



Arduino-IoT

[wk02]

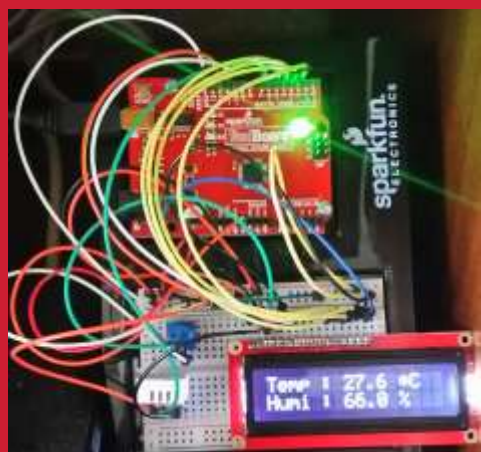
Start node.js

Visualization of Signals using Arduino,
Node.js & storing signals in MongoDB
& mining data using Python

Drone-IoT-Comsi, INJE University

2nd semester, 2023

Email : chaos21c@gmail.com





My ID

ID를 확인하고 github에 repo 만들기

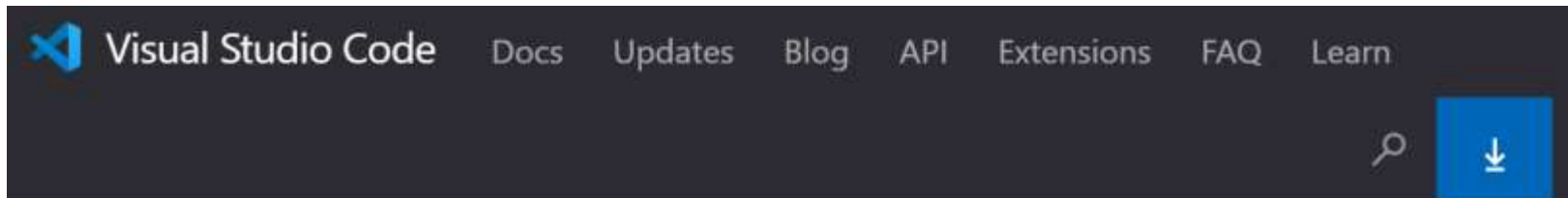
ID	성명
AA01	강동하
AA02	고서진
AA03	김민재
AA04	김예원
AA05	김주호
AA06	김창욱
AA07	김현서
AA08	박종혁
AA09	서명진
AA10	유동기
AA11	
AA12	이근보
AA13	정호기

위의 id를 이용해서 github에 repo를 만드시오.

Option: 아두이노응용 실습 과제 - **AAnn**

Public, **README.md** **check**

New editor: Vscode portable by MS



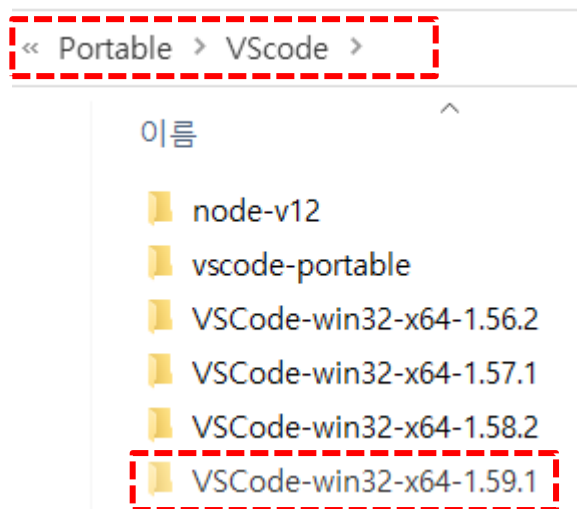
User Installer	64 bit	32 bit	ARM
System Installer	64 bit	32 bit	ARM
.zip	64 bit	32 bit	ARM



.deb	64 bit	ARM	ARM 64
.rpm	64 bit	ARM	ARM 64
.tar.gz	64 bit	ARM	ARM 64
Snap Store			

<https://code.visualstudio.com/download>

New editor: Vscode portable (MS)



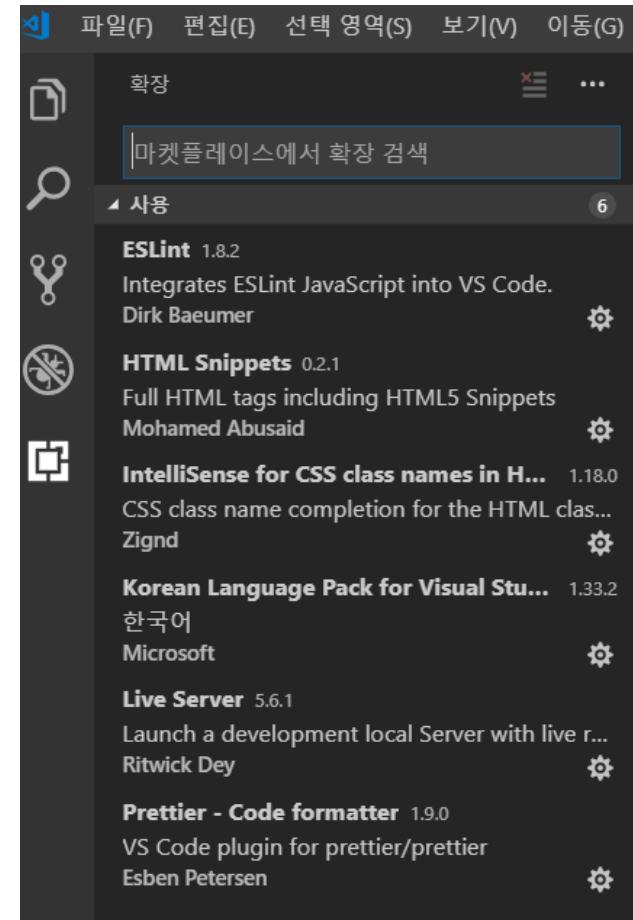
하드디스크 D에 **portable** 폴더를 만들고
vscode 폴더에
압축을 풀어서 사용

New editor: VScode

확장프로그램 설치 (각각 설치 후 vscode 재시작)

1. Korean language pack
2. HTML snippet
3. IntelliSense for CSS class names in HTML
4. Javascript (ES6)
5. Prettier
6. Live server (for HTML preview)
7. GitLens, Git History
8. Material Icon Theme
9. Python

C, C++, Java,
Node.js
Python, Jupyter
... all coding!



