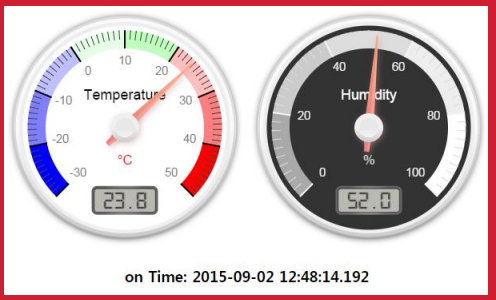
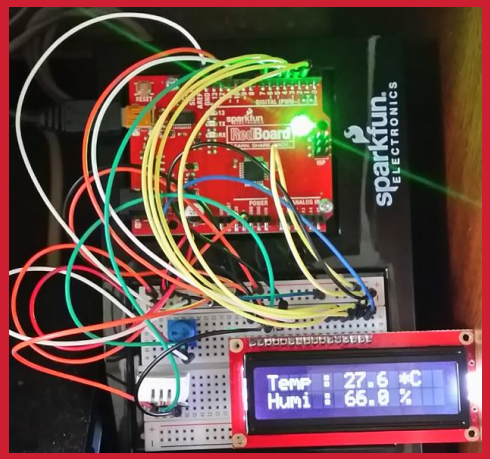




Healthcare-IOT

[wk02]

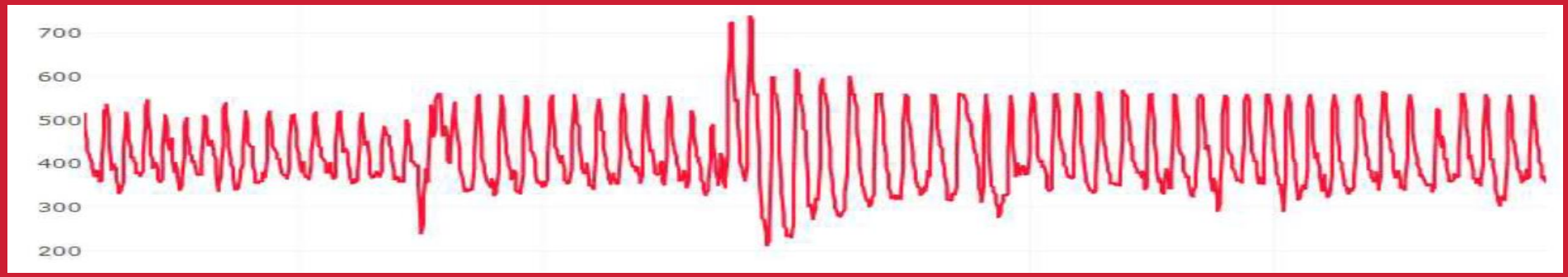
Start Node.js

Visualization of Healthcare Signals using Arduino & Node.js

HCit, INJE University

1st semester, 2018

Email : chaos21c@gmail.com



My ID

오전

성명	ID
김민선	HS01
김영걸	HS02
김주란	HS03
김주현	HS04
김태민	HS05
여준하	HS06
이수민	HS07
정민지	HS08
정유현	HS09
정재은	HS10
주하영	HS11
한준영	HS12

오후

성명	ID
신영주	HS21
오가영	HS22
윤민수	HS23
윤진아	HS24
이진영	HS25
임상은	HS26
임재형	HS27
최민영	HS28
황유빈	HS29

주간계획서

주간계획서			
주차	수업방법	수업내용	과제물
1	강의/실습	수업 및 실습 안내 -포터블 소프트웨어 설치	
2	강의/실습	Node.js I - Node.js 코드의 기본 구조 - 기초 Node 서버 및 클라이언트	실습확인
3	강의/실습	Node.js II - Node.js Express 서버	실습확인
4	강의/실습/발표	Arduino I - 아날로그 신호 회로 - LCD를 이용한 센서 신호 모니터링	실습확인
5	강의/실습	Arduino II - 단일 센서 회로와 Node.js 연결 - 다중 센서 회로와 Node.js 연결	실습확인
6	강의/실습	프로젝트1 - 생체 센서 회로와 Node.js 연결 - 생체 신호 소개	프로젝트1
7	강의/실습/발표	IOT 데이터 시각화 I (Plotly.js) - 데이터 및 시계열 차트 - 데이터 스트리밍	실습확인
8	시험	중간고사	
9	강의/실습	IOT 데이터 시각화 II (Plotly.js) - 다중 센서 데이터 시각화 - 다중 센서 데이터 스트리밍	실습확인
10	강의/실습/발표	프로젝트II - 생체 센서 데이터 시각화 - 생체 센서 데이터 스트리밍	프로젝트II
11	강의/실습	IOT 데이터 저장과 처리 - MongoDB 설치 및 Mongo shell - MongoDB와 Node.js 연결 및 데이터 저장	실습확인
12	강의/실습	프로젝트III - MongoDB에 IOT 데이터 저장 및 모니터링 - 생체 센서 데이터 저장 및 시각화	프로젝트III
13	강의/실습	IOT 데이터 마이닝 - 아두이노에서 발생된 데이터 관리 - 데이터마이닝 소개	실습확인
14	강의/실습/발표	프로젝트IV - 생체 센서 데이터 관리 - 생체 센서 데이터 마이닝	프로젝트IV
15	시험	기말고사	

Purpose of HS

주요 수업 목표는 다음과 같다.

1. Node.js를 이용한 아두이노 센서 신호 처리
2. Plotly.js를 이용한 아두이노 센서 신호 시각화
3. MongoDB에 아두이노 센서 데이터 저장 및 처리
4. 생체 센서 발생 신호 처리, 시각화 및 저장
5. 생체 센서 발생 신호 저장 및 분석
6. 생체 신호 장비 활용 능력

[Review]

- [wk01]
  - test : hsnn.html

wk01 : aann.html

- [Target of this week] Make **hsnn.html** using Sublime text3

wk01 : hsnn.html (2nd method)

서브라임텍스트3 에서 html파일 크롬으로 실행하기

1 댓글

서브라임텍스트3에서 html파일을 작업하다가 페이지를 바로 크롬 브라우저로 실행하는 방법이다.

1. 서브라임텍스트3 에서 Tools > Build System > New Build System

```
{
"cmd":
["c:\\ProgramFiles\\Google\\Chrome\\Application\\chrome.exe","$file"]
}
```

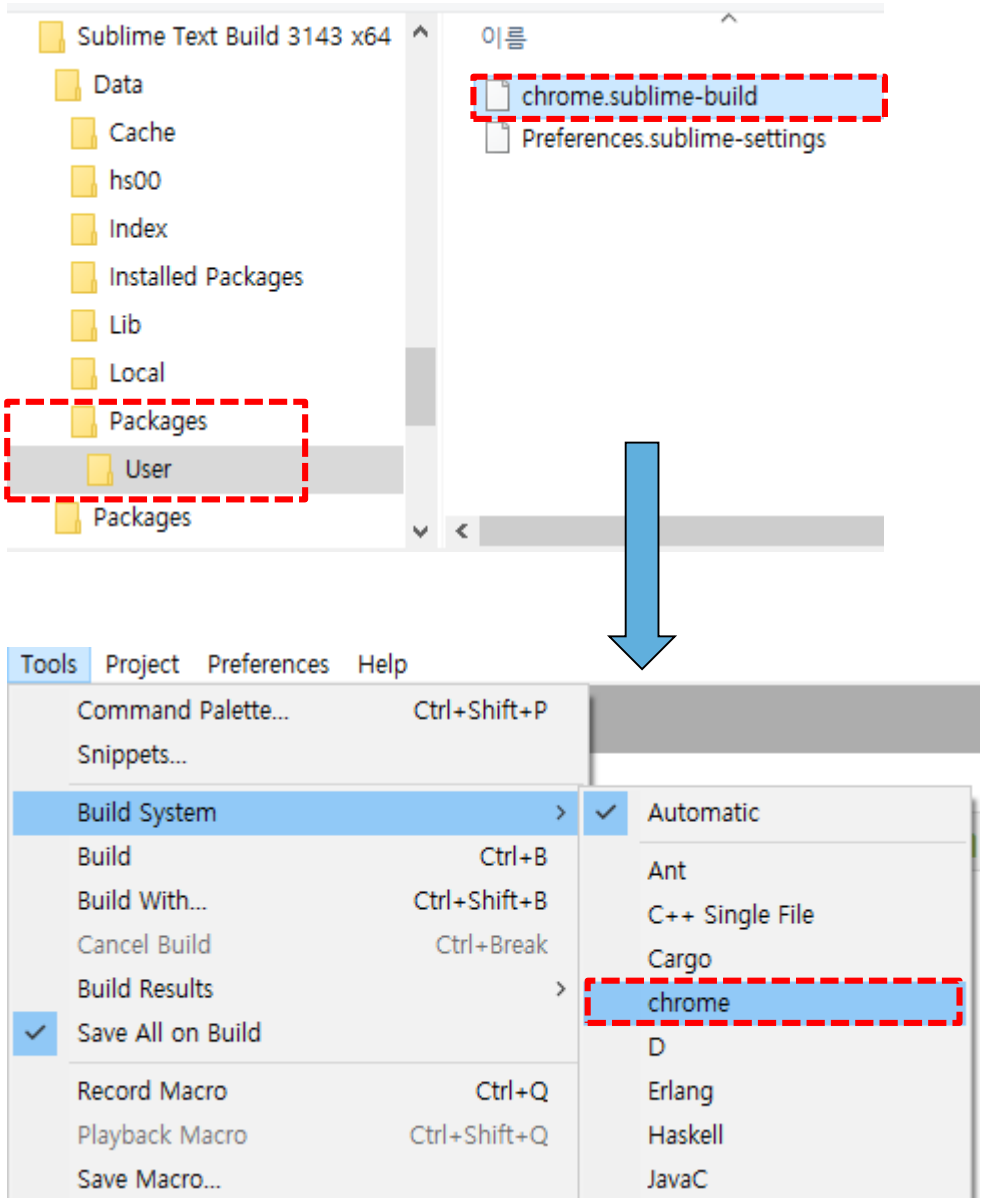
2. 위와 같이 작성하고 Chrome.sublime-build 이름으로 저장한다.

여기서 주의해야할 사항은 Chrome.exe 위치가 다를 수도 있으니 확인해보고 작성한다. 나는 programFilex (x86) 에 있어서 수정하고 적용했다. 그리고 역슬래시는 두개씩(₩₩) 들어간다.

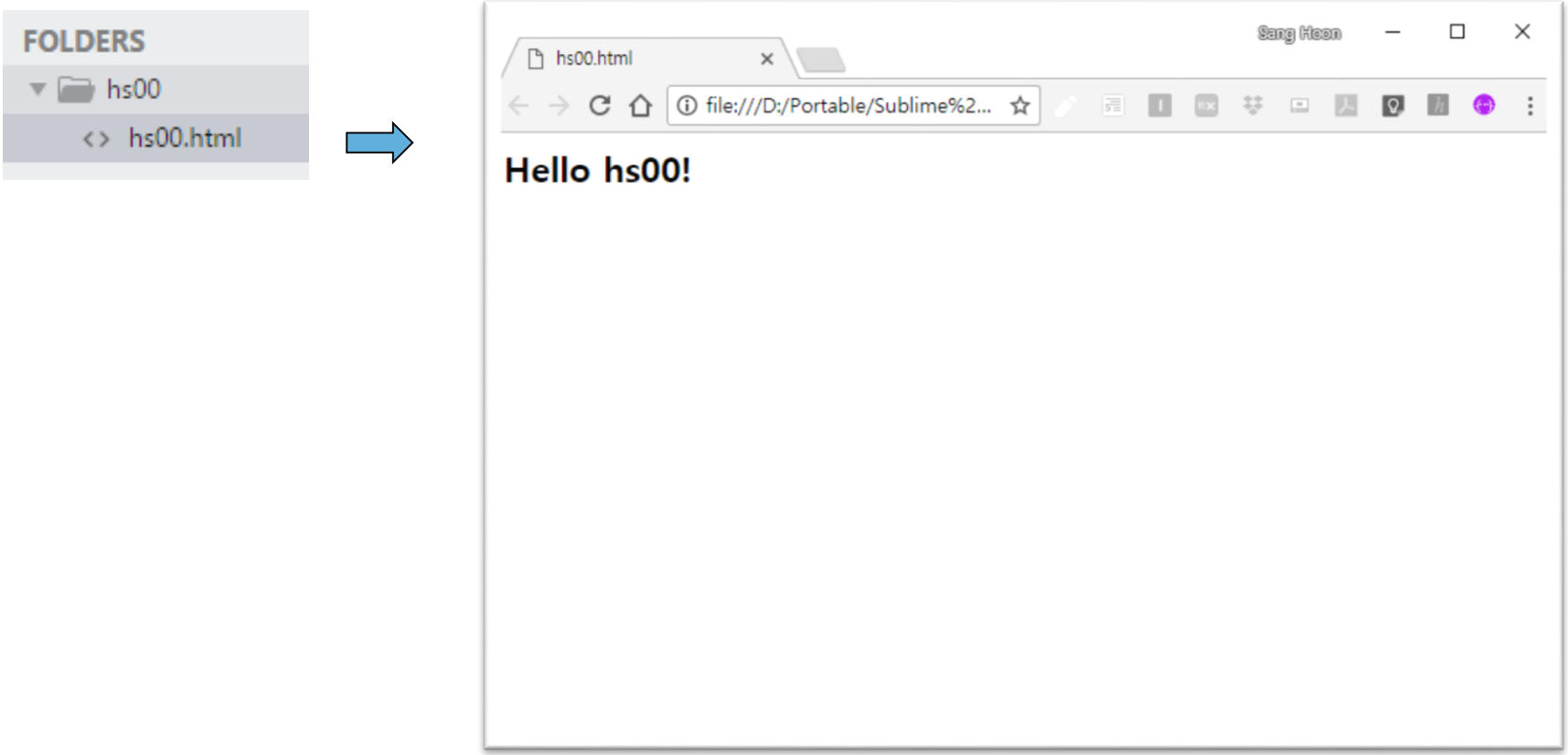
3. 프로그램을 재실행 한 후 Tools > Build System에 Chrome이라고 생겼으면 확인하고 선택한다.

