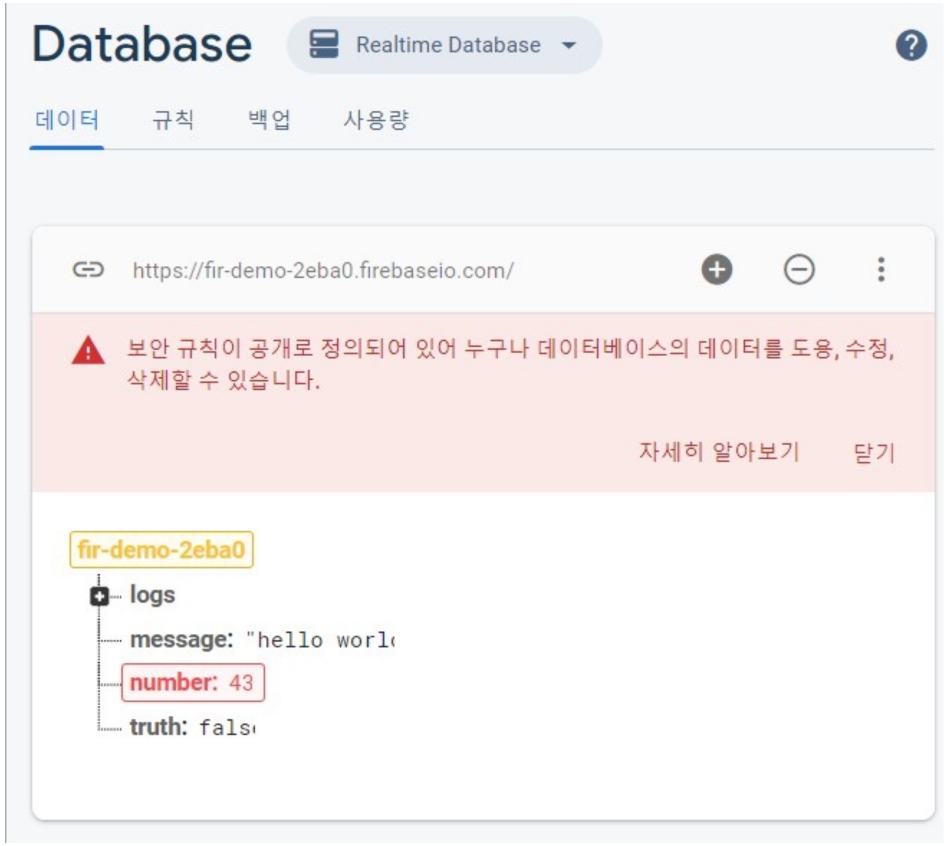
구글 Firebase, NodeMCU를 이용한 IoT 기반 온습도 모니터링

Week 10

Firebase-Ardunio API 살펴보기

- FirebaseDemo_ESP8266

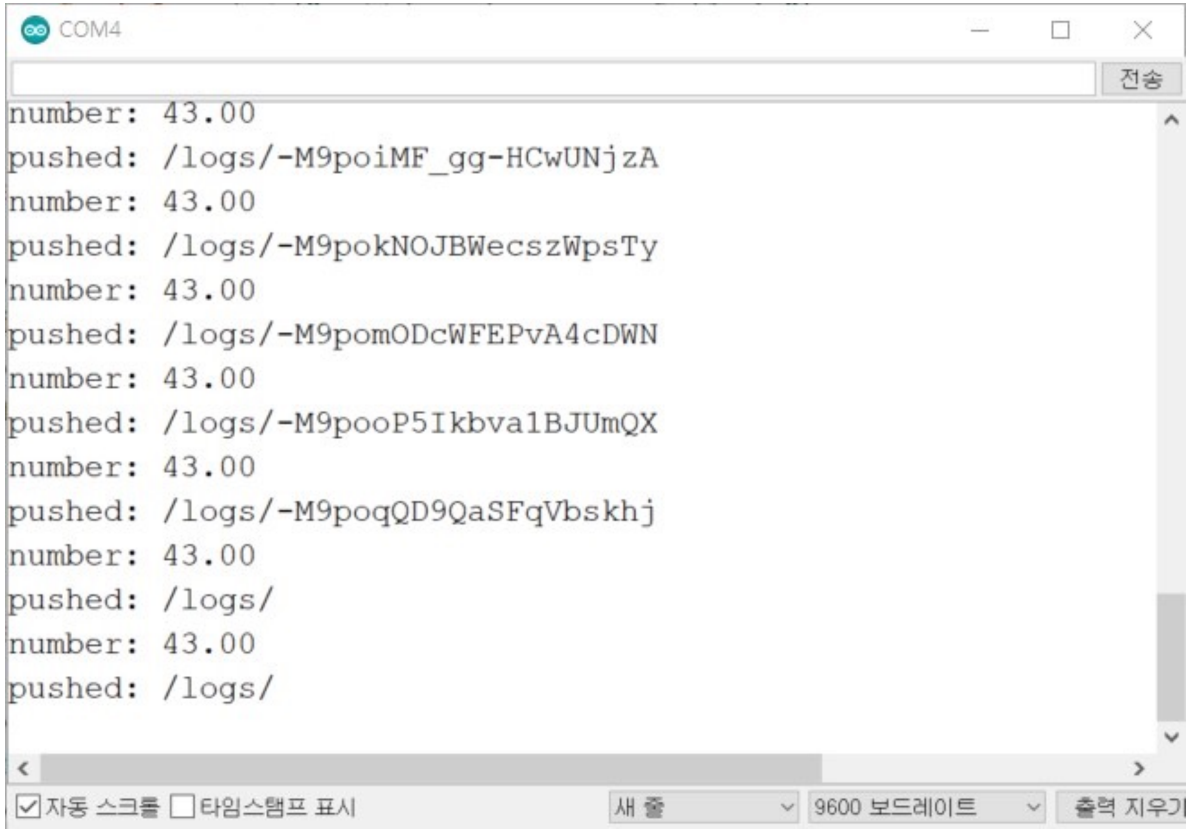
https://github.com/IoT-Lab-02/firebase-arduino/tree/master/examples/FirebaseDemo_ESP8266



https://fir-demo-2eba0.firebaseio.com/

보안 규칙이 공개로 정의되어 있어 누구나 데이터베이스의 데이터를 도용, 수정, 삭제할 수 있습니다.

fir-demo-2eba0
- logs
- message: "hello worl
- number: 43
- truth: fals



```
number: 43.00
pushed: /logs/-M9poiMF_gg-HCwUNjzA
number: 43.00
pushed: /logs/-M9pokNOJBWecszWpsTy
number: 43.00
pushed: /logs/-M9pomODcWFEPvA4cDWN
number: 43.00
pushed: /logs/-M9pooP5IkbvalBJUmQX
number: 43.00
pushed: /logs/-M9poqQD9QaSFqVbskhj
number: 43.00
pushed: /logs/
number: 43.00
pushed: /logs/
```