New editor: VScode

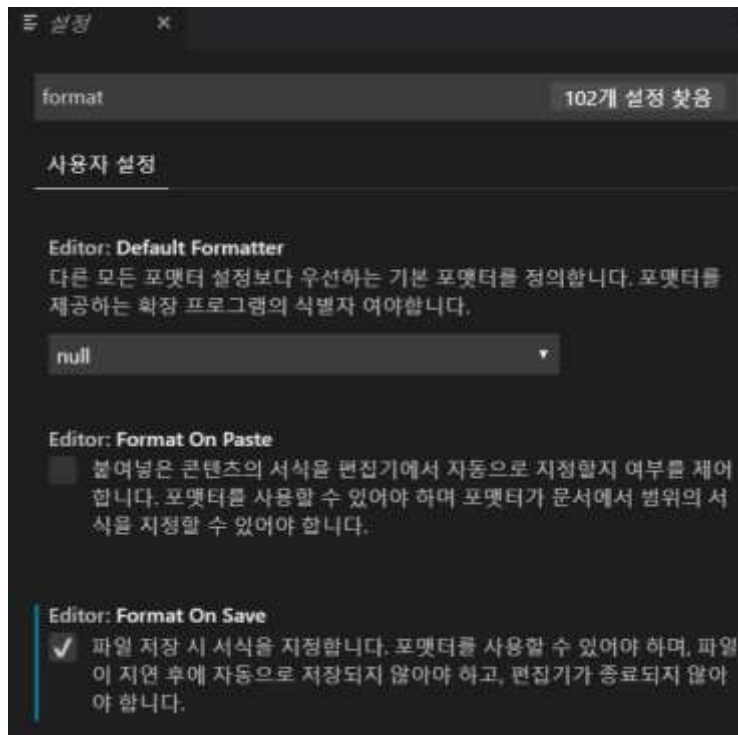
확장프로그램 설정 (각각 설정 후 종료/재시작)

1. Prettier

2. Live server (for HTML preview)

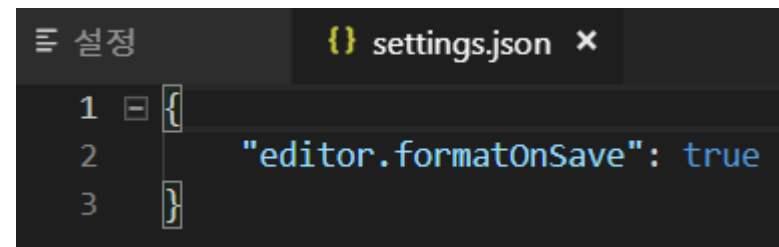
3. GitLens, Git History

파일 > 기본설정 > 설정 → 사용자 설정



검색: format

Editor: Format on Save (check)



설정 → Ctrl + Shift + P

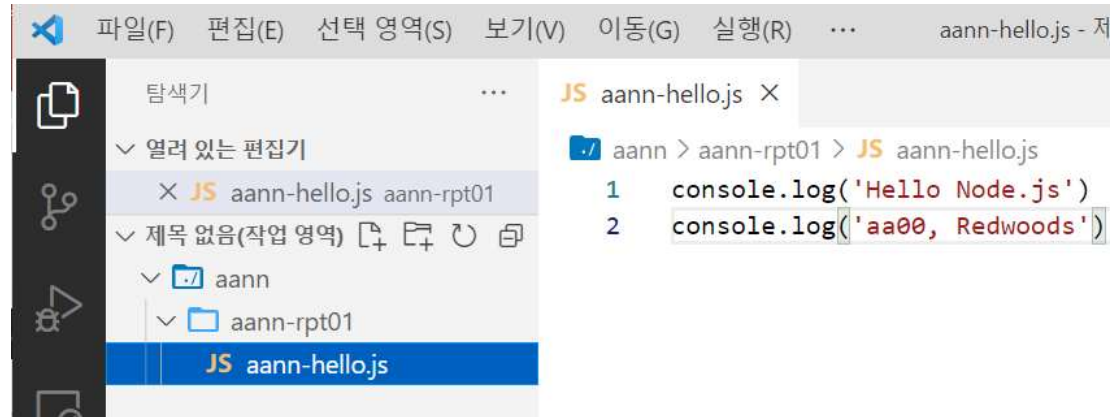
실습 준비: aann/aann-rpt01 폴더에서 js code

7

[파일] 메뉴

→ Node js 소스 만들기

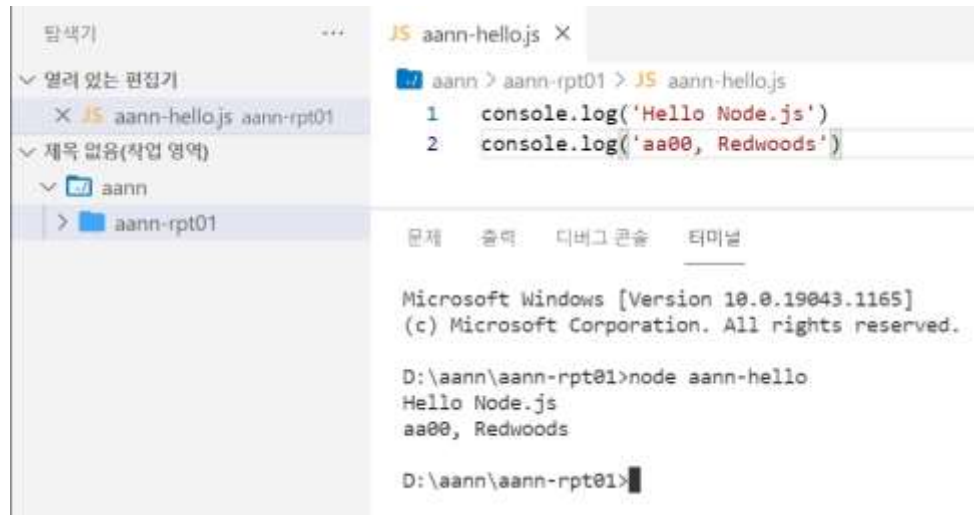
aann-rpt01 폴더 내에
aann-hello.js 파일 소스 생성.



→ Node js 소스 실행

aann-rpt01 폴더를 우클릭
통합터미널 열기 선택
다음 명령 실행

`node aann-hello.js`



[Project]

◆ [wk01]

- upload all work of this week
- Make repo “aann” in github
- upload folder “aann-rpt01” in your github.

실습 : 결과를 나의 github에 올리기

9

따라서 함께 해봅시다.

◆ Github.com 에 각자의 public 계정을 만드시오.
(이미 github 계정이 있으면 불필요)

1. 실습 결과를 올리는 github repo를 "aann"로 만드시오. (반드시 README.md 를 추가)
2. README.md에는 "아두이노응용 실습 과제" 입력
3. "aann" repo 에 aann-rpt01 폴더 upload
4. 각자의 github 주소를 이메일로 보내시오.
<https://github.com/accountName/aann>

Email : chaos21c@gmail.com

Purpose of AA

주요 수업 목표는 다음과 같다.

