

네트워크 프로그래밍

웹(Node.js) 기반의 소켓통신프로그래밍

- 2018-11-13
- 김 태 완



Node.js?

<https://ko.wikipedia.org/wiki/Node.js>



- 구글 크롬의 V8 Engine JavaScript 엔진
- JavaScript Runtime
- 확장성 있는 네트워크 어플리케이션
- Server-Side 플랫폼
- 뛰어난 확장성(Node)
- 가볍고, 효율적
- 라이선스 (MIT)
- 멀티 플랫폼
(Windows, Linux, MacOS , etc)

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

<https://velopert.com/node-js-tutorials>

Node.js?

<https://ko.wikipedia.org/wiki/Node.js>



- Speed (run on google JS Engine)
- Asynchronous I/O
- Non-Blocking I/O
- Data Streaming
(HTTP request / response as a single event)
- Real-Time Application
(client / server side)
- Easy / Fast 코딩
- Open-Source (NPM)

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

<https://velopert.com/node-js-tutorials>

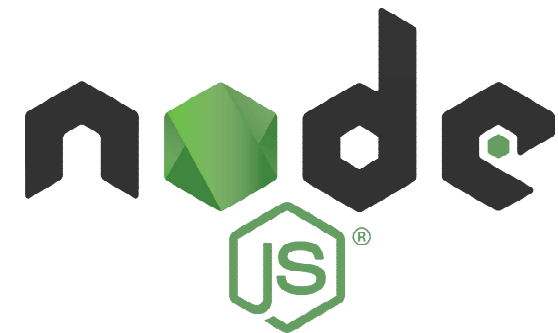
Node.js?

<https://ko.wikipedia.org/wiki/Node.js>



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

<https://velopert.com/node-js-tutorials>



Node.js?

<https://ko.wikipedia.org/wiki/Node.js>

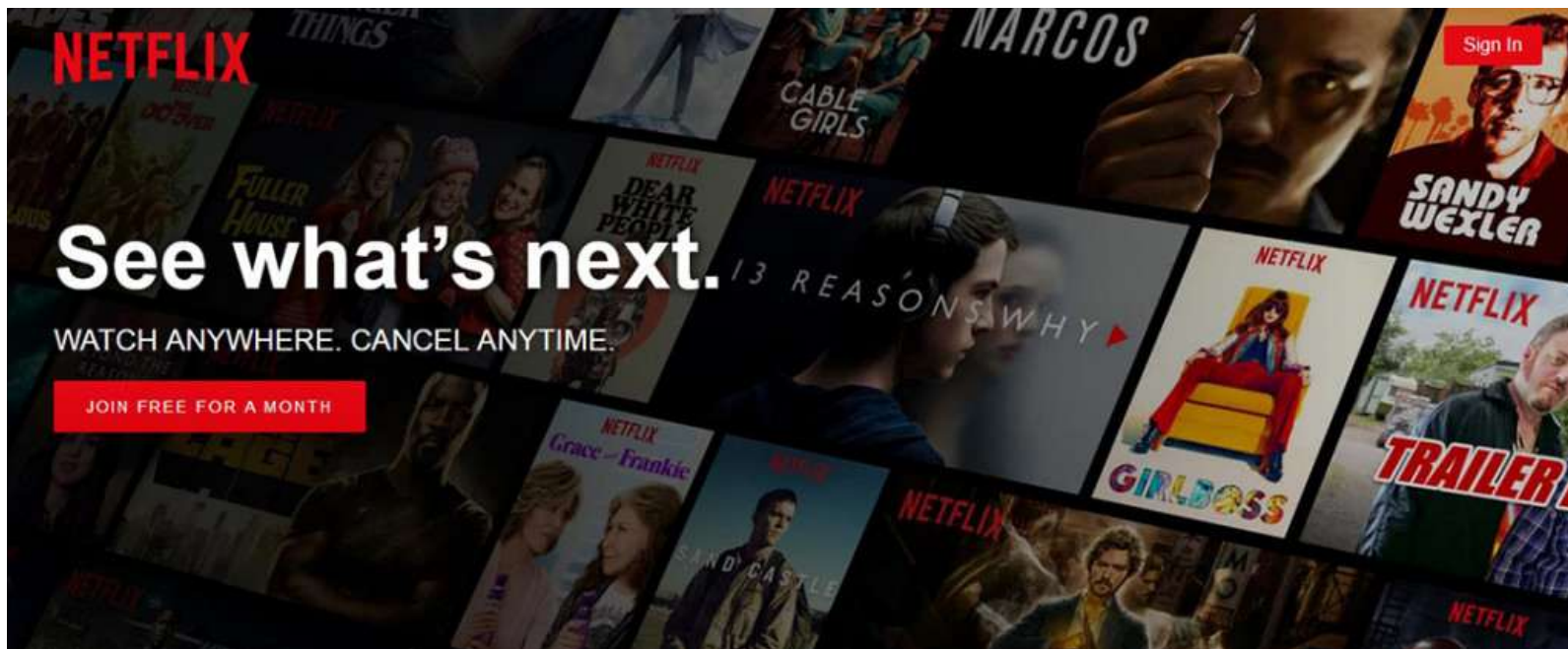
A screenshot of a PayPal advertisement for the Business Debit MasterCard. The background is a dark wood-grain texture. On the right side, there is a photograph of the actual card, which is silver with a blue stripe on the left. The card displays the PayPal logo, the MasterCard logo, the card number 5412 7500 0000, the name JOHN DOE, and the expiration date 06/18. The card is resting on a dark grey wallet. At the top left of the ad, the PayPal logo is followed by the text "Personal - Business - Send - Request". At the top right, there are two buttons: "Log In" and "Sign Up". The main heading "PayPal Business Debit MasterCard®" is in white. Below it, a list of features is provided: "- Withdraw money from your PayPal balance at any ATM.", "- No annual fee.", "- Earn unlimited 1% cash back on eligible purchases.†", and "- MasterCard Zero Liability policy for unauthorized purchases.*". A blue button with the text "Get a Card Today" is positioned below the list. At the bottom left, there is fine print: "† Additional enrollment for Cash Back is required. Earn Cash Back when you use your card online, over the phone or sign up for a purchase. Cash Back will be earned on net purchases when the receipt is signed or when the purchase is authorized as a credit transaction by phone or online. Purchases made using a PIN are not eligible to earn Cash Back." and "* Conditions and exceptions apply, see Cardholder Agreement."

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



Node.js?

<https://ko.wikipedia.org/wiki/Node.js>



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

2018-11-19



Node.js?

<https://ko.wikipedia.org/wiki/Node.js>

[Uber](#) [드라이버 파트너](#) [라이더](#) [비즈니스](#) [더 보기](#) [로그인](#) [가입](#)

원하는 대로 이동하세요.

드라이버 파트너

원하는 시간에 자유롭게 운행하세요.
Uber 앱이 주변의 운행 기회를 찾아 드립니다.
[자세히 알아보기](#)

드라이버 파트너로 가입하기 →

라이더

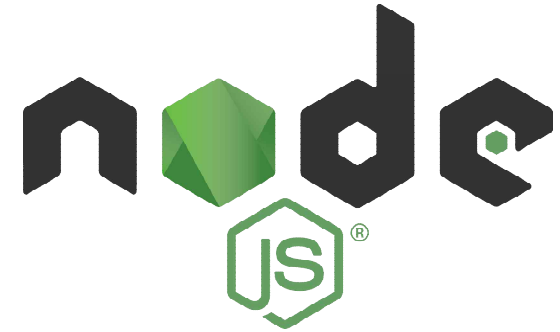
버튼 하나로 원하는 곳까지 간편하게 이동하세요.
[자세히 알아보기](#)

라이더로 가입하기 →

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

2018-11-19

7



Node.js?

<https://ko.wikipedia.org/wiki/Node.js>

A screenshot of the LinkedIn homepage with a sign-up form overlay. The form is titled "최고의 분야 전문가되기" (Become the best in your field) and "LinkedIn에서 가능합니다. 무료로 가입하세요." (Possible on LinkedIn. Join for free). It contains fields for "성" (Last name), "이름" (First name), "이메일 주소" (Email address), and "비밀번호(6자 이상)" (Password, 6+ characters). Below the fields is a blue button labeled "회원 가입" (Join). At the bottom of the form, it says "회원 가입을 클릭하면 LinkedIn 이용약관, 개인정보 취급 방침, 쿠키정책에 동의하는 것으로 간주됩니다." (By clicking Join, you agree to the LinkedIn Terms of Service, Privacy Policy, and Cookie Policy). The background shows a grid of diverse people's faces.

