

라즈베리파이 연결



```
pi@raspberrypi:~/WiringPi $ gpio readall
```

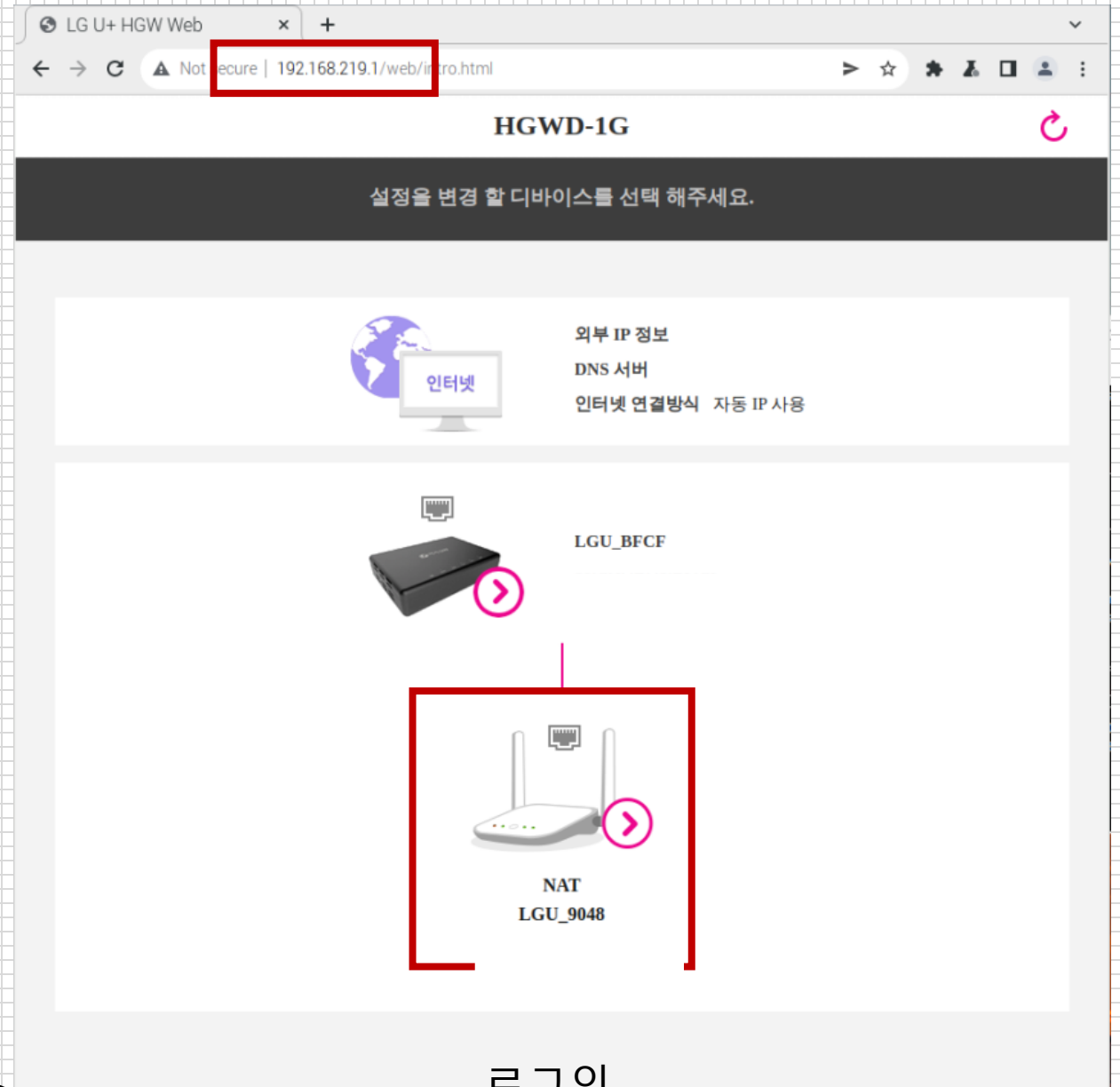
BCM	wPi	Name	Mode	V	Physical	V	Mode	Name	wPi	BCM	
		3.3v			2	5v					
2	8	SDA.1	IN	1	3	4		5v			
3	9	SCL.1	IN	1	5	6		0v			
4	7	GPIO. 7	IN	1	7	8	1	IN	TxD	15	14
		0v			9	10	1	IN	RxD	16	15
17	0	GPIO. 0	IN	0	11	12	0	IN	GPIO. 1	1	18
27	2	GPIO. 2	IN	0	13	14			0v		
22	3	GPIO. 3	IN	0	15	16	0	IN	GPIO. 4	4	23
		3.3v			17	18	0	IN	GPIO. 5	5	24
10	12	MOSI	IN	0	19	20			0v		
9	13	MISO	IN	0	21	22	0	IN	GPIO. 6	6	25
11	14	SCLK	IN	0	23	24	1	IN	CE0	10	8
		0v			25	26	1	IN	CE1	11	7
0	30	SDA.0	IN	1	27	28	1	IN	SCL.0	31	1
5	21	GPIO.21	IN	1	29	30			0v		
6	22	GPIO.22	IN	1	31	32	0	IN	GPIO.26	26	12
13	23	GPIO.23	IN	0	33	34			0v		
19	24	GPIO.24	IN	0	35	36	0	IN	GPIO.27	27	16
26	25	GPIO.25	IN	0	37	38	0	IN	GPIO.28	28	20
		0v			39	40	0	IN	GPIO.29	29	21

1. Vnc로 라즈베리파이 접속 후 인터넷 접속 ->



사용 중인 공유기 웹 페이지로 접속

->



로그인

2. DHCP 할당 정보에서 raspberrypi ip 확인 후 고정 할당 추가

DHCP 할당정보

GAPD-7300 > 상태 정보 > DHCP 할당정보

DHCP 고정 할당을 추가하거나 할당 정보를 확인할 수 있습니다.