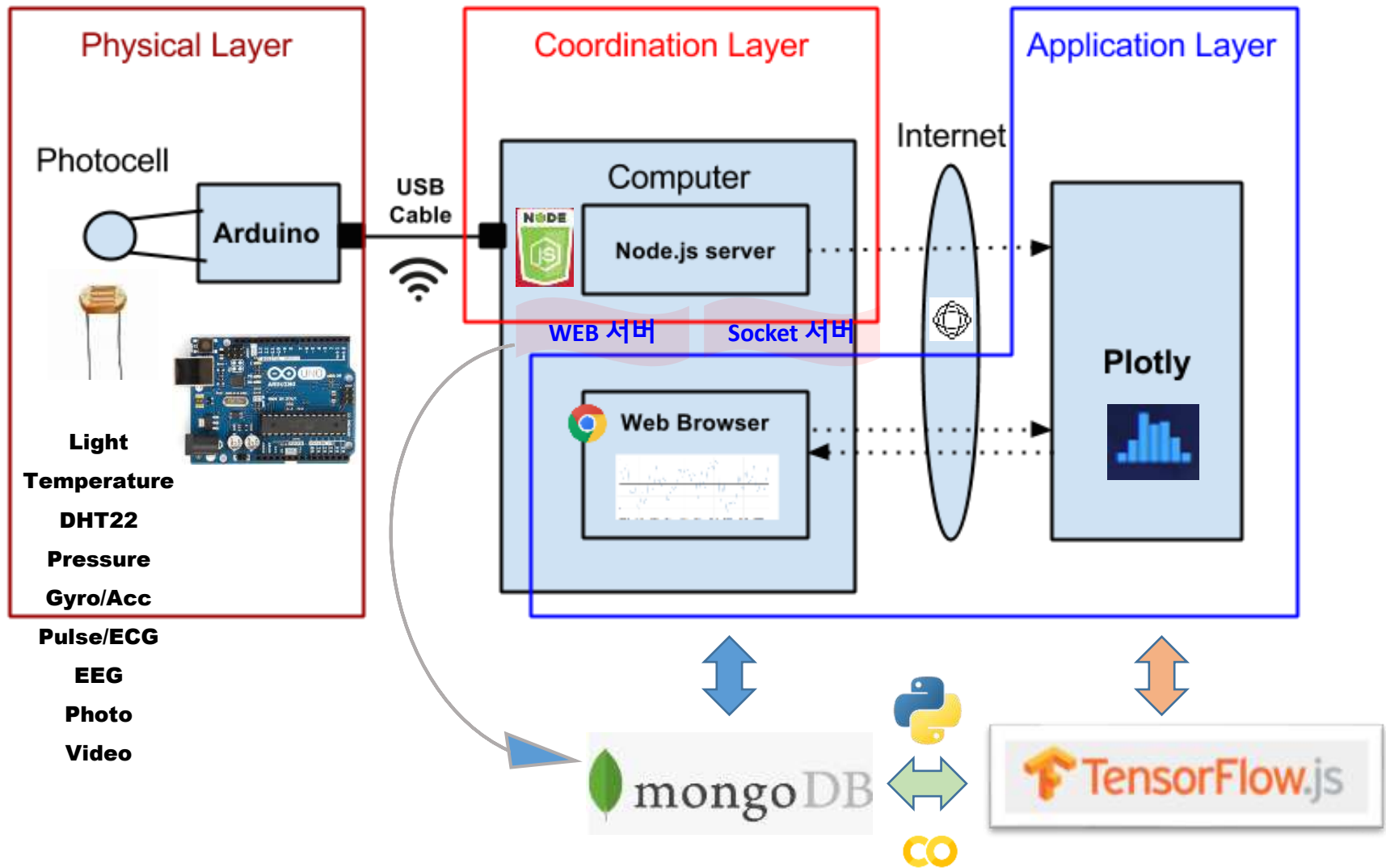
1. Node.js를 이용한 아두이노 센서 신호 처리
2. Plotly.js를 이용한 아두이노 센서 신호 시각화
3. MongoDB에 아두이노 센서 데이터 저장 및 처리



4. 저장된 IoT 데이터의 마이닝 (파이썬 코딩)



Layout [H S C]





1.0 What is node.js?





1.0 What is node.js?

← → ↻ 🏠 안전함 | https://www.w3schools.com/nodejs/nodejs_intro.asp

🏠 HTML CSS JAVASCRIPT SQL PHP BOOTSTRAP HOW TO JQUERY MORE ▼

Node.js Tutorial
Node.js HOME
Node.js Intro
Node.js Get Started
Node.js Modules
Node.js HTTP Module
Node.js File System
Node.js URL Module
Node.js NPM
Node.js Events
Node.js Upload Files
Node.js Email

Node.js MySQL
MySQL Get Started
MySQL Create Database
MySQL Create Table

Node.js Introduction

◀ Previous

What is Node.js?

- Node.js is an open source server framework
- Node.js is free
- Node.js runs on various platforms (Windows, Linux, Unix, Mac OS X, etc.)
- Node.js uses JavaScript on the server

Why Node.js?

Node.js uses asynchronous programming!

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



1.0 What is node.js?

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?



홈 | ABOUT | 다운로드 | 문서 | 재단 | 참여하기 | 보안 | 뉴스

Node.js®에 대해서

비동기 이벤트 주도 JavaScript 런타임으로써 Node는 확장성 있는 네트워크 애플리케이션을 만들 수 있도록 설계되었습니다. 다음 "hello world" 예제는 다수의 연결을 동시에 처리할 수 있습니다. 각 연결에서 콜백이 실행되는데 실행할 작업이 없다면 Node는 대기합니다.

```
const http = require('http');

const hostname = '127.0.0.1';
const port = 3000;

const server = http.createServer((req, res) => {
  res.statusCode = 200;
  res.setHeader('Content-Type', 'text/plain');
  res.end('Hello World\n');
});

server.listen(port, hostname, () => {
  console.log(`Server running at http://${hostname}:${port}/`);
});
```