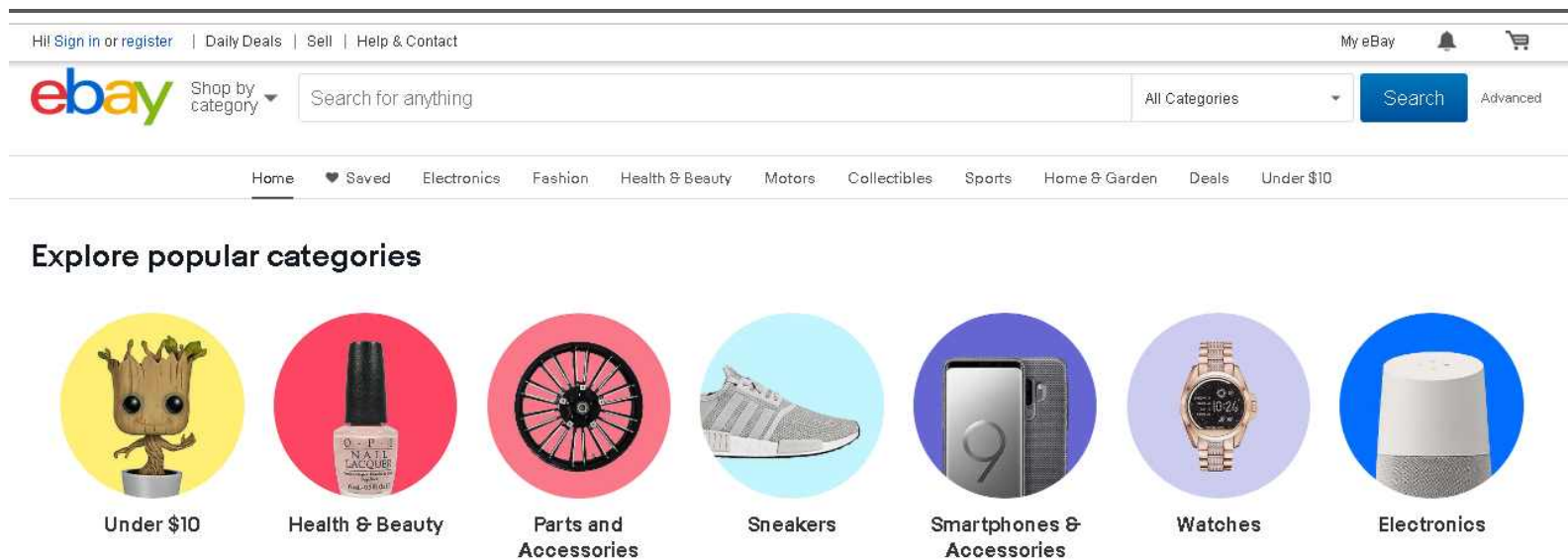
<https://nodejs.org/ko/>

2018-11-19



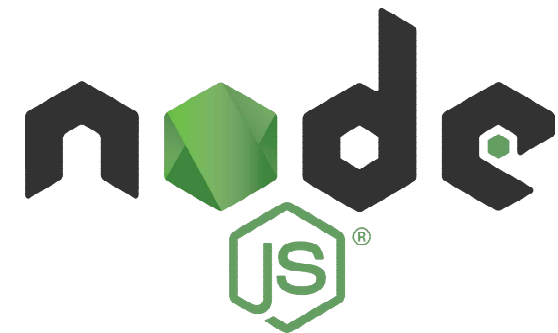
Node.js?

<https://ko.wikipedia.org/wiki/Node.js>



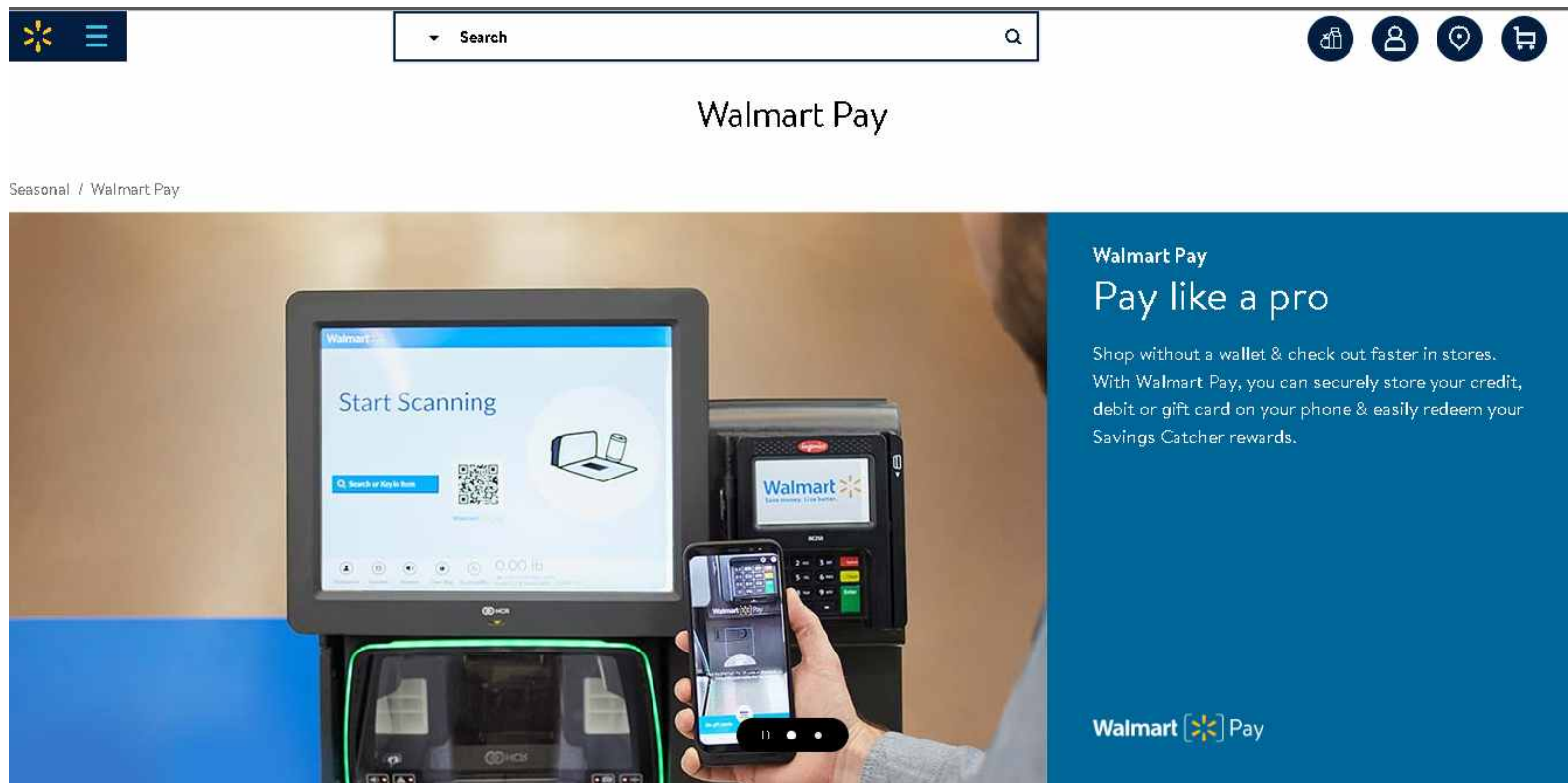
<https://nodejs.org/ko/>

2018-11-19



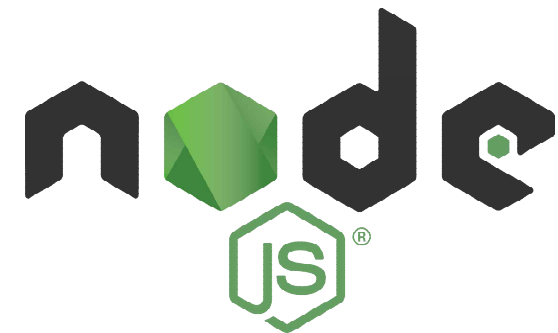
Node.js?

<https://ko.wikipedia.org/wiki/Node.js>



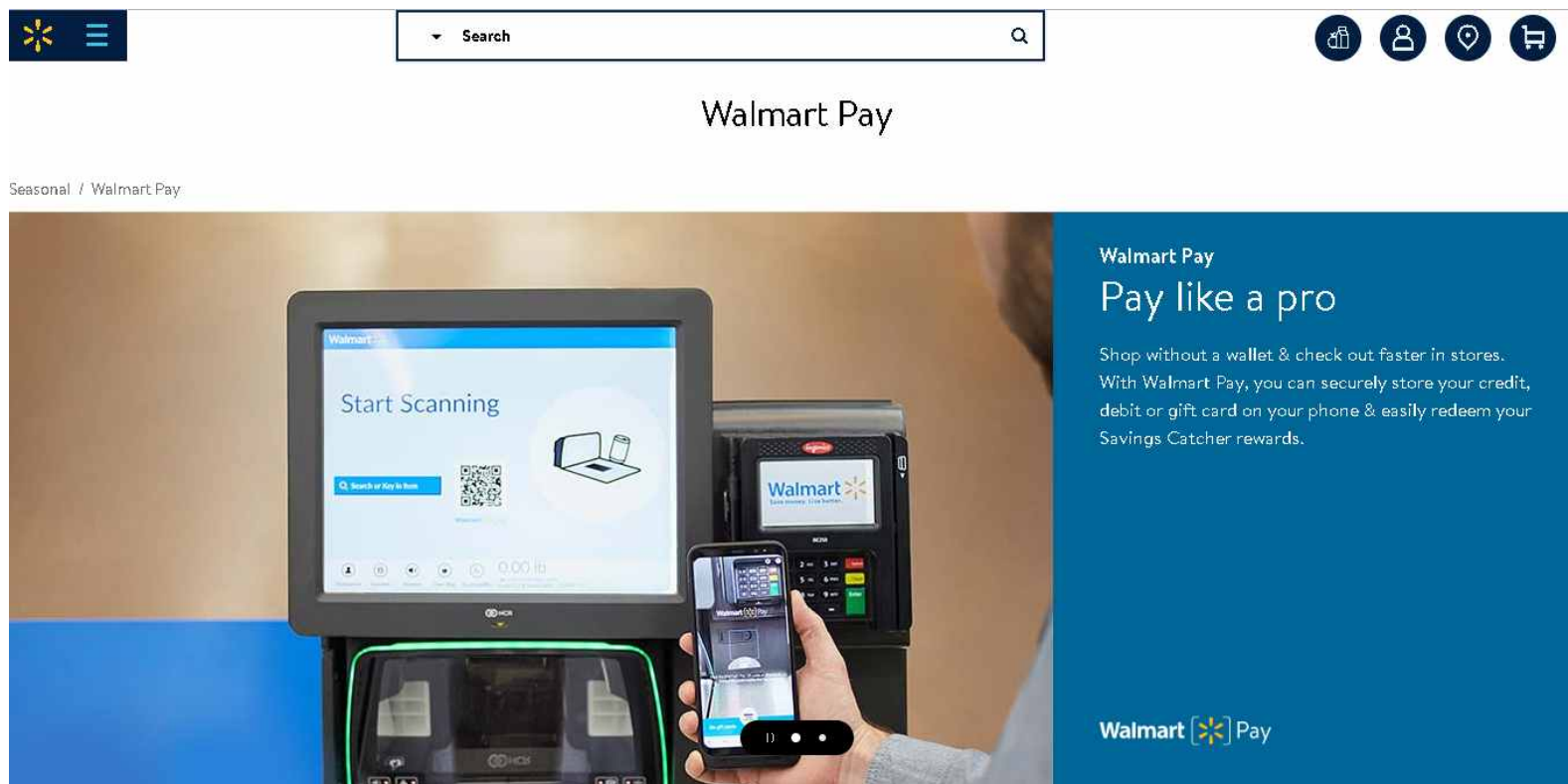
<https://nodejs.org/ko/>

2018-11-19



Node.js?