DHCP 할당 정보

DHCP 고정 할당

DHCP 할당 목록

NO.	IP 주소	호스트 정보	맥 주소	할당된 상태
1				자동 할당
2				자동 할당
3				자동 할당
4				자동 할당
5	192.168.123.102	raspberrypi	DC:A6:32:A0:25:57	IP고정 할당

DHCP 할당 정보

DHCP 고정 할당

DHCP 고정 할당 추가

\* 최대 20개를 할당 할 수 있습니다.

추가

MAC 주소

: : : : :

맥주소검색

할당할 IP 주소

DHCP 고정 할당 목록

<input type="checkbox"/>	NO.	On/Off	하드웨어 주소	IP 주소
<input type="checkbox"/>	1	<input checked="" type="radio"/> ON <input type="radio"/> OFF		192.168.123.102

수정

삭제

설정 적용

설정적용 반드시 클릭

### 3. Raspberry pi 안에 Node-Red 설치하기

<https://iotmaker.kr/iotbook-install-raspi-node-red/>  
<https://reddb.tistory.com/123>

#### 1). 최신버전으로 업데이트

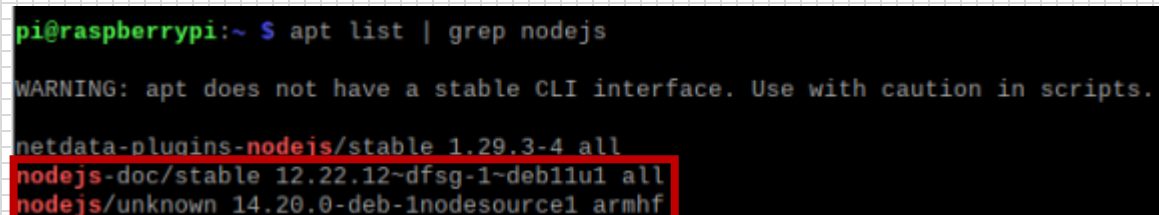
```
sudo apt update
```

```
sudo apt upgrade
```

#### 2). Node.js 설치

```
sudo curl -sL https://deb.nodesource.com/setup_14.x | sudo -E bash
```

```
apt list | grep nodejs
```



```
pi@raspberrypi:~ $ apt list | grep nodejs
WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

netdata-plugins-nodejs/stable 1.29.3-4 all
nodejs-doc/stable 12.22.12-dfsg-1-deb11u1 all
nodejs/unknown 14.20.0-deb-1nodesource1 armhf
```

```
sudo apt-get install nodejs
```

```
node -v
```

#### 3). Node-red 설치

```
bash <(curl -sL https://raw.githubusercontent.com/node-red/linux-installers/master/deb/update-nodejs-and-nodered)
```

```
node-red-start
```



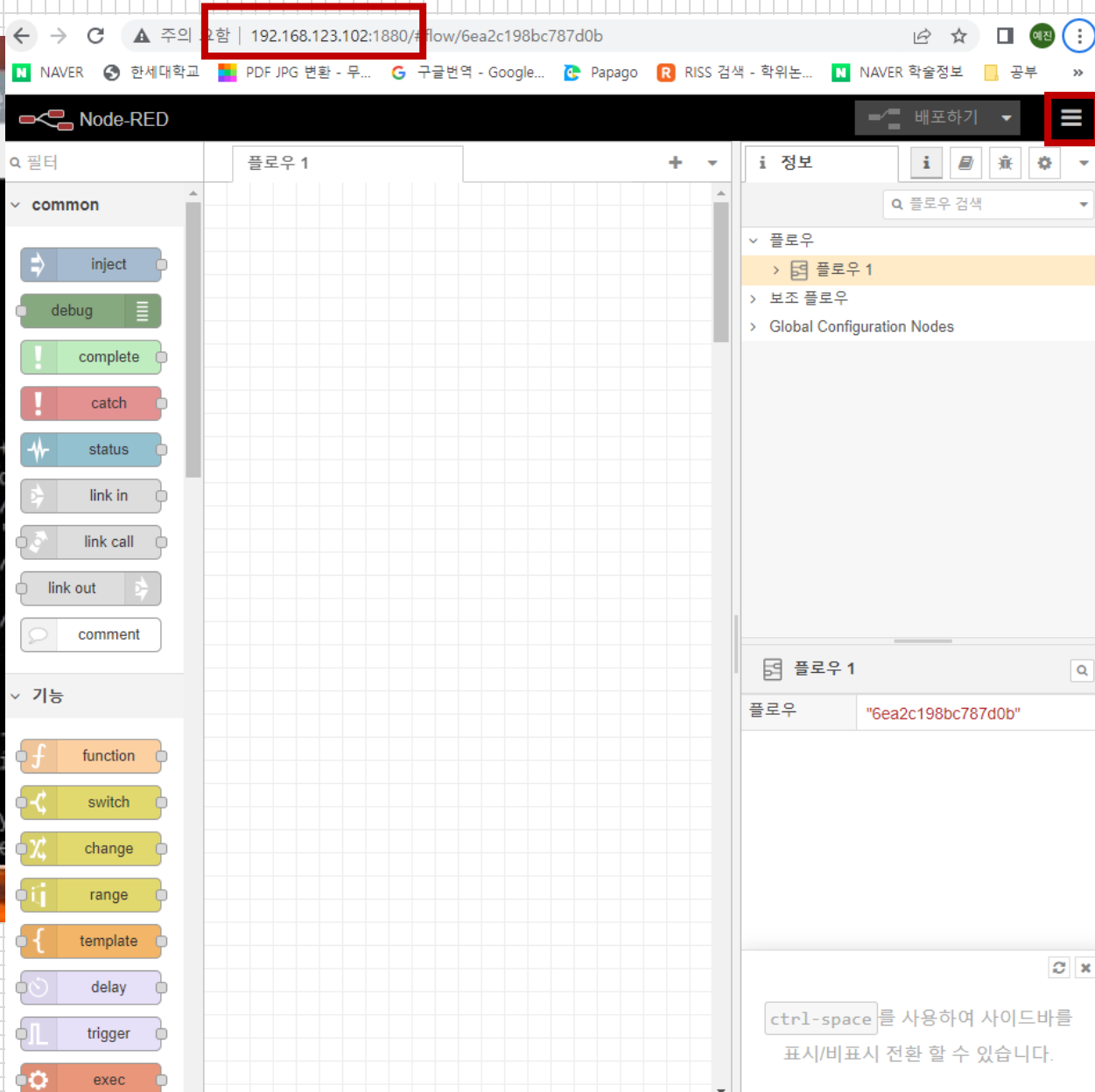
#### 4. node-red-start 후

```
pi@raspberrypi:~$ node-red
31 Aug 17:16:01 - [info]

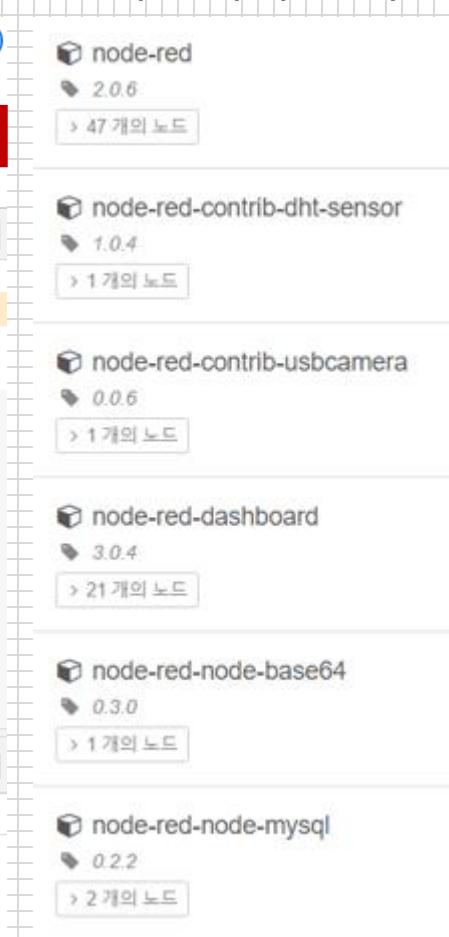
Welcome to Node-RED
=====

31 Aug 17:16:01 - [info] Node-RED version:
31 Aug 17:16:01 - [info] Node.js version:
31 Aug 17:16:01 - [info] Linux 5.15.32-v7l
31 Aug 17:16:01 - [info] Loading palette no
31 Aug 17:16:03 - [info] Settings file :
31 Aug 17:16:03 - [info] Context store :
31 Aug 17:16:03 - [info] User directory :
31 Aug 17:16:03 - [warn] Projects disabled
31 Aug 17:16:03 - [info] Flows file :
31 Aug 17:16:03 - [info] Creating new flow
31 Aug 17:16:03 - [warn]

-----
Your flow credentials file is encrypted us
If the system-generated key is lost for any
file will not be recoverable, you will have
```