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');
```

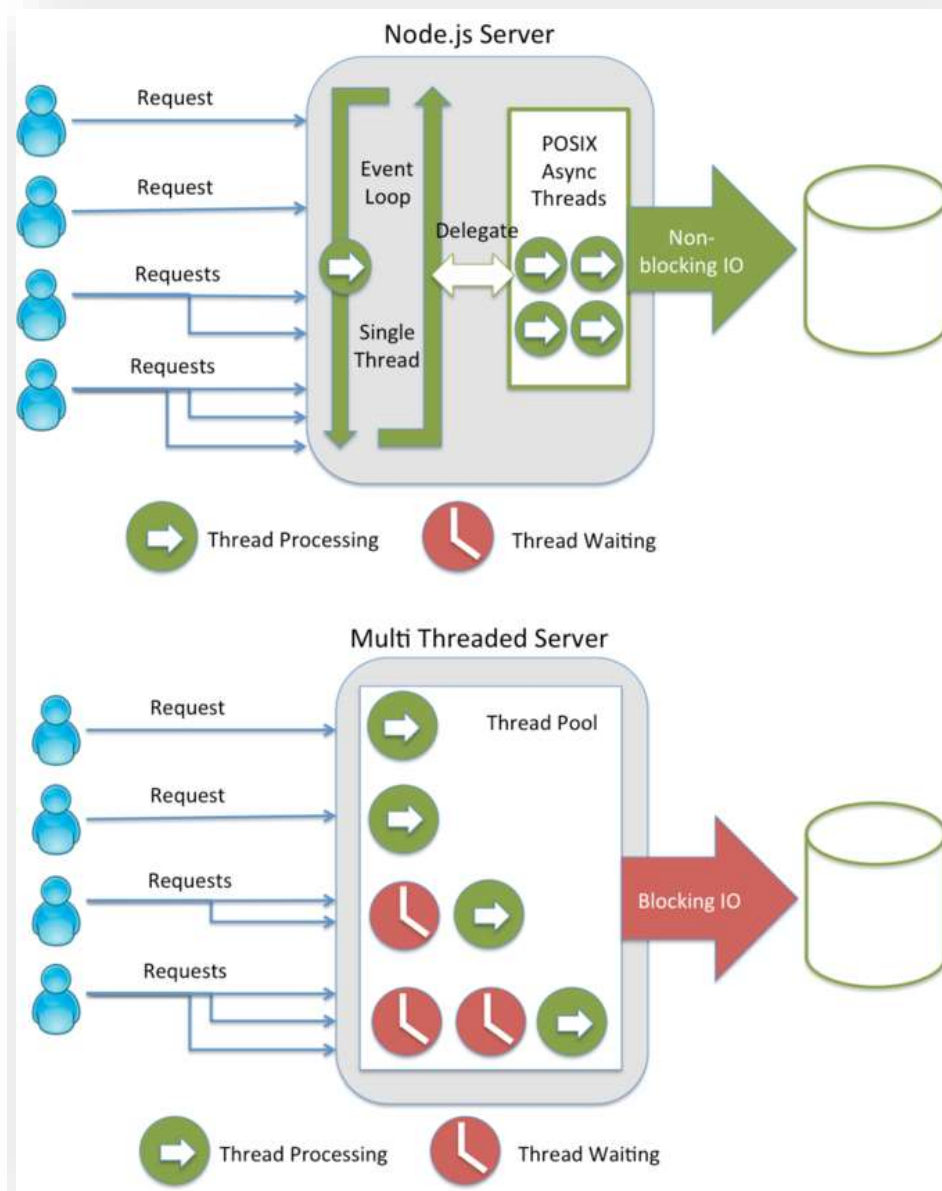
[Quiz] 계란 1개를 삶을 때 10분이 걸린다.

그러면 계란 10개를 삶을 때 걸리는 시간은?

Blocking : ?

Non-blocking : ?

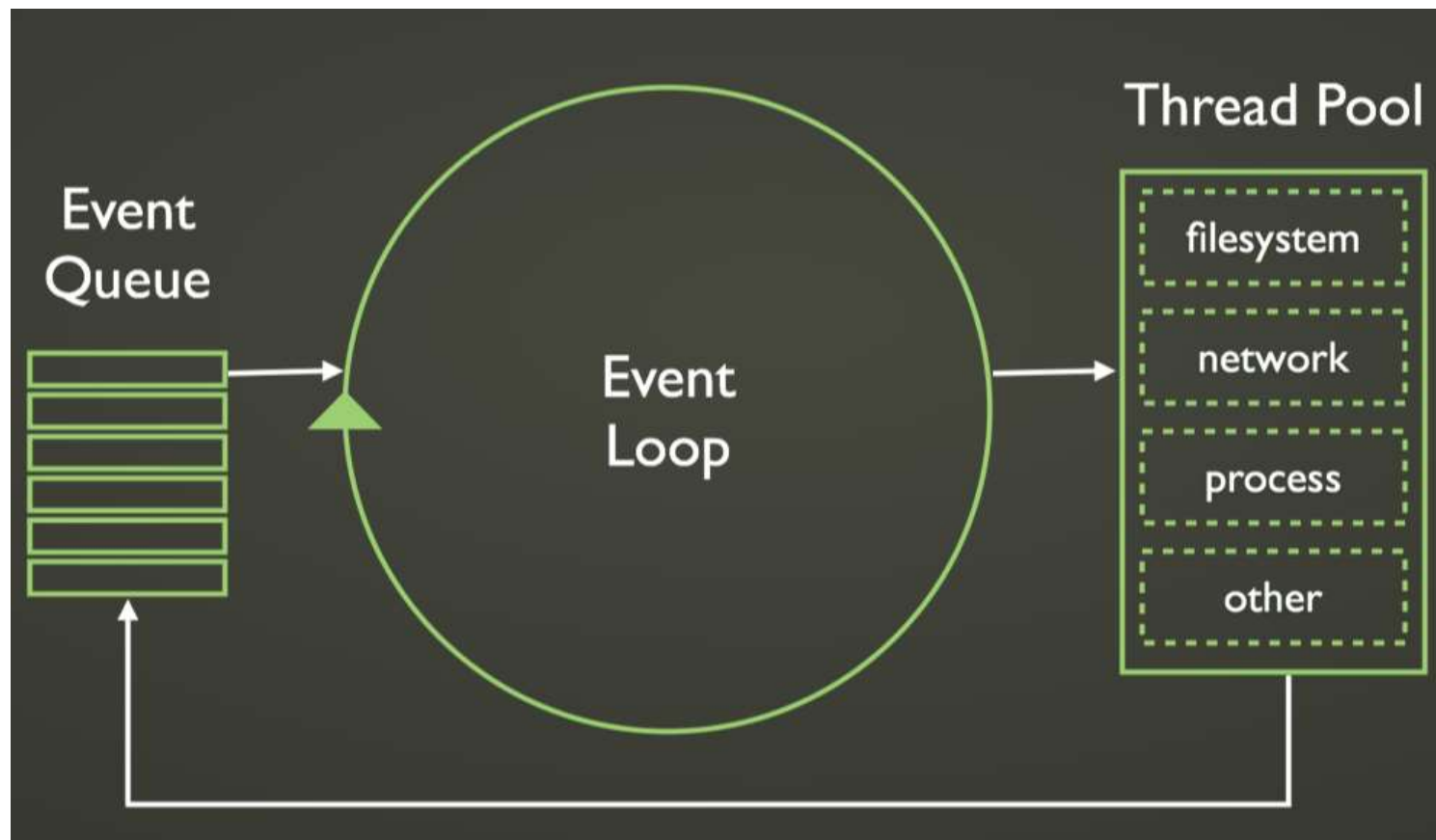
1.3 Non-blocking IO



Single thread
Non-blocking IO

Multi thread
Blocking IO

1.4 Non-blocking event loop





2.1 Install node.js

다운로드 | Node.js

nodejs.org/ko/download

node.js

홈 | ABOUT | **다운로드** | 문서 | 참여하기 | 보안 | CERTIFICATION | 뉴스

다운로드

최신 LTS 버전: 18.17.1 (includes npm 9.6.7)

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

LTS
대다수 사용자에게 추천

현재 버전
최신 기능

Windows Installer
node-v18.17.1-x64.msi

macOS Installer
node-v18.17.1.pkg

Source Code
node-v18.17.1.tar.gz

Windows Installer (.msi)	32-bit	64-bit
Windows Binary (.zip)	32-bit	64-bit
macOS Installer (.pkg)	64-bit / ARM64	
macOS Binary (.tar.gz)	64-bit	ARM64
Linux Binaries (x64)	64-bit	
Linux Binaries (ARM)	ARMv7	ARMv8
Source Code	node-v18.17.1.tar.gz	

<https://nodejs.org/ko/download/>



2.2 Verify installation

C:\> 명령 프롬프트

```
Microsoft Windows [Version 10.0.19044.1889]  
(c) Microsoft Corporation. All rights reserved.
```

```
C:\Users\life21c>node -v  
v16.17.0
```

```
C:\Users\life21c>npm -v  
8.15.0
```

```
C:\Users\life21c>
```

node -v

npm -v



2.3 Testing node.js – node shell

명령 프롬프트

```
C:\Users\life21c>node
Welcome to Node.js v14.9.0.
Type ".help" for more information.
> a=2
2
> b=5
5
> c=a+b
7
> a*b
10
> a/b
0.4
> a%b
2
> b%a
1
>
(To exit, press ^C again or ^D or type .exit)
>
C:\Users\life21c>_
```

// node shell
node
>
>
// exit
^C^C or ^D



2.4 Testing node.js – final test

Final test if Node.js was installed correctly:

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

문제 출력 디버그 콘솔 터미널

```
Microsoft Windows [Version 10.0.19045.3448]  
(c) Microsoft Corporation. All rights reserved.
```

```
D:\aann\aann-rpt02>node -e "console.log('Hello from node.js ' + process.version)"  
Hello from node.js v16.17.0
```