☑ 자동 스크롤 □ 타임스탬프 표시 새 줄 9600 보드레이트 출력 지우기

Firebase-Ardunio 라이브러리 API

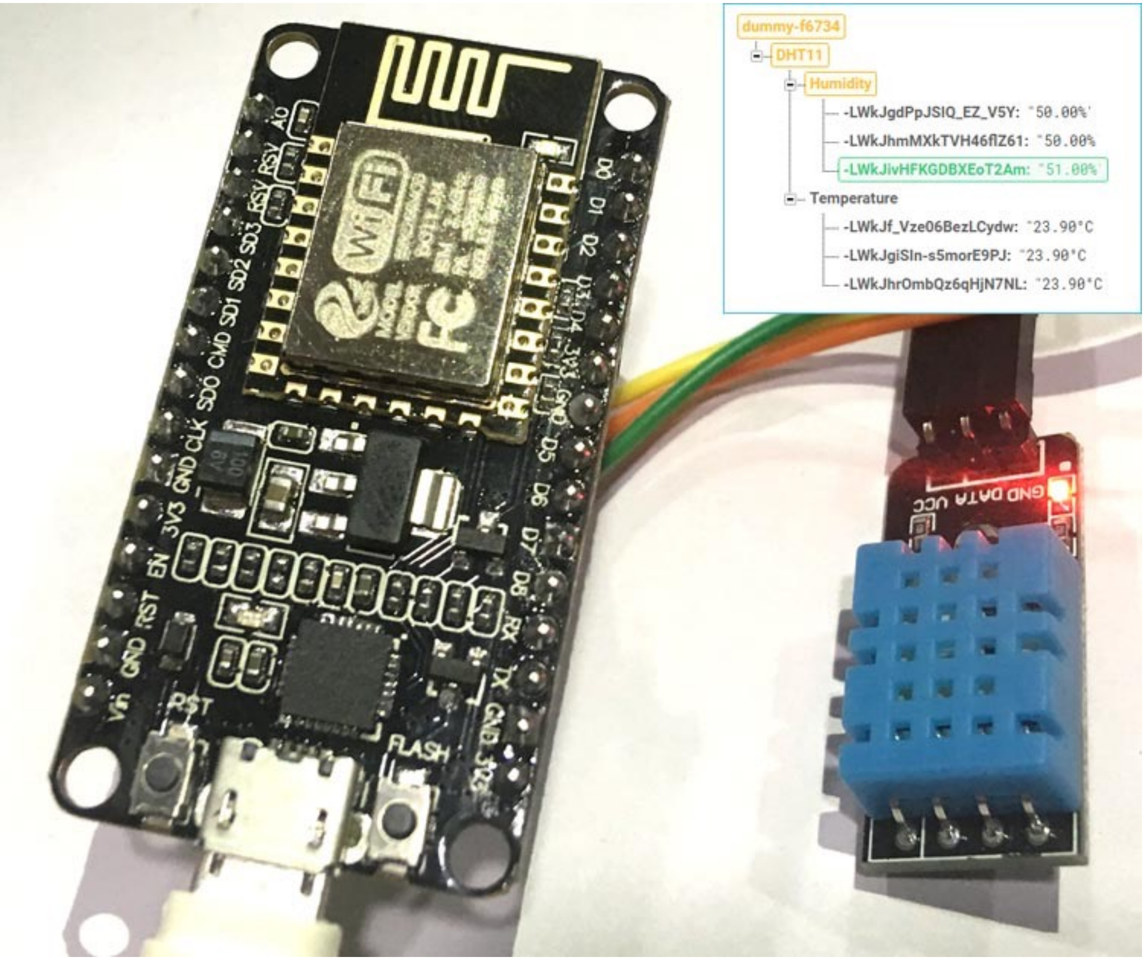
함수	설명	비고
setInt()	Firebase DB에 정수형(Int) 값 저장	
setFloat()	Firebase DB에 실수형(Float) 값 저장	
setString()	Firebase DB에 문자형(String) 값 저장	
setBool()	Firebase DB에 Bool 값 저장	Firebase.setBool(“truth”,false)
getInt()	Firebase DB에 정수형(int) 값 읽어 오기	
getFloat()	Firebase DB에 실수형(Float) 값 읽어 오기	
getString()	Firebase DB에 문자형(String) 값 읽어 오기	
pushInt()	Firebase DB에 정수형(Int) 값 저장	list 값 append
pushFloat()	Firebase DB에 실수형(Float) 값 저장	list 값 append
pushString()	Firebase DB에 문자형(String) 값 저장	list 값 append
Push()	Firebase DB에 객체형(Object) 값 저장	
remove()	Firebase DB에 값 삭제하기	
failed(), error()	Firebase 오류 체크, 메시지 출력	

무엇을 개발하나?

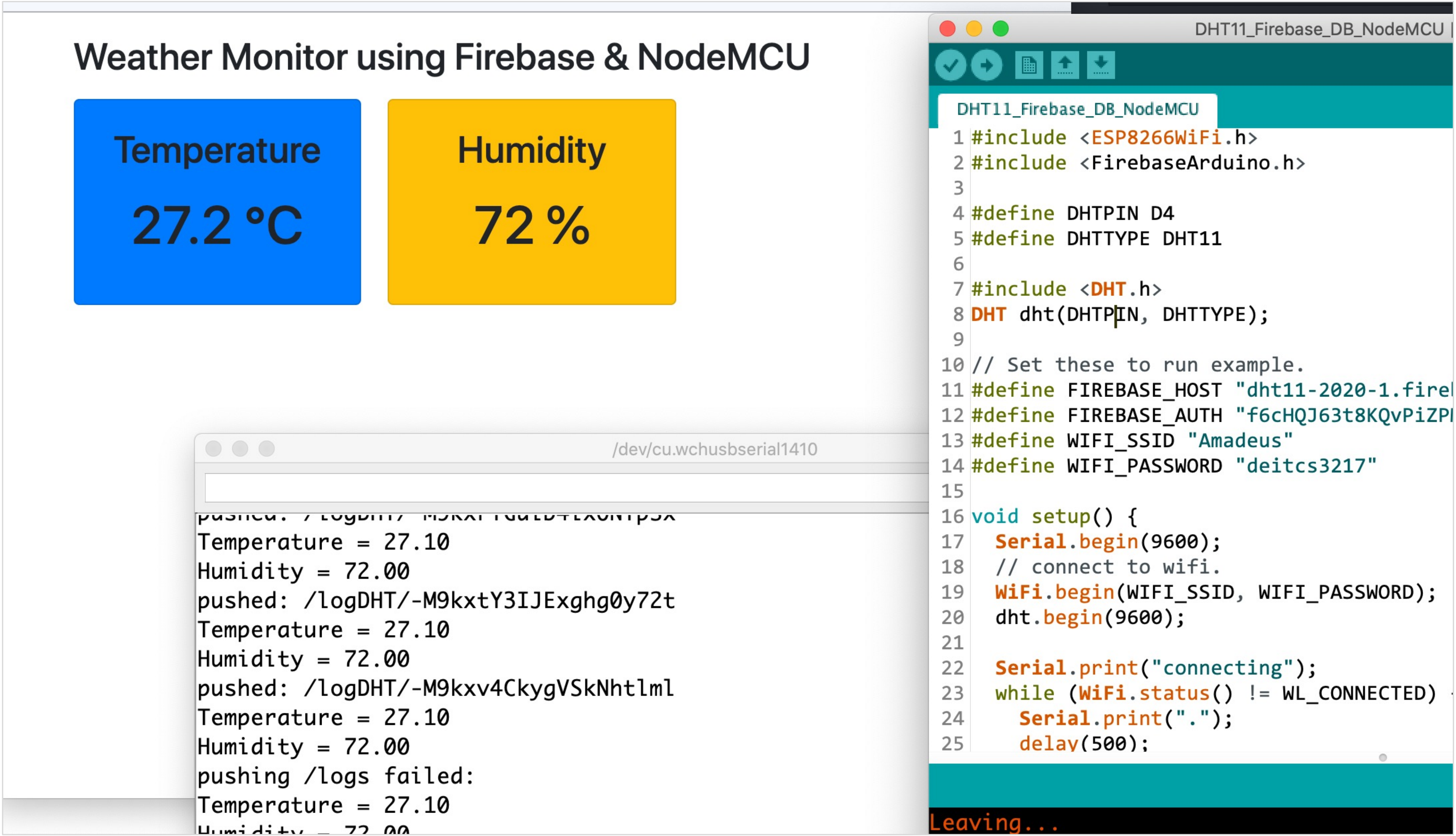
- 클라우드 기반 IoT 실시간 원격 온습도 모니터

필요한 실습 부품

- NodeMCU(ESP8266-E), DHT11, 구글 Firebase + Realtime Database



```
dummy-f6734
 ⊟ DHT11
    ⊟ Humidity
       ├ -LWkJgdPpJSIQ_EZ_V5Y: "50.00%"
       ├ -LWkJhmMXkTVH46flZ61: "50.00%
       └ -LWkJivHFKGDBXEoT2Am: "51.00%"
    ⊟ Temperature
       ├ -LWkJf_Vze06BezLCydw: "23.90°C
       ├ -LWkJgiSln-s5morE9PJ: "23.90°C
       └ -LWkJhrOmbQz6qHjN7NL: "23.90°C
```



Weather Monitor using Firebase & NodeMCU

Temperature

27.2 °C

Humidity

72 %

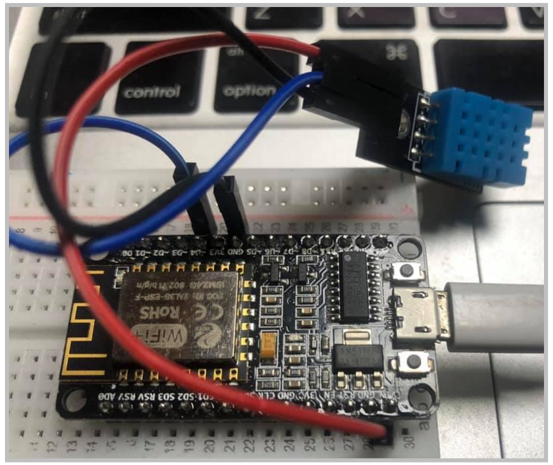
/dev/cu.wchusbserial1410

```
pushed: /logDHT/-M9kxYYGaLD4LxUNTp3x
Temperature = 27.10
Humidity = 72.00
pushed: /logDHT/-M9kxtY3IJExghg0y72t
Temperature = 27.10
Humidity = 72.00
pushed: /logDHT/-M9kxv4CkygVSkNhtlml
Temperature = 27.10
Humidity = 72.00
pushing /logs failed:
Temperature = 27.10
Humidity = 72.00
```