#### 팔레트에서 설치



## 5. Mysql 설치 후 정보 설정

```
MariaDB [(none)]> create database rasbp;  
Query OK, 1 row affected (0.001 sec)  
  
MariaDB [(none)]> show databases;  
+-----+  
| Database |  
+-----+  
| information_schema |  
| mysql |  
| performance_schema |  
| rasbp |  
+-----+  
4 rows in set (0.001 sec)  
  
MariaDB [(none)]> use rasbp  
Database changed  
MariaDB [rasbp]> █
```

```
MariaDB [rasbp]> create user 'pi'@'%'identified by '0000';  
Query OK, 0 rows affected (0.006 sec)  
  
MariaDB [rasbp]> grant all privileges on rasbp.* to 'pi';  
Query OK, 0 rows affected (0.005 sec)  
  
MariaDB [rasbp]> █
```

```
MariaDB [rasbp]> create table node_rasbp(  
-> sensor varchar(38) not null,  
-> collect_time datetime not null,  
-> temp_c float,  
-> temp_f float,  
-> hump float);  
Query OK, 0 rows affected (0.023 sec)  
  
MariaDB [rasbp]> show tables  
-> ;  
+-----+  
| Tables_in_rasbp |  
+-----+  
| node_rasbp |  
+-----+  
1 row in set (0.001 sec)
```

## Mysql 설치

sudo apt-get install mariadb-server

## DB 생성

sudo mysql

create database rasbp;

show databases;

use rasbp

## 계정 생성

create user 'pi'@'%'identified by '0000';

grant all privileges on rasbp.\* to 'pi';

## Table 생성

create table node\_rasbp(  
-> sensor varchar(38) not null,  
-> collect\_time datetime not null,  
-> temp\_c float,  
-> temp\_f float,  
-> hump float);

show tables;

## 6. Fswebcam 설치

sudo apt install fswebcam

```
pi@raspberrypi:~ $ sudo apt install fswebcam
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  gyp libc-ares2 libjs-highlight.js libjs-inherits libjs-is-typedarray libjs-psl
  libjs-typedarray-to-buffer libssl-dev libuv1-dev node-chownr node-color-name
  node-err-code node-extsprintf node-fast-deep-equal node-indent-string node-ini
  node-is-typedarray node-json-parse-better-errors node-json-schema
  node-json-schema-traverse node-qs node-resolve-from node-through
  node-typedarray-to-buffer node-universalify node-uuid
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  fswebcam
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 43.5 kB of archives.
After this operation, 116 kB of additional disk space will be used.
Get:1 http://ftp.kaist.ac.kr/raspbian/raspbian bullseye/main armhf fswebcam armhf 20140113-2 [43.5 kB]
Fetched 43.5 kB in 1s (33.8 kB/s)
Selecting previously unselected package fswebcam.
(Reading database ... 110742 files and directories currently installed.)
Preparing to unpack .../fswebcam_20140113-2_armhf.deb ...
```

