

<WA1/>
<AW1/>
2022

Applicazioni Web I Web Applications I

Introduction to the course

Fulvio Corno, **Luigi De Russis**, Enrico Masala

Luca Mannella, Juan Pablo Saenz, Antonio Servetti

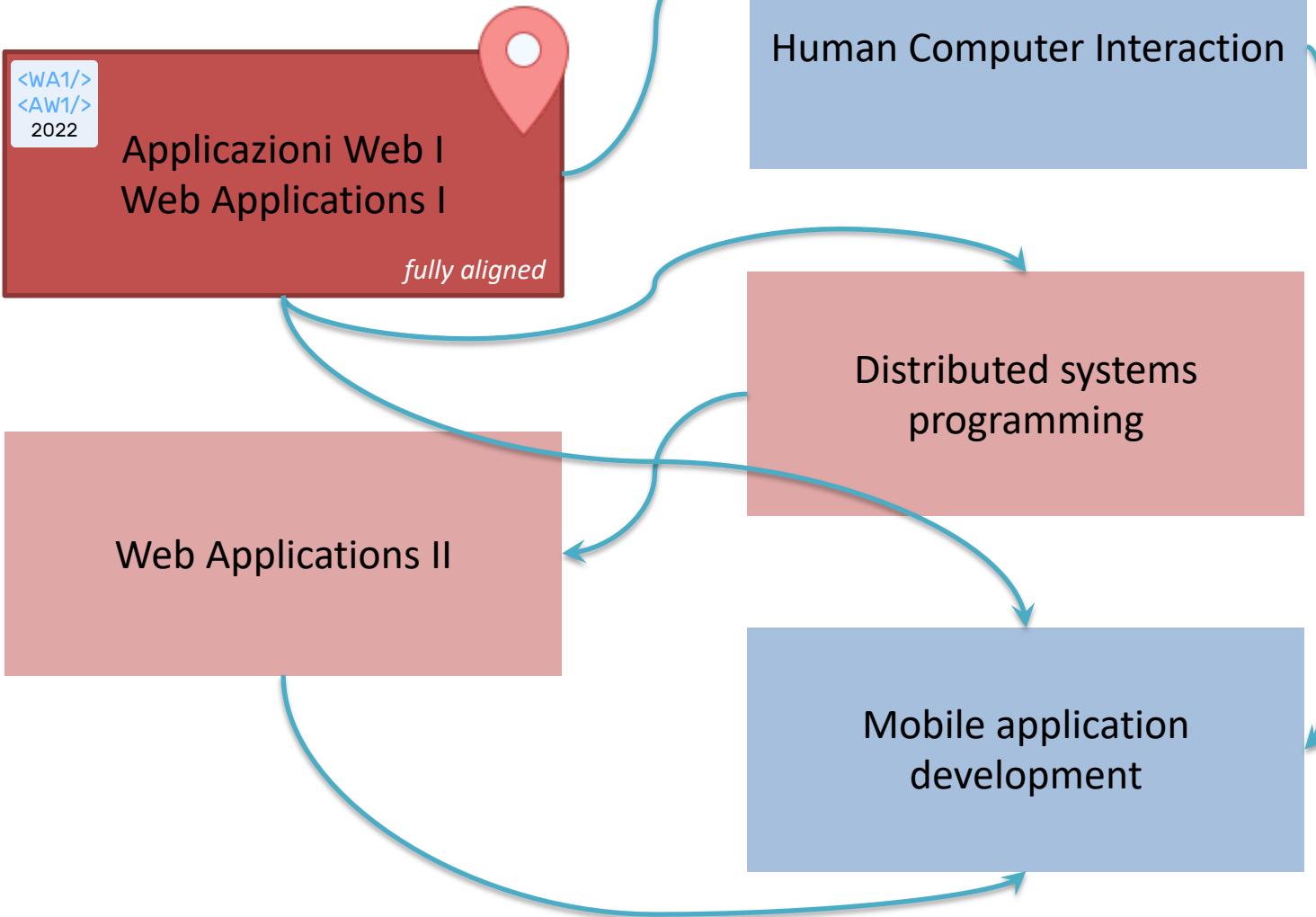


Goal

- Understanding web architectures
- Understanding and mastering web application design and development
- Gaining in-depth knowledge of the JavaScript language and ecosystem
- Becoming familiar with one of the most popular JavaScript frameworks (React)
- ...with special focus on the front-end

The Bigger Picture

- Web architecture
- JavaScript
- Browsers
- **Front-End** programming
- **Back-end** programming
- Scalability
- Large-scale



- Usability
- Interface design
- Human centered processes
- Distributed Architectures
- Protocols
- Foundations
- Mobile Front-End
- Mobile device programming



You are here

What We Will Learn

JavaScript as a language

- ECMAScript ES6
- Language constructs
- In-depth semantics
- Functional, Asynchronous, Modular, ...