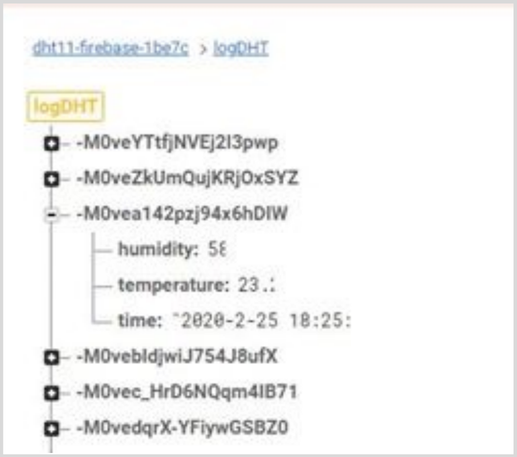
DHT11_Firebase_DB_NodeMCU

```
#include <ESP8266WiFi.h>
#include <FirebaseArduino.h>

#define DHTPIN D4
#define DHTTYPE DHT11

#include <DHT.h>
DHT dht(DHTPIN, DHTTYPE);

// Set these to run example.
#define FIREBASE_HOST "dht11-2020-1.fire
#define FIREBASE_AUTH "f6cHQJ63t8KQvPiZP
#define WIFI_SSID "Amadeus"
#define WIFI_PASSWORD "deitcs3217"

void setup() {
  Serial.begin(9600);
  // connect to wifi.
  WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
  dht.begin(9600);

  Serial.print("connecting");
  while (WiFi.status() != WL_CONNECTED)
    Serial.print(".");
    delay(500);
```

```
Leaving...
```



< NodeMCU/ DHT11>

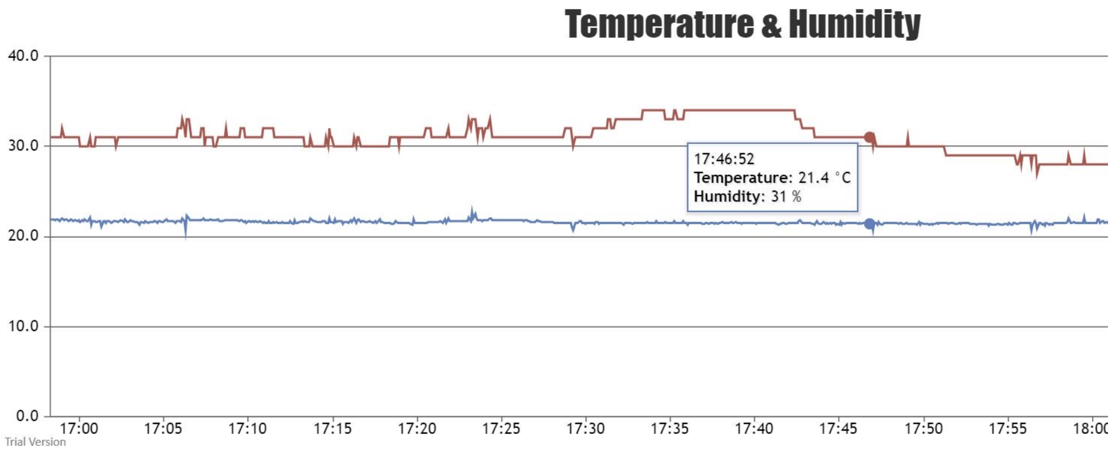


dht11-firebase-1be7c > logDHT

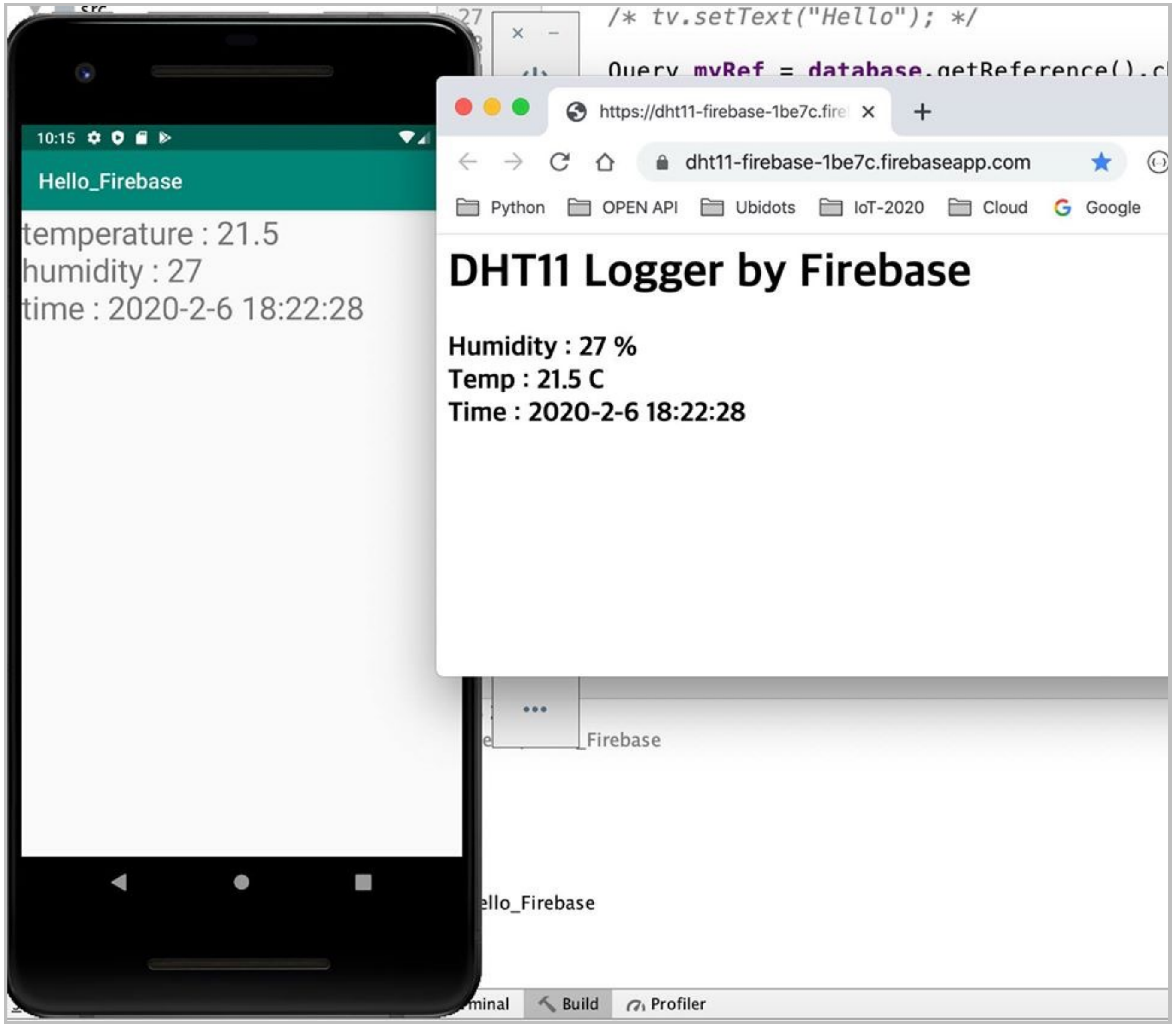
logDHT
- -M0veYTtfjNVEj2I3pwp
- -M0veZkUmQujKRjOxSYZ
- -M0vea142pzj94x6hDIW
  - humidity: 5ε
  - temperature: 23.:
  - time: "2020-2-25 18:25:
- -M0vebIdjwiJ754J8ufX
- -M0vec_HrD6NQqm4IB71
- -M0vedqrX-YFiywGSBZ0

< Realtime Database>

DHT11 Logger by Firebase



< 웹 대시보드 : CanvasJS>



```
/* tv.setText("Hello"); */
Query myRef = database.getReference().c
```