<https://ko.wikipedia.org/wiki/Node.js>

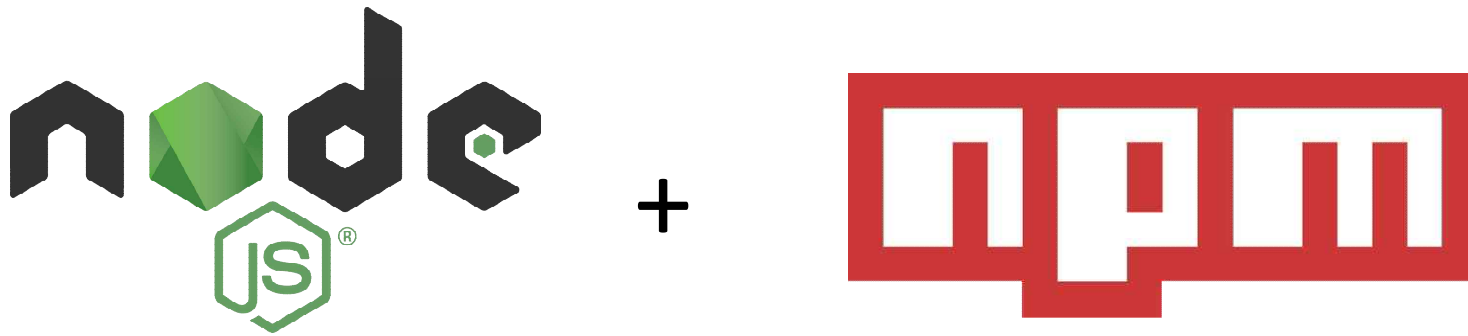


<https://nodejs.org/ko/>

2018-11-19

Node.js Open Source Library

<https://www.npmjs.com/>



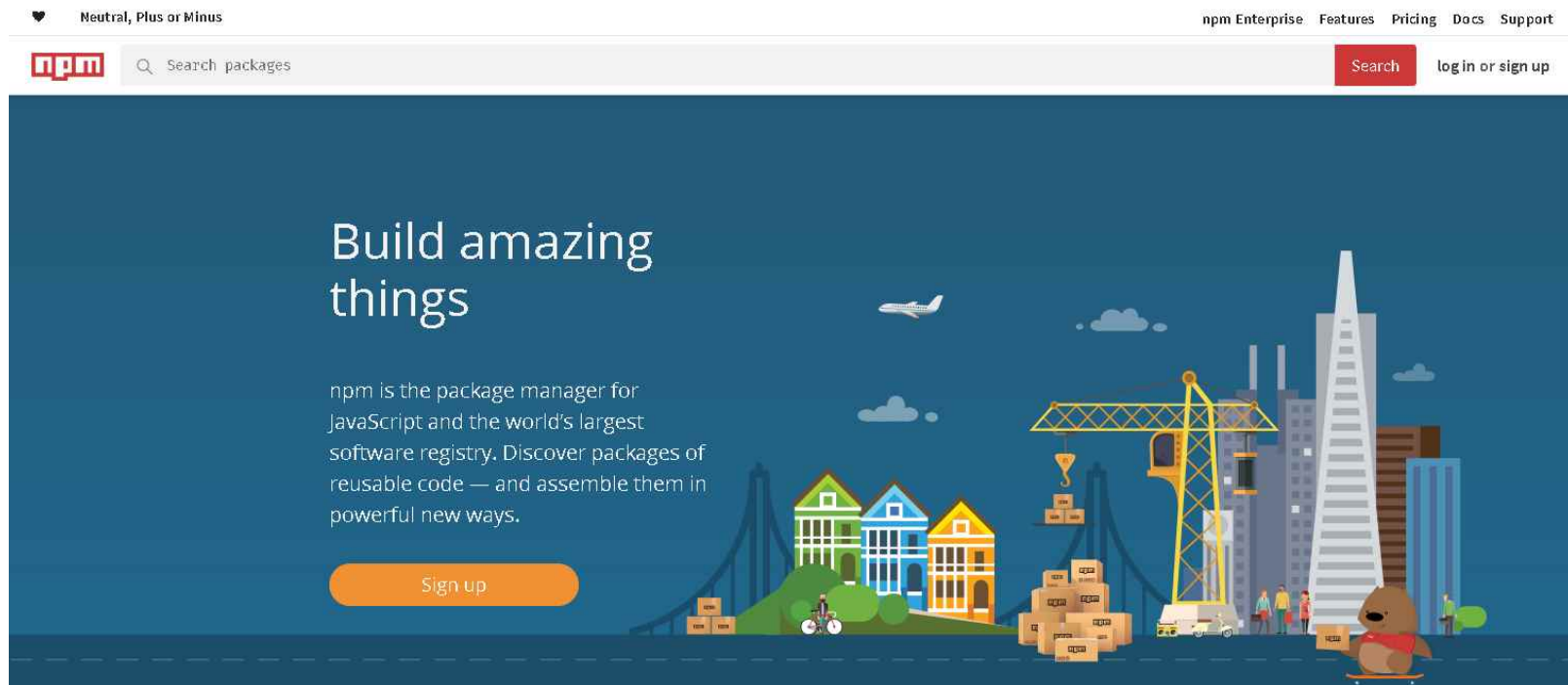
Open Source Library?

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



Node.js Open Source Library

<https://www.npmjs.com/>



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



Nifty Pun Master

npm Enterprise

Features

Pricing

Docs

Support

npm

socket

Search

log in or sign up

4655 packages found

123...233»

Sort Packages

Optimal

Popularity

Quality

Maintenance

Who's Hiring?

Triplebyte, MuleSoft, Callisto and lots of other companies are hiring javascript developers.

See all 19 companies

socket

Socket is a connect clone for simple socket based applications

mountainmansoftware

published 0.0.1 • 6 years ago

socket.io

Node.js realtime framework server

realtimeframeworkwebsockettcpeventssocketio

darrachequesne

published 2.1.1 • 6 months ago

ws

Simple to use, blazing fast and thoroughly tested websocket client and server for Node.js

HyBiPushRFC-6455WebSocketWebSocketsreal-time

lpinca

published 6.1.0 • a month ago

socket.io-client

[Build Status](https://secure.travis-ci.org/socketio/socket.io-client.svg?branch=master)[http://travis-ci.org/socketio/socket.io-client]

[Dependency Status](https://david-dm.org/socketio/socket.io-client.svg)[https://david-dm.org/socketio/socket.io-

realtimeframeworkwebsockettcpeventsclient

darrachequesne

published 2.1.1 • 6 months ago

sockjs-client

SockJS-client is a browser JavaScript library that provides a WebSocket-like object.

2018-11-19

14

[Search](#)[log in or sign up](#)

Share your code. npm Orgs help your team discover, share, and reuse code. [Create a free org »](#)

WS

6.1.0 • [Public](#) • Published a month ago

[Readme](#)[1 Dependencies](#)[4,450 Dependents](#)[99 Versions](#)

ws: a Node.js WebSocket library

npm v6.1.0 build passing build passing coverage 100%

ws is a simple to use, blazing fast, and thoroughly tested WebSocket client and server implementation.

Passes the quite extensive Autobahn test suite: [server](#), [client](#).

Note: This module does not work in the browser. The client in the docs is a reference to a backend with the role of a client in the WebSocket communication. Browser clients must use the native `WebSocket` object. To make the same code work seamlessly on Node.js and the browser, you can use one of the many wrappers available on npm, like [isomorphic-ws](#).

Table of Contents

- [Protocol support](#)
- [Installing](#)
 - [Opt-in for performance and spec compliance](#)
- [API docs](#)

install

```
> npm i ws
```

± weekly downloads

444,351



version

6.1.0

license

MIT

open issues

13

pull requests

1

homepage

[github.com](#)

repository

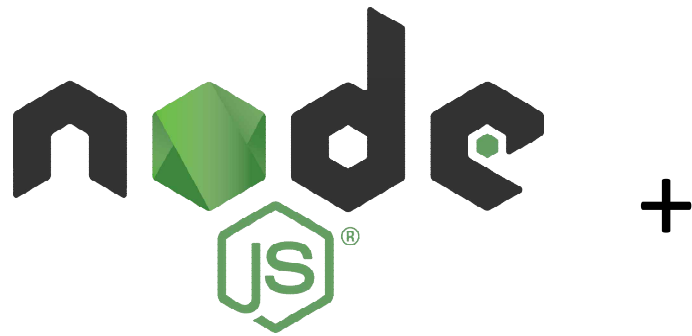
[github](#)

last publish

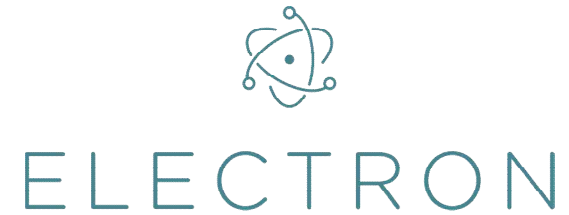
a month ago

collaborators

Node.js?