```
D:\aann\aann-rpt02>█
```



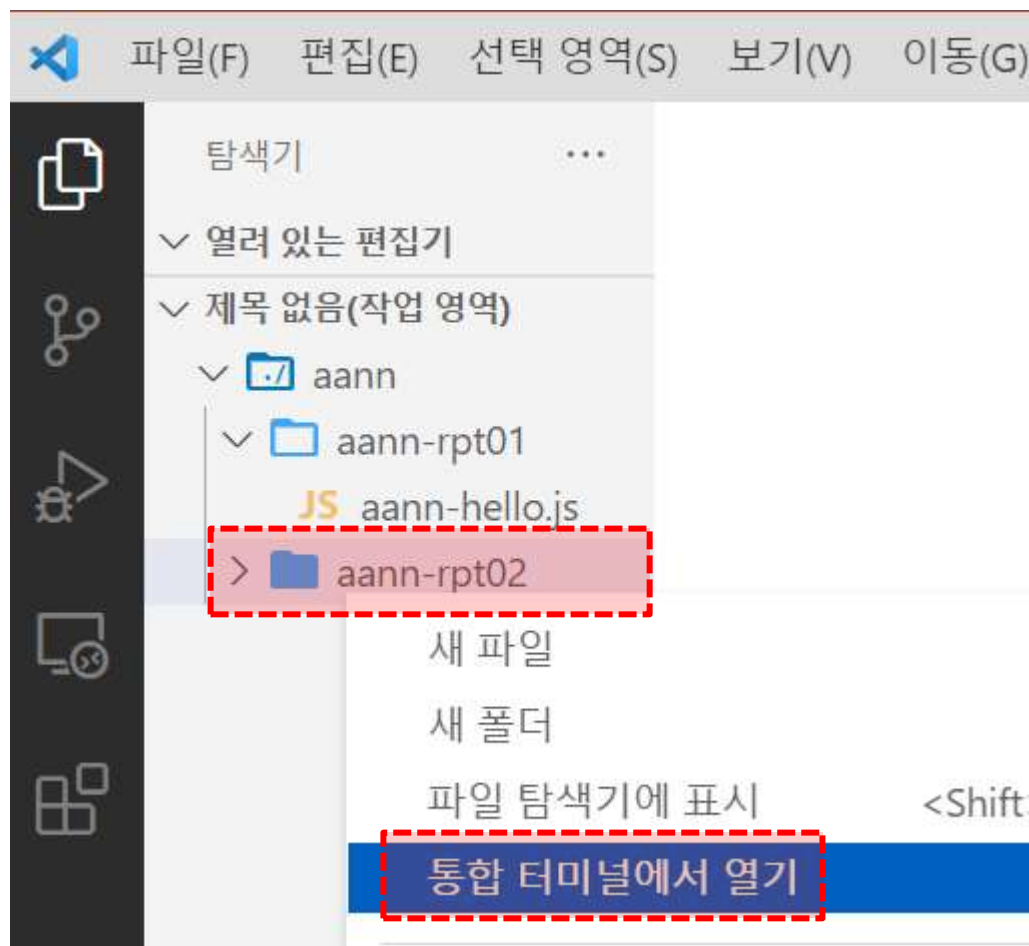
Node.js Project

npm init



4.1 Node project : start terminal

// VScode
작업영역에
aann-rpt02
폴더 만들고
터미널 열기





4.1 Node project : start terminal

문제 출력 디버그 콘솔 터미널

cmd + v [icon] [icon] [icon] [icon]

Microsoft Windows [Version 10.0.19043.1165]
(c) Microsoft Corporation. All rights reserved.

```
D:\aann\aann-rpt02>md start
```

```
D:\aann\aann-rpt02>cd start
```

```
D:\aann\aann-rpt02\start>█
```

// node cmd

**md start
cd start**



4.2 Node project : **npm init**

```
D:\aann\aann-rpt02\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 init` for definitive documentation on these fields
and exactly what they do.

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

Press ^C at any time to quit.

```
package name: (start)
version: (1.0.0)
description: strat node project
entry point: (index.js)
test command:
git repository:
keywords: test
author: aa00
license: (ISC) MIT
```

// node project

npm init



4.3.1 Node project : package.json

```
{
  "name": "start",
  "version": "1.0.0",
  "description": "strat node project",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [
    "test"
  ],
  "author": "aa00",
  "license": "MIT"
}
```

Is this OK? (yes)

D:\aann\aann-rpt02\start>dir

D 드라이브의 볼륨: DATA

볼륨 일련 번호: 82D1-4852

D:\aann\aann-rpt02\start 디렉터리

2021-09-07	오후 01:47	<DIR>	.
2021-09-07	오후 01:47	<DIR>	
2021-09-07	오후 01:47		255 package.json
		1개 파일	255 바이트
		2개 디렉터리	2,467,748,704,256 바이트 남음



4.3.2 Node project : package.json

package.json

Node 프로젝트 설정 파일
- json file

```
1  {
2    "name": "start",
3    "version": "1.0.0",
4    "description": "strat node project",
5    "main": "index.js",
6    "scripts": {
7      "test": "echo \"Error: no test specified\" && exit 1"
8    },
9    "keywords": [
10     "test"
11   ],
12   "author": "aa00",
13   "license": "MIT"
14 }
```