4. html 파일에서 Ctrl + b를 누르면 크롬에서 바로 실행된다.

wk01 : hsnn.html

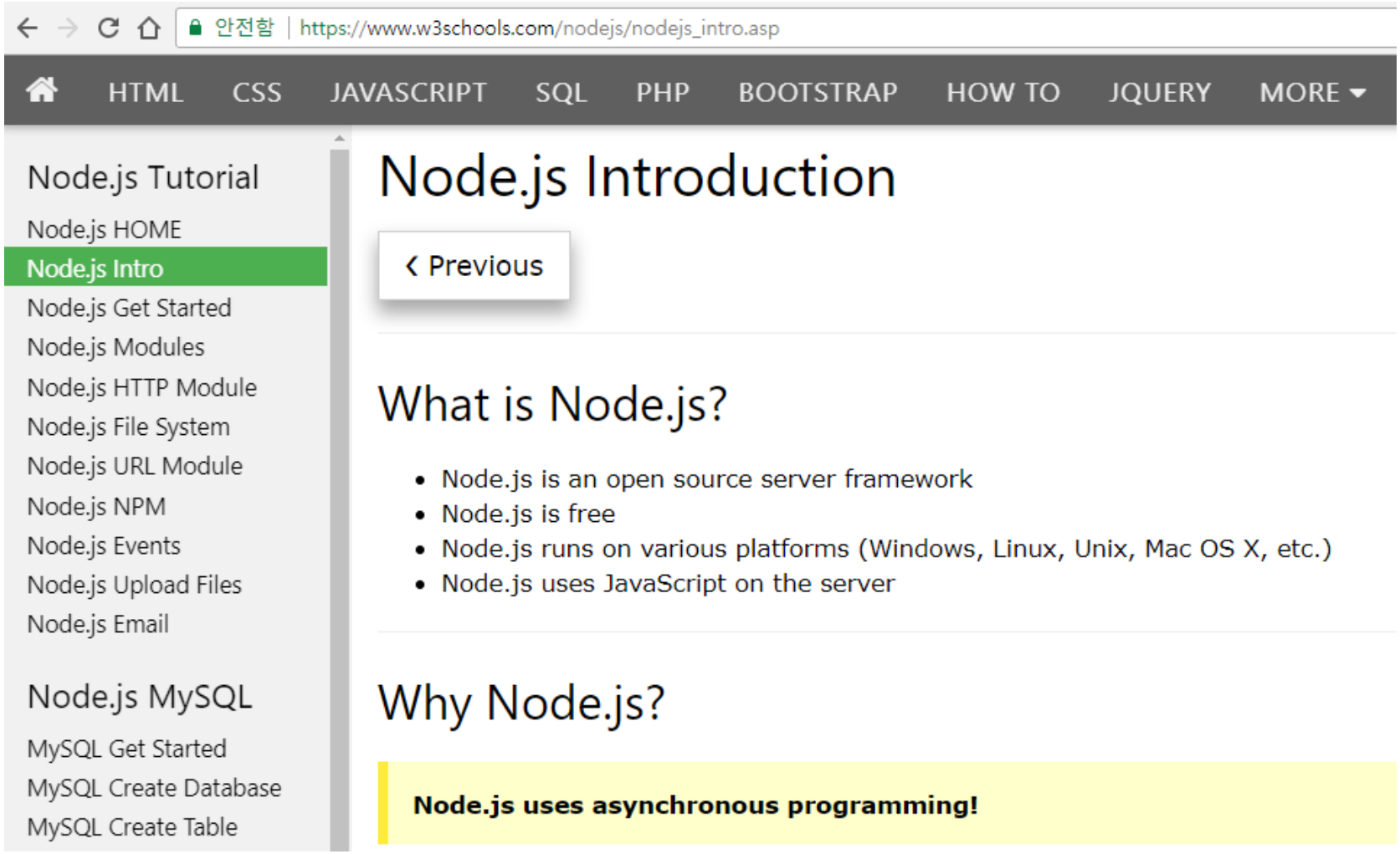


wk01 : hsnn.html – result!



1.0 What is node.js?

1.0 What is node.js?



https://www.w3schools.com/nodejs/nodejs_intro.asp

Javascript on Server

Node.js is an open-source, runtime environment for developing server-side and network applications in JavaScript.

Its event-driven architecture and non-blocking I/O model makes it ideal for building real-time applications that run across distributed devices.

1.1 What is node.js?

1.2 What is node.js?

- Node.js® is a JavaScript runtime built on Chrome's V8 JavaScript engine.
- Node.js uses an event-driven, non-blocking I/O model that makes it lightweight and efficient.
- Node.js' package ecosystem, npm, is the largest ecosystem of open source libraries in the world.

1.3 Non-blocking IO

Blocking Code

```
var contents = readFile('/path/some/file.txt');
console.log(contents);
console.log('Another independent operation');
```

Non-Blocking Code

```
var contents = readFile('/path/some/file.txt', function(err, contents){
      console.log(err || contents);
     });

console.log('Another independent operation');
```

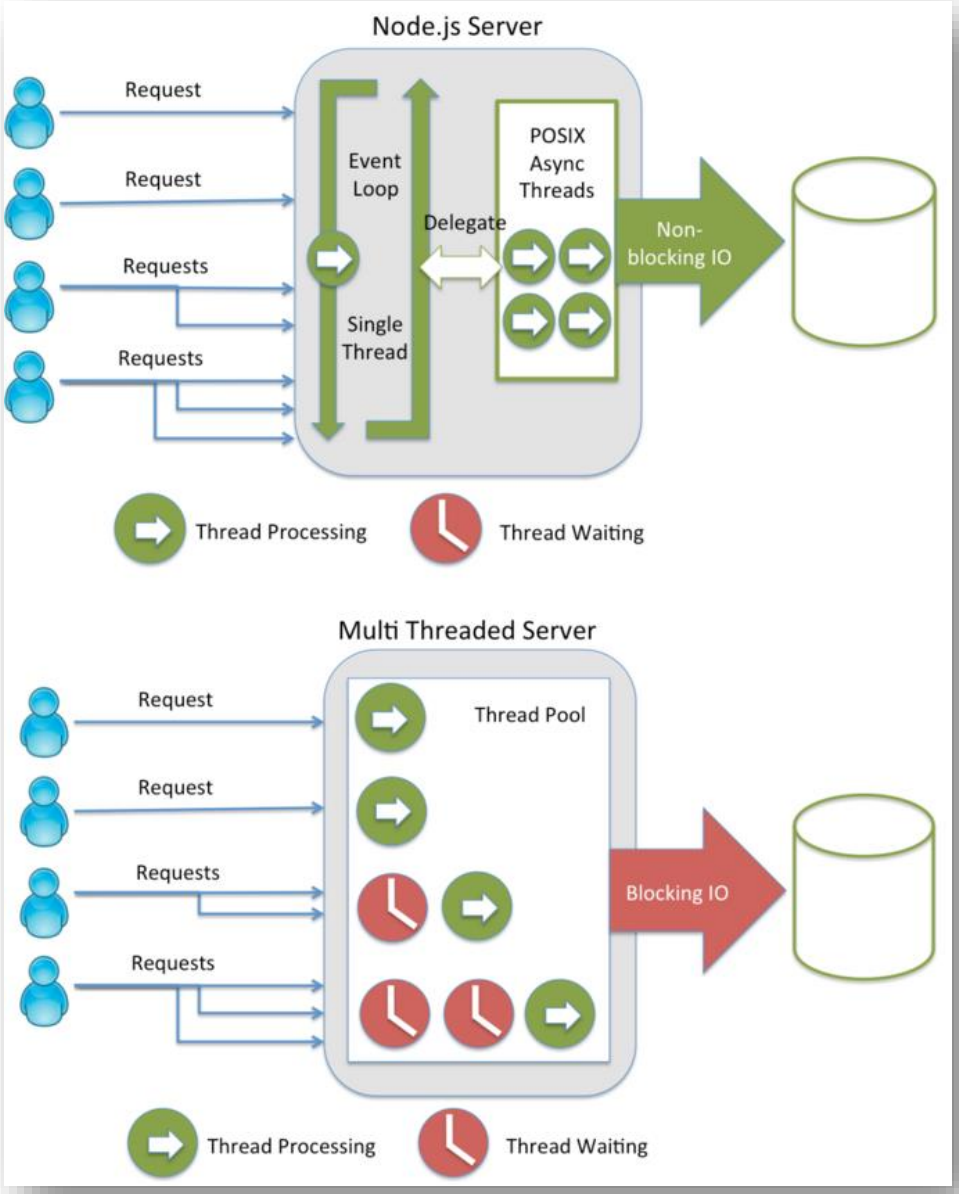
[Quiz] 계란 1개를 삶을 때 10분이 걸린다.

그러면 계란 10개를 삶을 대 걸리는 시간은?

Blocking : ?

Non-blocking : ?

1.3 Non-blocking IO



Single thread

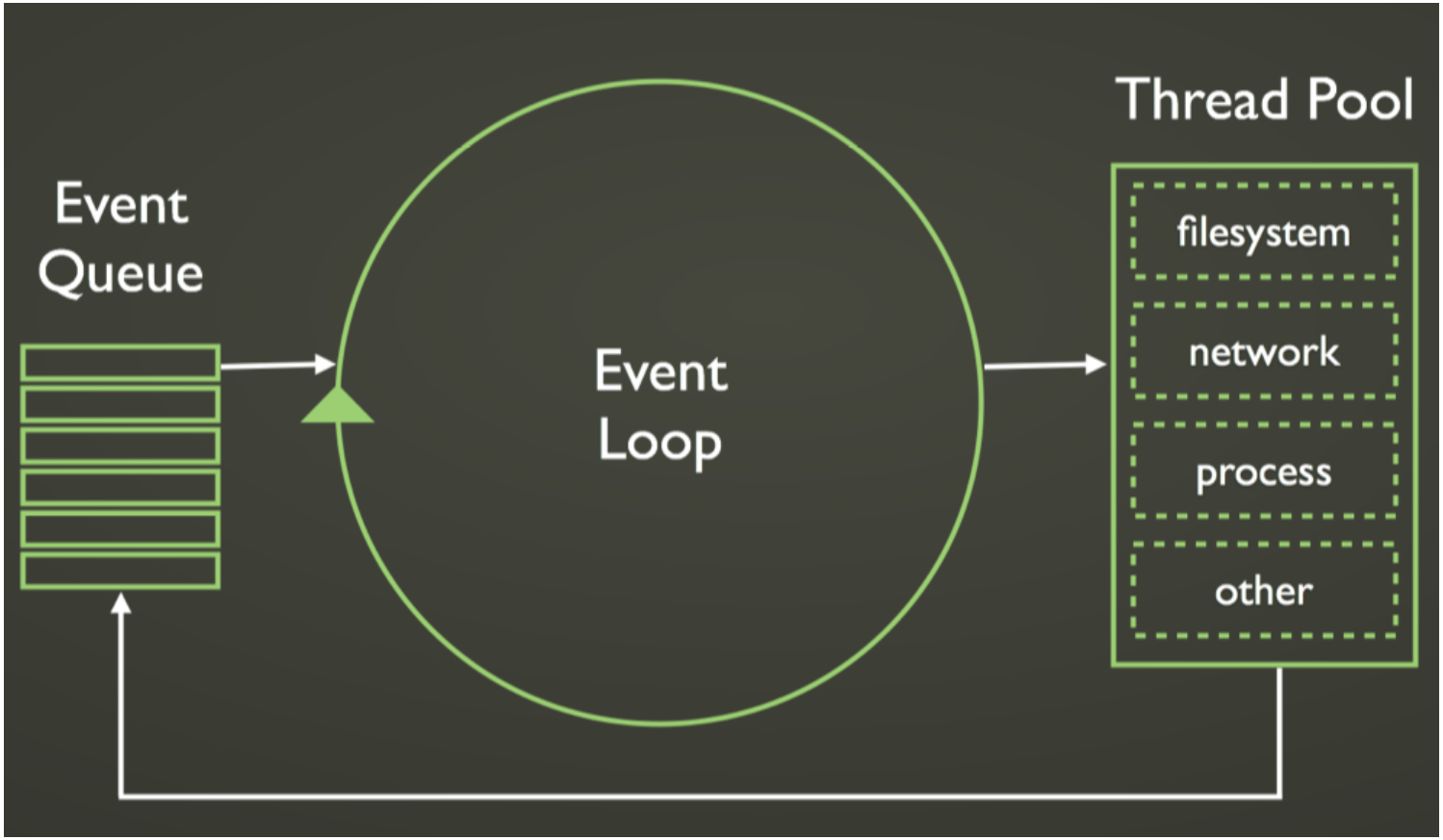
Non-blocking IO

Multi thread

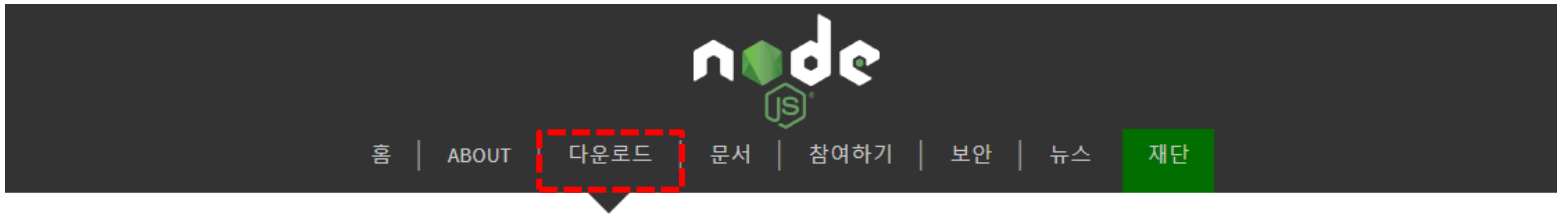
Blocking IO

https://strongloop.com/strongblog/node-js-is-faster-than-java/

1.4 Non-blocking event loop



2.1 Install node.js



다운로드

최신 LTS 버전: **8.10.0** (includes npm 5.6.0)

플랫폼에 맞게 미리 빌드된 Node.js 인스톨러나 소스코드를 다운받아서 바로 개발을 시작하세요.

LTS 대다수 사용자에게 추천	현재 버전 최신 기능

Windows Installer	macOS Installer	Source Code
node-v8.10.0-x64.msi	node-v8.10.0.pkg	node-v8.10.0.tar.gz

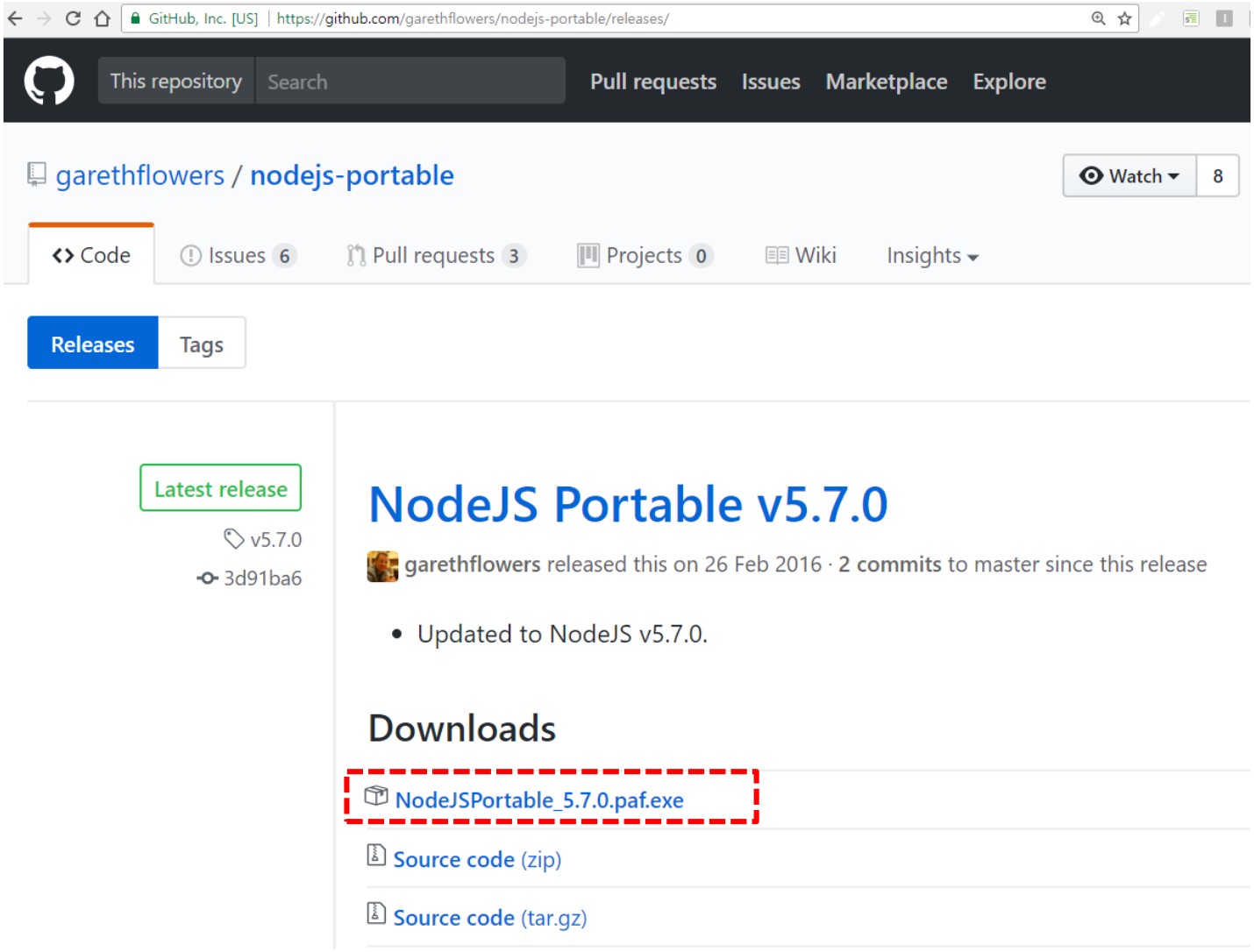
Windows Installer (.msi)	32-bit	64-bit	
Windows Binary (.zip)	32-bit	64-bit	
macOS Installer (.pkg)	64-bit		
macOS Binary (.tar.gz)	64-bit		
Linux Binaries (x86/x64)	32-bit	64-bit	
Linux Binaries (ARM)	ARMv6	ARMv7	ARMv8
Source Code	node-v8.10.0.tar.gz		