+



Desktop Application?

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



Node.js + Electron



Skype



GitHub Desktop



Figma



Flow



Discord



WordPress.com



Beaker Browser



Hyper



Kap



Now Desktop



Visual Studio Code



Kitematic



Insomnia



Sygus



Simplenote



Collectie



Caret



JIBO



GitKraken



Ghost



WebTorrent



1Clipboard



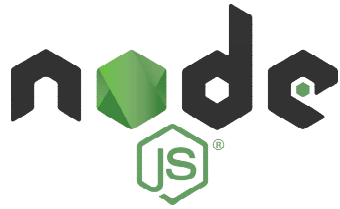
Slack



Atom


<https://github.com>
<https://github.com>

2018-1



Node.js + Electron

<https://electronjs.org/apps>

 ELECTRON

후원자 앱 문서 블로그 커뮤니티 출시 검색 한국어

Filter apps by name, description, etc...

카테고리들

Productivity 198

Developer Tools 139

Utilities 108

Music 44

Social Networking 40

Photo & Video 40

Games 29

Finance 23

Business 20

Education 16

Graphics & Design 11

Entertainment 6

Books 5


News 4


Lifestyle 4


Medical 2


Travel 1


Health & Fitness 1


 **Dusk Player** Minimal music player for your desktop.


 **RIDE** Remote IDE for Dyalog APL.


 **Superscript** A text editor for comic book writers.


 **P3X Redis UI** Redis UI based on redis-commander and phpRedisAdmin.


 **EasyHand** Helpful tool of making easier to work with huge quantity of files, folders and IDEs in the same...


 **Tagstoo** Software to tag folders and files, with multimedia and ebooks preview.


 **MoviePrint** With MoviePrint you can create screenshots of entire movies in an instant.

 **Altair GraphQL Client** Beautiful feature-rich GraphQL Client for all platforms.

 **Raven Reader** Simple RSS Reader for desktop without any distraction.

 **Genotify** Light-weight, cross-species gene lookup and summarization for desktop.

 **tiny-timer** Simple timer desktop app.

 **Excel Parser Processor** A Cross-Platform Desktop App for processing all rows of excel files.

<https://electronjs.org>
<https://nodejs.org>

2018-11-19

Node.js 준비물



1. Node.js 설치하기

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



Node.js®는 Chrome V8 JavaScript 엔진으로 빌드된 JavaScript 런타임입니다.

다운로드 - Windows (x64)

10.13.0 LTS

안정적, 신뢰도 높음

11.1.0 현재 버전

최신 기능

[다른 운영 체제](#) | [변경사항](#) | [API 문서](#)

[다른 운영 체제](#) | [변경사항](#) | [API 문서](#)

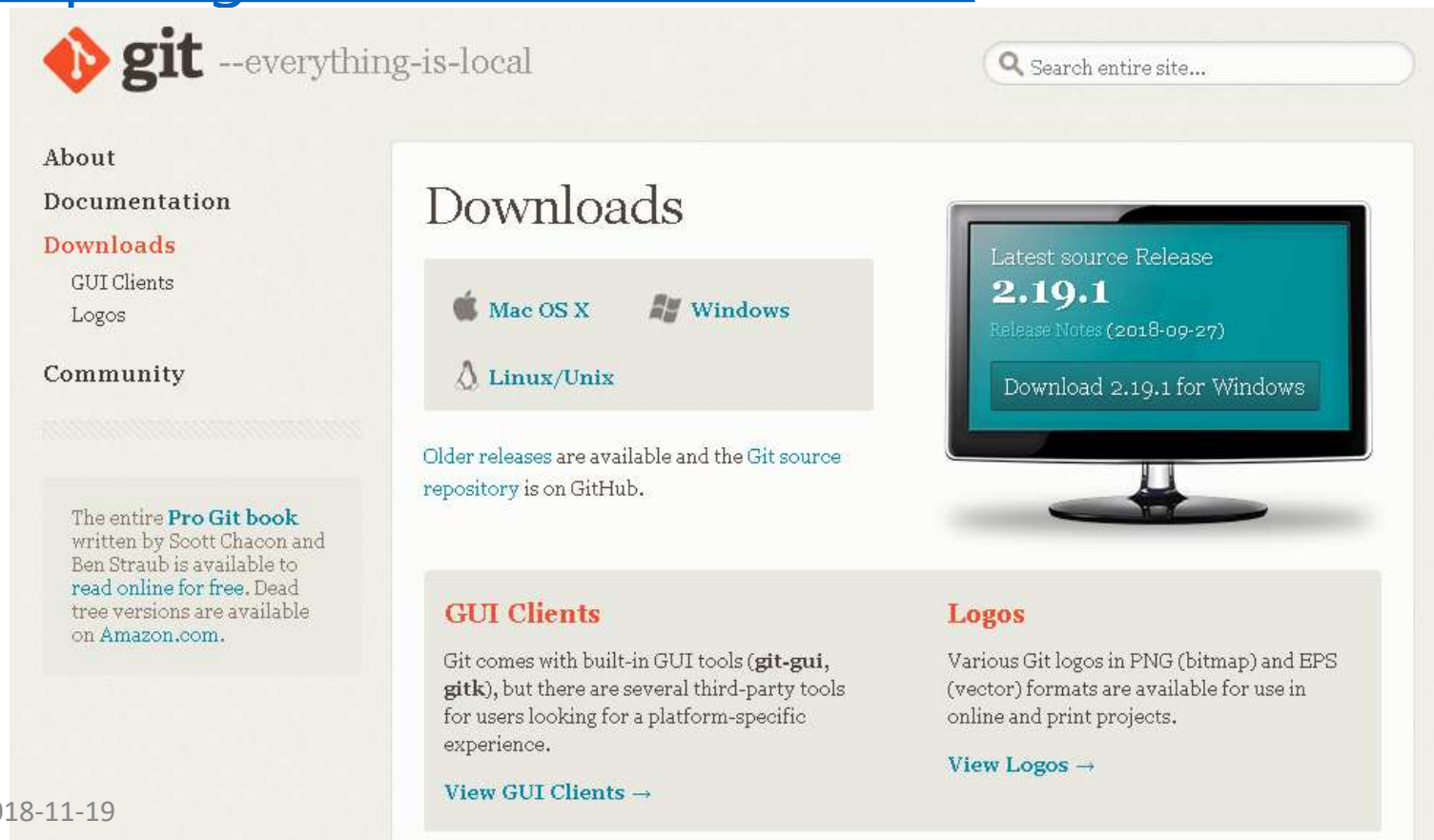
LTS 일정은 [여기서](#) 확인하세요.

Node.js 준비물



2. git 설치하기

<https://git-scm.com/downloads>

A screenshot of the Git website's Downloads page. The page has a light beige background. At the top left is the Git logo (a red diamond with a white 'G') and the text "git --everything-is-local". To the right is a search bar with the placeholder text "Search entire site...". On the left side, there is a navigation menu with links: "About", "Documentation", "Downloads" (highlighted in red), "GUI Clients", "Logos", and "Community". Below the menu is a box containing text about the "Pro Git book". The main content area is titled "Downloads" and features three platform-specific download buttons: "Mac OS X" (with an Apple logo), "Windows" (with a Windows logo), and "Linux/Unix" (with a Linux logo). To the right of these buttons is a large monitor displaying the "Latest source Release 2.19.1" and a button to "Download 2.19.1 for Windows". Below the platform buttons, a note states "Older releases are available and the Git source repository is on GitHub." At the bottom, there are two sections: "GUI Clients" with a link to "View GUI Clients" and "Logos" with a link to "View Logos".

git --everything-is-local

Search entire site...

About
Documentation
Downloads
GUI Clients
Logos
Community

The entire **Pro Git book** written by Scott Chacon and Ben Straub is available to [read online for free](#). Dead tree versions are available on [Amazon.com](#).

Downloads

Mac OS X Windows Linux/Unix

Latest source Release
2.19.1
Release Notes (2018-09-27)
Download 2.19.1 for Windows

Older releases are available and the Git source repository is on GitHub.

GUI Clients

Git comes with built-in GUI tools (**git-gui**, **gitk**), but there are several third-party tools for users looking for a platform-specific experience.

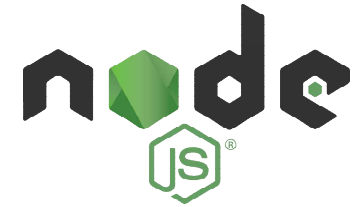
[View GUI Clients](#) →

Logos

Various Git logos in PNG (bitmap) and EPS (vector) formats are available for use in online and print projects.