## 7. 파이썬 설치 후 dht11.py 생성 후 DHT11 작동 확인

<https://www.circuitbasics.com/how-to-set-up-the-dht11-humidity-sensor-on-the-raspberry-pi/>

```
pi@raspberrypi:~ $ cd /home/pi/Adafruit_Python_DHT
pi@raspberrypi:~/Adafruit_Python_DHT $ python3 dht11.py
Unable to set line 7 to input
^Z
[18]+  Stopped                  python3 dht11.py
pi@raspberrypi:~/Adafruit_Python_DHT $ python3 dht11.py
Temp: 80.6 F / 27.0 C Humidity 59%
Lost access to message queue
pi@raspberrypi:~/Adafruit_Python_DHT $
```



```
Thonny - /home/pi/Adafruit_Python_DHT/dht11.py @ 12:1
New Load Save Run Debug Over Into Out Stop Zoom Quit Switch to regular mode
dht11.py
1 import time
2 import board
3 import adafruit_dht
4
5 dhtDevice = adafruit_dht.DHT11(board.D4)
6 t = dhtDevice.temperature
7 f = t * (9/5)+32
8 h = dhtDevice.humidity
9
10 print("Temp: {:.1f} F / {:.1f} C Humidity {}".format(f,t,h))
11
12
Shell
```

```
import time
import board
import adafruit_dht
```

```
dhtDevice = adafruit_dht.DHT11(board.D4)
t = dhtDevice.temperature
f = t * (9/5)+32
h = dhtDevice.humidity
```

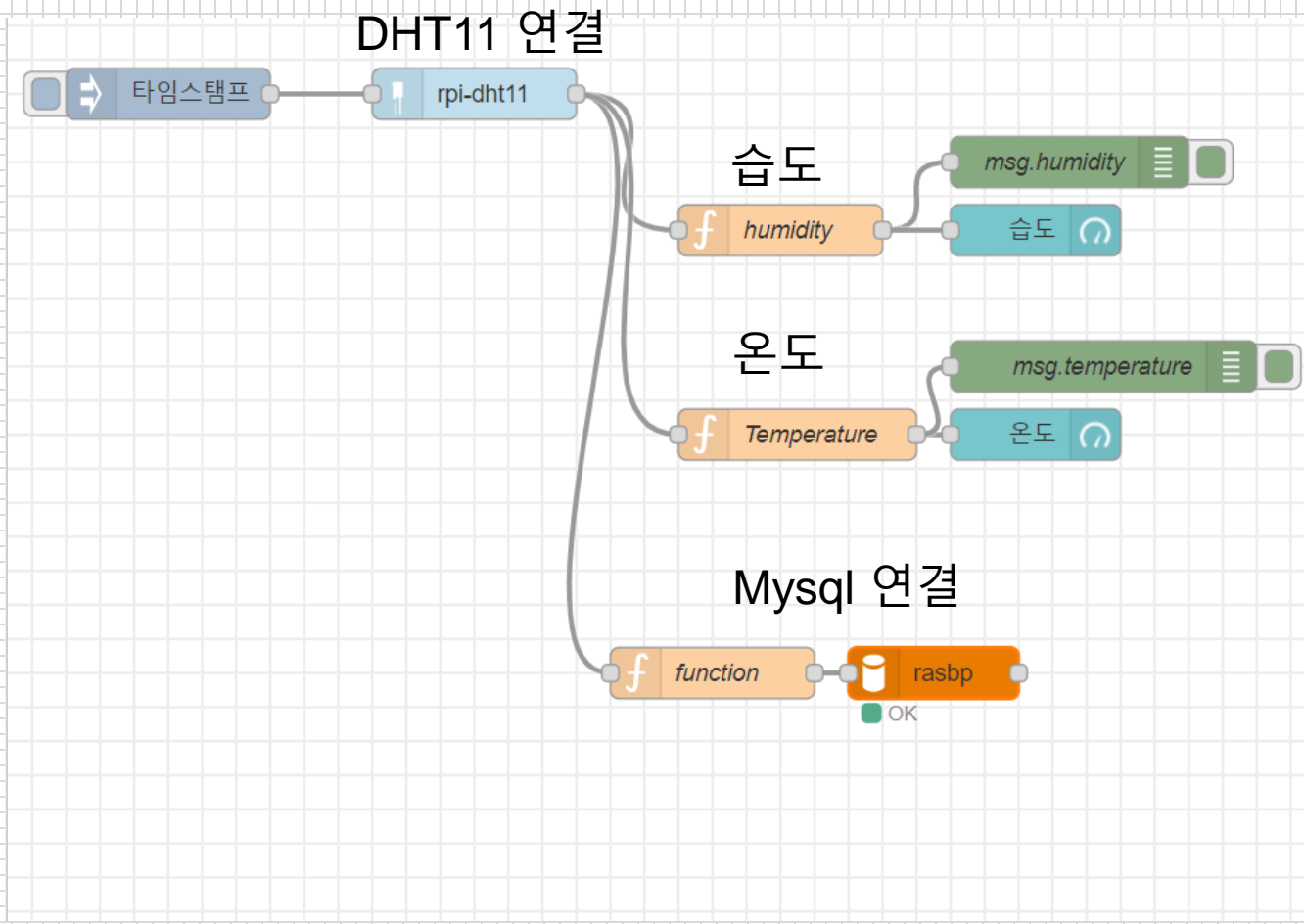
```
print("Temp: {:.1f} F / {:.1f} C Humidity {}".format(f,t,h))
```



8. node-red 접속하여 작업

1). 사진과 같이 생성

<https://www.youtube.com/watch?v=AprmCrSZXEw&t=425s>



rpi-dht22의 노드 수정

삭제 취소 완료

속성

Topic rpi-dht11

Sensor model DHT11

Pin numbering WiringPi (rev. 2)

Pin number 7

Name Name

rpi-dht11

8. node-red 접속하여 작업

2). 각 속성 정의

debug의 노드 수정

속성

대상 msg. humidity

출력대상 ☒ 디버깅 창

☐ 시스템 콘솔

☐ 노드 상태(32자)

이름 msg.humidity



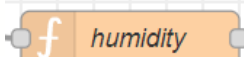
function의 노드 수정

속성

이름 humidity

코드

```
1 msg.payload = msg.humidity;  
2 return msg;
```



gauge의 노드 수정

속성

Group [Home] dht11

Size auto

Type Gauge

Label 습도


Value format {{value}}

Units units

Range min 0 max 10

Colour gradient

Sectors 0 optional optional 10



debug의 노드 수정

속성

대상 msg. payload

출력대상 ☒ 디버깅 창

☐ 시스템 콘솔

☐ 노드 상태(32자)