https://nodejs.org/ko

2.2 Install node.js portable

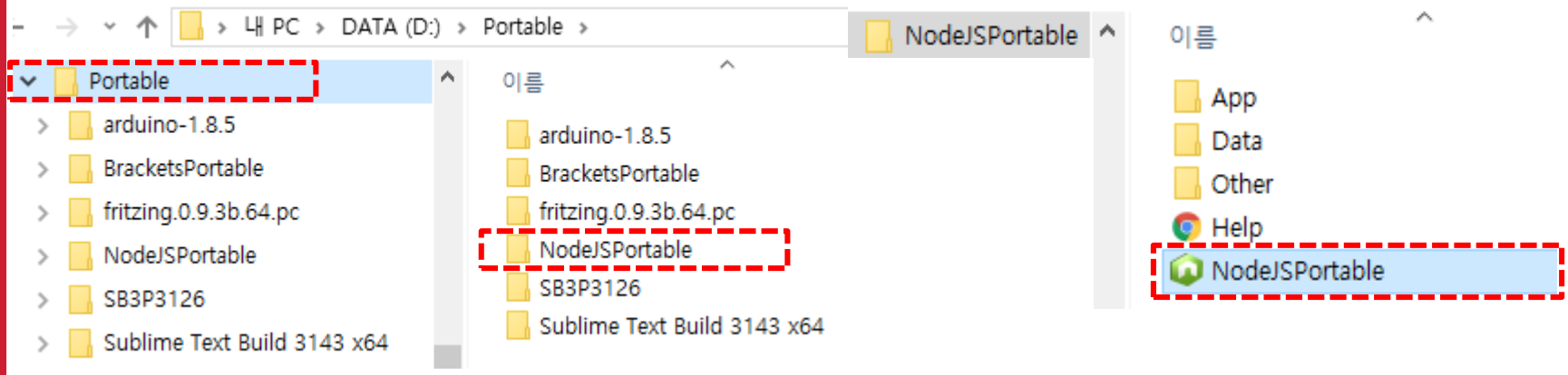
https://gareth.flowers/nodejs-portable/

2.2 Install node.js portable

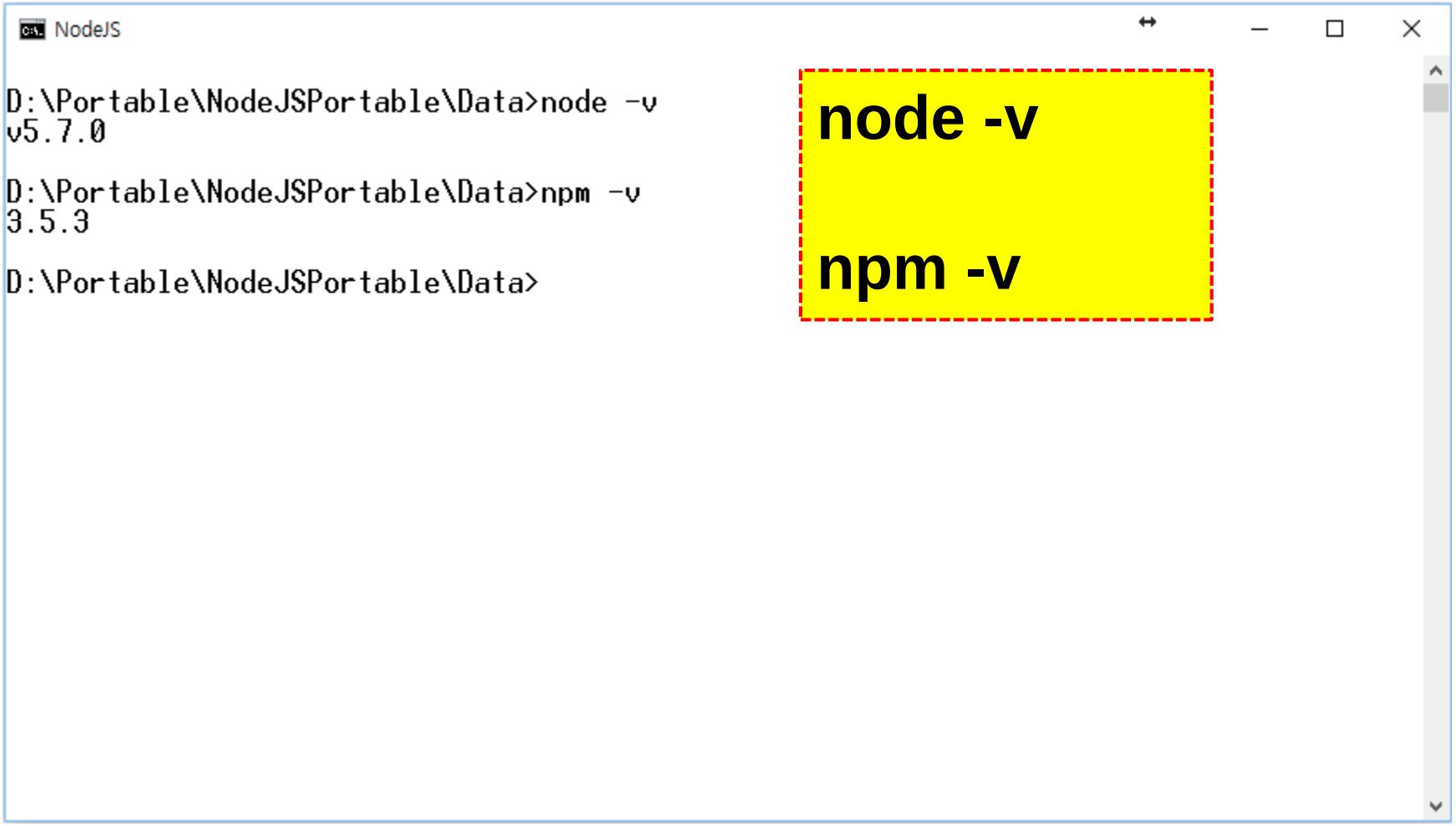


https://github.com/garethflowers/nodejs-portable/releases/

2.2 Install node.js portable



2.3.1 Verify installation



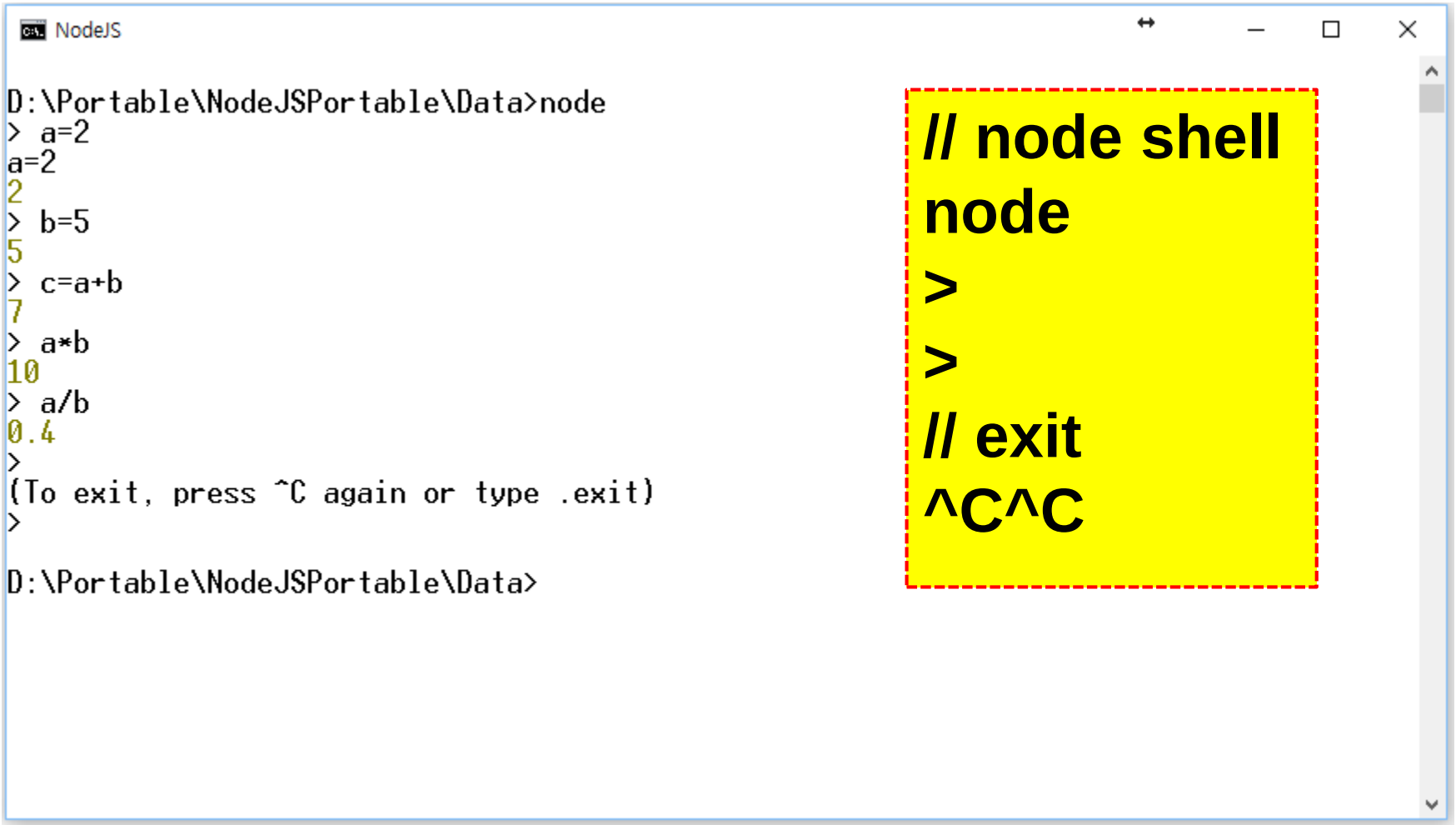
2.3.2 Check node folders.

NodeJS

```
D:\Portable\NodeJSPortable\Data>dir
 D 드라이브의 볼륨: DATA
 볼륨 일련 번호: 7A01-106A

 D:\Portable\NodeJSPortable\Data 디렉터리

2017-12-28  오후 01:53    <DIR>          .
2017-12-28  오후 01:53    <DIR>          ..
2016-02-26  오전 04:36             6,148 .DS_Store
2017-12-28  오후 01:53    <DIR>          node_modules
2015-10-15  오전 07:21               296 npm
2015-10-15  오전 07:21               204 npm.cmd
2017-12-28  오후 01:53                89 PortableApps.comLauncherRuntimeData-NodeJSPortable.ini
2017-12-28  오후 01:53    <DIR>          settings
2017-12-28  오후 01:53    <DIR>          Temp
               4개 파일                 6,737 바이트
               5개 디렉터리  902,995,701,760 바이트 남음

D:\Portable\NodeJSPortable\Data>
```

Data folder

2.4 Testing node.js – node shell

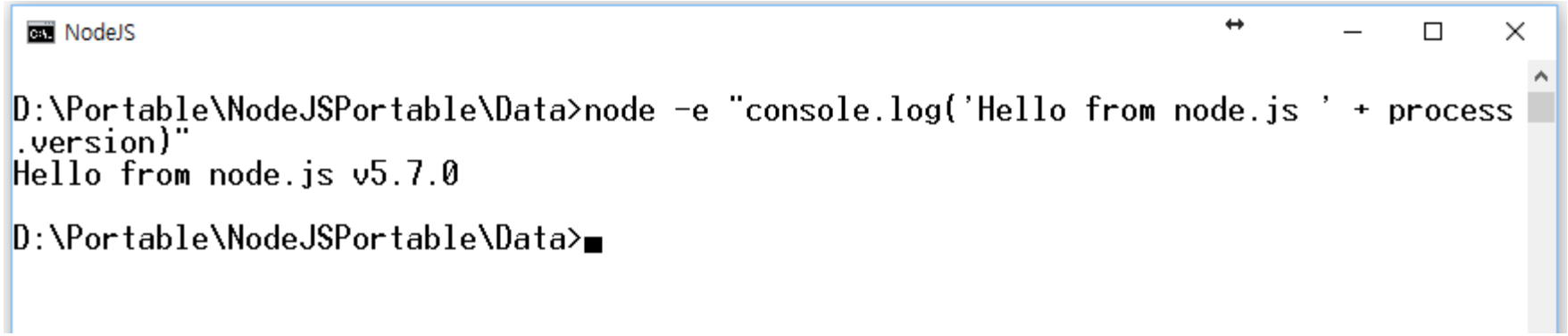


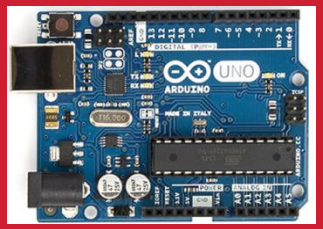
// node shell
node
>
>
// exit
^C^C

2.5 Testing node.js – final test

Final test if Node.js was installed correctly:

```
node -e "console.log('Hello from node.js ' + process.version)"
```





