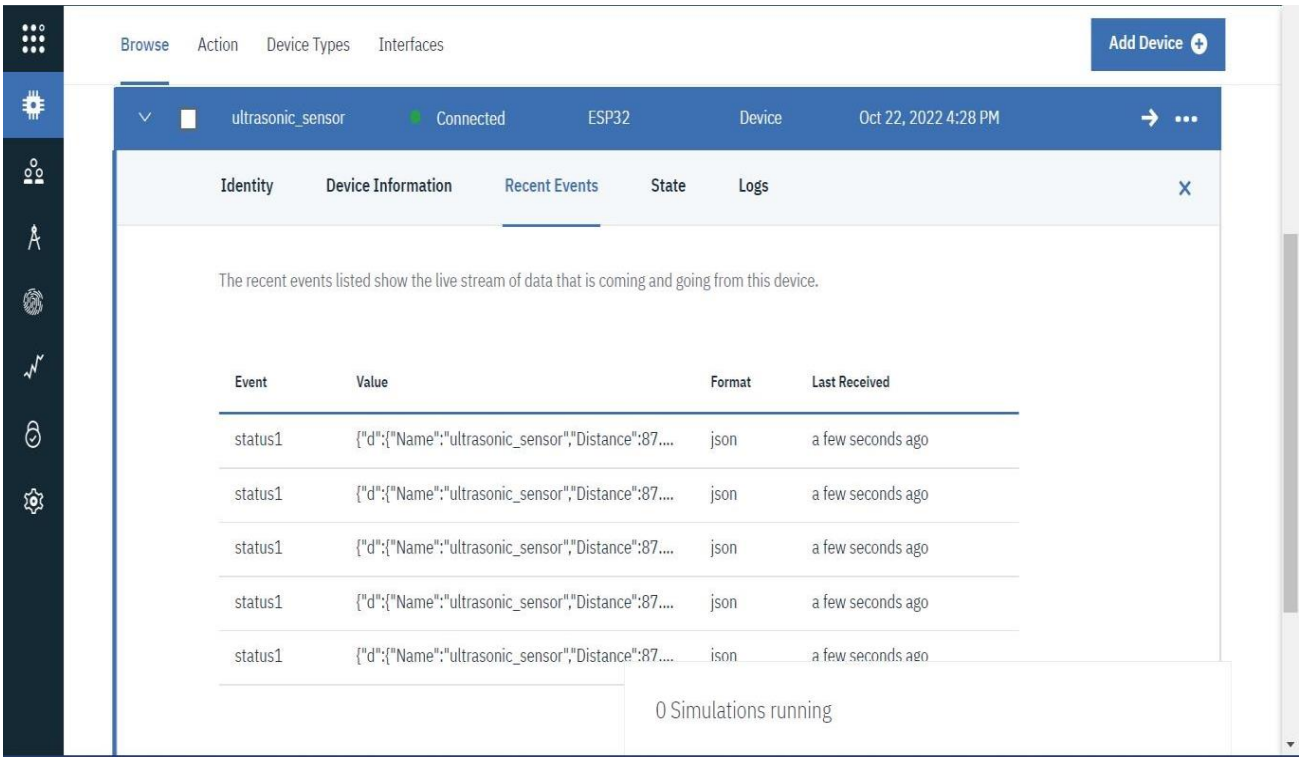


Output:

Simulation

```
Connecting to Wokwi-GUEST.....................
WiFi connected, IP address: 10.10.0.2
Reconnecting client to 4fvguz.messaging.internetofthings.ibmcloud.com
Bluemix connected
Measured distance: 88.03
Sending value: {"d":{"Name":"ultrasonic_sensor","Distance":87.99}}
Publish Success
Measured distance: 88.03
Sending value: {"d":{"Name":"ultrasonic_sensor","Distance":87.96}}
Publish Success
```

IBM Cloud:


Browse
Action
Device Types
Interfaces
Add Device
ultrasonic_sensor
Connected
ESP32
Device
Oct 22, 2022 4:28 PM
Identity
Device Information
Recent Events
State
Logs
The recent events listed show the live stream of data that is coming and going from this device.
Event
Value
Format
Last Received
status1
{"d":{"Name":"ultrasonic_sensor","Distance":87....
json
a few seconds ago
status1
{"d":{"Name":"ultrasonic_sensor","Distance":87....
json
a few seconds ago
status1
{"d":{"Name":"ultrasonic_sensor","Distance":87....
json
a few seconds ago
status1
{"d":{"Name":"ultrasonic_sensor","Distance":87....
json
a few seconds ago
status1
{"d":{"Name":"ultrasonic_sensor","Distance":87....
json
a few seconds ago
0 Simulations running