10:15

Hello_Firebase

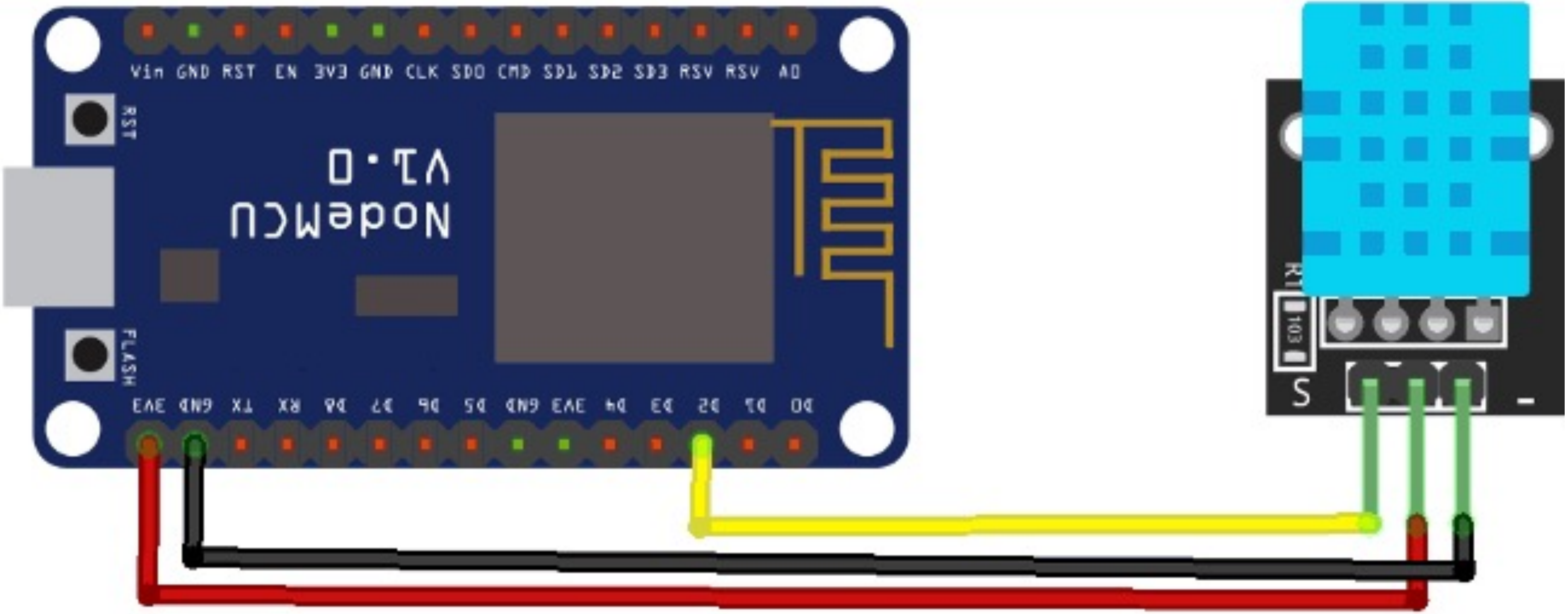
temperature : 21.5
humidity : 27
time : 2020-2-6 18:22:28

DHT11 Logger by Firebase

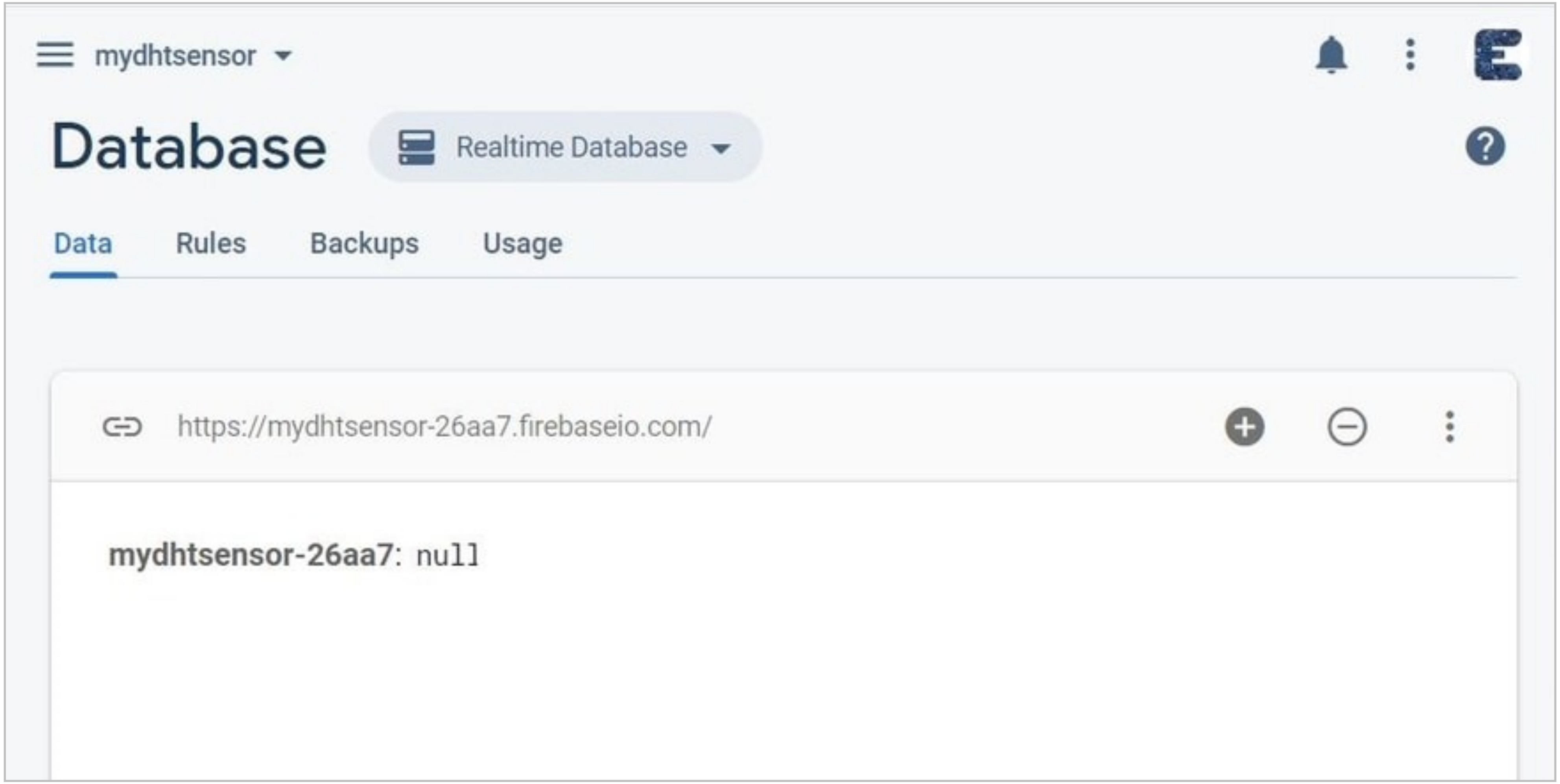
Humidity : 27 %
Temp : 21.5 C
Time : 2020-2-6 18:22:28

< 안드로이드 앱/ 웹 앱>

회로


Vin GND RST EN 3V3 GND CLK SDO CMD SD1 SD2 SD3 RSV RSV A0
RST
NodeMCU
V1.0
FLASH
3V3 GND TX RX D8 D7 D6 D5 GND 3V3 D4 D3 D2 D1 D0
R1
103
S
-