The browser ecosystem

- HTML, CSS, page structure
- DOM
- JavaScript in the browser
- Events, Properties, Handlers, APIs



Single Page Applications

- Server-side (bare minimum) with node
- API development
- Backend storage
- Sessions and Authentication



React framework

- Components, Properties, State
- JSX
- Hooks
- Router



Weeks and Calendar... At a Glance!

1. Intro to JS: basics, objects, functions
2. Intro to JS: async programming, callbacks, DB interaction + Intro to Web
3. HTML, CSS, Bootstrap
4. JS: classes, modules, this + JS in the browser
5. Intro to React
6. React: props and state
7. React: context, life cycle, forms
8. React router
9. Server-side with Express
10. Fetch and client-server interaction (in React)
11. Authentication

Course Organization

- Classes
 - 3 h/week
 - Lectures + Exercises (*mixed*)
- Laboratories (room 1I)
 - 1.5 h/week
 - 2 Lab slots (see later for the split)
 - 3 Labs + 2 BigLabs, starting 2nd week
- **Exception:** first week
 - Class instead of Lab

	MO	TU	WE	TH	FR
08:30		9I		1I	
10:00		9I		1I	
11:30					
13:00					
14:30					
16:00					
17:30					

Classes

- In person, in rooms with power outlets at the desks
 - bring your own computer, if possible, to follow the examples/exercises
- Video-recorded and made available soon after each class
 - *not* streamed live
- A few times during the course, we will give you some materials to read/watch before a lecture
 - relatively *short* and published *in advance*

Laboratories

- Starting 10/03/2022
- In rooms with power outlets at the desks
- Text online, some days in advance
- Exercises to be done during Lab hours
- Solution will be posted on GitHub
 - around 1 week after the end of each lab

Laboratories

- In (fixed) group
 - 3-4 people
 - you decide the team
 - fill this out with your group composition and your Lab slot preference, by **March 6** (end of the day): <https://forms.gle/oaADCNnud2x85r726>
- 3 Labs, each long 1.5 hours
- 2 BigLabs, each long 6 hours
 - if submitted, each BigLab gives up to +1 point to the exam
 - evaluated as a group
 - detailed instructions will follow

Learning Material

- Course website – <https://bit.ly/polito-wa1-ii>
 - Slides (in English)
 - Full schedule
 - Links and supplementary material
- Video lectures (screencasts)
 - YouTube - https://www.youtube.com/playlist?list=PLs7DWGc_wmwQJhmKEK2v8JbjbJSklv12O
 - Portale della Didattica
- GitHub - <https://github.com/polito-WA1-AW1-2022>
 - Examples, exercises, labs, exams, ...

The screenshot shows the e-Lite website interface. At the top, there's a navigation bar with links for HOME, NEWS, PEOPLE, RESEARCH, TEACHING (which is highlighted in red), THESIS, JOBS, and a search bar. Below the navigation, a breadcrumb trail shows 'HOME • TEACHING • CURRENT COURSES • 01TXYOV - WEB APPLICATIONS I (COURSE 2 - KZ)'. The main content area displays information for the course '01TXYOV - WEB APPLICATIONS I (COURSE 2 - KZ)'. It includes a note about last update (23 February 2022), basic course info (Title: Web Applications I, Credits: 6 credits, Alphabetic division: Course 2 - surnames J-Z, Year: 1st year M.S. Computer Engineering, Semester: 2nd semester (March-June)), and an article index with links to Schedule, Development Resources, Exam and BigLabs, and All Pages.