[View Logos](#) →

Node.js 준비물



3. Visual Studio Code 설치하기

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

The image shows the Visual Studio Code website and a screenshot of the code editor interface. The website header includes links for Visual Studio Code, Docs, Updates, Blog, Community, Extensions, and FAQ. A search bar and a Download button are also present. A banner below the header states: "Version 1.28 is now available! Read about the new features and fixes from September." The main content area features the text "Code editing. Redefined." and "Free. Open source. Runs everywhere." Below this is a "Download for Windows" button with a dropdown arrow, and a link to "Other platforms and Insiders Edition". A disclaimer at the bottom of the website states: "By using VS Code, you agree to its license and privacy statement." The date "2018-11-19" is displayed in the bottom left corner. The screenshot of the code editor shows the "EXTENSIONS" sidebar on the left with a list of popular extensions: C# 1.22 (356K stars), Python 0.12.0 (211K stars), Debugger for Chrome (148 stars), C/C++ 0.7.0 (143K stars), Go 0.6.39 (99K stars), and ESLint 0.10.0 (88K stars). The main editor area displays a TypeScript file named "app.ts" with code for a web server using Express and TypeScript. The code includes imports for Express, debugModule, and http, and defines a server that listens on a port from the environment or defaults to 3000. The status bar at the bottom indicates the current file is "app.ts" at line 9, column 21, with 2 spaces, UTF-8 encoding, and LF line endings.

Visual Studio Code Docs Updates Blog Community Extensions FAQ

Search Docs Download

Version 1.28 is now available! Read about the new features and fixes from September.

Code editing. Redefined.

Free. Open source. Runs everywhere.

Download for Windows Stable Build

Other platforms and Insiders Edition

By using VS Code, you agree to its license and privacy statement.

2018-11-19

File Edit View Goto Help

EXTENSIONS

- @popular
- C# 1.22 356K ★★★★★ C# for Visual Studio Code (p... Microsoft Install
- Python 0.12.0 211K ★★★★★ Linting, Debugging (multi-L... Don Jayamanne Install
- Debugger for Chrome 148 ★★★★★ Debug your JavaScript code... Microsoft JS Diagno... Install
- C/C++ 0.7.0 143K ★★★★★ Complete C/C++ language ... Microsoft Install
- Go 0.6.39 99K ★★★★★ Rich Go language support f... Luke Hoban Install
- ESLint 0.10.0 88K ★★★★★ Integrates ESLint into VS Co... Dirk Baumer Install

app.ts

```
1 import app from './app';
2 import debugModule = require('debug');
3 import http = require('http');
4
5 const debug = debugModule('node-express-typescript:server');
6
7 // Get port from environment and store in Express.
8 const port = normalizePort(process.env.PORT || '3000');
9 app.set('port', port);
10
11 // create
12 const server = export
13 server.listen
14 server.on
15 server.on
16
17 /**
18 * Normal
19 */
20 function normalizePort(val: any): number|string|boolean {
21   let port = parseInt(val, 10);
22 }
```

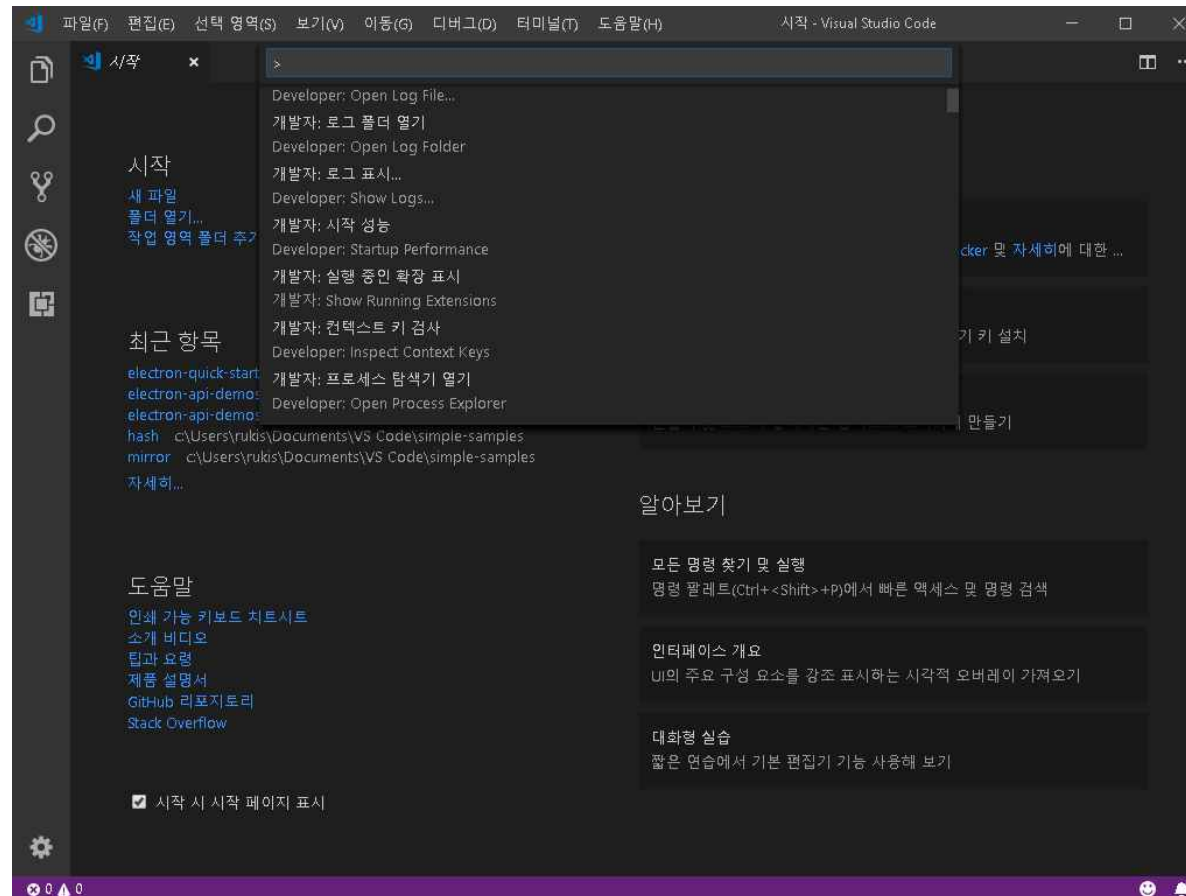
Ln 9, Col 21 Spaces: 2 UTF-8 LF TypeScript

Node.js 시작하기



Visual Studio Code

➤ Ctrl + Shift + p / F1 (명령팔레트)

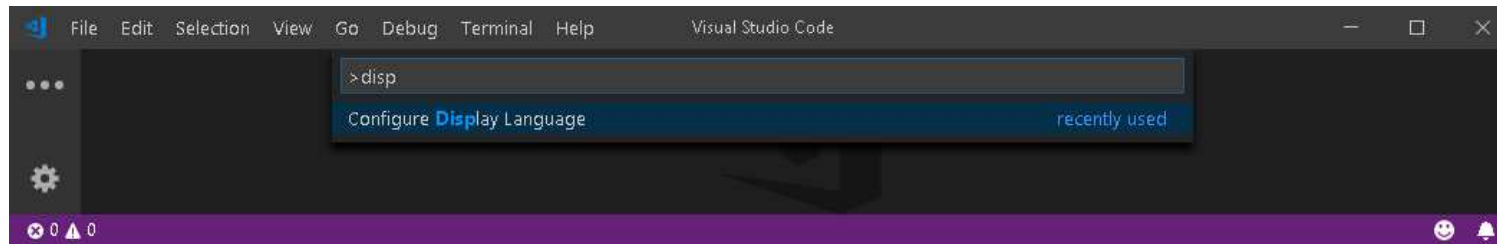


Node.js 시작하기



Visual Studio Code

➤ 한글화 -> F1 -> Configure Display Language



```
{ } locale.json x
1 {
2   // Defines VS Code's display language.
3   // See https://go.microsoft.com/fwlink/?LinkId=761051 for a list of sup
4   "locale": "en" // Changes will not take effect until VS Code has been r
5 }
```



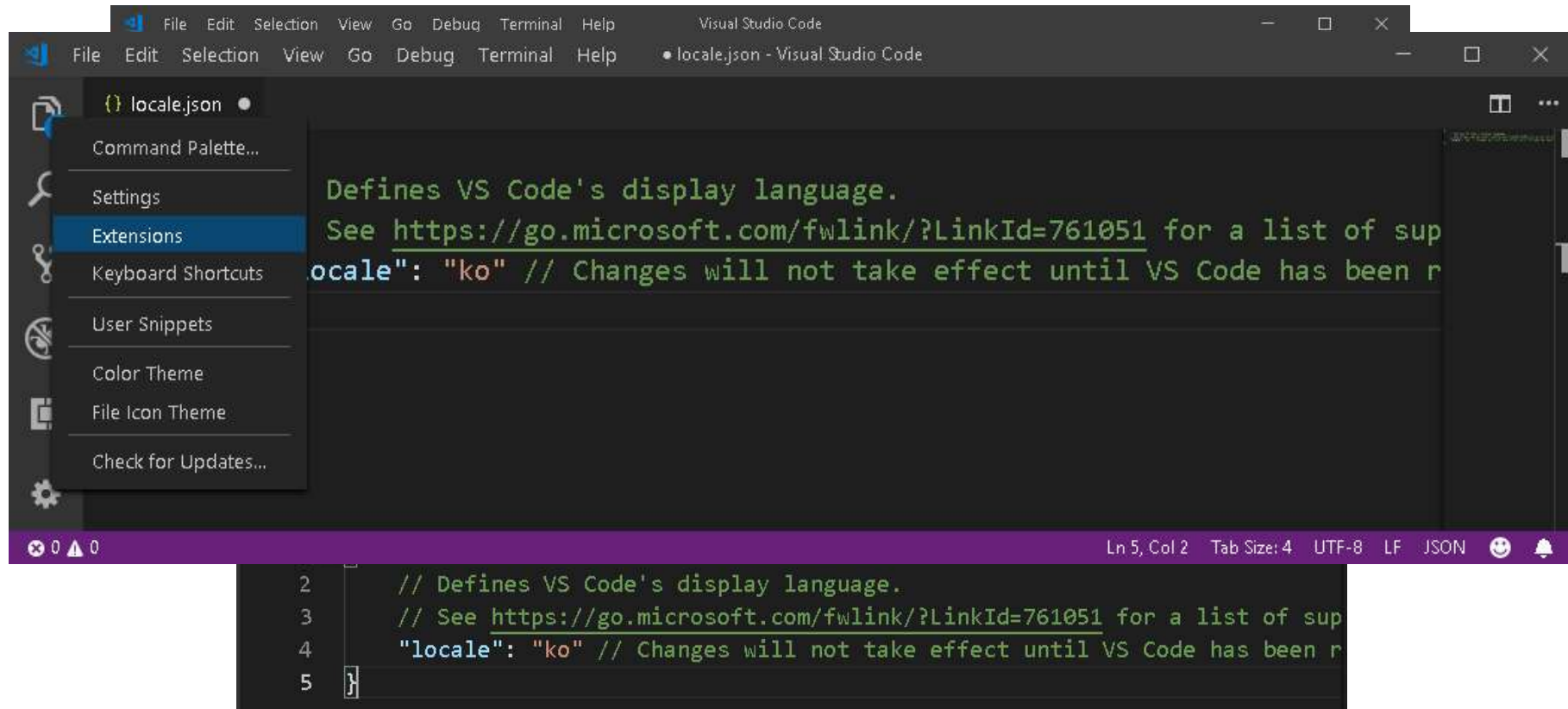
```
{ } locale.json •
1 {
2   // Defines VS Code's display language.
3   // See https://go.microsoft.com/fwlink/?LinkId=761051 for a list of sup
4   "locale": "ko" // Changes will not take effect until VS Code has been r
5 }
```