Using node.js in Sublime text 3

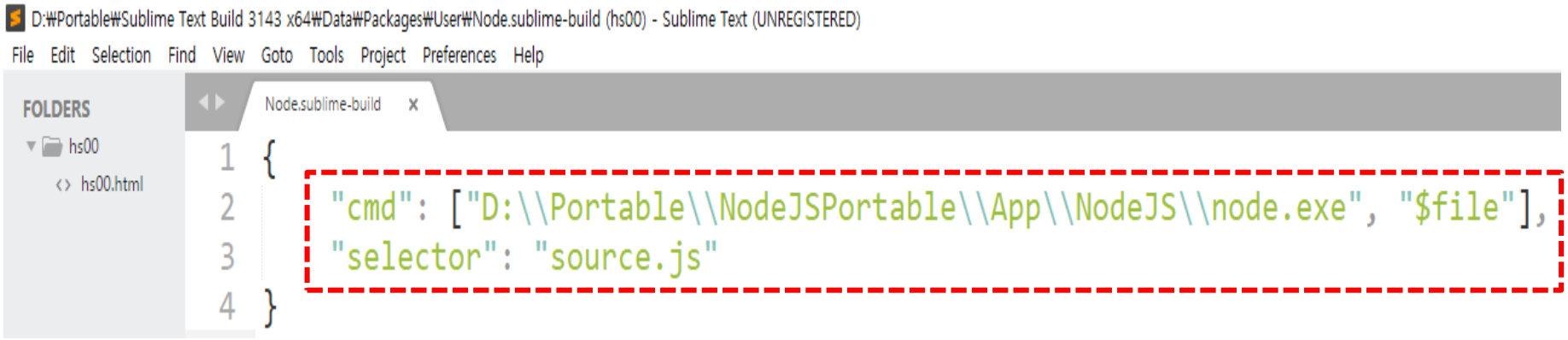
→ Node build system

3.1 Using node.js in Sublime text 3

- **Node.js 연결 : Tools > Build System > New Build System**

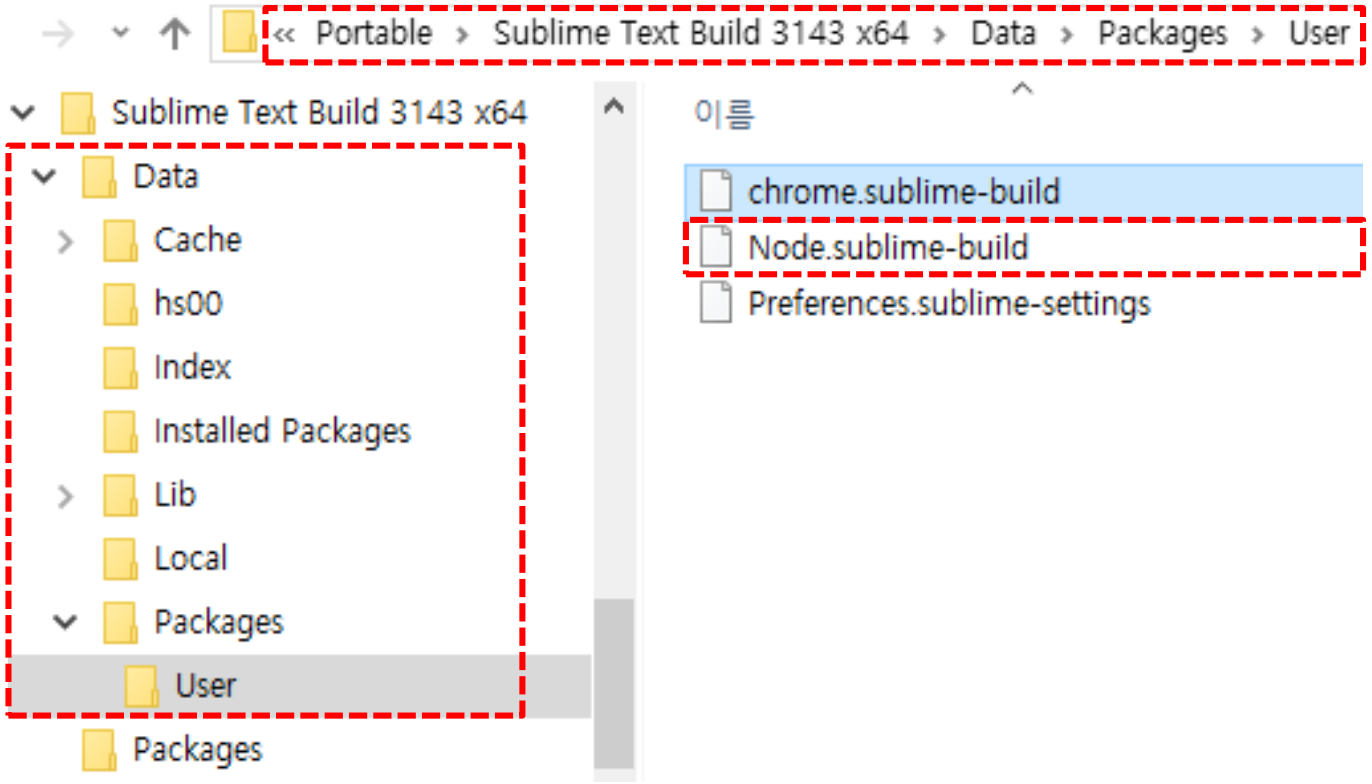
```
{
        "cmd": ["node.exe path", "$file"],
        "selector": "source.js"
}
```

Node.sublime-build 로 저장



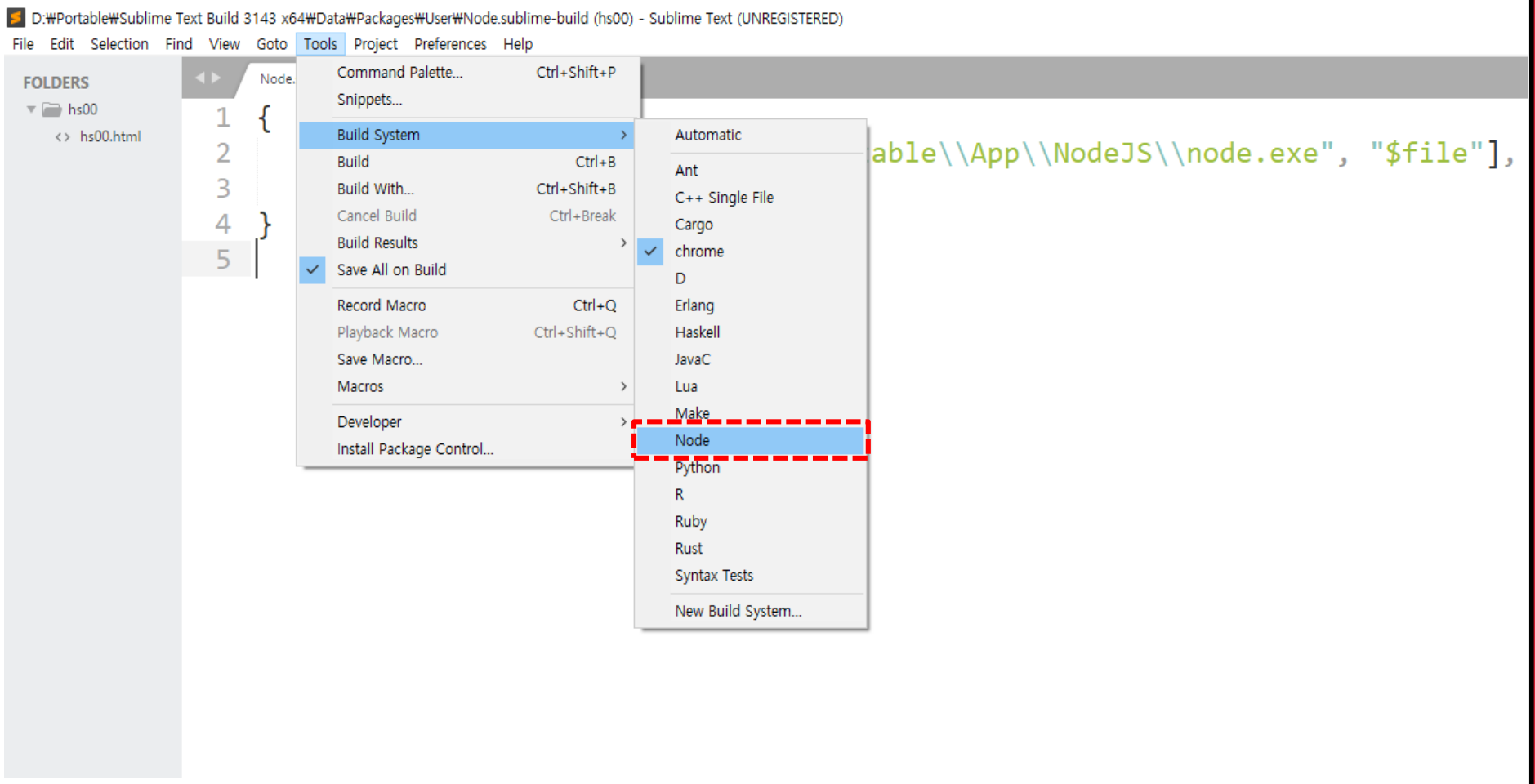
3.2 Using node.js in Sublime text 3

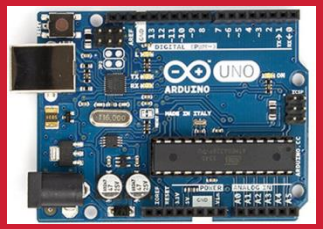
- Node.js 설정 파일 저장 폴더 확인



3.3 Using node.js in Sublime text 3

- Node.js 연결 : **Check node from Build System**





Node.js Project

npm init

4.1 Node project : md hsnn

```
NodeJS
D:\Portable\NodeJSPortable\Data>md hs00

D:\Portable\NodeJSPortable\Data>cd hs00

D:\Portable\NodeJSPortable\Data\hs00>dir
 D 드라이브의 볼륨: DATA
 볼륨 일련 번호: 7A01-106A

 D:\Portable\NodeJSPortable\Data\hs00 디렉터리

2018-03-14  오후 01:05    <DIR>          .
2018-03-14  오후 01:05    <DIR>          ..
               0개 파일                   0 바이트
               2개 디렉터리  890,091,855,872 바이트 남음

D:\Portable\NodeJSPortable\Data\hs00>md start

D:\Portable\NodeJSPortable\Data\hs00>cd start

D:\Portable\NodeJSPortable\Data\hs00\start>dir
 D 드라이브의 볼륨: DATA
 볼륨 일련 번호: 7A01-106A

 D:\Portable\NodeJSPortable\Data\hs00\start 디렉터리

2018-03-14  오후 01:11    <DIR>          .
2018-03-14  오후 01:11    <DIR>          ..
               0개 파일                   0 바이트
               2개 디렉터리  890,091,855,872 바이트 남음

D:\Portable\NodeJSPortable\Data\hs00\start>
```

// node cmd

md hs00

cd hs00

4.2 Node project : npm init

```
npm

D:\Portable\NodeJSPortable\Data\hs00\start>npm init
This utility will walk you through creating a package.json file.
It only covers the most common items, and tries to guess sensible defaults.

See 'npm help json' for definitive documentation on these fields
and exactly what they do.

Use 'npm install <pkg> --save' afterwards to install a package and
save it as a dependency in the package.json file.

Press ^C at any time to quit.
name: (start)
version: (1.0.0)
description: start node project
entry point: (index.js)
test command:
git repository:
keywords: test
author: hs00
license: (ISC) MIT
About to write to D:\Portable\NodeJSPortable\Data\hs00\start\package.json:

{
  "name": "start",
  "version": "1.0.0",
  "description": "start node project",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [
    "test"
  ],
  "author": "hs00",
  "license": "MIT"
}


Is this ok? (yes)
```

// node project

npm init

4.3.1 Node project : package.json

NodeJS

```
D:\Portable\NodeJSPortable\Data\hs00\start>dir
 D 드라이브의 볼륨: DATA
 볼륨 일련 번호: 7A01-106A

 D:\Portable\NodeJSPortable\Data\hs00\start 디렉터리

2018-03-14  오후 01:21    <DIR>          .
2018-03-14  오후 01:21    <DIR>          ..
2018-03-14  오후 01:21               255 package.json
               1개 파일                 255 바이트
               2개 디렉터리  890,091,794,432 바이트 남음

D:\Portable\NodeJSPortable\Data\hs00\start>
```

4.3.2 Node project：package.json

package.json

type package.json

Use “cat” when “type” does not work

NodeJS

```
D:\Portable\NodeJSPortable\Data\hs00\start>type package.json
{
  "name": "start",
  "version": "1.0.0",
  "description": "start node project",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [
    "test"
  ],
  "author": "hs00",
  "license": "MIT"
}

D:\Portable\NodeJSPortable\Data\hs00\start>
```