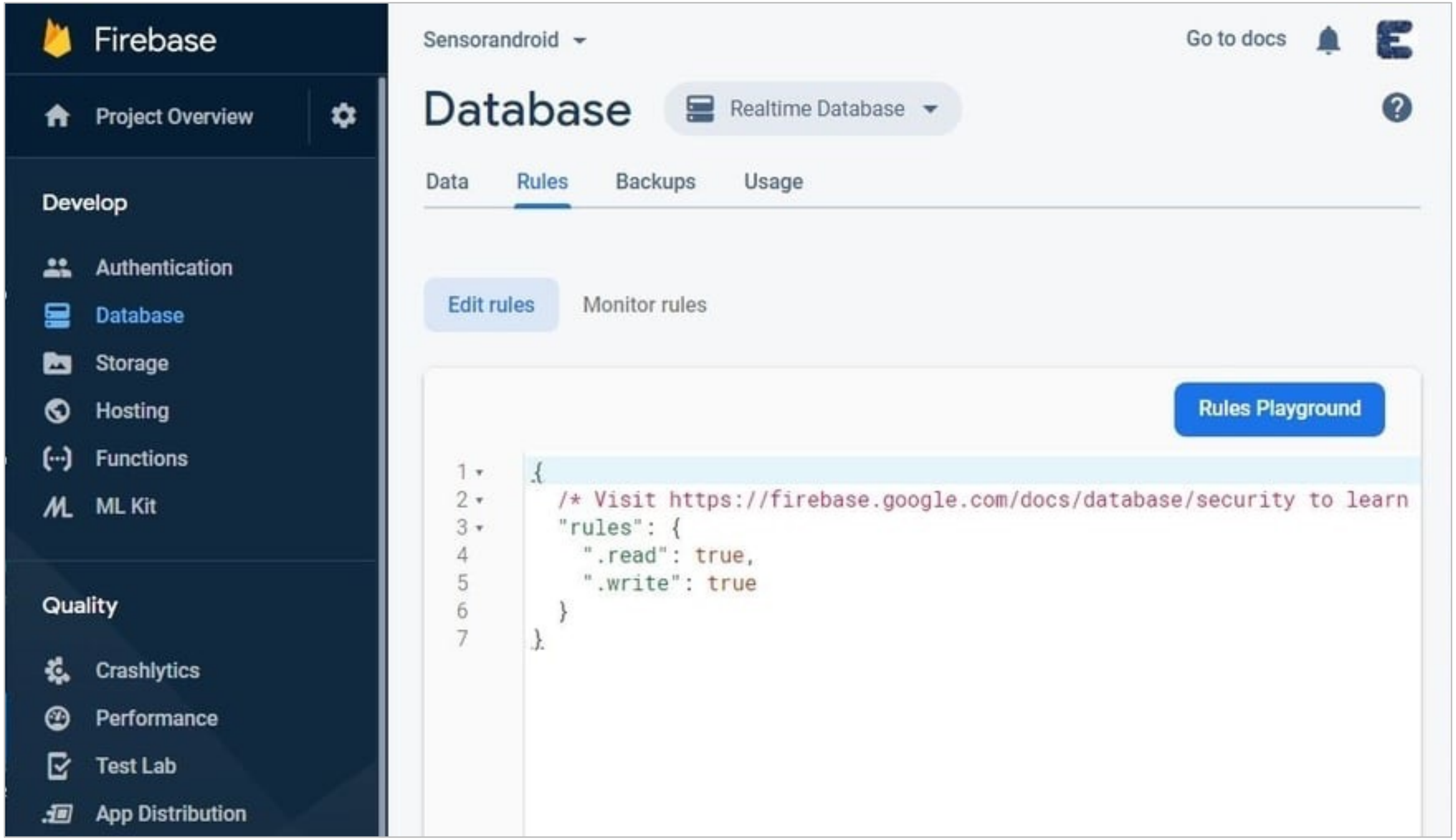
Database Setup



https://mydhtsensor-26aa7.firebaseio.com/

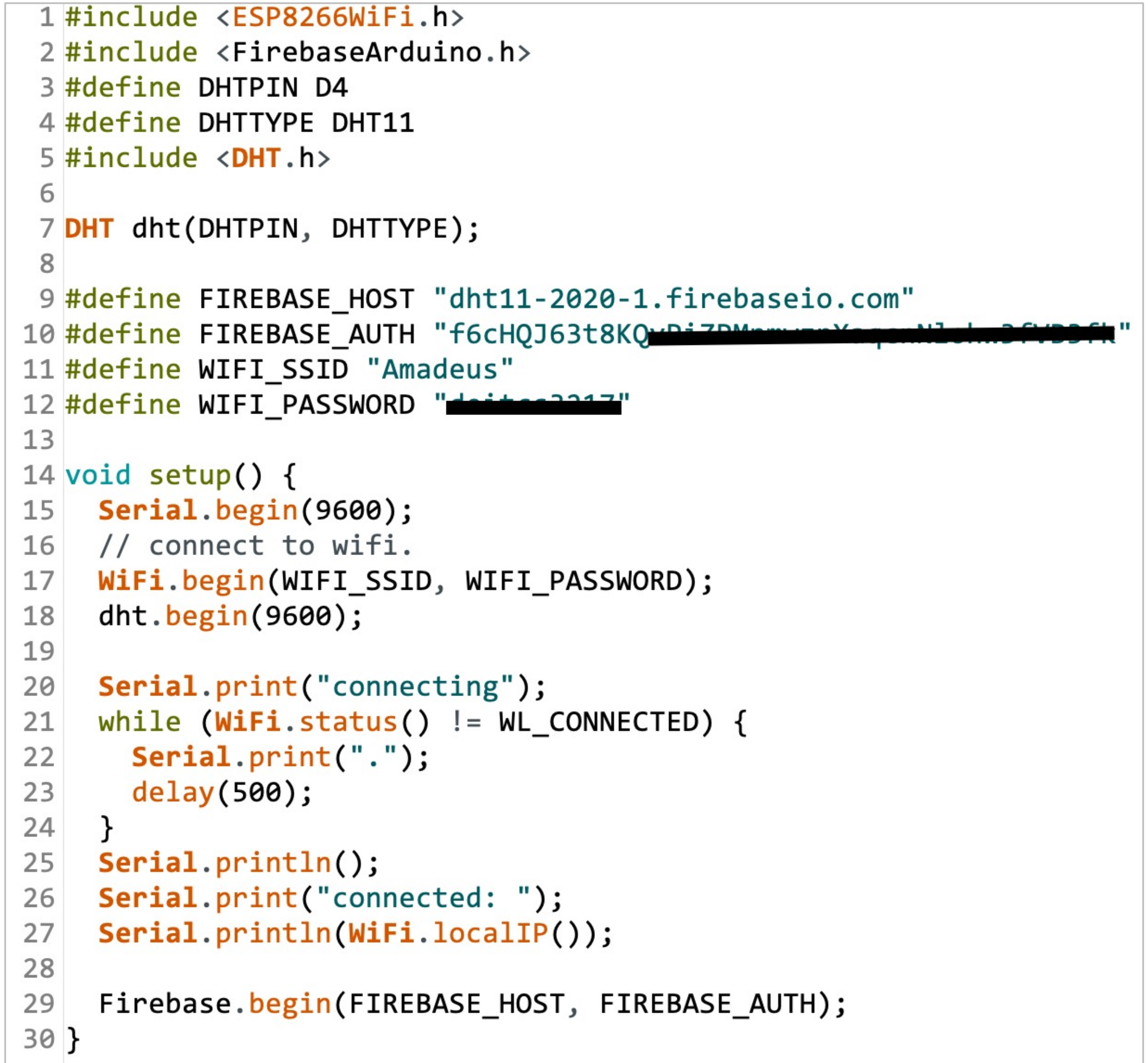
mydhtsensor-26aa7: null

Database Rule

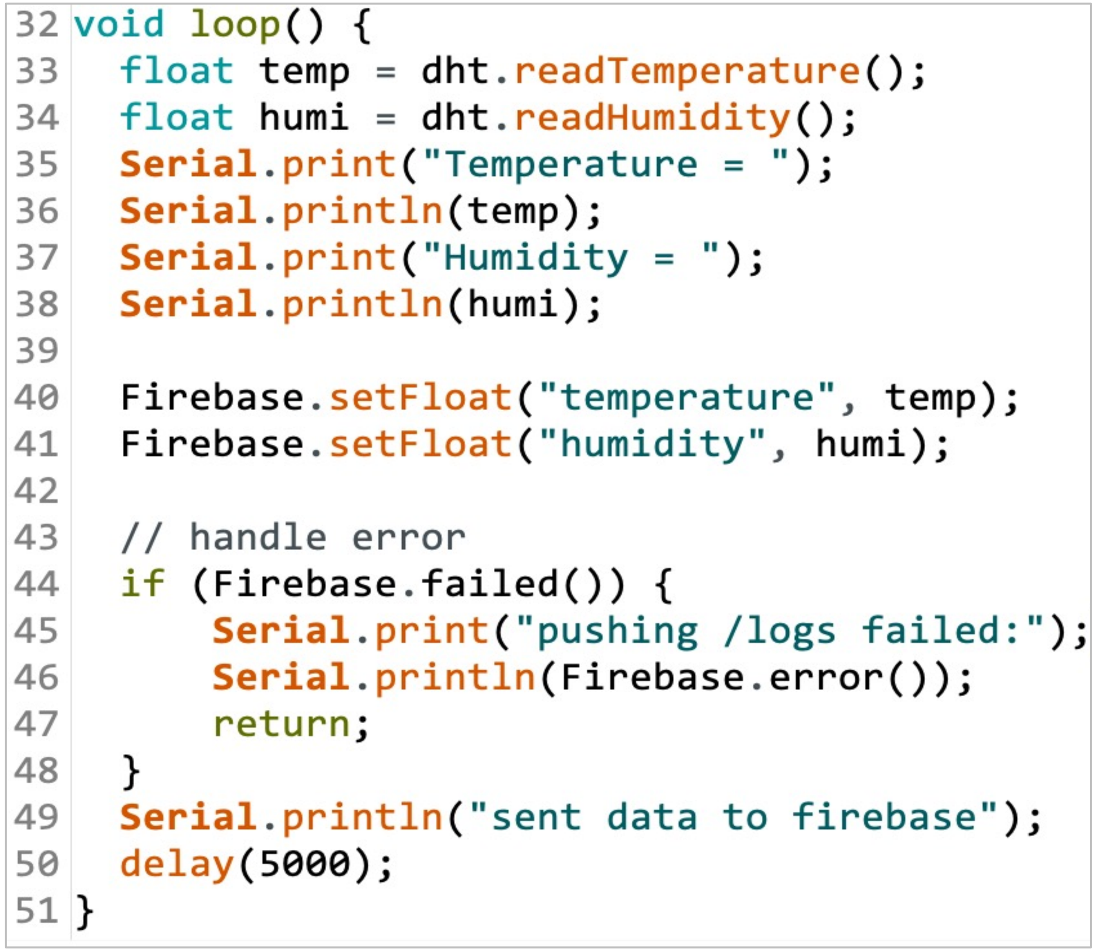


```
{
  /* Visit https://firebase.google.com/docs/database/security to learn
  "rules": {
    ".read": true,
    ".write": true
  }
}
```