Node.js 시작하기

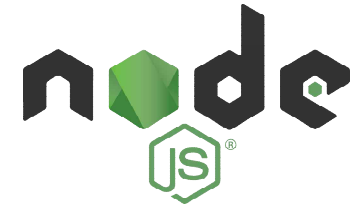


Visual Studio Code

➤ 한글화 -> F1 -> Configure Display Language

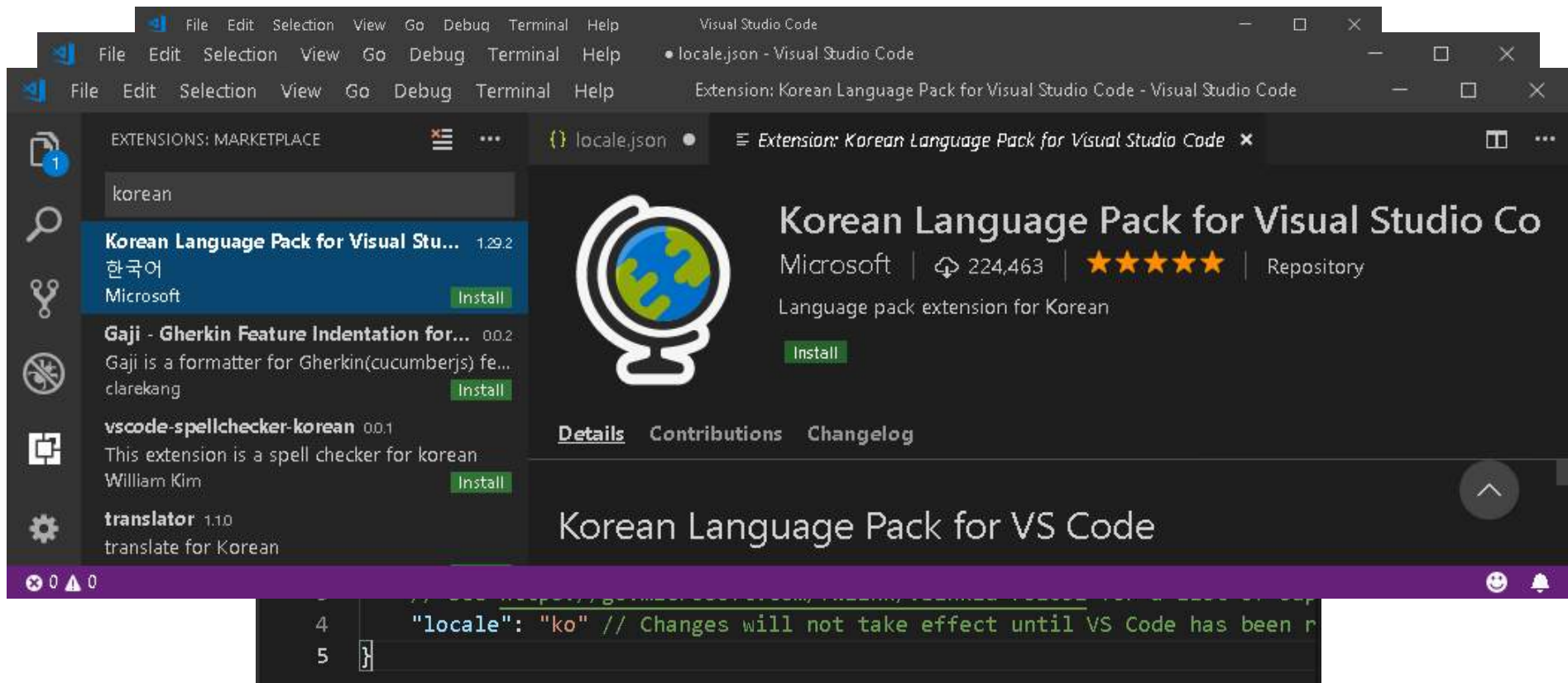


Node.js 시작하기

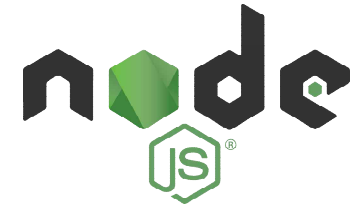


Visual Studio Code

➤ 한글화 -> F1 -> Configure Display Language



Node.js 시작하기



Visual Studio Code

➤ 한글화 -> F1 -> Configure Display Language



Node.js 시작하기



▶ HELLO NODE JS

The screenshot shows the Visual Studio Code interface with a project named 'NetworkProgrammingStudy'. The file explorer on the left shows a folder 'NETWORKPROGRAMMINGSTUDY' containing 'StartNode.js' and 'main.js'. The editor window displays 'main.js' with the following code:

```
1 var msg = 'Hello Node.js';
2 console.log(msg);
```

The terminal at the bottom shows the command to run the application with the Node.js debugger:

```
C:\Program Files\nodejs\node.exe --inspect-brk=5889 StartNode.js\main.js
Debugger listening on ws://127.0.0.1:5889/a6dd7a74-082d-4e80-89eb-cb1ae86d3598
For help, see: https://nodejs.org/en/docs/inspector
Hello Node.js
```

The status bar at the bottom indicates the file is 'master*', the encoding is 'UTF-8', and the language is 'JavaScript'.

Node.js 프로젝트 생성



➤ Express 사용하기

➤ 파일 -> 폴더 열기 -> 선택

➤ `npm install -g express-generator`

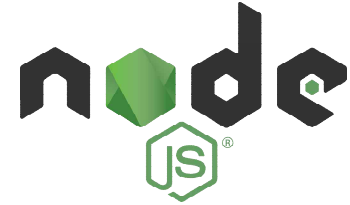
```
문제  출력  디버그 콘솔  터미널
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\rukis\Documents\NetworkProgrammingStudy> npm install -g express-generator
```

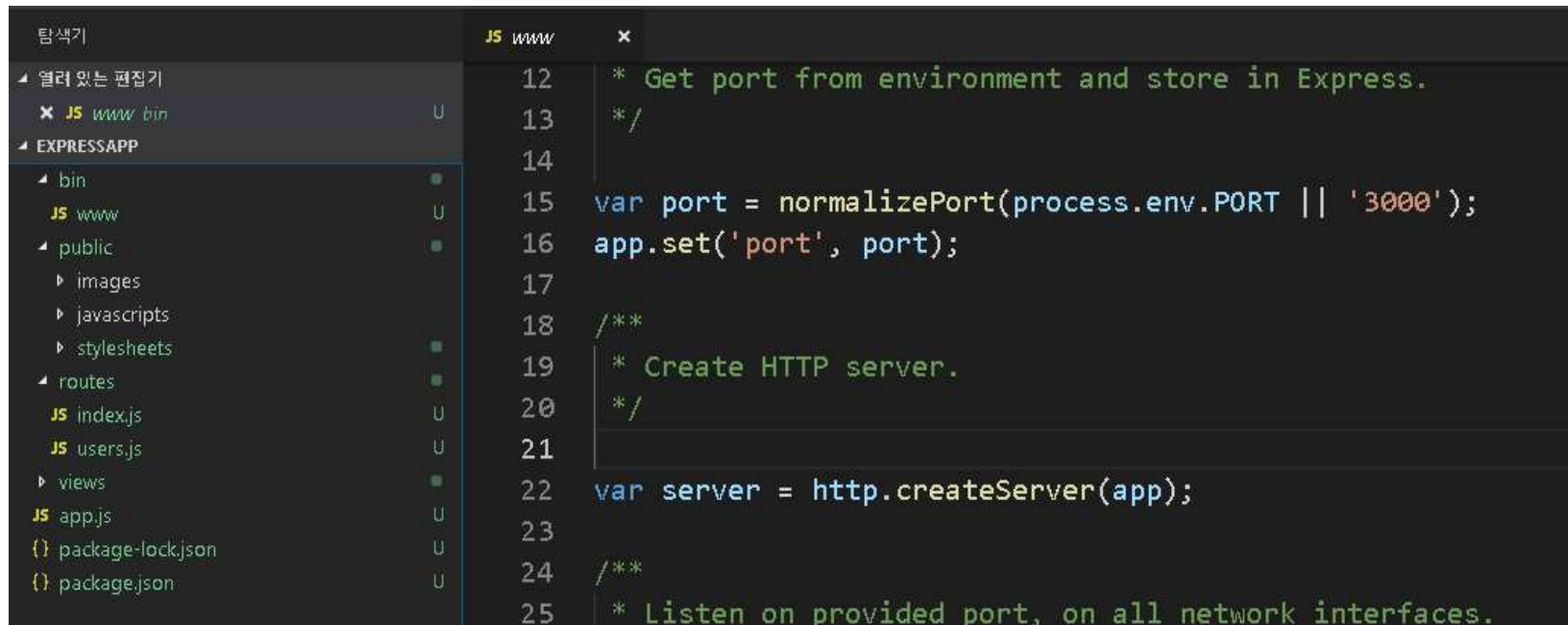
➤ `express -e ./`

```
문제  출력  디버그 콘솔  터미널
1: powershell
PS C:\Users\rukis\Documents\NetworkProgrammingStudy> express -e ./프로젝트명 혹은 폴더명
```