이름 msg.temperature



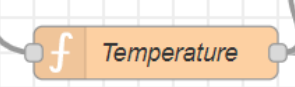
function의 노드 수정

속성

이름 Temperature

코드

```
1 msg.payload = msg.payload;  
2 return msg;
```



gauge의 노드 수정

속성

Group [Home] dht11

Size auto

Type Gauge

Label 온도

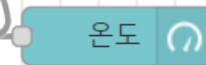
Value format {{value}}

Units units

Range min 0 max 10

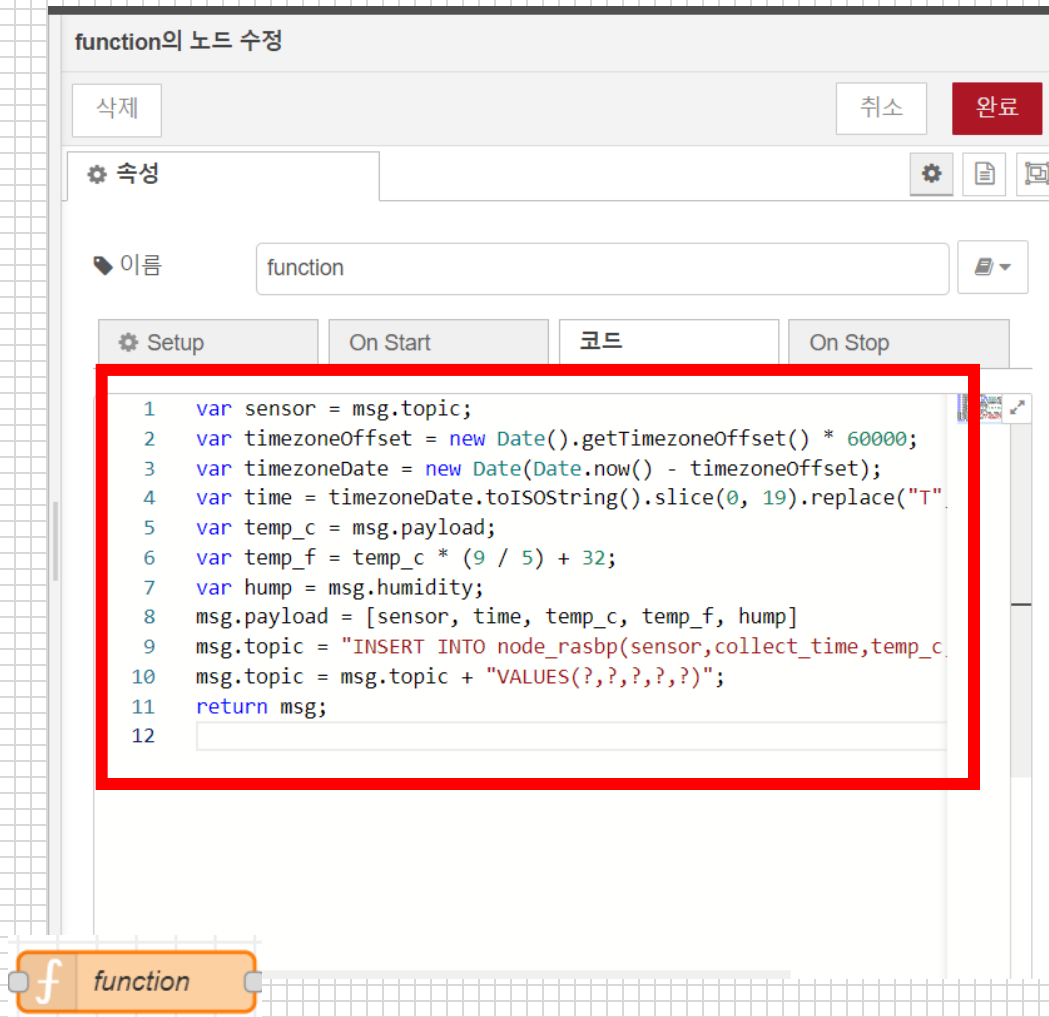
Colour gradient

Sectors 0 optional optional 10



## 8. node-red 접속하여 작업

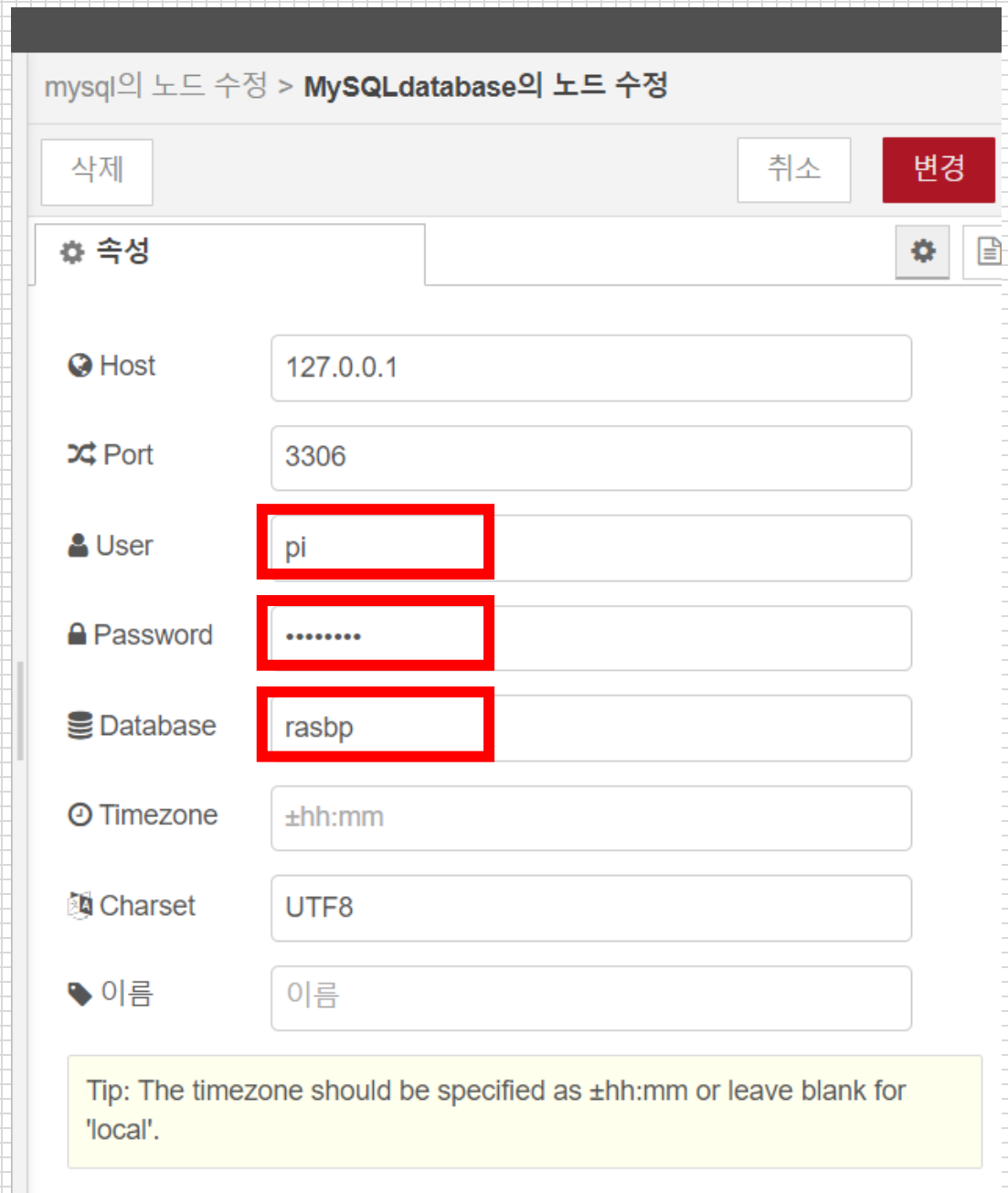
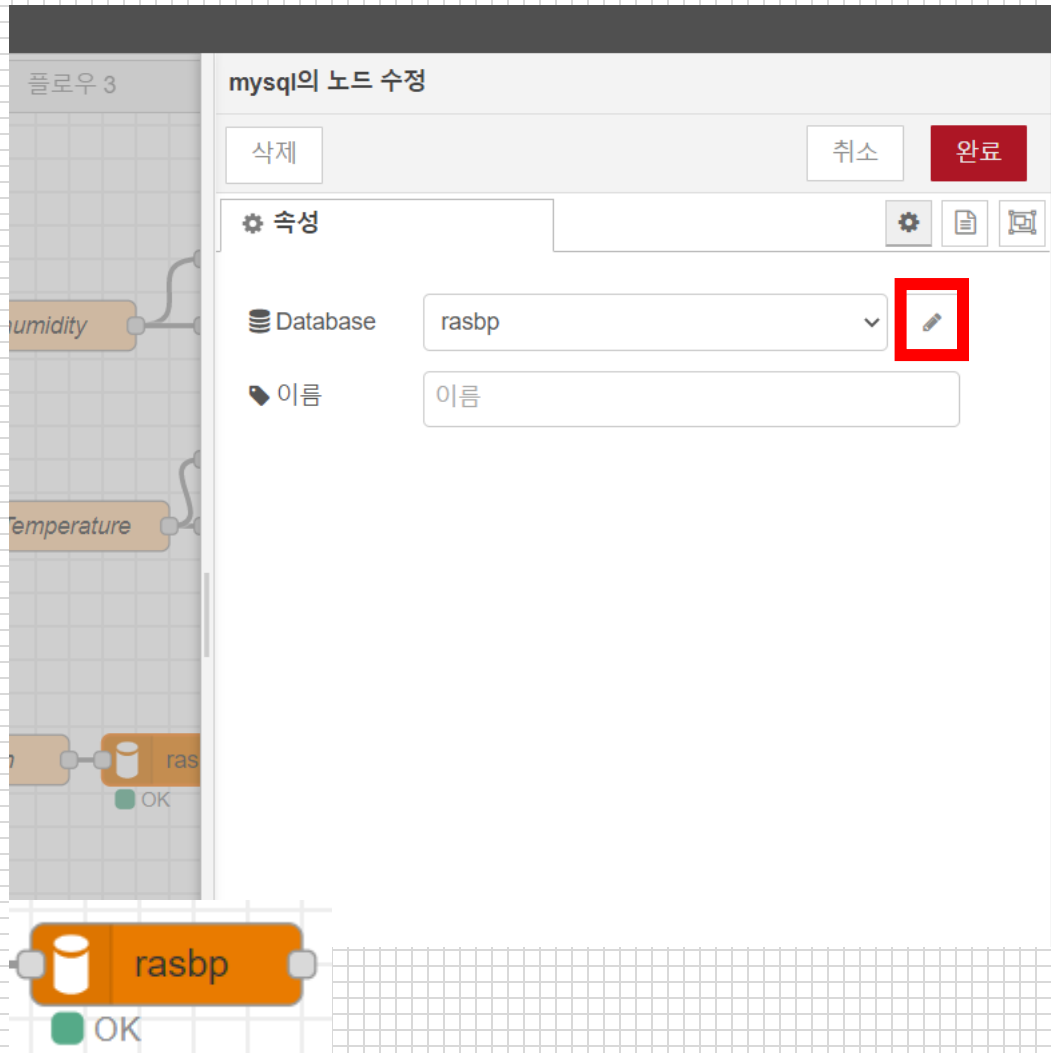
### 2). 각 속성 정의



```
var sensor = msg.topic;
var timezoneOffset = new
Date().getTimezoneOffset() * 60000;
var timezoneDate = new Date(Date.now() -
timezoneOffset);
var time = timezoneDate.toISOString().slice(0,
19).replace("T", " ")
var temp_c = msg.payload;
var temp_f = temp_c * (9 / 5) + 32;
var hump = msg.humidity;
msg.payload = [sensor, time, temp_c, temp_f,
hump]
msg.topic = "INSERT INTO
node_rasbp(sensor,collect_time,temp_c,temp_f,hu
mp)"
msg.topic = msg.topic + "VALUES(?,?,?,?);";
return msg;
```