Save as HSnn_package.png

4.4 Node project : package.json

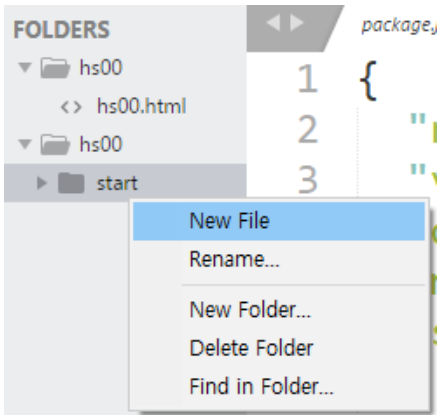
Sublime Text 3

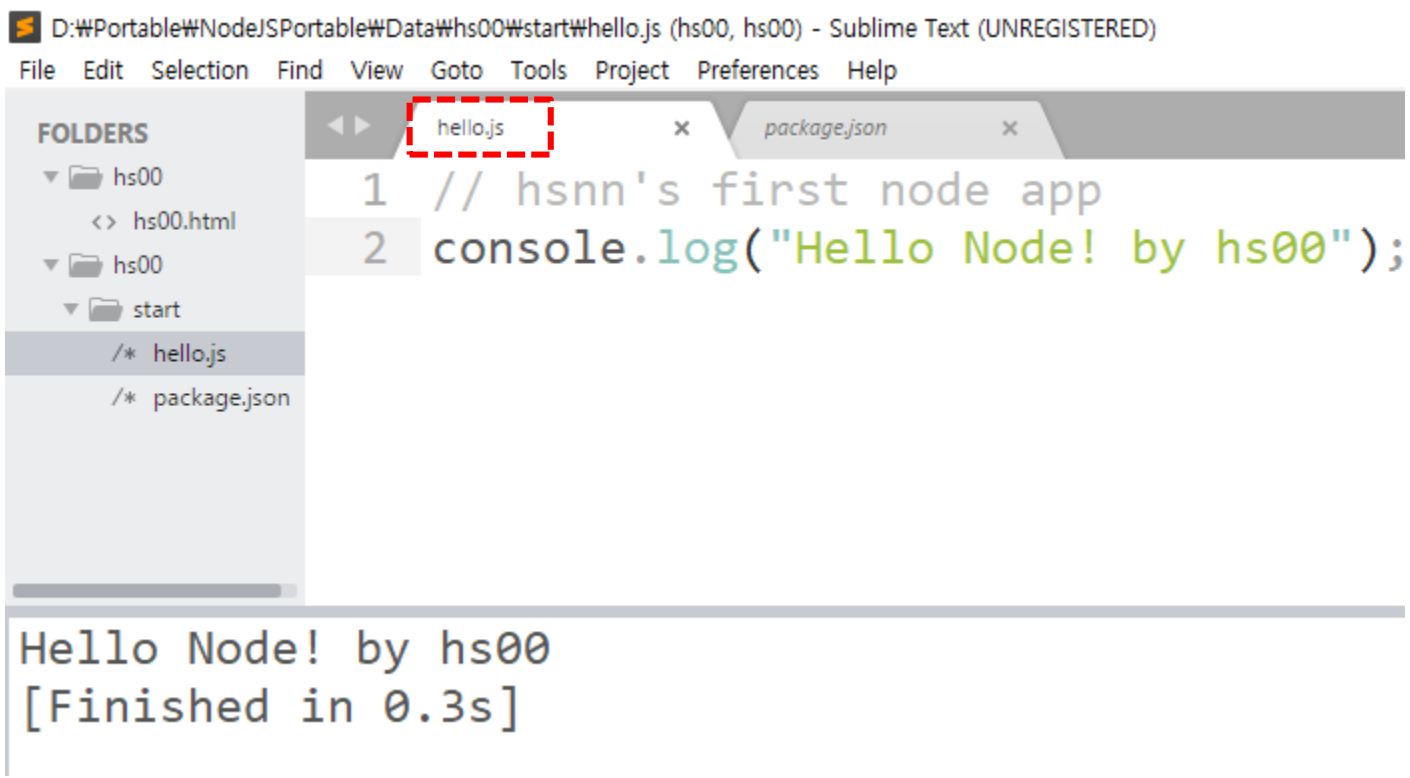
Project > Add Folder to Project

Select folder: NodeJSPortable/Data/hs00

Node Apps

5.1.1 Hello Node! – hello.js





Build system을 Node로 지정 후 ^B로 실행

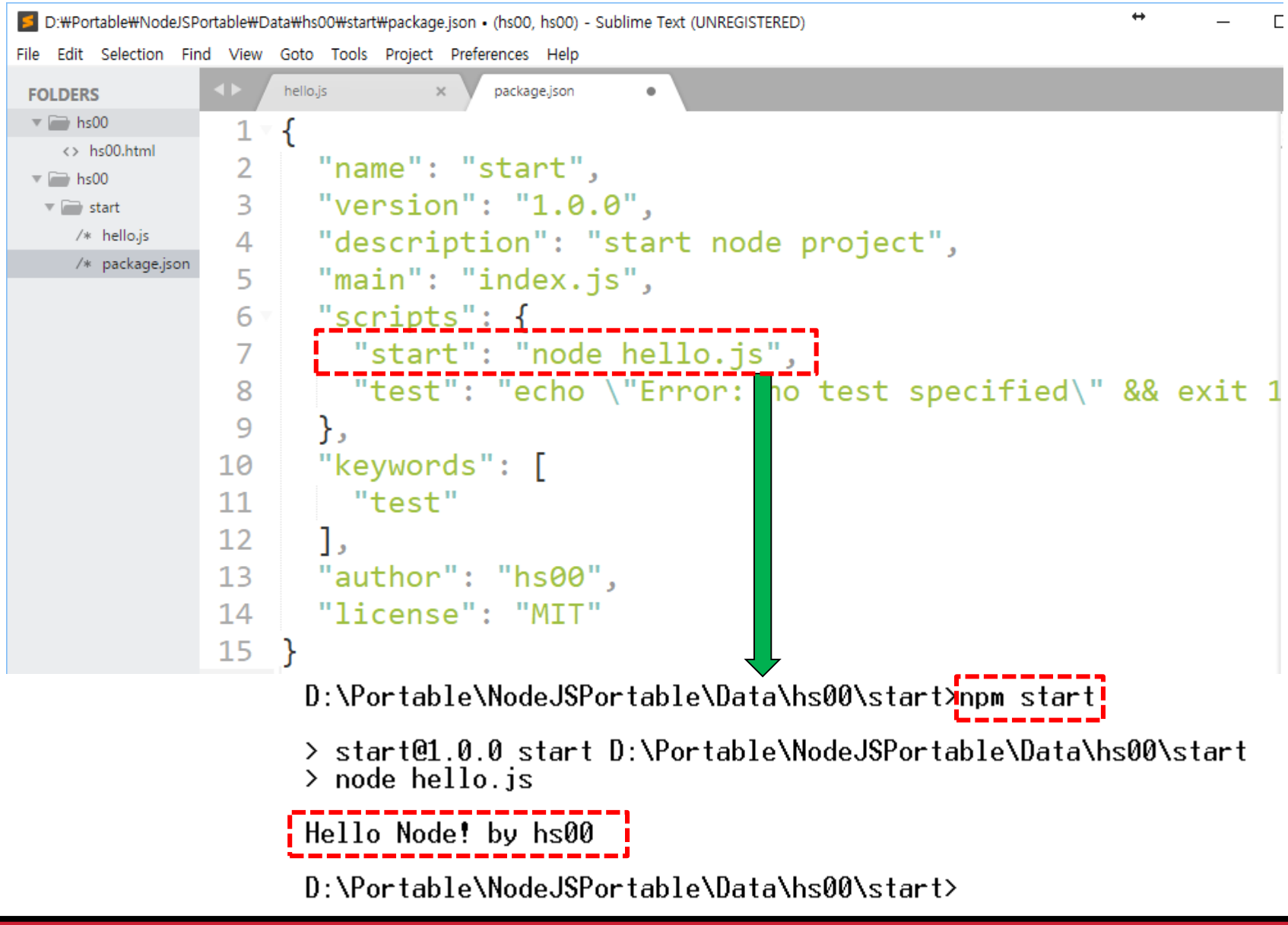
5.1.2 Hello Node! – “node hello.js”

Node cmd에서 “node hello” 로 실행

```
NodeJS

D:\Portable\NodeJSPortable\Data\hs00\start>dir
 D 드라이브의 볼륨: DATA
 볼륨 일련 번호: 7A01-106A

 D:\Portable\NodeJSPortable\Data\hs00\start 디렉터리

2018-03-14  오후 01:43    <DIR>          .
2018-03-14  오후 01:43    <DIR>          ..
2018-03-14  오후 01:43                61 hello.js
2018-03-14  오후 01:21               255 package.json
               2개 파일                 316 바이트
               2개 디렉터리  890,091,540,480 바이트 남음

D:\Portable\NodeJSPortable\Data\hs00\start>node hello
Hello Node! by hs00

D:\Portable\NodeJSPortable\Data\hs00\start>
```

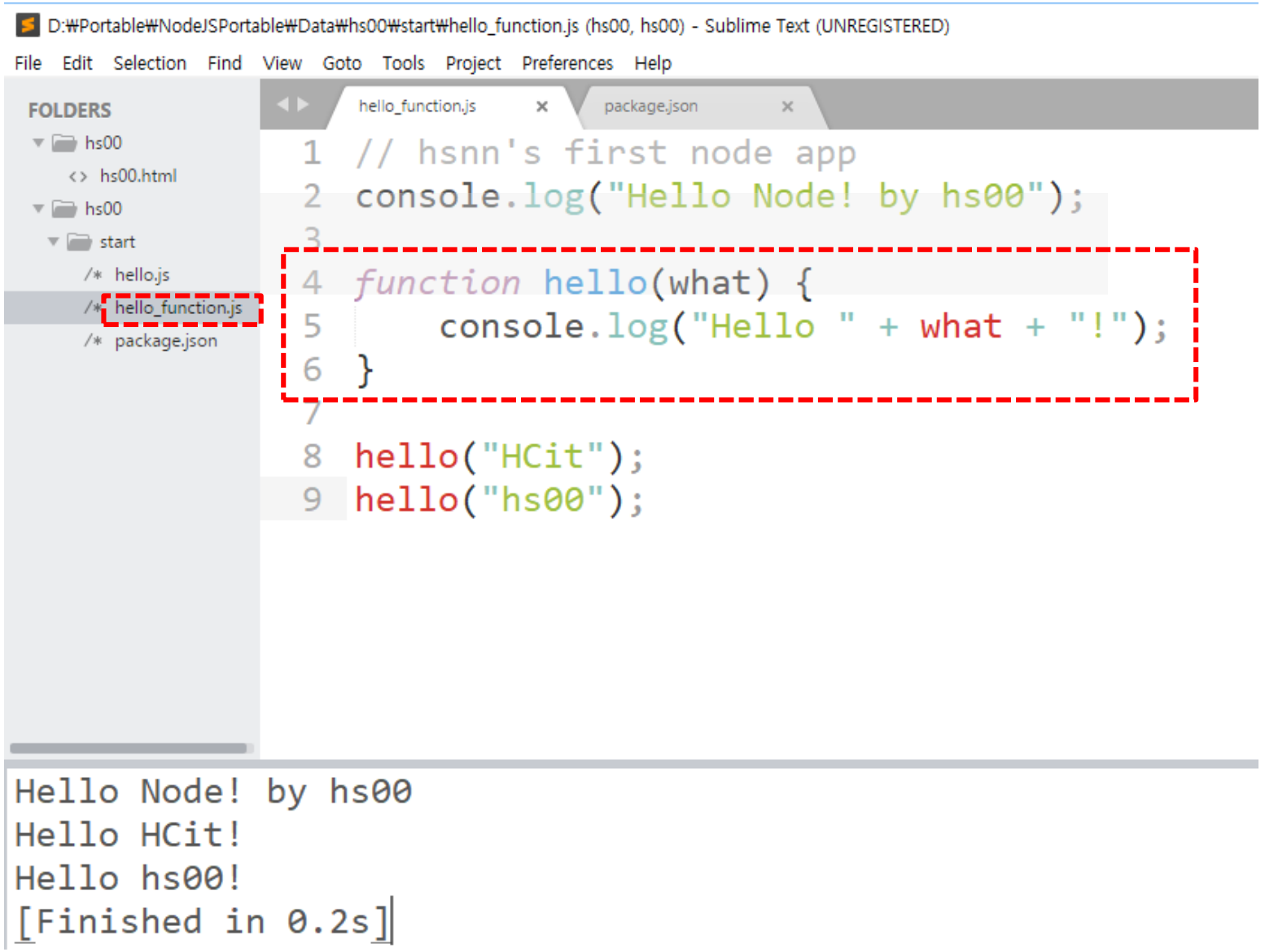
// node cmd
node hello.js

5.1.3 Hello Node! – npm start 로 실행



Using function in node

5.2.1 Using function in node



5.2.2 Using module in node


```
(node) util.print is deprecated. Use console.log instead.
Hello HCit!
Hello hs00!
[Finished in 0.2s]
```

```
// Using module in node.
var util = require('util');
```

https://nodejs.org/api/util.html#util_util_print

5.2.3 Using local module – hello_mymodule.js

D:₩Portable₩NodeJSPortable₩Data₩hs00₩start₩hello_mymodule.js (hs00, hs00) - Sublime Text (UNREGISTERED)

File Edit Selection Find View Goto Tools Project Preferences Help

FOLDERS
- hs00
- hs00
  - start
    - hello.js
    - hello_function.js
    - hello_module.js
    - hello_mymodule.js
    - package.json

hello_mymodule.js | package.json

```
1  // hello_mymodule.js
2
3  module.exports = function(what) {
4      console.log("Hello " + what + "!");
5  }
6
```

사용자 정의 모듈

FOLDERS
- hs00
- hs00
  - start
    - hello.js
    - hello_call_module.js
    - hello_function.js
    - hello_module.js
    - hello_mymodule.js
    - package.json

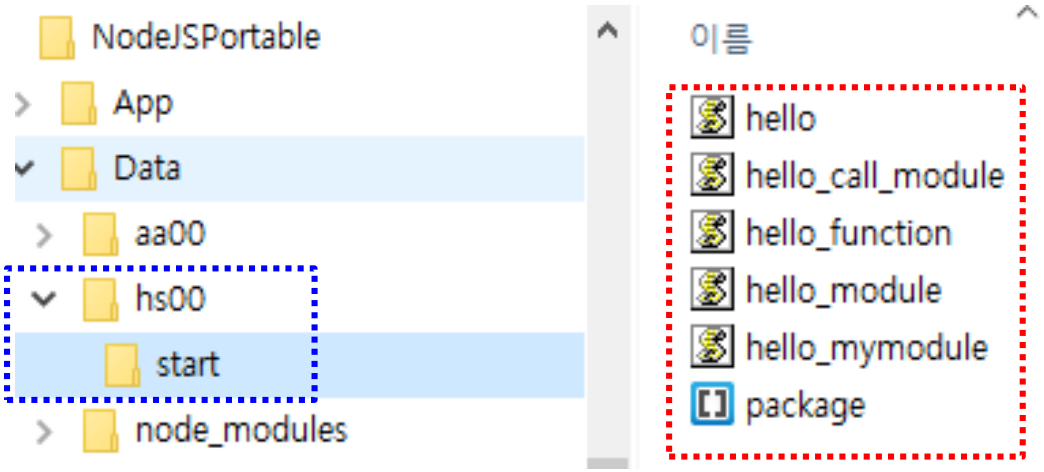
hello_call_module.js | hello_mymodule.js | hello_function.js | package.json

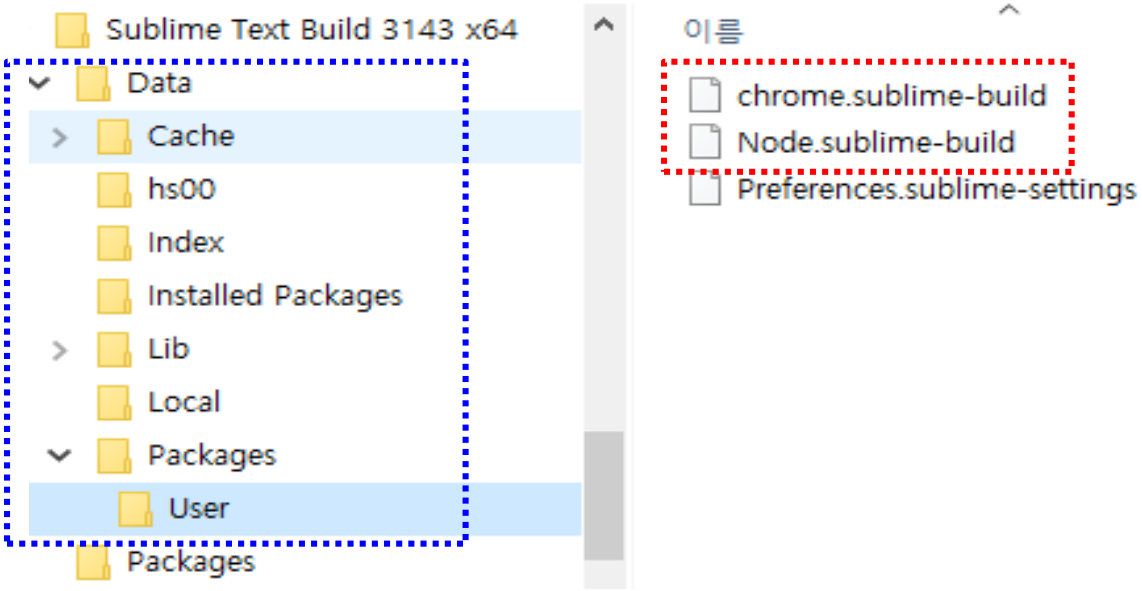
```
1  // hello_call_module.j
2
3  var olleh = require('./hello_mymodule');
4
5  olleh("HCit");
6  olleh("hs00");
```

```
Hello HCit!
Hello hs00!
[Finished in 0.2s]
```

Call local module 'hello_mymodule.js' from hello_call_module.js

Checking – Portable working folders





[extra code] local module : circle.js

circle_info.js uses local module circle.js.

circle.js

```
1  // cicle.js
2  var PI = Math.PI;
3
4  module.exports.area = function (r) {
5      return PI * r * r;
6  };
7
8  module.exports.circumference = function (r) {
9      return 2 * PI * r;
10 };
```

circle_info.js

```
1  // circle_info.js
2  var circle = require('./circle.js');
3  console.log( 'The area of a circle of radius 4 is '
4       + circle.area(4).toFixed(2));
5  console.log( 'The circumference of a circle of radius 4 is '
6       + circle.circumference(4).toFixed(2));
```

```
The area of a circle of radius 4 is 50.27
The circumference of a circle of radius 4 is 25.13
[Finished in 0.2s]
```

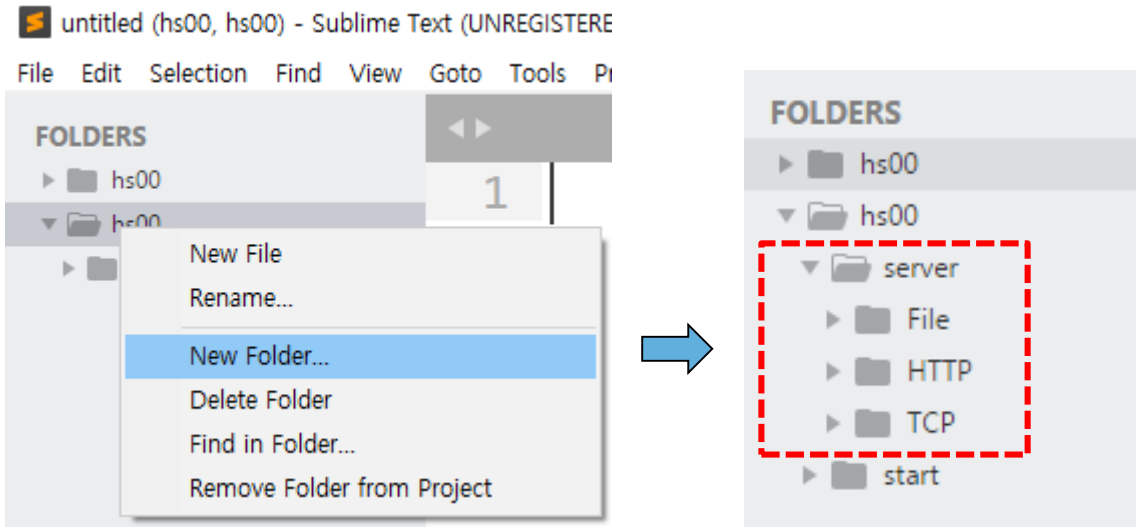
Node.js Server

1. http, tcp, file
2. Express

Node Server I.