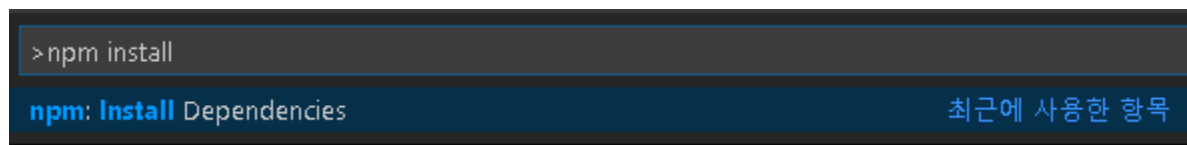

Node.js 프로젝트 생성



➤ Express 프로젝트 생성



➤ F1 -> npm install or 터미널 -> npm install



Node.js 시작하기



- Express 프로젝트 생성
- 빌드 -> F5, 웹 접속 (localhost:3000)



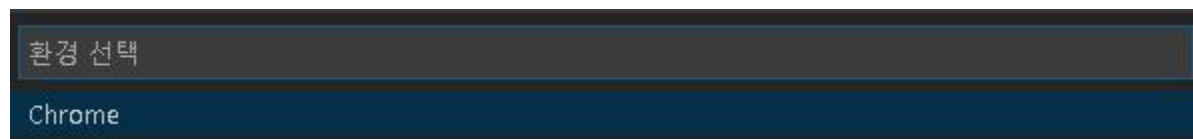
Node.js 시작하기



- Express 프로젝트 (Debugging)
- Debugger for Chrome 확장 설치



- 빌드 > F5 > Chrome



Node.js 시작하기



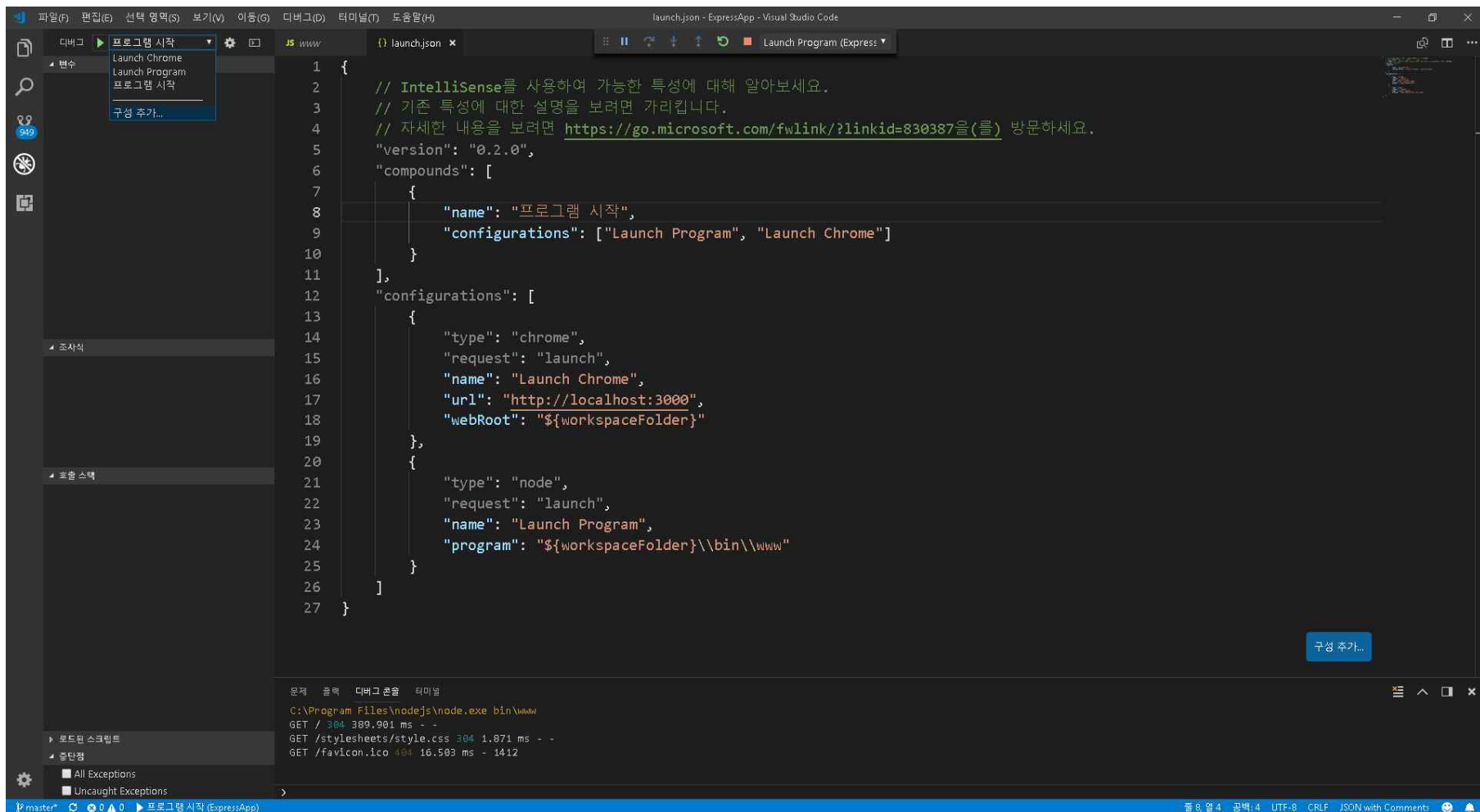
- Express 프로젝트 (Debugging)
- .vscode/launch.json 파일 자동생성

```
1 {  
2   // IntelliSense를 사용하여 가능한 특성에 대해 알아보세  
3   // 기존 특성에 대한 설명을 보려면 가리킵니다.  
4   // 자세한 내용을 보려면 https://go.microsoft.com/fwlink  
5   "version": "0.2.0",  
6   "configurations": [  
7     {  
8       "type": "chrome",  
9       "request": "launch",  
10      "name": "Launch Chrome against localhost",  
11      "url": "http://localhost:8080",  
12      "webRoot": "${workspaceFolder}"  
13    }  
14  ]  
15 }
```

Node.js 시작하기



➤ Express 프로젝트 (Debugging)



Node.js + Express + Html



➤ Jade vs Ejs

<http://jade-lang.com/>

<https://ejs.co/>

➤ Jade 의 경우 기능이 더 뛰어나다.

➤ Ejs 의 경우 html 코드를 그대로 사용하여 이질감이 없다.

➤ html 파일 사용하기

➤ views/index.ejs => views/index.html 파일명 수정

➤ app.js 코드 수정

```
// view engine setup
app.set('views', path.join(__dirname, 'views'));
/// ***** html 사용을 위한 ejs module 추가
App.engine('html', require('ejs').renderFile);
App.set('view engine', 'html');
```

Node.js + Express + Html



➤ routes/index.js

<https://www.w3schools.com/html/>

<https://ejs.co/>

```
res.render('index', { title: 'test' });
```

➤ views/index.html

```
<html> <head>
<title><%=title%></title> </head>
<body>
<h1>This is a Heading</h1>
<p>This is a paragraph.</p>
</body> </html>
```

Node.js 데이터 입력

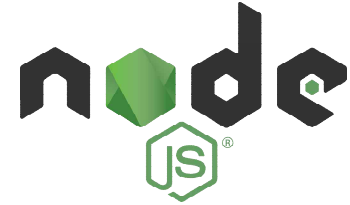


➤ routes/index.js

<https://www.w3schools.com/html/>

```
// POST
router.post('/', function (req, res) {
  var returnVal = { result: '' };
  if (req.body.msg) {
    console.log("client message : " + req.body.msg);
    returnVal.result= 'success';
  }
  else {
    returnVal.result= 'failure';
  }
  res.json(returnVal);
});
```


Node.js 데이터 입력



➤ javacripts/test.js

<https://www.w3schools.com/html/>
<https://api.jquery.com/>

```
function test()
{
    var data = { msg:
        $("#name").val()
    };
    console.log(data);
    $("#result").text(data.msg);
    $.ajax({
        type: 'POST',
        url: '/',
        data: data,
        contentType:
            'application/json',
        async: true,
        success: function (data) {
```

```
        var res = data;
        if (res.result == 'success') {
            console.log("success!!");
        } else if (res.result ==
            'failure') {
            console.log("failure!!");
        } else {
            alert(JSON.stringify(res));
        }
        $("#result").text(res.result)
    });
}
```

Node.js 데이터 입력



➤ views/index.html

<https://www.w3schools.com/html/>

```
<head>
<title><%=title%></title>
<script type="text/javascript" src="https://code.jquery.com/jquery-3.3.1.min.js">
<script type="text/javascript" src="/javascripts/test.js">/>
</head>
```