Save as
AAnn_package.png

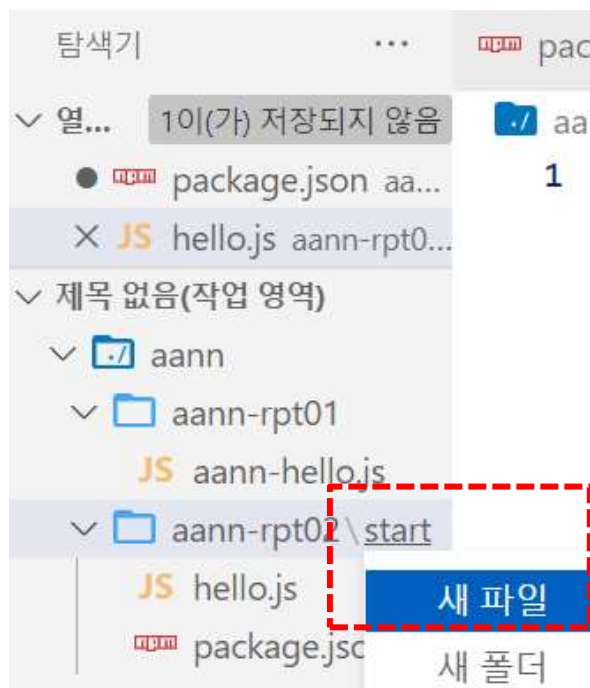


5. Node Apps

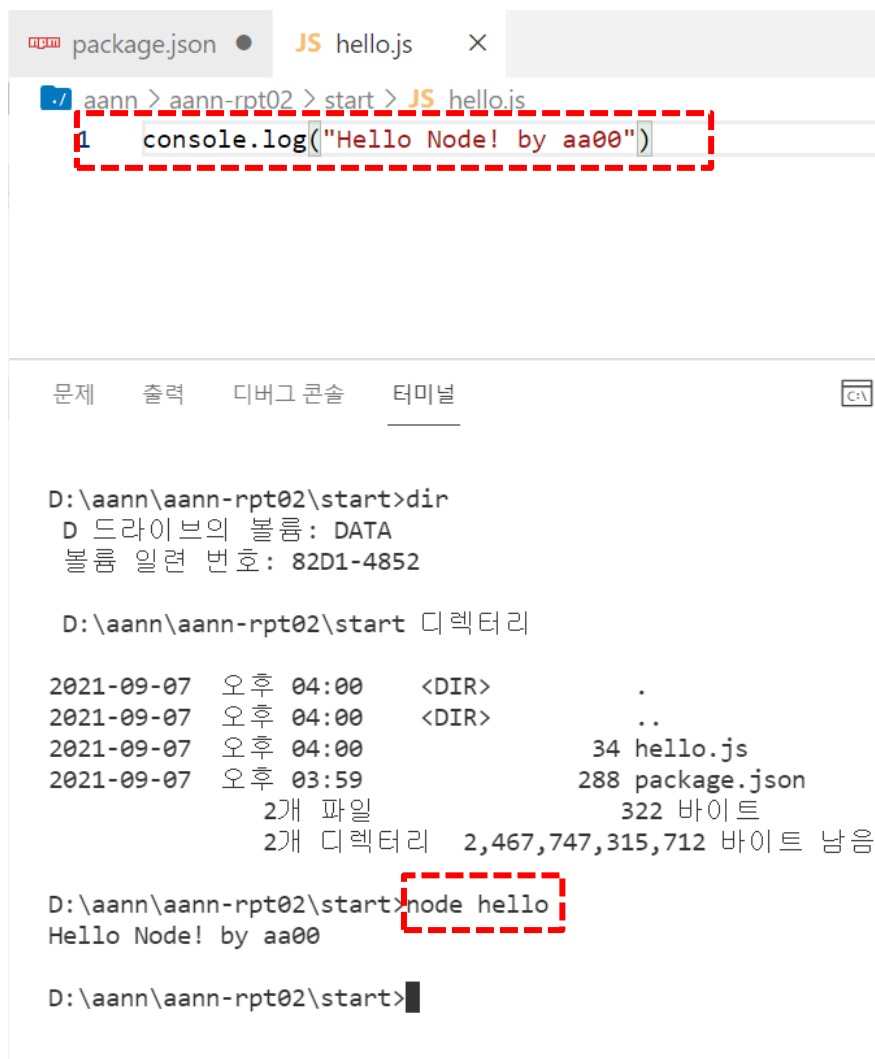
Node Apps



5.1.1 Hello Node! – hello.js



**start 폴더 안에
hello.js 파일**



VSCode 터미널에서 실행 : node js-file-name



5.1.2 Hello Node! – npm start 로 실행

package.json X JS hello.js

./ aann > aann-rpt02 > start > package.json > {} scripts > start

```
1  {
2    "name": "start",
3    "version": "1.0.0",
4    "description": "strat node project",
5    "main": "index.js",
6    "scripts": {
7      "start": "node hello.js",
8      "test": "echo \"Error: no test specified\" && exit 1"
9    },
10   "keywords": [
11     "test"
12   ],
13   "author": "aa00",
14   "license": "MIT"
15 }
16
```

문제

출력

디버그 콘솔

터미널

cmd + v

D:\aann\aann-rpt02\start>npm start

```
> start@1.0.0 start D:\aann\aann-rpt02\start
> node hello.js
```

Hello Node! by aa00



Using function in node



5.2.1 Using function in node

package.json

JS hello_function.js

JS hello.js

aann > aann-rpt02 > start > JS hello_function.js > ...

```
1 // hello_function.js
2 function hello(what) {
3   |   console.log("Hello " + what + " !");
4   | }
5
6 hello("aa00");
7 hello("redwoods, 홍길동");
8
```

문제

출력

디버그 콘솔

터미널

cmd

D:\aann\aann-rpt02\start>node hello_function

Hello aa00 !

Hello redwoods, 홍길동 !

D:\aann\aann-rpt02\start>



5.2.2 Using user-module: hello_user_module.js

사용자 정의 모듈

열... 1이(가) 저장되지 않음

1 그룹

- package.json aa...
- JS hello_user_mod...

2 그룹

- × JS hello_call_modul...

제목 없음(작업 영역)

- ✓ aann
 - ✓ aann-rpt01
 - JS aann-hello.js
 - ✓ aann-rpt02\start
 - JS hello_call_mod...
 - JS hello_function.js
 - JS hello_user_mo...
 - JS hello.js
 - package.json

aann > aann-rpt02 > start > JS hello_user_module.js > ...

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

JS hello_call_module.js ×

aann > aann-rpt02 > start > JS hello_call_module.js > ...

```
1 // hello_call_module.js
2 var olleh = require('./hello_user_module.js');
3
4 olleh("Node");
5 olleh("aa00");
6
7
```

문제 출력 디버그 콘솔 터미널

cmd + v

```
D:\aann\aann-rpt02\start>node hello_call_module
Hello Node !
Hello aa00 !
```

```
D:\aann\aann-rpt02\start>
```

Call user-module 'hello_user_module.js' from hello_call_module.js



[extra code] local module : circle.js

circle_info.js uses local module **circle.js**.

The screenshot shows a VS Code editor with the following components:

- File Explorer (Left):** Shows the project structure. The file `circle_info.js` is selected under the `start` folder.
- Editor (Top):** Displays the content of `circle.js`. A red dashed box highlights the `module.exports` section, which defines `area` and `circumference` functions. A blue arrow points from this box to the `circle_info.js` file in the File Explorer.
- Editor (Bottom):** Displays the content of `circle_info.js`. It shows the `require` function being used to load `./circle` and the `console.log` statements that use the `area` and `circumference` functions.
- Terminal (Bottom):** Shows the command `D:\aann\start>cd ..` and `D:\aann\start>node circle_info`. The output of the command is:
The area of a circle of radius 4 is 50.26548245743669
The circumference of a circle of radius 4 is 25.132741228718345



Node.js Server

1. http, tcp, file

2. Express



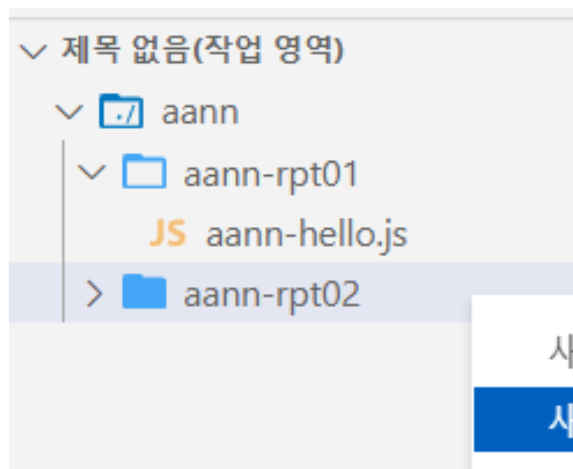
6. Node Server

Node Server I.

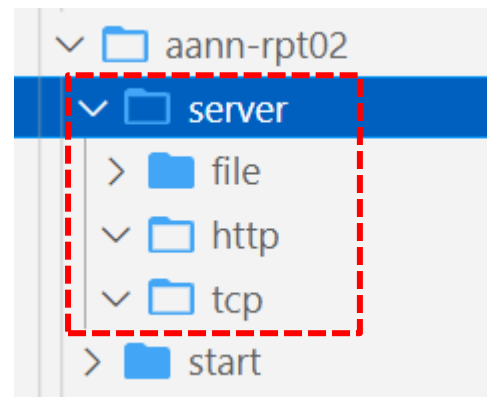
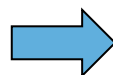
- 1. HTTP server**
- 2. TCP server**
- 3. File upload**



6.1 Node server : working folders



새 파일
새 폴더





6. Node Server

Node Server I.