1. HTTP server
2. TCP server
3. File upload

6.1 Node server : working folders



6.1.1 http server

D:₩Portable₩NodeJSPortable₩Data₩hs00₩server₩HTTP₩index.js (hs00, hs00) - Sublime Text (UNREGISTERED)

File Edit Selection Find View Goto Tools Project Preferences Help

FOLDERS
- hs00
- hs00
  - server
    - File
    - HTTP
      - index.js
    - TCP
    - start

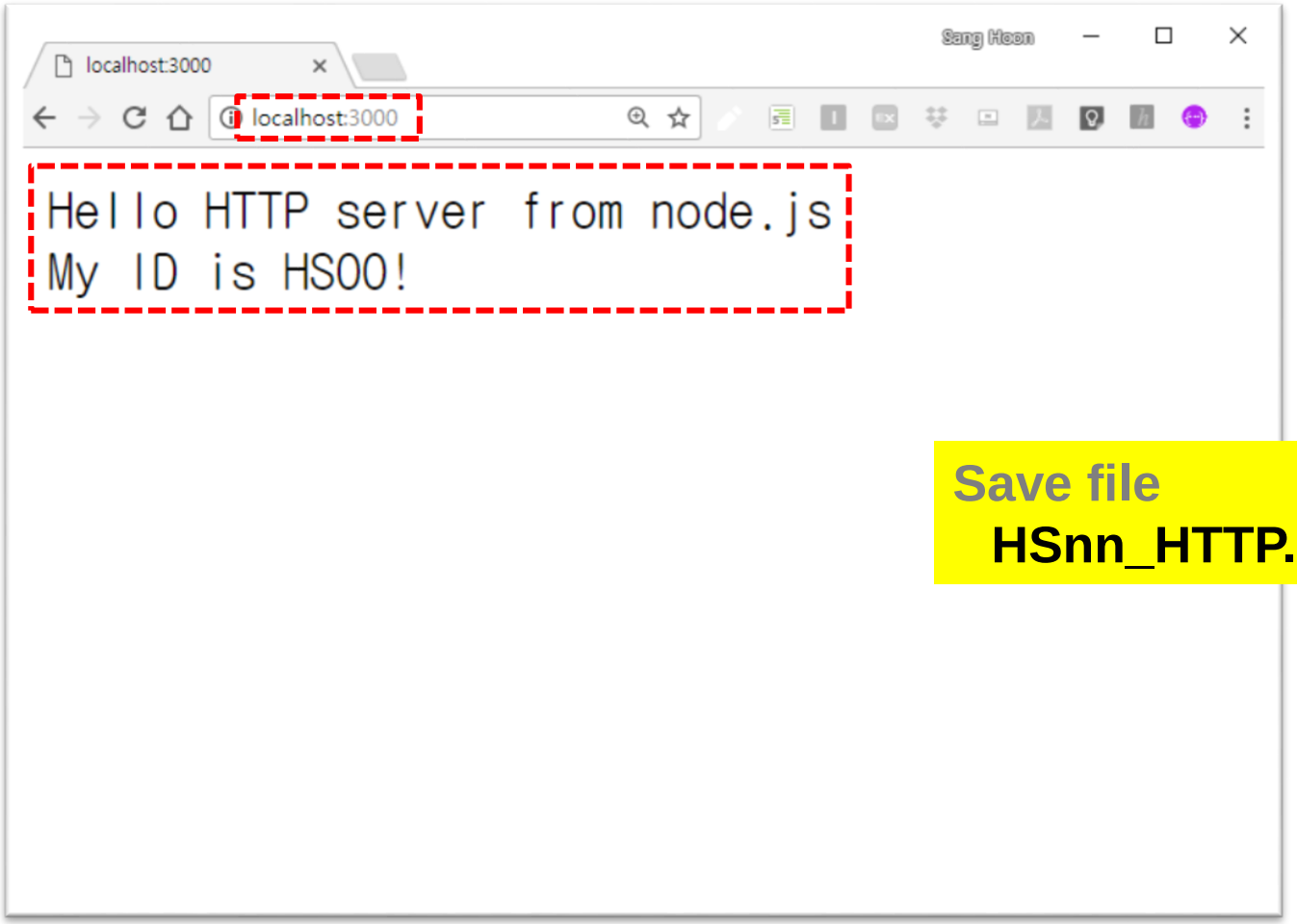
index.js

```
1  // http server : index.js
2
3  var http = require('http');
4  port = 3000;
5
6  var server = http.createServer(function(request, response) {
7    response.writeHeader(200, {
8      "Content-Type": "text/plain"
9    });
10   response.write("Hello HTTP server from node.js"); // WEB response
11   response.write("\nMy ID is HS00!");
12   response.end();
13
14 });
15
16 server.listen(port);
17 console.log("Server Running on " + port +
18     ".\nLaunch http://localhost:" + port);
19
```

```
Server Running on 3000.
Launch http://localhost:3000
```

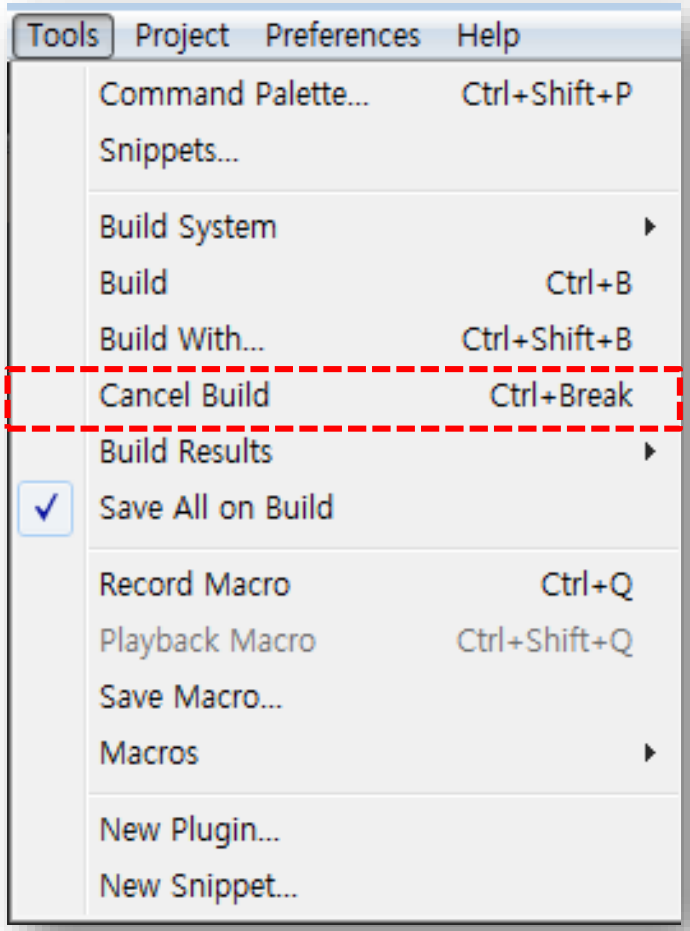
6.1.2 http server : result 1

```
Server Running on 3000.
Launch http://localhost:3000
```



Save file
HSnn_HTTP.png

6.1.3 http server - stop




```
Server Running on 3000.
Launch http://localhost:3000
[Cancelled]
```

[Tip] port number

★사용해도 되는 포트번호와 사용할 수 없는 포트 번호

1. 잘 알려진 포트는 0~1023 까지입니다.

(특정 프로그램들이 사용하기로 예약되어 있기 때문에 쓸 수 없는 포트 번호)

2. 등록된 포트는 1024~49151 까지입니다. (사용가능)

3. 동적 및/또는 개인 포트는 49152~65535 까지입니다. (사용가능)

참고: http://support.microsoft.com/kb/174904/ko

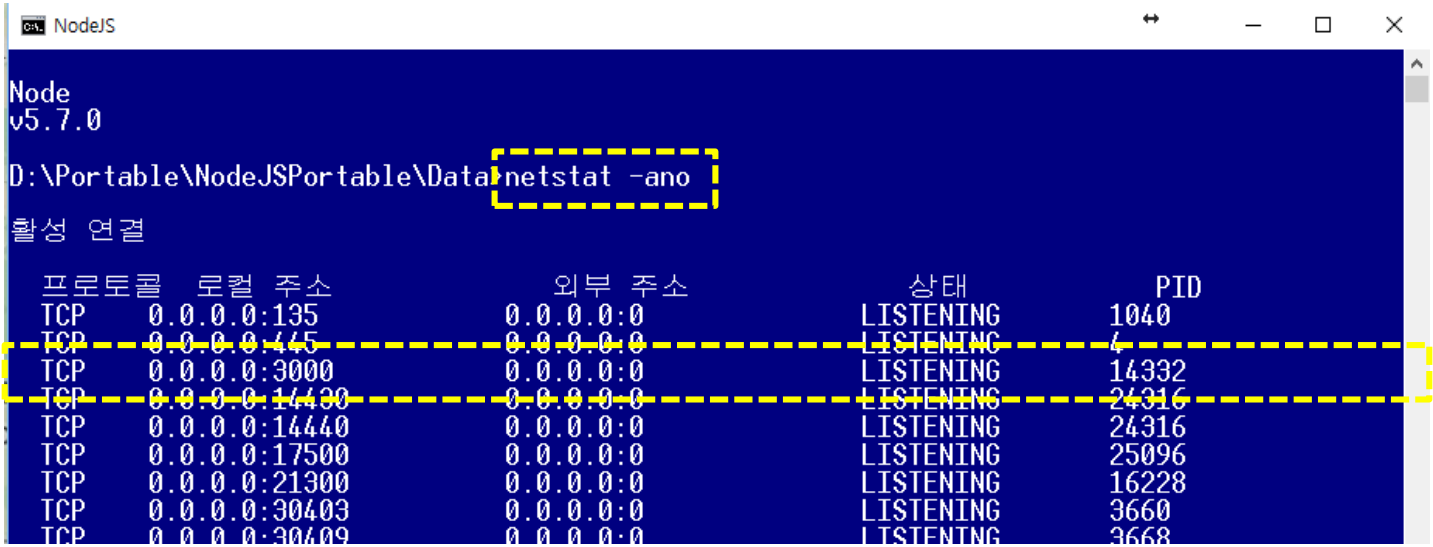
[Tip] listen EADDRINUSE 오류 해결 -1

1. listen EADDRINUSE 오류
   -사용중인 포트이거나 포트를 중지시키지 않고 종료시켰을 경우 계속 포트가 사용되고 있는데 연결 시키려고 할 때 나타나는 오류

```
Server Running on 3000.
Launch http://localhost:3000
events.js:154
      throw er; // Unhandled 'error' event
      ^

Error: listen EADDRINUSE :::3000
    at Object.exports._errnoException (util.js:856:11)
    at exports._exceptionWithHostPort (util.js:879:20)
```

2. 해결 방법
   (1) cmd창에서 **netstat –ano**를 입력한 후, 로컬주소에서 사용 중인 포트 번호를 확인
   (2) 사용중인 포트번호를 확인하고 그 해당포트의 **pid번호를 확인**한다.

[Tip] listen EADDRINUSE 오류 해결 -2



2. 해결 방법 (cmd에서 다음 명령 실행 후 port 3000의 pid가 제거됨을 확인)
   taskkill /pid PID_number

```
D:\Portable\NodeJSPortable\Data>taskkill /pid 14332
성공: 프로세스(PID 14332)에 종료 신호를 보냈습니다.
```

```
D:\Portable\NodeJSPortable\Data>netstat -ano

활성 연결

  프로토콜  로컬 주소          외부 주소          상태           PID
  TCP    0.0.0.0:135      0.0.0.0:0      LISTENING       1040
  TCP    0.0.0.0:445      0.0.0.0:0      LISTENING       4
  TCP    0.0.0.0:14430    0.0.0.0:0      LISTENING       24316
```

6.2.1 tcp server (socket connection)

D:₩Portable₩NodeJSPortable₩Data₩hs00₩server₩TCP₩server.js (hs00, hs00) - Sublime Text (UNREGISTERED)

File Edit Selection Find View Goto Tools Project Preferences Help

FOLDERS
- hs00
- hs00
  - server
    - File
    - HTTP
      - index.js
    - TCP
      - client.js
      - server.js
  - start

index.js | server.js | client.js

```
1  // tcp server (network server)
2  var net = require('net');
3  var port = 3000;
4
5  // Network connection using socket
6  var server = net.createServer(function(socket) {
7      console.log("Connection from " + socket.remoteAddress);
8      socket.end("Hello HS00! from localhost:3000");
9  });
10
11 server.listen(port, "127.0.0.1");
12 console.log("Network server started at port : " + port);
13
```

```
Network server started at port : 3000
```

6.2.2 tcp server [Node cmd : node server.js]

```
NodeJS
D:\Portable\NodeJSPortable\Data\hs00\start>cd ..

D:\Portable\NodeJSPortable\Data\hs00>dir
 D 드라이브의 볼륨: DATA
 볼륨 일련 번호: 7A01-106A

 D:\Portable\NodeJSPortable\Data\hs00 디렉터리

2018-03-14   오후 02:57    <DIR>          .
2018-03-14   오후 02:57    <DIR>          ..
2018-03-14   오후 02:57    <DIR>          server
2018-03-14   오후 02:52    <DIR>          start
               0개 파일                   0 바이트
               4개 디렉터리  890,091,003,904 바이트 남음

D:\Portable\NodeJSPortable\Data\hs00>cd server

D:\Portable\NodeJSPortable\Data\hs00\server>dir
 D 드라이브의 볼륨: DATA
 볼륨 일련 번호: 7A01-106A

 D:\Portable\NodeJSPortable\Data\hs00\server 디렉터리

2018-03-14   오후 02:57    <DIR>          .
2018-03-14   오후 02:57    <DIR>          ..
2018-03-14   오후 03:00    <DIR>          File
2018-03-14   오후 03:00    <DIR>          HTTP
2018-03-14   오후 03:00    <DIR>          TCP
               0개 파일                   0 바이트
               5개 디렉터리  890,091,003,904 바이트 남음

D:\Portable\NodeJSPortable\Data\hs00\server>cd tcp

D:\Portable\NodeJSPortable\Data\hs00\server\TCP>dir
 D 드라이브의 볼륨: DATA
 볼륨 일련 번호: 7A01-106A

 D:\Portable\NodeJSPortable\Data\hs00\server\TCP 디렉터리

2018-03-14   오후 03:00    <DIR>          .
2018-03-14   오후 03:00    <DIR>          ..
2017-12-29   오후 04:37               415 client.js
2018-03-14   오후 03:17               372 server.js
               2개 파일                 787 바이트
               2개 디렉터리  890,091,003,904 바이트 남음
```

Node cmd에서 TCP 서버 실행

TCP 폴더로 가서

node server

```
D:\Portable\NodeJSPortable\Data\hs00\server\TCP>node server
Network server started at port : 3000
```

6.2.3 tcp client

D:₩Portable₩NodeJSPortable₩Data₩hs00₩server₩TCP₩client.js (hs00, hs00) - Sublime Text (UNREGISTERED)

File Edit Selection Find View Goto Tools Project Preferences Help

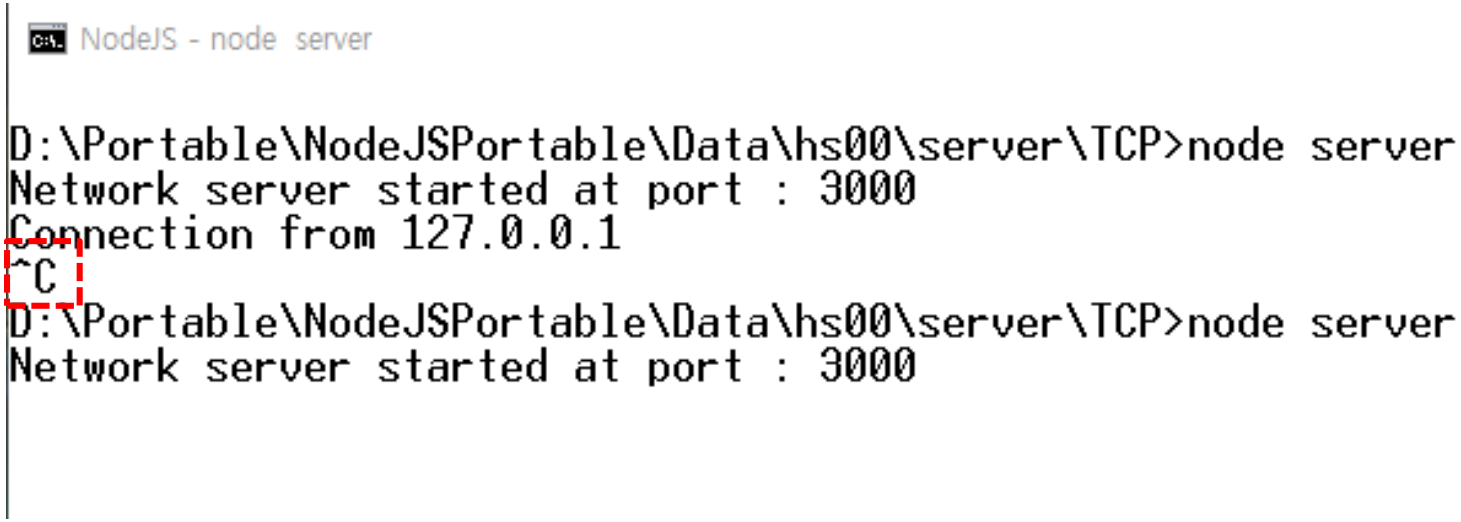
FOLDERS
- hs00
- hs00
  - server
    - File
    - HTTP
      - index.js
    - TCP
      - client.js
      - server.js
    - start

index.js | server.js | client.js

```
1  // tcp client
2  var net = require('net');
3  var port = 3000;
4  var client = new net.Socket();
5
6  // Connection using socket
7  client.connect(port, "127.0.0.1");
8
9  // Receive data from socket
10 client.on('data', function (data) {
11     console.log('Data: ' + data);
12     client.destroy();
13 });
14
15 // Add a 'close' event handler for the client socket
16 client.on('close', function () {
17     console.log('Connection closed');
18 });
19
```

```
Data: Hello HS00! from localhost:3000
Connection closed
[Finished in 0.3s]
```

6.2.4 tcp server 정지 (^C) 후 재 실행!