Slack



- We will use Slack for all communications
 - among students, with teachers, etc.
 - new to Slack? -> <https://slack.com/resources/using-slack/how-to-use-slack>
- Join with your @studenti.polito.it email at <https://join.slack.com/t/wa1-2022-kz/signup>
- Announcements and official information in **#general**
- Feel free to contact the teachers for feedback and questions in **#discussion**
 - questions of general interest must be posted there, so that everybody can see the answer

Office Hours

Why?

- An opportunity *for students* to discuss any need or challenge
- To clarify information and ask questions about the course
- To discuss academic and/or career goals
- To know more about certain topics
- ...

When?

- The hour after Tuesday's class
- On request, either in person (in my office) or remotely (on Zoom)

About the Exam

1. Project development
 - Individual
 - up to 24 points (minimum: 12)
 - 20 days of time
2. Oral discussion (on the project)
 - individual and mandatory
 - up to 6 points
3. BigLabs evaluation
 - *optional* (i.e., if submitted as a group)
 - up to 2 points -> the only way to get 30L

Full exam rules in the course website (under "Exams")

Project Development

What

- Develop a web application using
 - React + JavaScript
 - Node + Express
 - SQLite
- According to a functional specification
 - published 20 days before each official exam date

How

- Individually (i.e., not in group)
- Using GitHub Classroom
 - commit + push your project
- Teacher's Evaluation
 - running the application on a clean recent Linux distro (with node)
 - examining the code

Oral Discussion

Goals

- To ensure that each student developed the web application by themselves
- To evaluate how much the student can explain the exact behaviour of the code

Evaluation Criteria

- Theoretical and practical knowledge of the project design
- Theoretical and practical knowledge of the project code base
- Readiness and clarity in the replies

Resources (fundamentals)

The screenshot shows the MDN homepage with a blue header bar. Below it, there's a large section titled "Resources for developers, by developers." featuring a "The browser built for devs" card and a "Learn the best of web development" card. Further down, there are sections for "Hacks Blog" and "Help improve MDN". A sidebar on the left lists various technologies like HTML, CSS, JavaScript, and APIs/DOM.

Mozilla Developer Network
(MDN)
<https://developer.mozilla.org/>

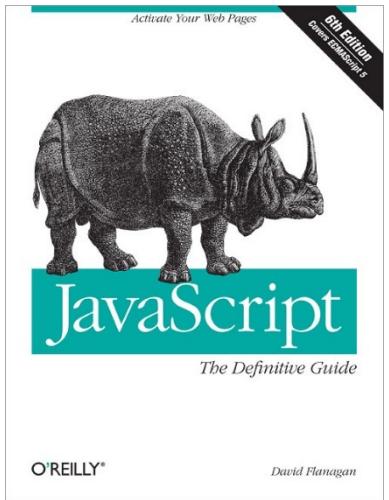
This screenshot shows the "Technologies Overview" page. It features a sidebar with links to "Technologies Overview", "HTML", "CSS", "JavaScript", "Graphics", "HTTP", "APIs / DOM", "Browser Extensions", and "MathML". The main content area is titled "Learn web development" and includes sections for "Tutorials", "References", "Developer Guides", "Accessibility", "Game development", and "...more docs".

The React homepage has a dark header with the word "React" and a search bar. Below the header, there's a "Get Started" button and a "Take the Tutorial" button. The main content area is divided into three columns: "Declarative", "Component-Based", and "Learn Once, Write Anywhere". Each column contains text and small screenshots. At the bottom, there's a "A Simple Component" example with a JSX editor showing code and a result preview.