소스 코드

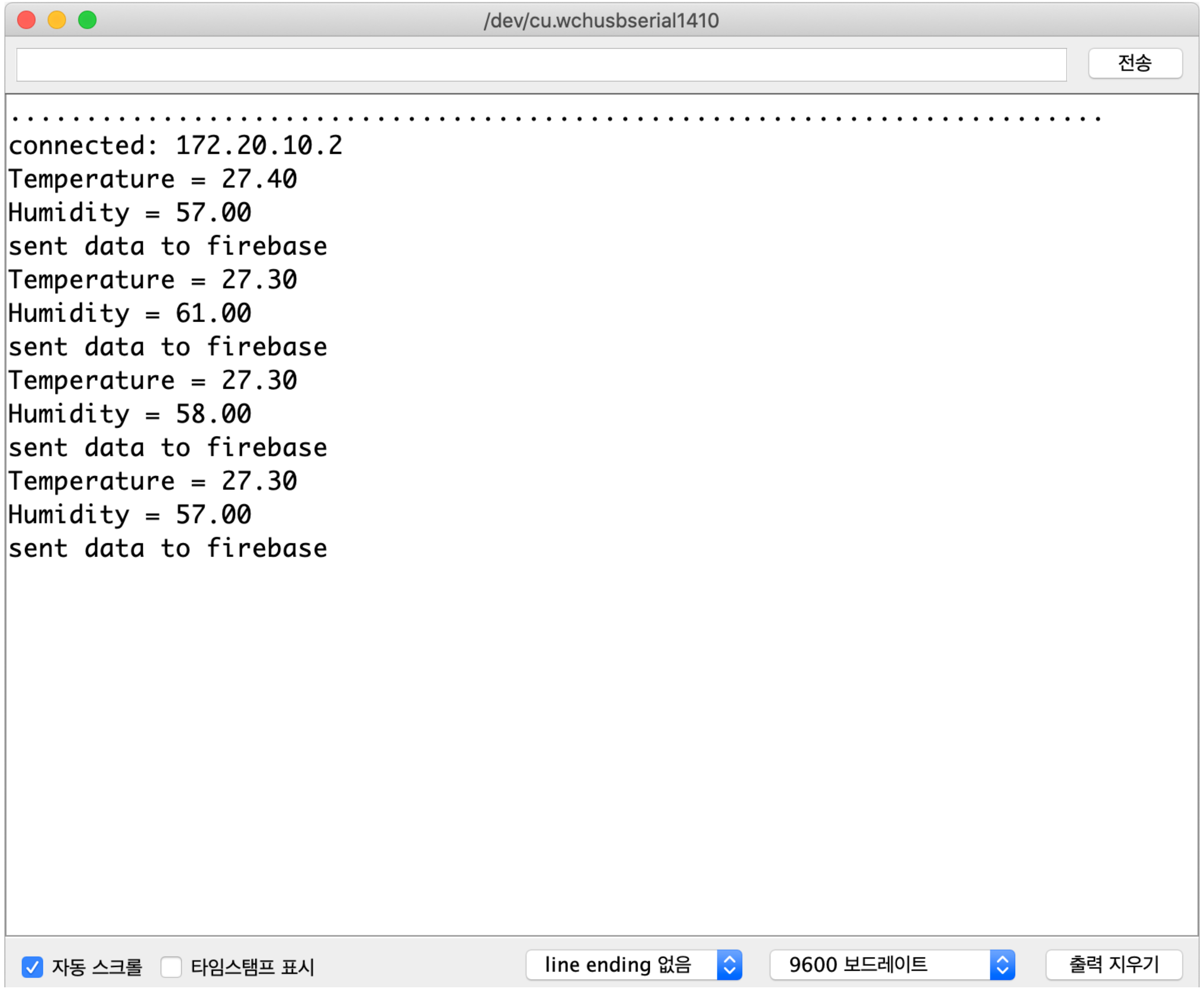


```
#include <ESP8266WiFi.h>
#include <FirebaseArduino.h>
#define DHTPIN D4
#define DHTTYPE DHT11
#include <DHT.h>

DHT dht(DHTPIN, DHTTYPE);

#define FIREBASE_HOST "dht11-2020-1.firebaseio.com"
#define FIREBASE_AUTH "f6cHQJ63t8KQ[redacted]"
#define WIFI_SSID "Amadeus"
#define WIFI_PASSWORD "[redacted]"

void setup() {
  Serial.begin(9600);
  // connect to wifi.
  WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
  dht.begin(9600);

  Serial.print("connecting");
  while (WiFi.status() != WL_CONNECTED) {
    Serial.print(".");
    delay(500);
  }
  Serial.println();
  Serial.print("connected: ");
  Serial.println(WiFi.localIP());

  Firebase.begin(FIREBASE_HOST, FIREBASE_AUTH);
}
```



```
void loop() {
  float temp = dht.readTemperature();
  float humi = dht.readHumidity();
  Serial.print("Temperature = ");
  Serial.println(temp);
  Serial.print("Humidity = ");
  Serial.println(humi);

  Firebase.setFloat("temperature", temp);
  Firebase.setFloat("humidity", humi);

  // handle error
  if (Firebase.failed()) {
      Serial.print("pushing /logs failed:");
      Serial.println(Firebase.error());
      return;
  }
  Serial.println("sent data to firebase");
  delay(5000);
}
```

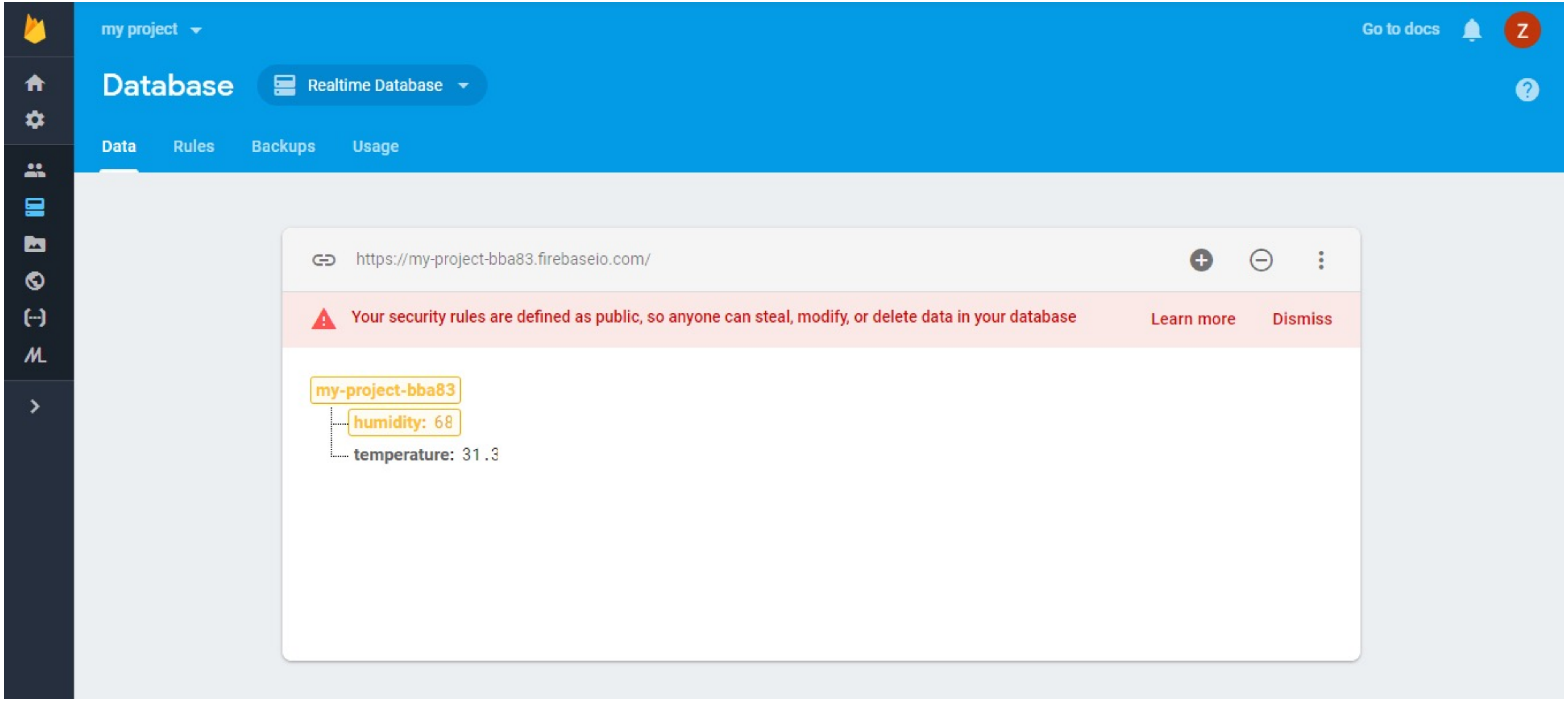
Serial Monitor



```
...........................................................................
connected: 172.20.10.2
Temperature = 27.40
Humidity = 57.00
sent data to firebase
Temperature = 27.30
Humidity = 61.00
sent data to firebase
Temperature = 27.30
Humidity = 58.00
sent data to firebase
Temperature = 27.30
Humidity = 57.00
sent data to firebase
```