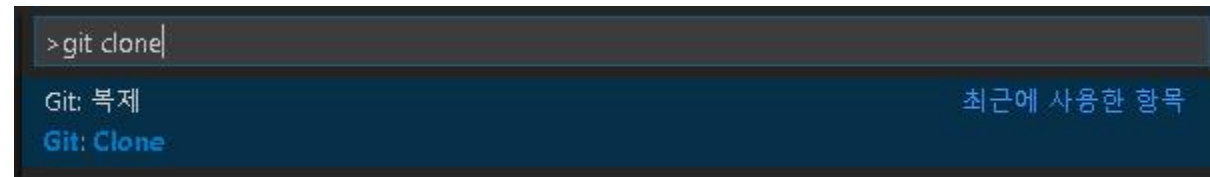
```
<body>
  User Name: <input type="text" id="name" name="name" value="test">
  <br/>
  <button onclick="test()">input</button>
  <br/>
  result: <label id="result"></label>
</body>
```

Node.js 로그인 처리



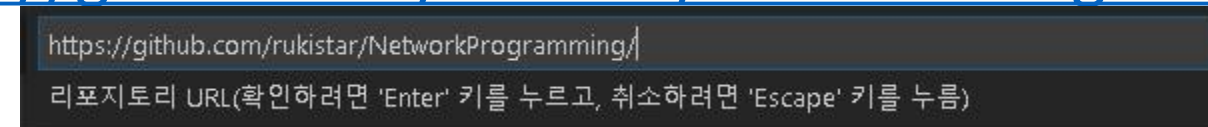
➤ F1 -> Git Clone

<https://www.w3schools.com/html/>

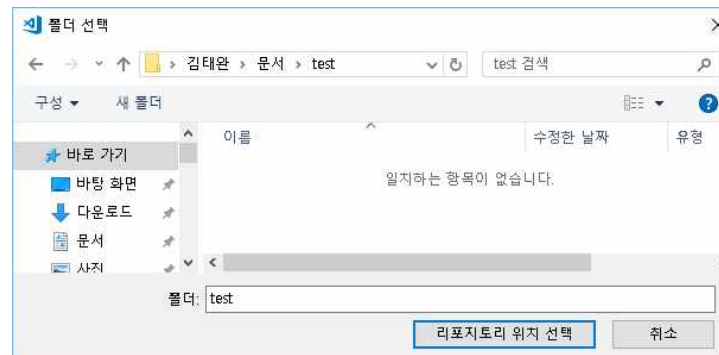


➤ 주소 입력 :

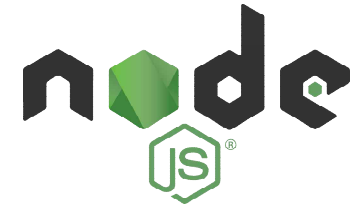
<https://github.com/rukistar/NetworkProgramming/>



➤ 폴더 지정



Node.js 로그인 처리



➤ 파일 -> 폴더 열기

<https://github.com/rukistar/NetworkProgramming/>

The screenshot shows the VS Code interface. On the left, the '파일(F)' menu is open, with '폴더 열기...' (Open Folder...) selected. The main area shows the 'Explorer' view with the 'LoginExpress' folder selected. The 'File Explorer' view shows the contents of the 'LoginExpress' folder, including subfolders like '.vscode', 'bin', 'public', 'routes', and 'views'.

이름	수정한 날짜	유형
.vscode	2018-11-18 오후...	파일 폴더
bin	2018-11-18 오후...	파일 폴더
public	2018-11-18 오후...	파일 폴더
routes	2018-11-18 오후...	파일 폴더
views	2018-11-18 오후...	파일 폴더

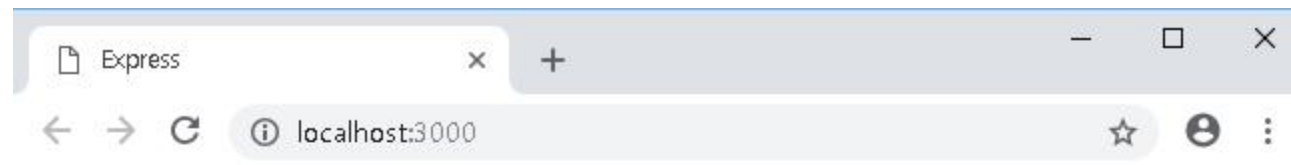
Node.js 로그인 처리



➤ index.html

/LoginExpress

<https://www.w3schools.com/w3css>



Node.js 로그인 처리



➤ login.html

/LoginExpress

<https://www.w3schools.com/w3css>

A screenshot of a web browser window. The address bar shows "localhost:3000/Login". The page has a dark background with a green aurora borealis. The login form consists of two input fields: "Username" with the placeholder "Enter Username" and "Password" with the placeholder "Enter Password". Below these is a green "Login" button. At the bottom, there is a checkbox labeled "Remember me" which is checked.

로그인

← → ↻ ⓘ localhost:3000/Login ☆ ⓘ ⋮

Username

Enter Username

Password

Enter Password

Login

☒ Remember me

Node.js 소켓 프로그래밍



➤ Websocket vs Socket.io

<https://www.npmjs.com/package/ws>

➤ Websocket

- http Web은 http프로토콜을 이용 요청 / 응답 동작
- Web에서 TCP/IP Socket 처럼 실시간 통신 할 수 없음
- 그래서 등장 WebSocket(ws) 프로토콜
- Websocket을 이용하면 웹브라우저
- 실시간 데이터 주고 받을 수 있음
- 최근 대부분 브라우저에서 Websocket지원
- InternetExplorer 의 경우 version 10부터 지원

Node.js 소켓 프로그래밍



➤ Websocket vs Socket.io

<https://www.npmjs.com/package/ws>

➤ Websocket

- `npm install -g express-generator`
- `express -e ./`
- `npm install`
- `npm install ws`

Node.js 소켓 프로그래밍



➤ Websocket vs Socket.io

<https://socket.io>

➤ Socket.io

- Node.js 기반 OpenSource Library
- WebSocket처럼 실시간 데이터 처리 가능
- 멀티 디바이스 (Web, android, iOS, Windows, 등)
- WebSocket이 지원되지 않는 브라우저도 가능

Node.js 소켓 프로그래밍



➤ Socket.io

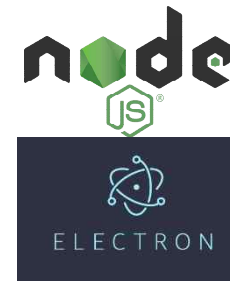
<https://socket.io>

➤ Server

➤ npm install socket.io

➤ Client

➤ npm install socket.io-client



Node.js 응용프로그래밍

➤ Electron

- <https://electronjs.org/docs/tutorial/first-app>
- <https://github.com/electron/electron-quick-start>
- <https://github.com/electron/electron-api-demos>

Node.js 응용프로그래밍

➤ Electron – Socket.io, Chat

- Git clone <https://github.com/electron/electron-quick-start>
- npm install
- npm install jquery
- npm install socket.io
- npm install socket.io-client
- /socket/server.js
- index.html 수정

Node.js 응용프로그래밍

➤ Electron – Socket.io, Chat

➤ /socket/server.js

```
var app = require('express')();
var http = require('http').Server(app);
var io = require('socket.io')(http);
var port = process.env.PORT || 3000;
app.get('/', function(req, res){
  res.sendFile(__dirname + '/index.html');
});
io.on('connection', function(socket){
  socket.on('chat message', function(msg){
    io.emit('chat message', msg);
  });
});
http.listen(port, function(){
  console.log('listening on *:' + port);
});
```

Node.js 응용프로그래밍

➤ Electron – Socket.io, Chat

➤ index.html 수정

```
<body>
<ul id="messages"></ul>
<form action="">
<input id="m" autocomplete="off" /><button>Send</button>
</form>
<script>
window.$ = window.jQuery = require('jquery');
require('./renderer.js')
</script>
</body>
```


Node.js 응용프로그래밍

➤ Electron – Socket.io, Chat

➤ ./renderer.js

```
$(function () {  
  var socket = require('socket.io-client')  
  ('http://localhost:3000');  
  // var socket = io();  
  $('form').submit(function () {  
    socket.emit('chat message', $('#m').val());  
    $('#m').val('');  
    return false;  
  });  
  socket.on('chat message', function (msg) {  
    $('#messages').append($('- ').text(msg));  
    window.scrollTo(0, document.body.scrollHeight);  
  });  
});

```

팀 프로젝트

- 소켓 통신
- 다중 디바이스 (옵션*)
(Android / Arduino / Raspberry PI 등등...)
- 아이디어 / 기획 / 기능 정의
- 시스템 설계
- 화면 구성 (사용자 인터페이스)
- 구현

참조

- Html
 - <https://www.w3schools.com/html/default.asp>
- Javascript
 - <https://www.w3schools.com/js/default.asp> (javascript)
 - <https://www.w3schools.com/jquery/default.asp> (jquery)
- CSS
 - <https://www.w3schools.com/css/default.asp> (css)
 - <https://www.w3schools.com/w3css/default.asp> (w3.css library)
- Node.js
 - <https://nodejs.org/dist/latest-v10.x/docs/api/> (node.js document)
 - <https://velopert.com/category/dev-log/tech-log/nodejs/page/4> (blog)
 - <http://bcho.tistory.com/tag/node.js>

참조

- Socket.io
 - <https://socket.io/>
- Electron
 - <https://electronjs.org/docs>
 - <https://electronjs.org/apps>
 - <https://electronjs.org/docs/tutorial/first-app>
- npm (node.js library)
 - <https://www.npmjs.com/>