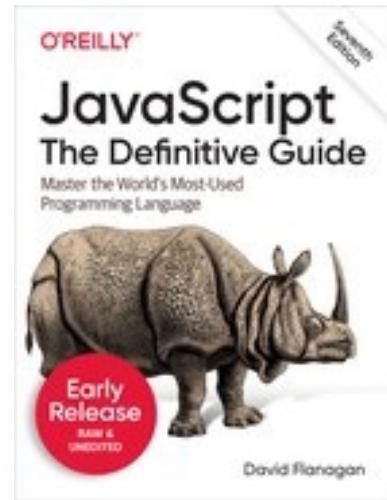
React Library
<https://reactjs.org/>

This screenshot shows the React documentation site. It has a sidebar with sections like "MAIN CONCEPTS", "ADVANCED GUIDES", "HOOKS", "TESTING", and "CONCURRENT MODE (EXPERIMENTAL)". The main content area is titled "TUTORIAL" and includes sections for "Before We Start the Tutorial", "What Are We Building?", "Prerequisites", "Setup for the Tutorial", "Overview", "What Is React?", "Inspecting the Starter Code", "Passing Data Through Props", "Making an Interactive Component", "Developer Tools", "Completing the Game", "Lifting State Up", "Why Immutability Is Important", "Function Components", "Taking Turns", "Declaring a Winner", "Adding Time Travel", "Storing a History of Moves", "Lifting State Up, Again", "Showing the Past Moves", "Picking a Key", "Implementing Time Travel", and "Wrapping Up".

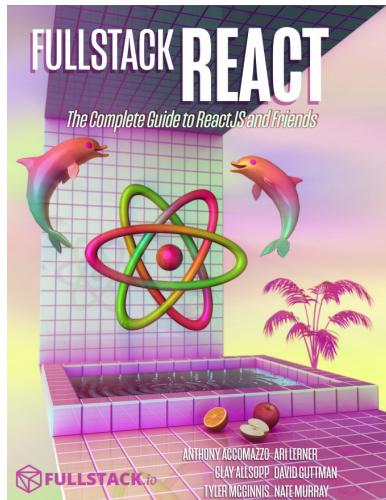
Resources (books)



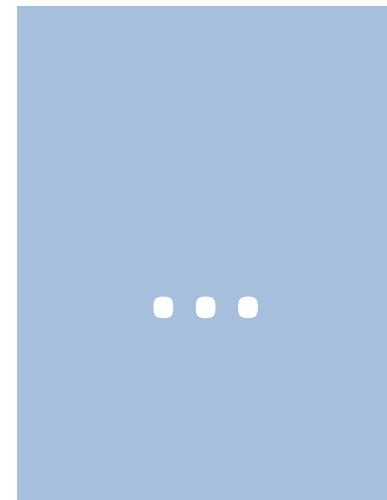
JavaScript: The Definitive Guide,
6th Edition
By David Flanagan
ISBN 978-0596805524
Release Date: May 2011
(not very updated...)



JavaScript: The Definitive Guide,
7th Edition
By David Flanagan
ISBN 978-1491952023
Release Date: July 2020