☑ 자동 스크롤 □ 타임스탬프 표시 line ending 없음 9600 보드레이트

Firebase Database

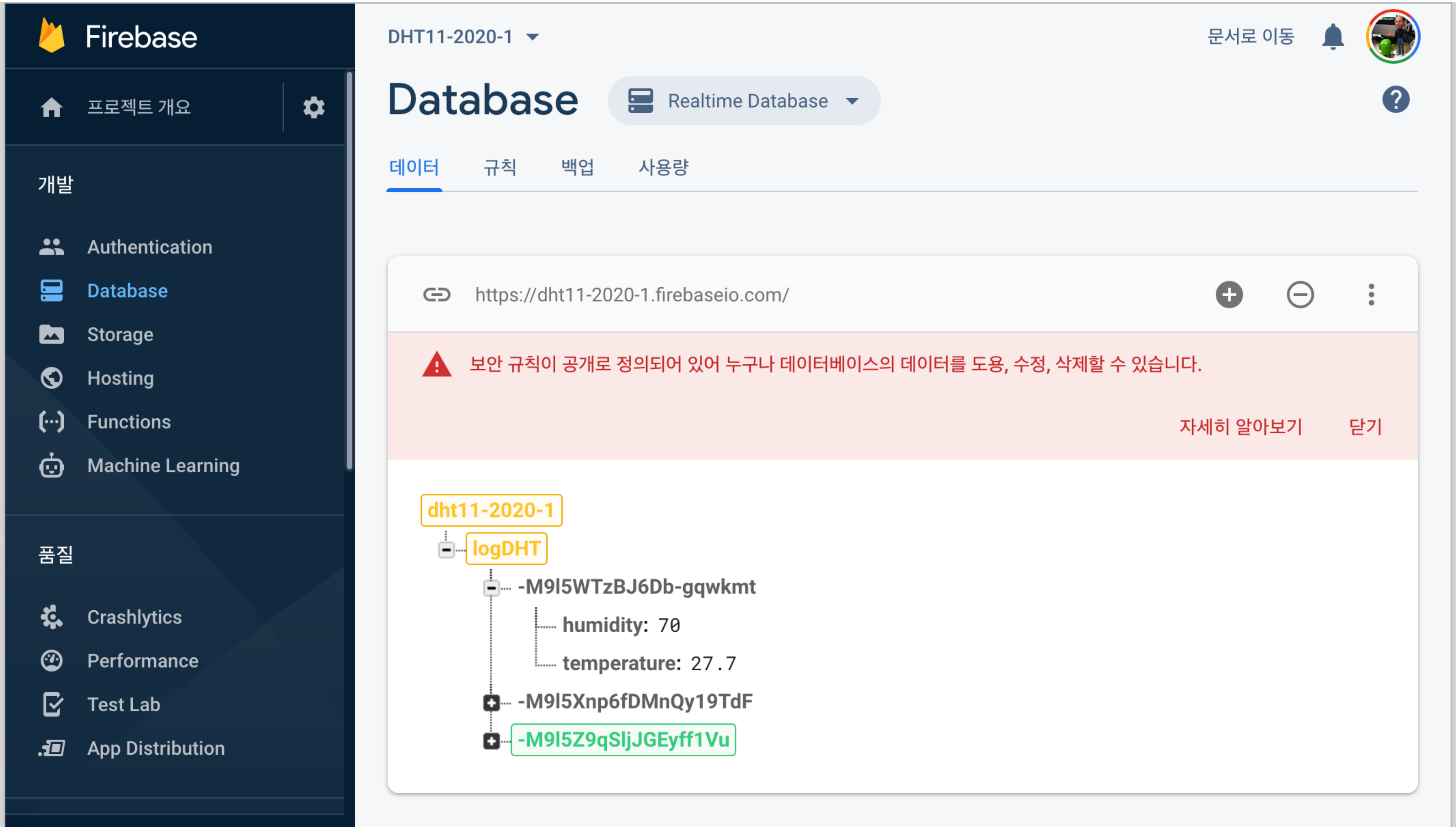


https://my-project-bba83.firebaseio.com/

Your security rules are defined as public, so anyone can steal, modify, or delete data in your database

```
my-project-bba83
  humidity: 68
  temperature: 31.3
```