6.2.5 tcp server & client : result

(A)

```
NodeJS - node  server
D:\Portable\NodeJSPortable\Data\hs00\server\TCP>node server
Network server started at port : 3000
```

(B)

```
Data: Hello HS00! from localhost:3000
Connection closed
[Finished in 0.3s]
```

Sublime Text 3

(C)

```
NodeJS - node  server
D:\Portable\NodeJSPortable\Data\hs00\server\TCP>node server
Network server started at port : 3000
Connection from 127.0.0.1
Connection from 127.0.0.1
Connection from 127.0.0.1
Connection from 127.0.0.1
Connection from 127.0.0.1
```

Save file

HSnn_TCP_Log.png

6.3.1 file upload using module 'formidable'

FOLDERS
- hs00
- hs00
  - server
    - File
      - file_server.js
    - HTTP
      - index.js
    - TCP
      - client.js
      - server.js
  - start

index.js | server.js | client.js | file_server.js

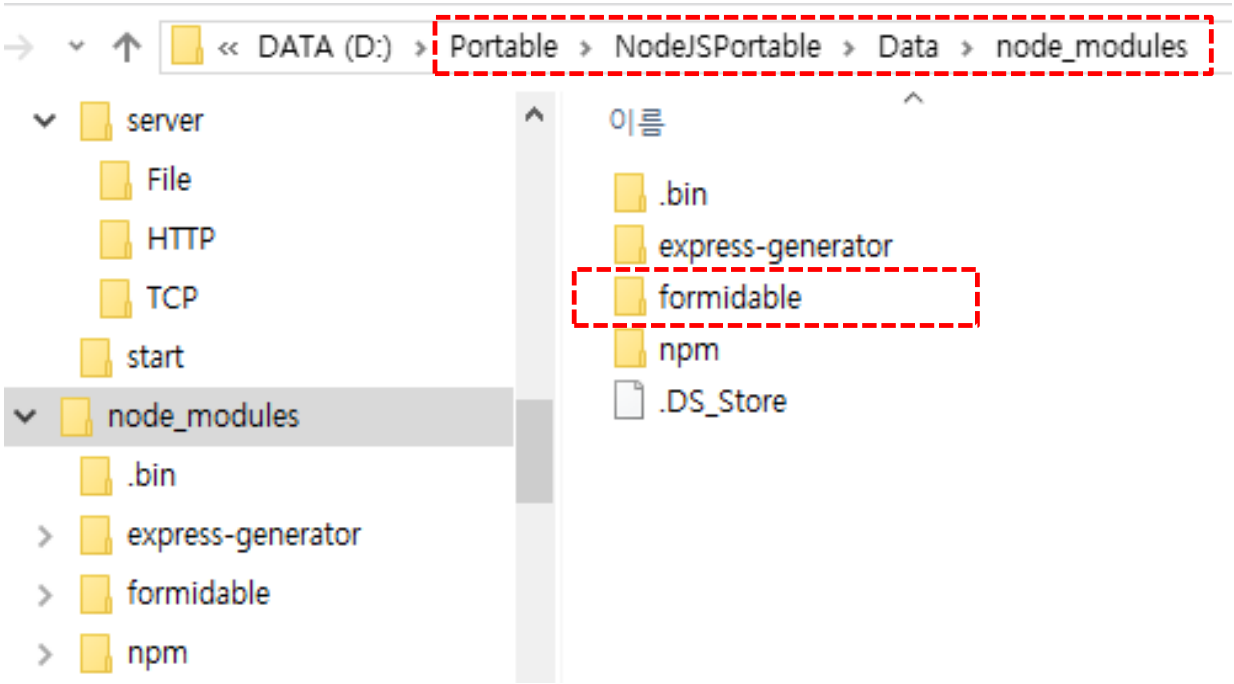
```
1  // File upload using formidable node module
2  var formidable = require('formidable'),
3      http = require('http'),
4      util = require('util'),
5      port = 3663;
6
7  http.createServer(function(req, res) {
8    if (req.url == '/upload' && req.method.toLowerCase() == 'post') {
9      // parse a file upload
10     var form = new formidable.IncomingForm();
11
12     form.parse(req, function(err, fields, files) {
13       res.writeHead(200, {'content-type': 'text/plain'});
14       res.write('received upload:\n\n');
15       res.end(util.inspect({fields: fields, files: files}));
16     });
17     return;
18   }
19   // show a file upload form
20   res.writeHead(200, {'content-type': 'text/html'});
21   res.end(
22     '<form action="/upload" enctype="multipart/form-data" method="post">
23     '<input type="text" name="title"><br>'+
```

```
File server Running on 3663.
Launch http://localhost:3663
```

6.3.2 file upload : npm install formidable

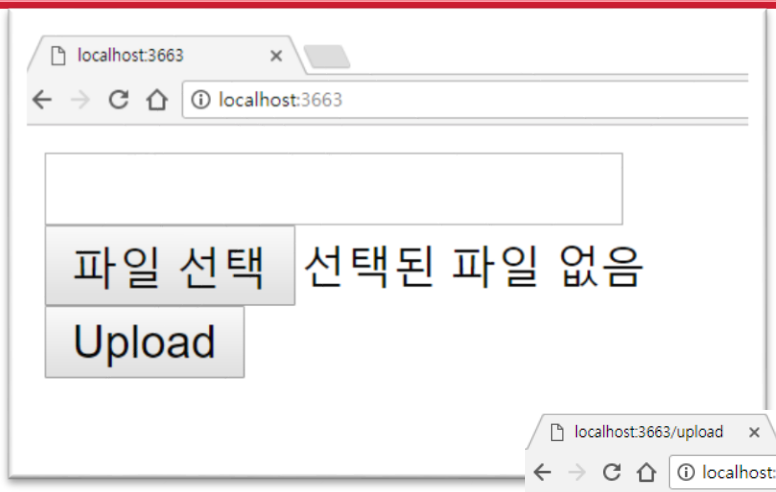
```
NodeJS
D:\Portable\NodeJSPortable\Data\hs00\server\TCP>cd ..

D:\Portable\NodeJSPortable\Data\hs00\server>cd file

D:\Portable\NodeJSPortable\Data\hs00\server\File>npm install formidable
loadRequestedDeps → addRe ? ??????????????????????????????????????????????????
loadRequestedDeps → fetch ? ??????????????????????????????????????????????????
loadRequestedDeps → netwo ? ??????????????????????????????????????????????????
loadRequestedDeps → netwo ? ??????????????????????????????????????????????????
loadRequestedDeps → netwo ? ??????????????????????????????????????????????????
loadRequestedDeps → netwo ? ??????????????????????????????????????????????????
loadRequestedDeps → fetch ? ??????????????????????????????????????????????????
loadRequestedDeps → netwo ? ??????????????????????????????????????????????????
extract → gunzTarPerm     ? ??????????????????????????????????????????????????
D:\Portable\NodeJSPortable\Data
 └──formidable@1.2.0


D:\Portable\NodeJSPortable\Data\hs00\server\File>dir
 D 드라이브의 볼륨: DATA
 볼륨 일련 번호: 7A01-106A

 D:\Portable\NodeJSPortable\Data\hs00\server\File 디렉터리

2018-03-14  오후 03:00    <DIR>          .
2018-03-14  오후 03:00    <DIR>          ..
2017-12-29  오후 05:21             1,048 file_server.js
               1개 파일               1,048 바이트
               2개 디렉터리  890,090,643,456 바이트 남음

D:\Portable\NodeJSPortable\Data\hs00\server\File>
```

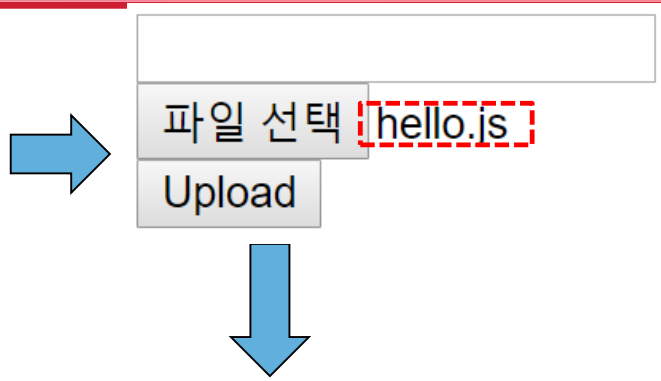
6.3.3 file upload : npm install formidable

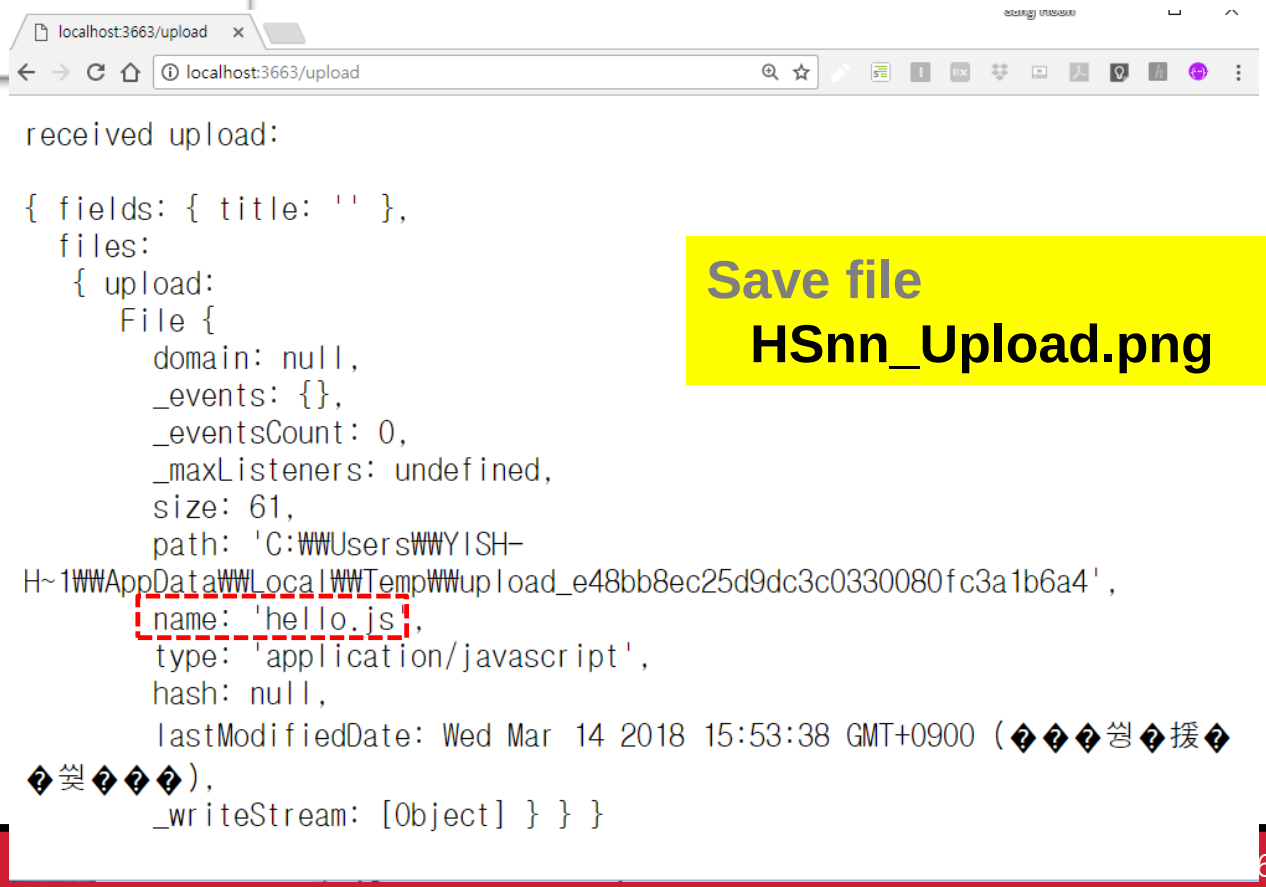


Portable node.js에서는
외부 node module이
Data/node_modules에 저장된다.

6.3.4 file upload







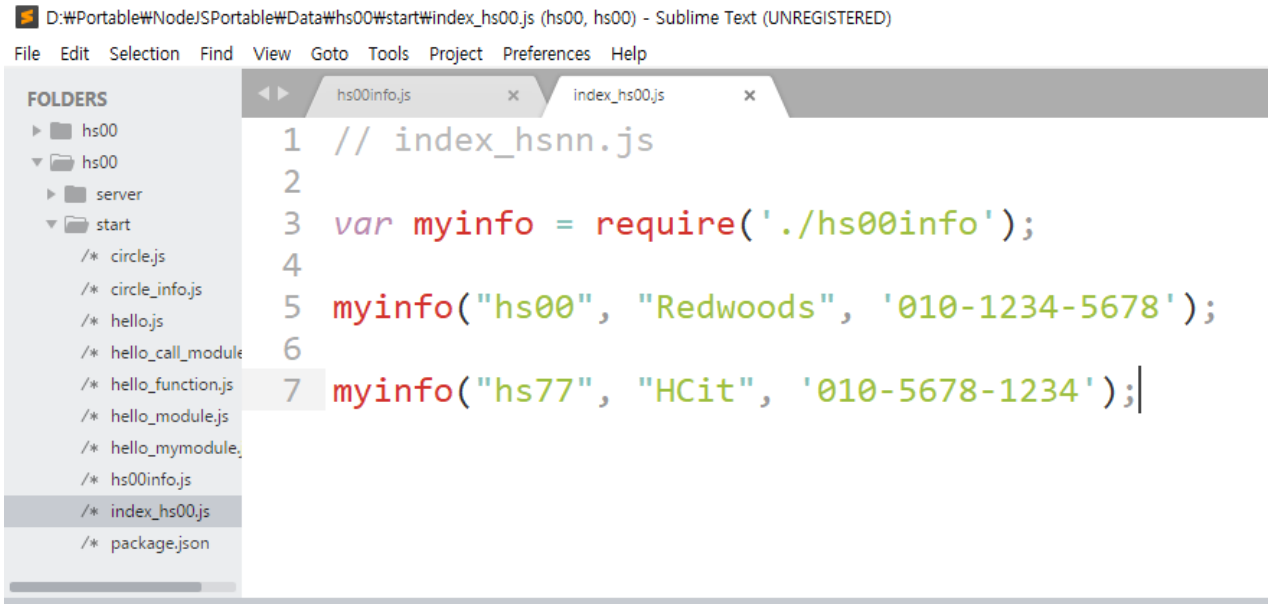
Save file
HSnn_Upload.png

[Practice]

- [wk02]
  - Node module : hsnninfo.js
  - Upload file name : HSnn_Rpt01.zip

[practice] local module : hsnninfo.js

index_hsnn.js uses local module hsnninfo.js in start subfolder.




```
My Info
ID : hs00
Name : Redwoods
Phone : 010-1234-5678

My Info
ID : hs77
Name : HCit
Phone : 010-5678-1234

[Finished in 0.2s]
```

Save as
HSnn_info.png

[practice] local module : hsnninfo.js

How to make hsnninfo.js in start subfolder.