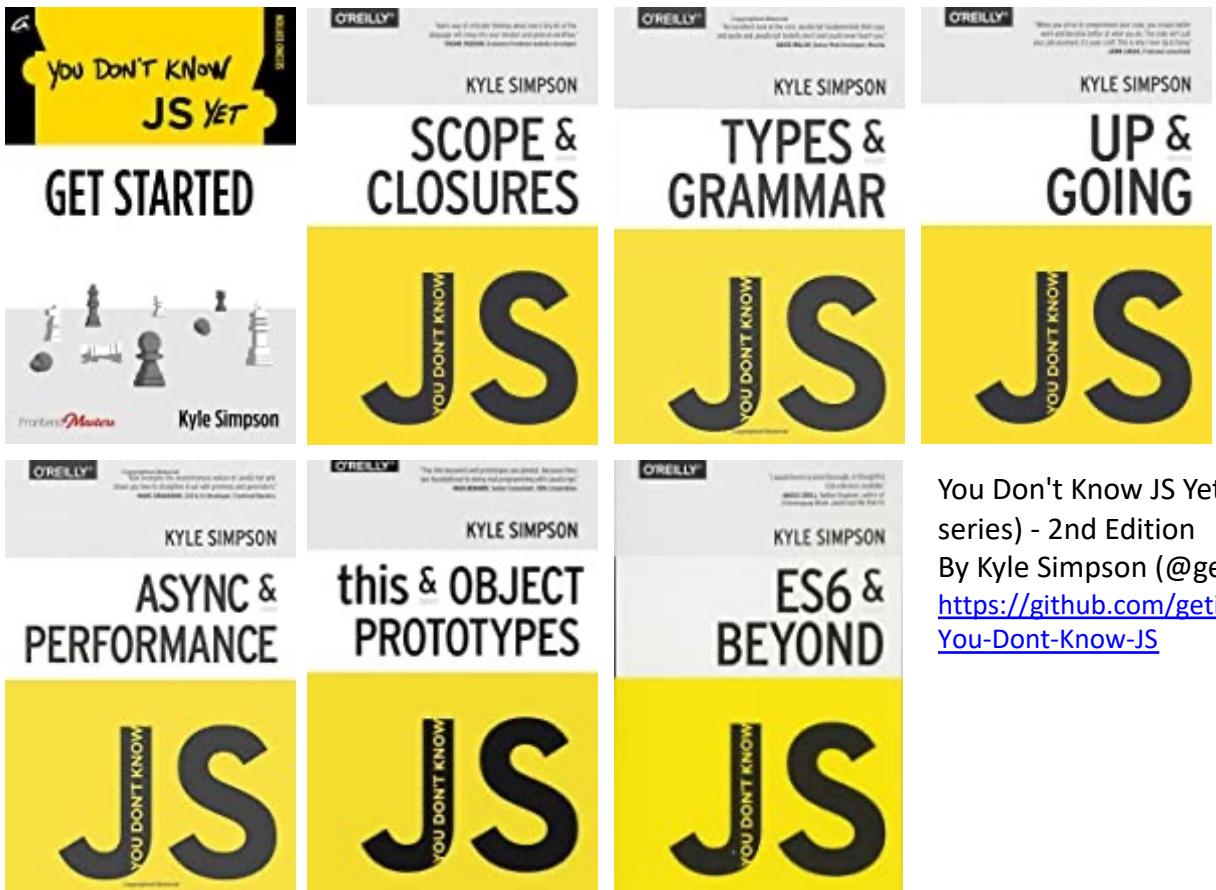


Fullstack React
By Anthony Accomazzo, Nate Murray, Ari Lerner, Clay Allsopp, David Guttman, and Tyler McGinnis
<https://www.newline.co/fullstack-react>
Release: r40 (January 2020)