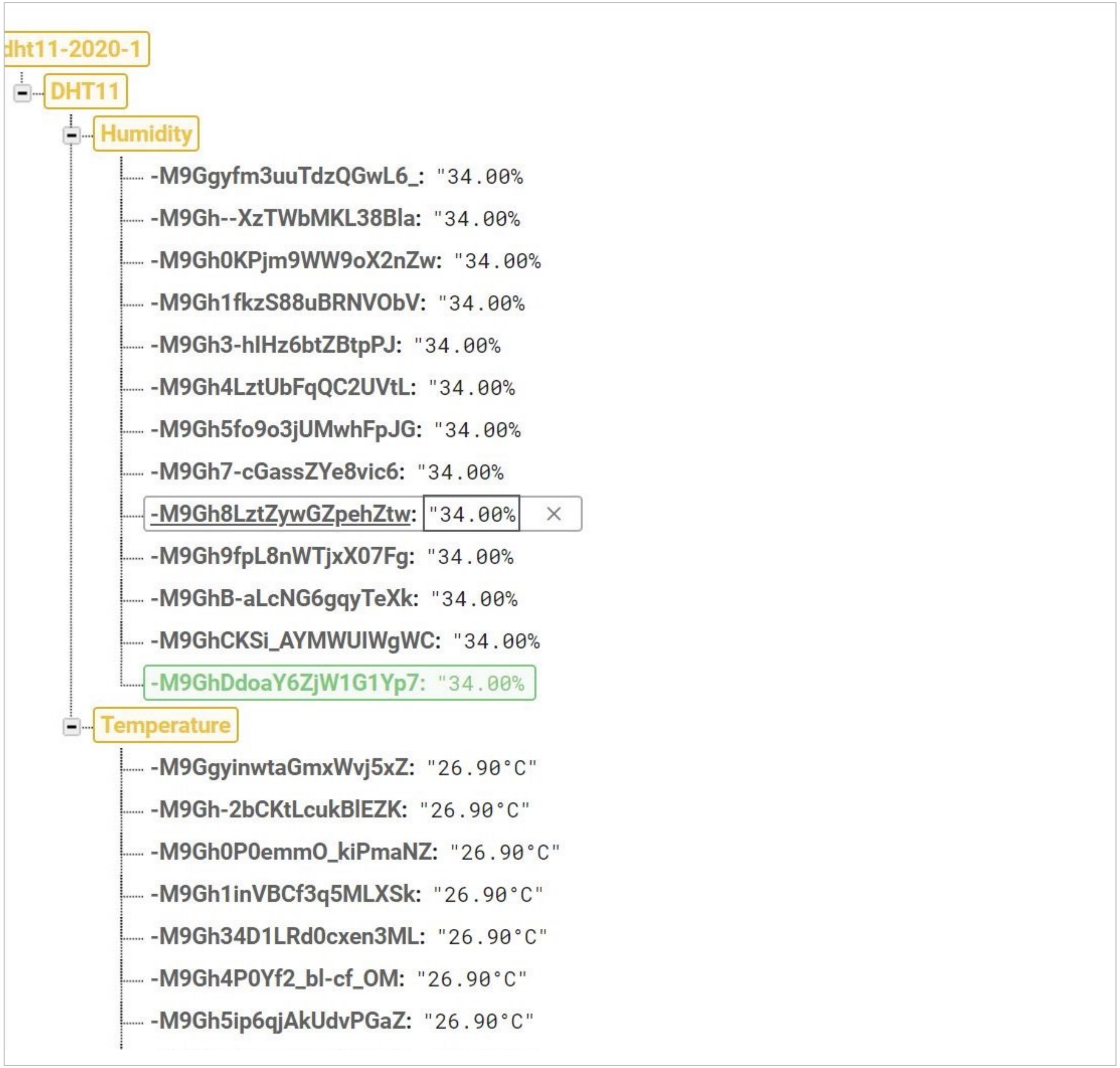
실습 과제 01 : DB에 list 값 append



https://dht11-2020-1.firebaseio.com/

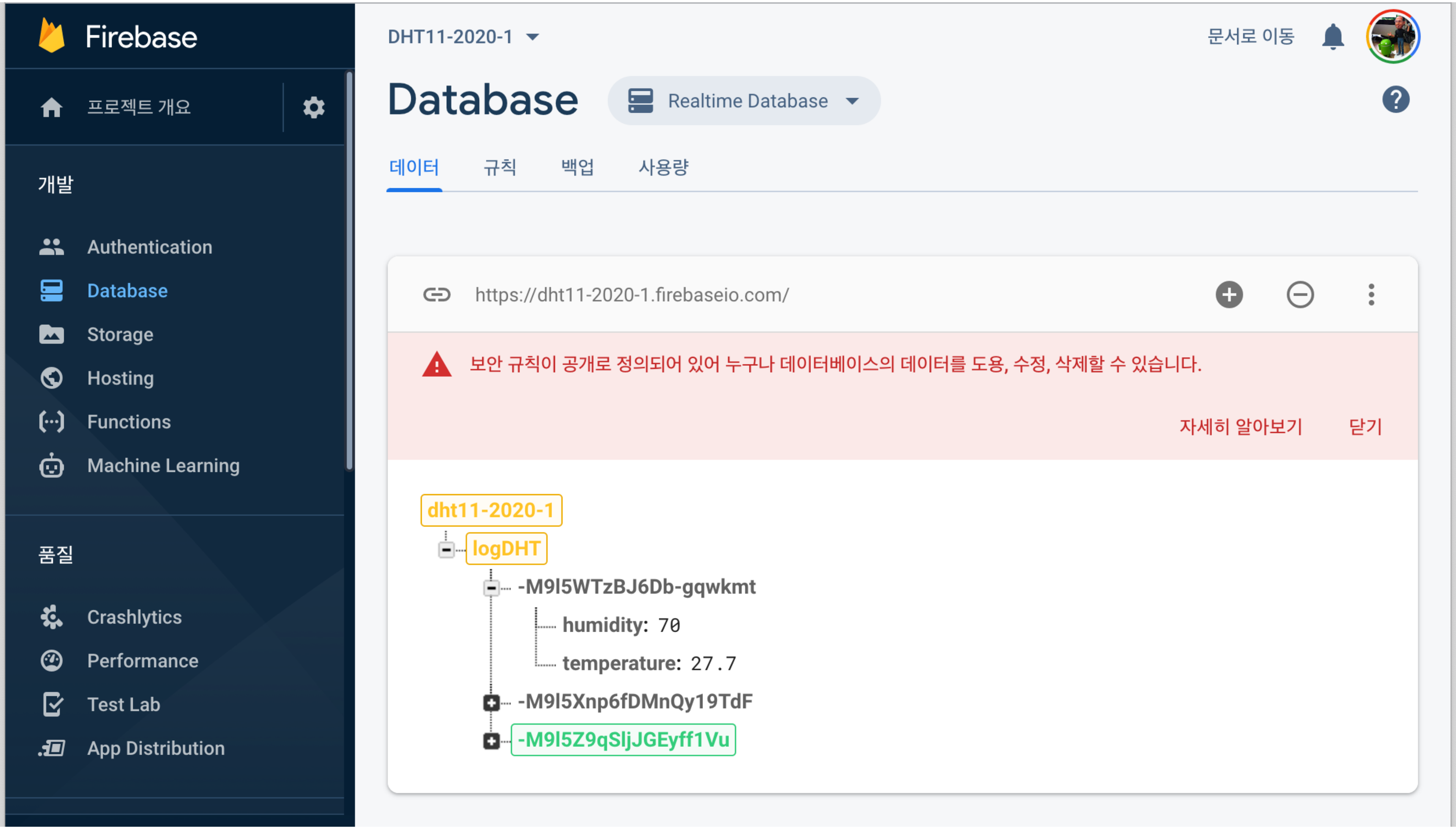
보안 규칙이 공개로 정의되어 있어 누구나 데이터베이스의 데이터를 도용, 수정, 삭제할 수 있습니다.

```
dht11-2020-1
  logDHT
    -M9I5WTzBJ6Db-gqwkmt
      humidity: 70
      temperature: 27.7
    -M9I5Xnp6fDMnQy19TdF
    -M9I5Z9qSljJGEyff1Vu
```



```
dht11-2020-1
  DHT11
    Humidity
      -M9Ggyfm3uuTdzQGwL6_: "34.00%
      -M9Gh--XzTWbMKL38Bla: "34.00%
      -M9Gh0KPjm9WW9oX2nZw: "34.00%
      -M9Gh1fkzS88uBRNVObV: "34.00%
      -M9Gh3-hlHz6btZBtpPJ: "34.00%
      -M9Gh4LztUbFqQC2UVtL: "34.00%
      -M9Gh5fo9o3jUMwhFpJG: "34.00%
      -M9Gh7-cGassZYe8vic6: "34.00%
      -M9Gh8LztZywGZpehZtw: "34.00%
      -M9Gh9fpL8nWTjxX07Fg: "34.00%
      -M9GhB-aLcNG6gqyTeXk: "34.00%
      -M9GhCKSi_AYMWUIWgWC: "34.00%
      -M9GhDdoaY6ZjW1G1Yp7: "34.00%
    Temperature
      -M9GgyinwtaGmxWvj5xZ: "26.90°C"
      -M9Gh-2bCKtLcukBlEZK: "26.90°C"
      -M9Gh0P0emmO_kiPmaNZ: "26.90°C"
      -M9Gh1inVBCf3q5MLXSk: "26.90°C"
      -M9Gh34D1LRd0cxen3ML: "26.90°C"
      -M9Gh4P0Yf2_bl-cf_OM: "26.90°C"
      -M9Gh5ip6qjAkUdvPGaZ: "26.90°C"
```

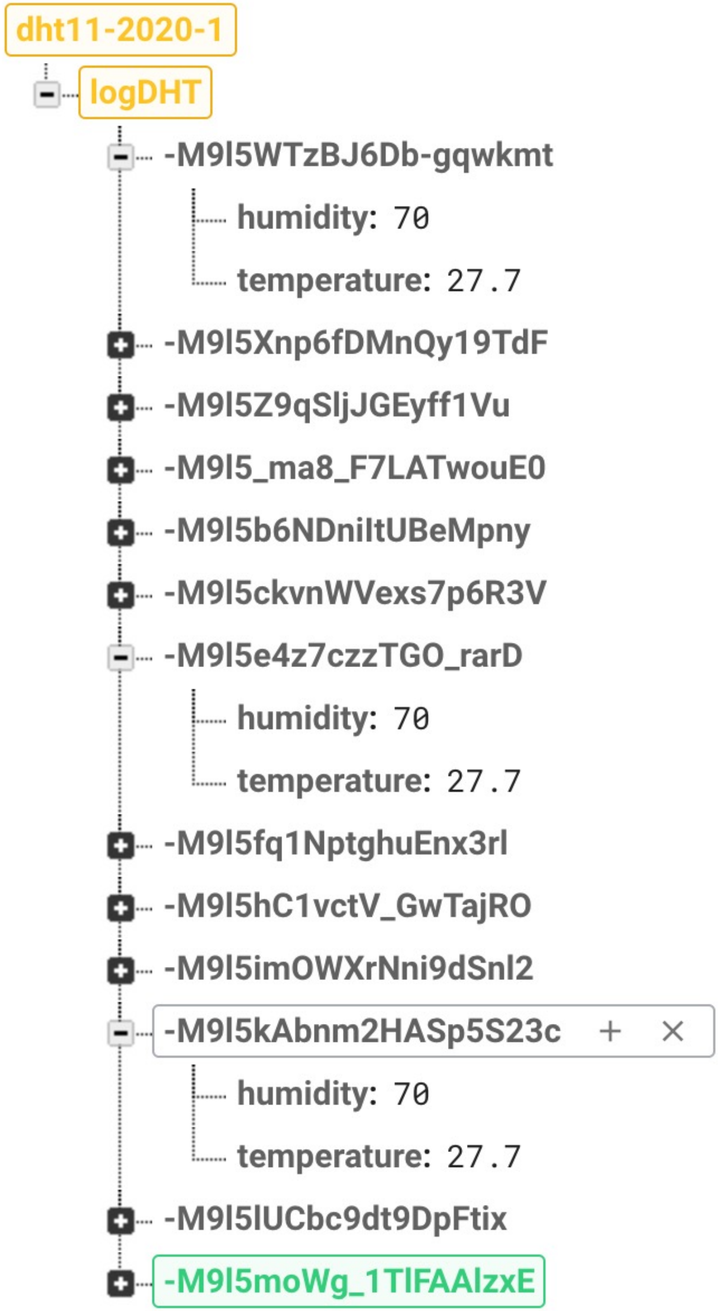
실습 과제 02 : DB에 Object 값 append



https://dht11-2020-1.firebaseio.com/

보안 규칙이 공개로 정의되어 있어 누구나 데이터베이스의 데이터를 도용, 수정, 삭제할 수 있습니다.

```
dht11-2020-1
  logDHT
    -M9I5WTzBJ6Db-gqwkmt
      humidity: 70
      temperature: 27.7
    -M9I5Xnp6fDMnQy19TdF
    -M9I5Z9qSljJGEyff1Vu
```



```
dht11-2020-1
  logDHT
    -M9l5WTzBJ6Db-gqwkmt
      humidity: 70
      temperature: 27.7
    -M9l5Xnp6fDMnQy19TdF
    -M9l5Z9qSljJGEyff1Vu
    -M9l5_ma8_F7LATwouE0
    -M9l5b6NDniltUBeMpny
    -M9l5ckvnWVexs7p6R3V
    -M9l5e4z7czzTGO_rarD
      humidity: 70
      temperature: 27.7
    -M9l5fq1NptghuEnx3rl
    -M9l5hC1vctV_GwTajRO
    -M9l5imOWXrNni9dSnl2
    -M9l5kAbnm2HASp5S23c  +  ×
      humidity: 70
      temperature: 27.7
    -M9l5lUCbc9dt9DpFtix
    -M9l5moWg_1TlFAAlzxE
```

학습 참고

- 참고 소스
  - https://github.com/IoT-Lab-02/Week10-Lab
- Sending Sensor Data to Google Firebase
  - http://bitly.kr/Q00AhwgwU6