1. HTTP server

2. TCP server

3. File upload



6.1.1 http server

```
JS index.js  X
./ aann > aann-rpt02 > server > http > JS 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.writeHead(200, {
8      "Content-Type": "text/plain"
9    });
10   response.write("Hello HTTP server from node.js"); // WEB response
11   response.write("\nMy ID is AA00!");
12   response.end();
13
14 });
15
16 server.listen(port);
17 console.log("Server Running on " + port +
18   ".\nLaunch http://localhost:" + port);
```

문제 출력 디버그 콘솔 터미널

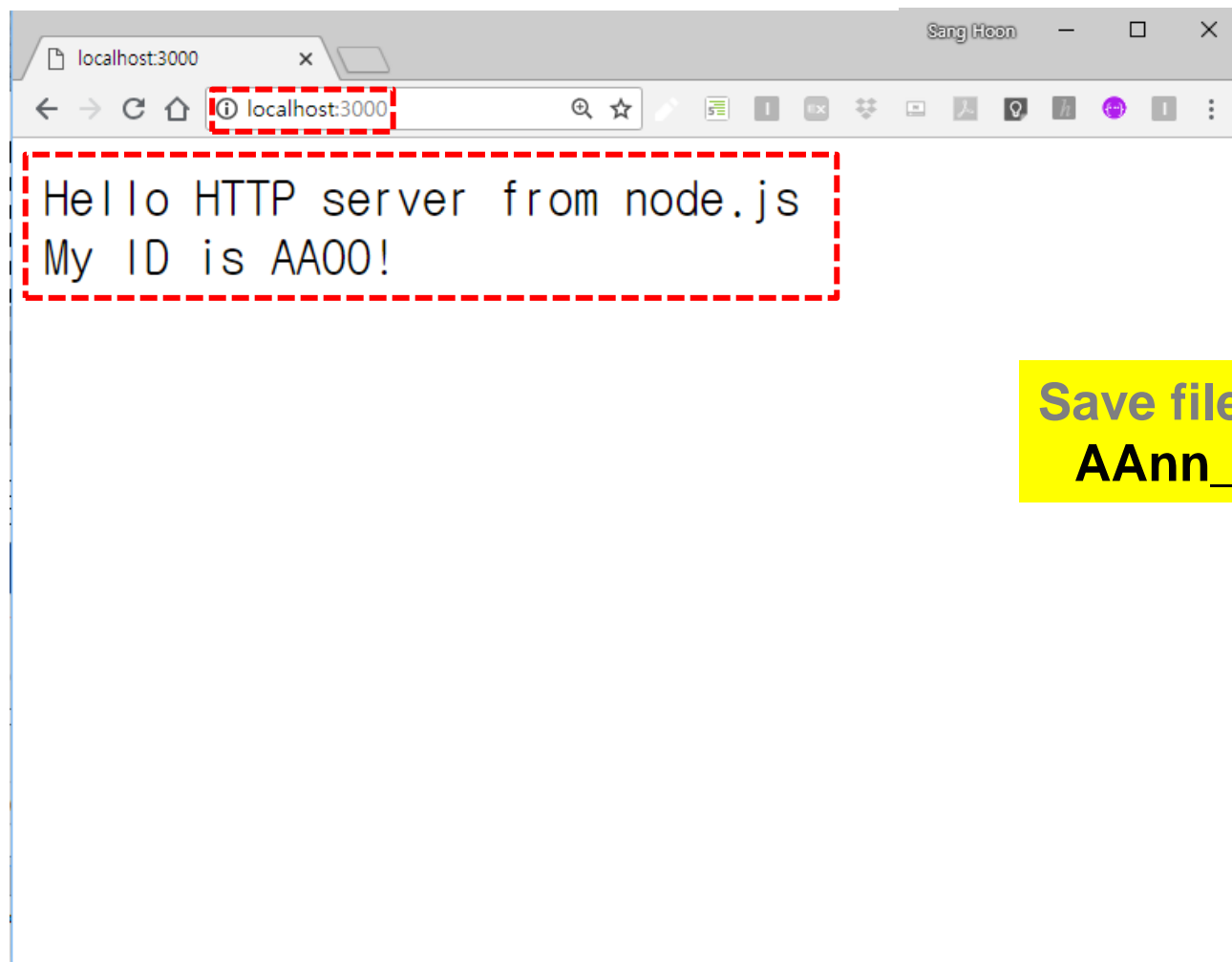
```
D:\aann\aann-rpt02\server\http>node index
Server Running on 3000.
Launch http://localhost:3000
```



6.1.2 http server : result 1

Server Running on 3000.

Launch `http://localhost:3000`



Save file

AAnn_HTTP.png



6.1.3 Stop HTTP server !!! → ^C

문제 출력 디버그 콘솔 터미널

```
D:\aann\aann-rpt02\server\http>node index
```

```
Server Running on 3000.
```

```
Launch http://localhost:3000
```

```
^C
```

```
D:\aann\aann-rpt02\server\http>
```



6.1.4 http server – ES6 version

JS index_ES6.js X

./ aann > aann-rpt02 > server > http > JS index_ES6.js > server > http.createServer() callback

```
1 // http server : index_ES6.js
2
3 var http = require('http');
4 port = 3000;
5
6 var server = http.createServer((request, response) => {
7     response.writeHead(200, {
8         "Content-Type": "text/plain"
9     });
10    response.write("Hello HTTP server from node.js, ES6"); // WEB response
11    response.write("\nMy ID is AA00!");
12    response.end();
13
14 });
15
16 server.listen(port);
17 console.log("Server Running on " + port +
18     ".\nLaunch http://localhost:" + port);
19
```

문제 출력 디버그 콘솔 터미널

node + v

D:\aann\aann-rpt02\server\http>node index_ES6

Server Running on 3000.

Launch http://localhost:3000

[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

```
Node
v5.7.0
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       0.0.0.0:3000    0.0.0.0:0          LISTENING     14332
TCP       0.0.0.0:14430   0.0.0.0:0          LISTENING     24316
TCP       0.0.0.0:14440   0.0.0.0:0          LISTENING     24316
TCP       0.0.0.0:17500   0.0.0.0:0          LISTENING     25096
TCP       0.0.0.0:21300   0.0.0.0:0          LISTENING     16228
TCP       0.0.0.0:30403   0.0.0.0:0          LISTENING     3660
TCP       0.0.0.0:30409   0.0.0.0:0          LISTENING     3668
```

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. Node Server

Node Server I.

1. HTTP server

2. TCP server

3. File upload

6.2.1 tcp server (socket connection)

JS server.js X

./ aann > aann-rpt02 > server > tcp > JS server.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 AA00! from localhost:3000");
9  });
10
11 server.listen(port, "127.0.0.1");
12 console.log("Network server started at port : " + port);
13

```

Socket으로 전송

문제 출력 디버그 콘솔 터미널

node + v

D:\aann\aann-rpt02\server\tcp> node server

Network server started at port : 3000

6.2.2 tcp client

JS server.js

JS client.js

X

aann > aann-rpt02 > server > tcp > JS client.js > ...

```

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

```

Socket으로 전송되는 데이터를 처리하고 종료

문제 출력 디버그 콘솔 터미널

```

D:\aann\aann-rpt02\server\tcp>node server
Network server started at port : 3000
Connection from 127.0.0.1

```

```

D:\aann\aann-rpt02\server\tcp>node client
Data: Hello AA00! from localhost:3000
Connection closed

```

```
D:\aann\aann-rpt02\server\tcp>
```



6.2.3 tcp server & client : result

```
JS server.js x JS client.js x
aann > aann-rpt02 > server > tcp > JS server.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 AA00! from localhost:3000");
9 });
10
11 server.listen(port, "127.0.0.1");
12 console.log("Network server started at port : " + port);
13

aann > aann-rpt02 > server > tcp > JS client.js > ...
1 // tcp client
2 var net = require('net');
3 var port = 3000;
4 var client = new net.Socket();
5 // Connection using socket
6 client.connect(port, "127.0.0.1");
7 // Receive data from socket
8 client.on('data', function (data) {
9   console.log('Data: ' + data);
10  client.destroy();
11 });
12
13 // Add a 'close' event handler for the client
14 client.on('close', function () {
15   console.log('Connection closed');
16 });

문제 출력 디버그 콘솔 터미널
D:\aann\aann-rpt02\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

Data: Hello AA00! from localhost:3000
Connection closed

D:\aann\aann-rpt02\server\tcp>node client
Data: Hello AA00! from localhost:3000
Connection closed