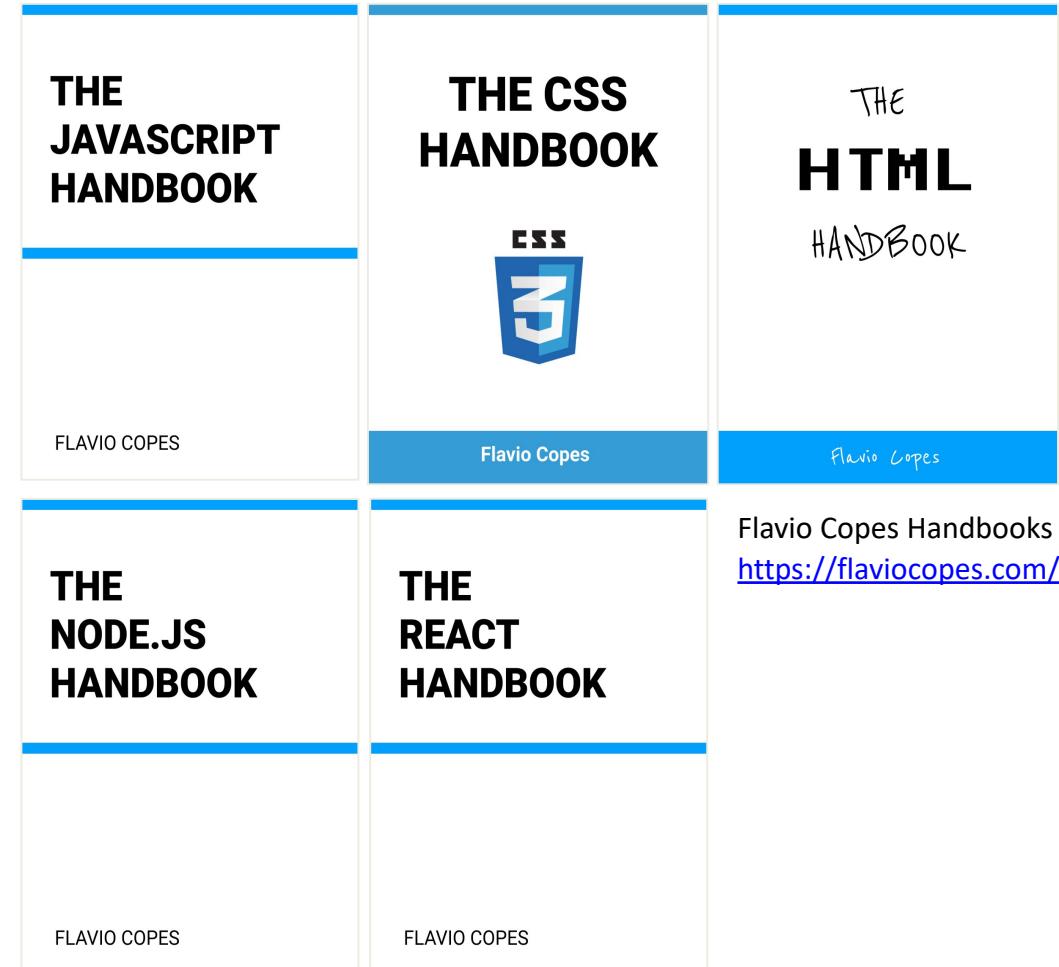


... and many others

Resources (on-line books)

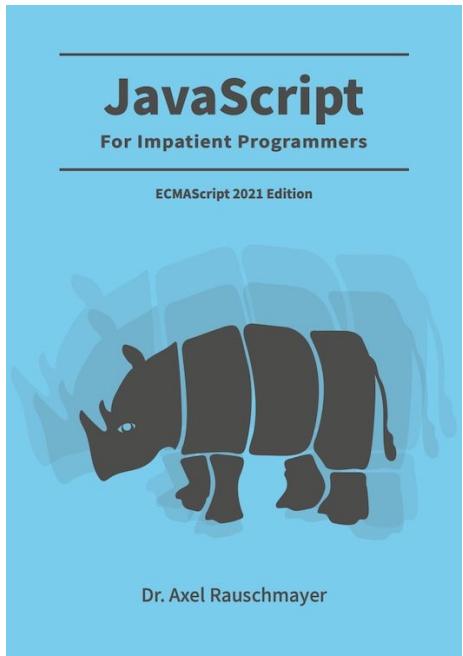


You Don't Know JS Yet (book series) - 2nd Edition
By Kyle Simpson (@getify)
<https://github.com/getify/You-Dont-Know-JS>



Flavio Copes Handbooks
<https://flaviocopes.com/>

Resources (on-line books)