## 8. node-red 접속하여 작업

### 2). 각 속성 정의

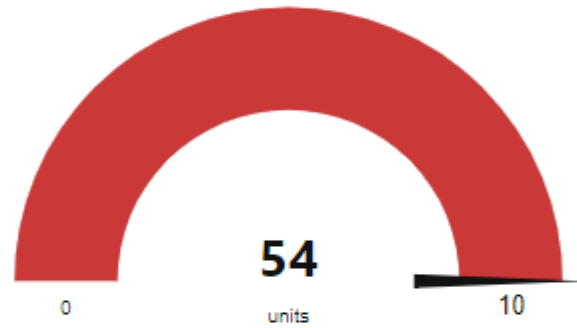




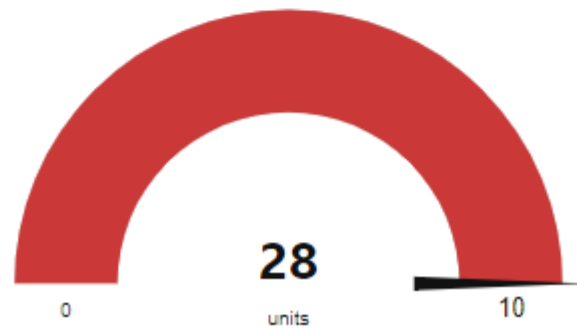
## 9. 대시보드에서 UI 확인

dht11

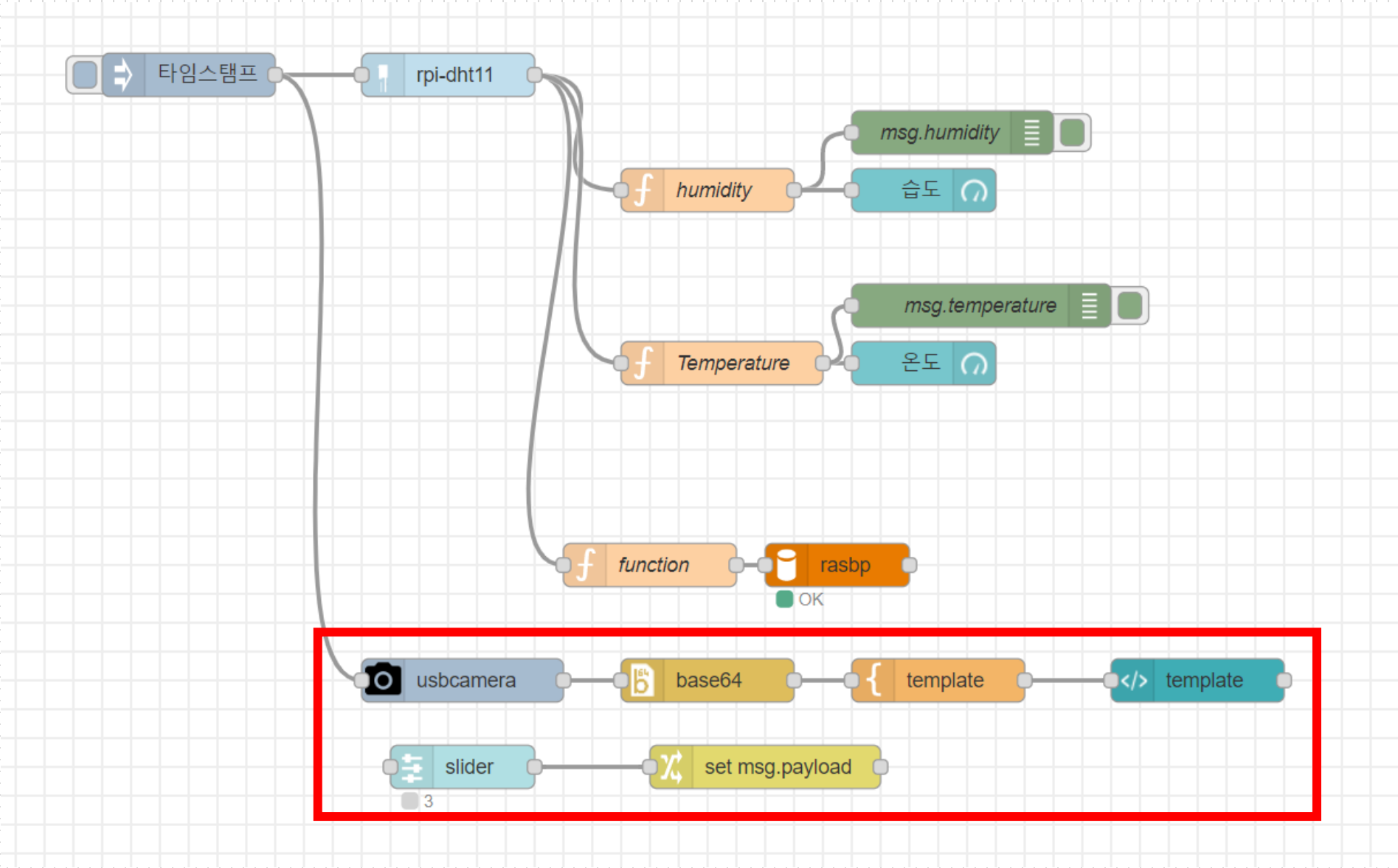
습도



온도



10. 카메라 추가하여 아래와 같이 설정



## 10. 카메라 추가하여 아래와 같이 설정

slider의 노드 수정

삭제 취소 완료

속성

Group [Home] dht11

Size auto

Label slider

Tooltip optional tooltip

Range min 3 max 11 step 0.5

Output continuously while sliding

If msg arrives on input, pass through to output: ☒

When changed, send:

Payload Current value

Topic msg.topic

slider

usbcamera의 노드 수정

삭제 취소 완료

속성

File Mode Buffer

Image Resolution 320x240

Name USB Camera

usbcamera

template의 노드 수정

삭제 취소 완료

속성

Template type Widget in group

Group [Home] dht11

Size auto

Class Optional CSS class name(s) for widget

이름 이름

Template

```
1 <div ng-bind-html=msg.payload></div>
```

template

template의 노드 수정

삭제 취소 완료

속성

이름 이름

프로퍼티 msg.payload

템플릿

```
1 
```

template

## 카메라 결과값 확인

dht11



slider

습도

```

```

## 오류 - 1

Node-red 설치 시 아래와 같은 오류 출력

```
pi@raspberrypi: ~  
File Edit Tabs Help  
Running Node-RED install for user pi at /home/pi on raspbian  
Node-RED v3.x no longer supports Nodejs 12  
  
You can force an install of node 14, 16 or 18 by using the --node14, --node16  
or --node18 parameter.  
However doing so may break some nodes that may need re-installing manually.  
Generally it is recommended to update all nodes to their latest versions before  
upgrading.  
  
If you wish to stay on nodejs 12 you can update to the latest Node-RED 1.x or  
2.x version by adding  
--nodered-version="1.3.7" or --nodered-version="2.2.2" to that install command.  
If in doubt this is the safer option.  
Please backup your installation and flows before upgrading.  
  
Exiting now.
```

해결 방안 – node.js 미설치로 위에 기술한대로 node.js 설치 후 node-red 설치 시 해결

```
pi@raspberrypi: Node-RED update  
File Edit Tabs Help  
Running Node-RED install for user pi at /home/pi on raspbian  
  
This can take 20-30 minutes on the slower Pi versions - please wait.  
  
Stop Node-RED ✓  
Remove old version of Node-RED ✓  
Node option not specified : --node14, --node16, or --node18  
Leave existing Node.js : v14.20.0 Npm 6.14.17  
Clean npm cache -  
Install Node-RED core  
Move global nodes to local  
Npm rebuild existing nodes  
Install extra Pi nodes  
Add shortcut commands  
Update systemd script  
  
Any errors will be logged to /var/log/nodered-install.log
```

```
pi@raspberrypi:~ $ node -v  
v14.20.0  
pi@raspberrypi:~ $
```



오류 - 2

Python 설치 후 예제 파일 실행 시 board가 없는 오류 출력

```
pi@raspberrypi:~ $ python3 dht11_test.py
Traceback (most recent call last):
  File "/home/pi/dht11_test.py", line 2, in <module>
    import board
ModuleNotFoundError: No module named 'board'
pi@raspberrypi:~ $ sudo pip3 install adafruit-blinka
```

sudo pip3 install adafruit-blinka

<https://stackoverflow.com/questions/53196848/importerror-no-module-named-board-adafruit>

해결 방안 : sudo pip3 install adafruit-blinka 명령어로 pip3 설치 후 해결

오류 - 3

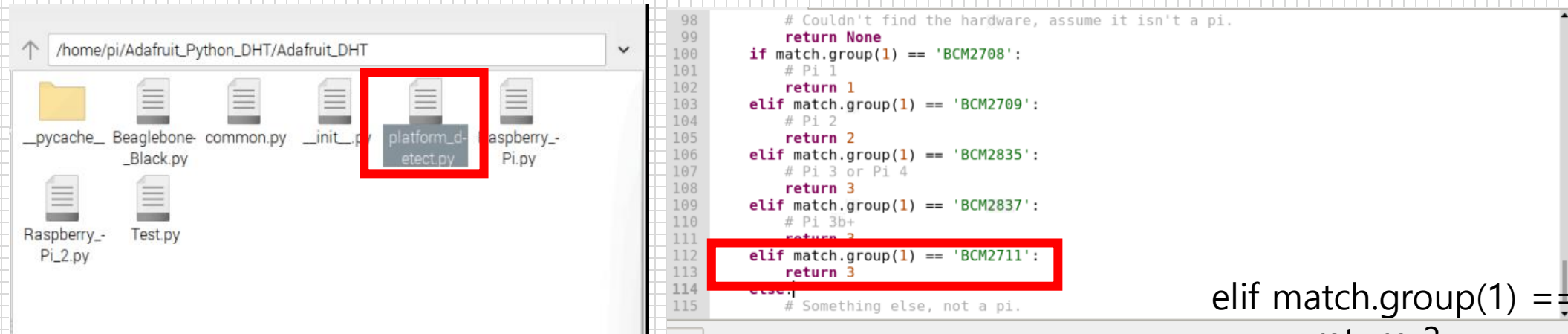
예제 파일 실행 시 Adafruit\_DHT가 없는 오류 출력

```
pi@raspberrypi:~ $ sudo nano test.py
pi@raspberrypi:~ $ python3 test.py
Traceback (most recent call last):
  File "/home/pi/test.py", line 6, in <module>
    import Adafruit_DHT as DHT
ModuleNotFoundError: No module named 'Adafruit_DHT'
pi@raspberrypi:~ $
```

방법 1 : sudo python3 setup.py install / sudo pip3 install Adafruit\_DHT

설치하려 했으나 오류 발생

방법 2 : Adafruit\_DHT 설치 -> 라즈베리파이 관리자 모드 변경 -> python 파일로 Adafruit\_DHT 파일 이동  
-> Adafruit\_DHT 내부에 있는 platform\_detect.py 파일 열기 -> 112번 라인에 이미지와 같이 추가 후 저장



elif match.group(1) == 'BCM2711':  
return 3

오류 - 3

방법 3 : 아래 명령어로 install

`pip3 install adafruit-circuitpython-dht`

`pip3 install adafruit-blinka`

`sudo apt-get install mariadb-server`

## 참고 자료 URL

<https://blog.naver.com/PostView.nhn?blogId=emperonics&logNo=222092518468>

<https://docs.circuitpython.org/projects/dht/en/latest/>

<https://power-of-optimism.tistory.com/10>

<https://fishpoint.tistory.com/5224>

<https://blog.naver.com/PostView.nhn?blogId=agapeuni&logNo=222135758778>

<https://bradheo.tistory.com/entry/%EB%9D%BC%EC%A6%88%EB%B2%A0%EB%A6%AC%ED%8C%8C%EC%9D%B4-%EC%98%A8%EC%8A%B5%EB%8F%84-%EC%84%BC%EC%84%9Cdht11>

<https://github.com/traveller59/spconv/issues/484>

해결 방안 : 위 자료를 검색하여 install하였으나 오류 발생으로 라즈베리파이 os 재설치 후 자료 참고하여 install 및 방법1, 2, 3을 실행하여 시간을 둔 후 작업하였더니 해결되었음.