1. **Make local module – hsnninfo.js**
2. **Call hsnninfo.js from index_hsnn.js.**
3. **Capture your result.**

hs00info.js × index_hs00.js ×

```
1  // hsnninfo.js
2
3  module.exports = function(id, name, phone) {
4      console.log("My Info");
5      console.log("ID : " + id);
6      console.log("Name : " + name);
7      console.log("Phone : " + phone +"\n");
8  }
```

[참고] Node local module 만들기

wk02 : Practice-01 : HSnn_Rpt01.zip

- [Target of this week]

  My Info using node module – hsnninfo.js

제출파일명 : **HSnn_Rpt01.zip**

- 압축할 파일들

  ① **HSnn_package.png**

  ② **HSnn_HTTP.png**

  ③ **HSnn_TCP_Log.png**

  ④ **HSnn_Upload.png**

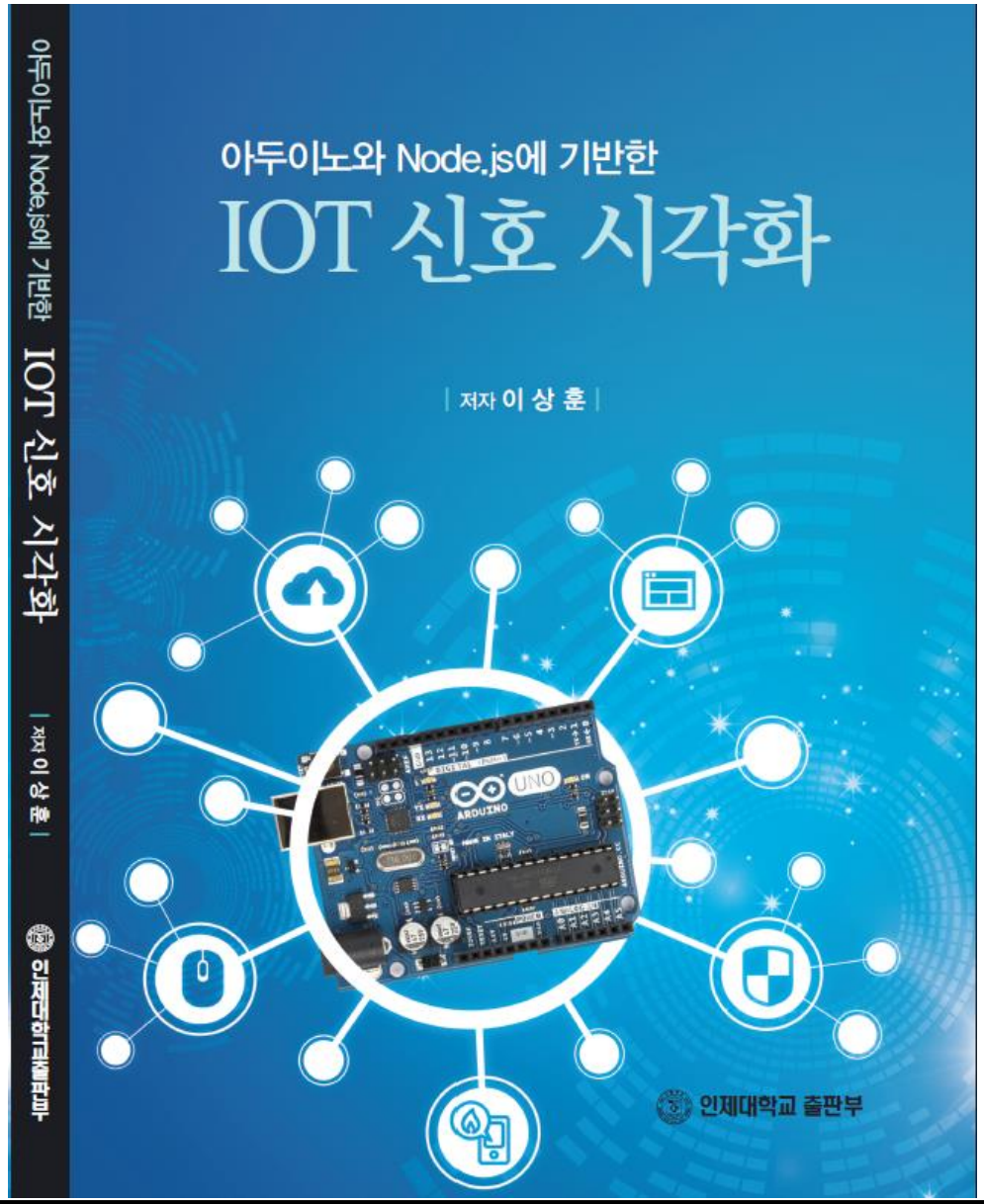
  ⑤ **HSnn_info.png**

Lecture materials

References & good sites

- ✓ http://www.nodejs.org/ko Node.js
- ✓ http://www.arduino.cc Arduino Homepage
- ✓ http://www.w3schools.com By w3schools
- ✓ http://www.github.com GitHub
- ✓ http://www.google.com Googling

Syllabus of HS – 주교재 (인쇄 중 ..)



Github.com/Redwoods

GitHub, Inc. [US] | https://github.com Redwoods (Redwoods Yi) · GitHub

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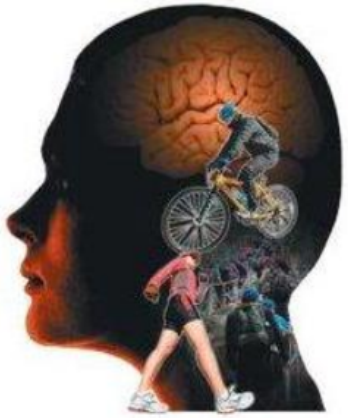

Redwoods Yi

Redwoods

Block or report user

GimHae, Republic of Korea

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Pinned repositories

dht22-iot-project

Iot project to monitor data streaming from DHT22 wired at Arduino.

HTML

Lec

All lectures by Redwoods in Inje University

arduino-nodejs-plotly-streaming

This repo introduces a simple and efficient way to plot the streaming data from Arduino with Easy Pulse ppg sensor or DHT11 sensor.

HTML

hw-coding

Resource for lecture of Hardware Programming (2017, Inje university)

Arduino

Github.com/Redwoods/healthcare-signal-iot

Redwoods / Lec

Unwatch 1

Code | Issues 0 | Pull requests 0 | Projects 0 | Wiki | Insights | Settings

All lectures by Redwoods in Inje University

Add topics

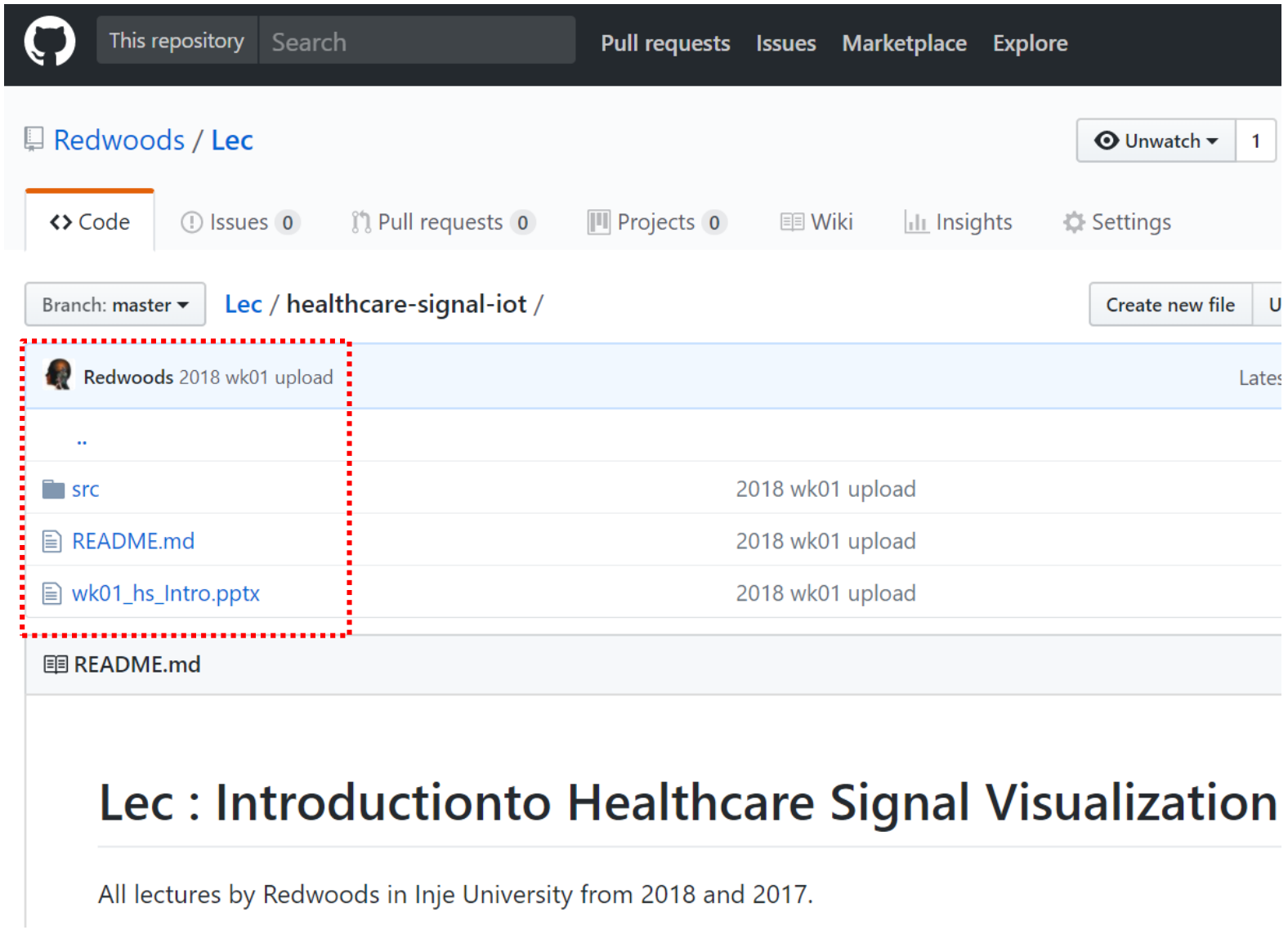
81 commits | 1 branch | 0 releases

Branch: master | New pull request | Create new file | Upload files

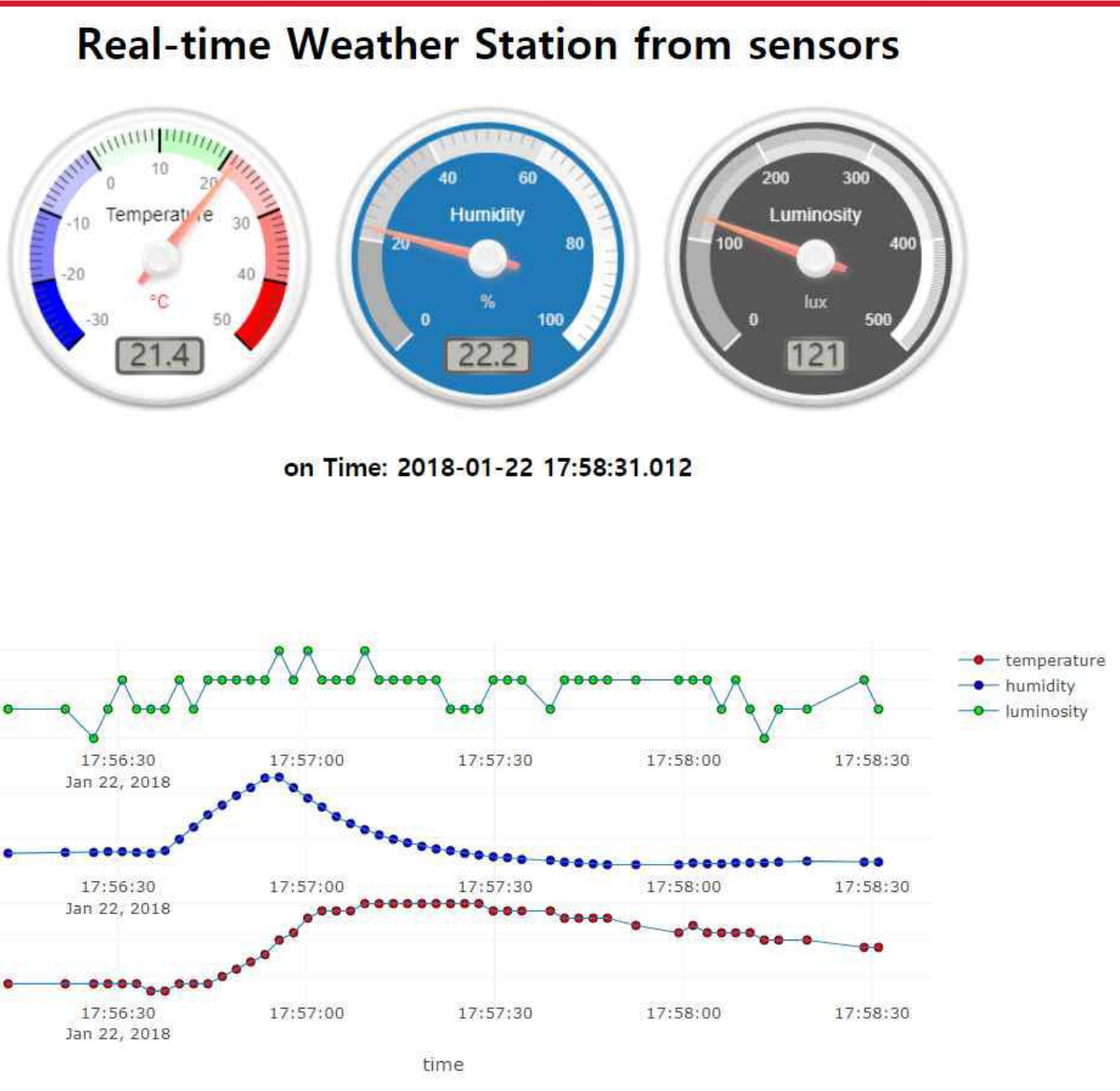
Redwoods 2018 wk01 upload

advanced-Arduino-iot	wk16 exam upload
ev3	wk16 final exam. answers
healthcare-signal-iot	2018 wk01 upload
html5-basic	2018 wk01 upload
html5-mobile-simulation	wk15 lec upload
Lec.Rproj	2018 wk01 upload
README.md	wk03 upload and fix links

Github.com/Redwoods/healthcare-signal-iot



Target of this class



Project of this class