D:\aann\aann-rpt02\server\tcp>node client
Data: Hello AA00! from localhost:3000
Connection closed

D:\aann\aann-rpt02\server\tcp>

줄 1, 열 1 Tab 크기: 4 UTF-8 CRLF JavaScript kiter ready
```

Save file

AAnn_TCP_Log.png



6. Node Server

Node Server I.

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

6.3.1 file upload using module 'formidable'

JS file_server.js X

aann > aann-rpt02 > server > file > 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

```

문제 출력 디버그 콘솔 터미널

node + v

D:\aann\aann-rpt02\server\file>node file_server

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



6.3.2 file upload : npm install formidable

문제 출력 디버그 콘솔 터미널

cmd + v [icon] [icon] [icon] [icon]

```
D:\aann\aann-rpt02\server\file>npm install formidable
npm WARN saveError ENOENT: no such file or directory, open 'D:\aann\aann-rpt02\server\file\package.json'
npm notice created a lockfile as package-lock.json. You should commit this file.
npm WARN enoent ENOENT: no such file or directory, open 'D:\aann\aann-rpt02\server\file\package.json'
npm WARN file No description
npm WARN file No repository field.
npm WARN file No README data
npm WARN file No license field.
```

```
+ formidable@1.2.2
added 1 package and audited 1 package in 0.96s
```

```
1 package is looking for funding
  run `npm fund` for details
```

```
found 0 vulnerabilities
```

```
D:\aann\aann-rpt02\server\file>
```

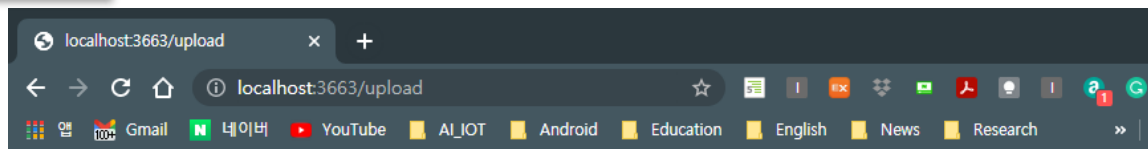
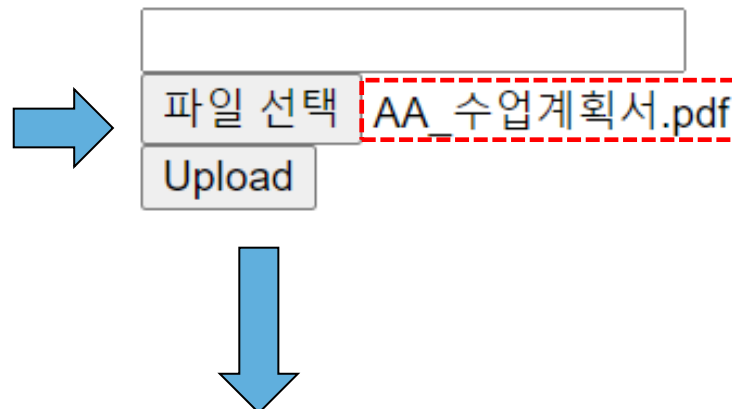
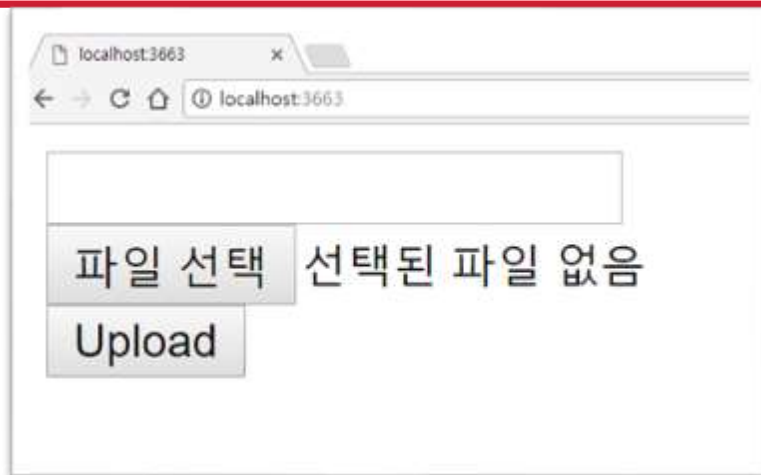
```
D:\aann\aann-rpt02\server\file>dir
```

```
D 드라이브의 볼륨: DATA
볼륨 일련 번호: 82D1-4852
```

```
D:\aann\aann-rpt02\server\file 디렉터리
```

2021-09-07	오후 10:45	<DIR>	.
2021-09-07	오후 10:45	<DIR>	..
2017-12-29	오후 05:21		1,048 file_server.js
2021-09-07	오후 10:45	<DIR>	node_modules
2021-09-07	오후 10:45		323 package-lock.json
	2개 파일		1,371 바이트
	3개 디렉터리		2,467,732,140,032 바이트 남음

6.3.3 file upload



received upload:

```
{
  fields: { title: '' },
  files: {
    upload: File {
      _events: [Object: null prototype] {},
      _eventsCount: 0,
      _maxListeners: undefined,
      size: 112398,
      path: 'C:\\Users\\l\\AppData\\Local\\Temp\\upload_b94c6a275a78a8edfed4e771256fb455',
      name: 'AA_&#49688;&#50629;&#44228;&#54925;&#49436;.pdf',
      type: 'application/pdf',
      hash: null,
      lastModifiedDate: 2021-09-07T13:57:11.868Z,
      _writeStream: [WriteStream],
      [Symbol(kCapture)]: false
    }
  }
}
```

Save file
AAnn_Upload.png



[Practice]

◆ [wk02]

- Node module : **aanninfo.js**
- Upload folder: **aann-rpt02**



[practice] local module : aanninfo.js

index_aann.js uses local module **aanninfo.js** in start subfolder.



```
1 // index_aann.js
2
3 var myinfo = require('./aanninfo');
4
5 myinfo("aa00", "Redwoods", '010-1234-5678');
6
7 myinfo("aa55", "Comsi", '010-5678-1234');
```

My Info
ID : aa00
Name : Redwoods
Phone : 010-1234-5678

My Info
ID : aa55
Name : Comsi
Phone : 010-5678-1234

[Finished in 0.2s]

Save as
AAnn_info.png



[practice] local module : aanninfo.js

How to make aanninfo.js in start subfolder.

1. Make local module – aanninfo.js
2. Call aanninfo.js from index_aann.js.
3. Capture your result.

```
index_aann.js  x  aanninfo.js  x
1 // aanninfo.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](#)

◆ [Target of this week]

My Info using node module – aanninfo.js

Upload folder : aann-rpt02

- 제출할 파일들

- ① **AAnn_package.png**
- ② **AAnn_HTTP.png**
- ③ **AAnn_TCP_Log.png**
- ④ **AAnn_Upload.png**
- ⑤ **AAnn_info.png**
- ⑥ **start folder**
- ⑦ **server folder**

[Upload to github]

◆ [wk02]

- upload all work of this week
- Use repo “aann” in github
- upload folder “aann-rpt02”
in your github.

● References & HW/SW sites

- ✓ <http://www.arduino.cc> Arduino Homepage
- ✓ <http://www.nodejs.org/ko> Node.js
- ✓ <https://plot.ly/> plotly
- ✓ <https://www.mongodb.com/> MongoDB
- ✓ <https://www.anaconda.com/> Anaconda
- ✓ <http://www.github.com> GitHub
- ✓ <https://colab.research.google.com/> Colab