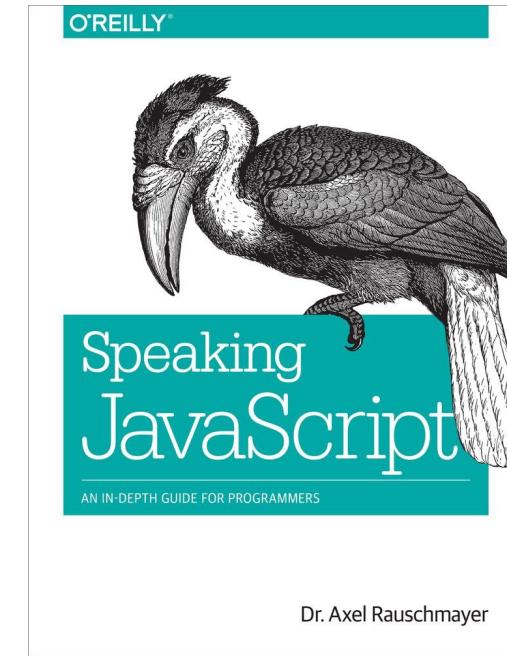


<https://exploringjs.com/impatient-js/index.html>

+

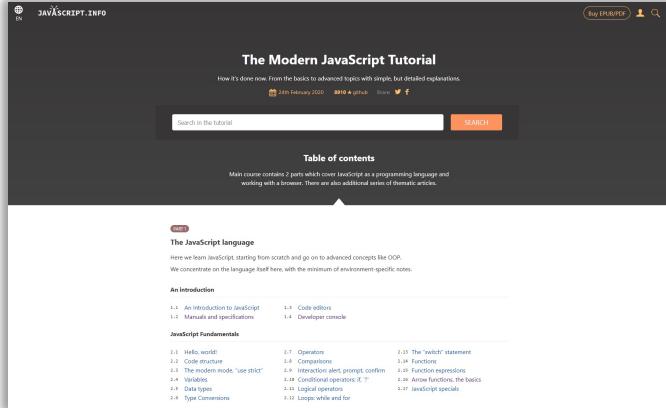


<https://exploringjs.com/deep-js/index.html>

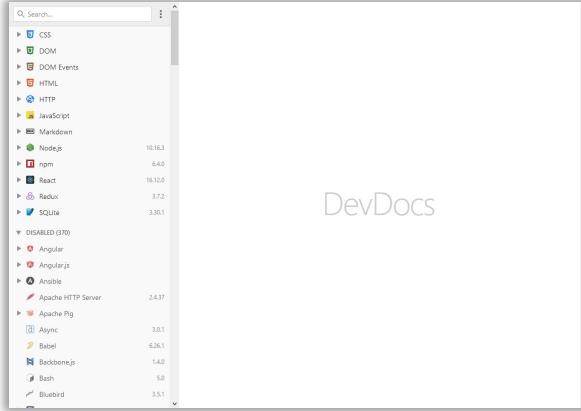


<http://speakingjs.com/>

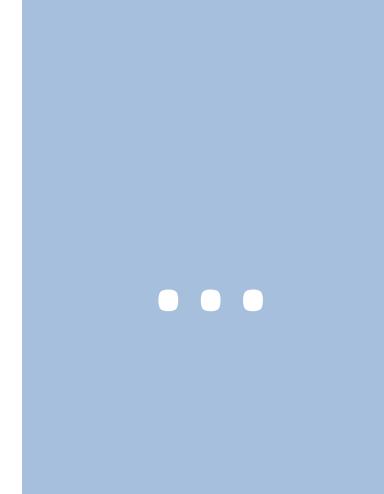
More Resources...



The Modern JavaScript Tutorial
<https://javascript.info/>

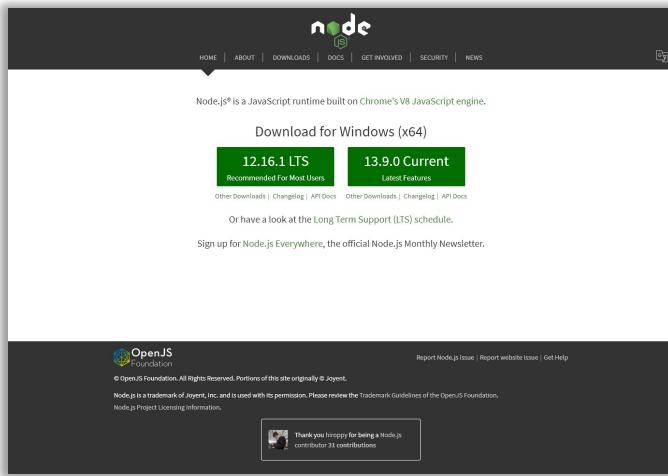


DevDocs: API Documentation
Browser
<https://devdocs.io/>



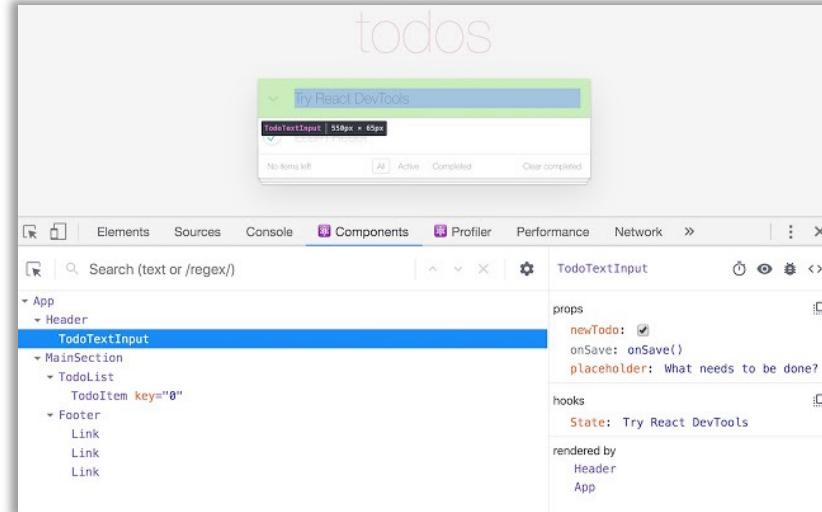
... and many others

Tools



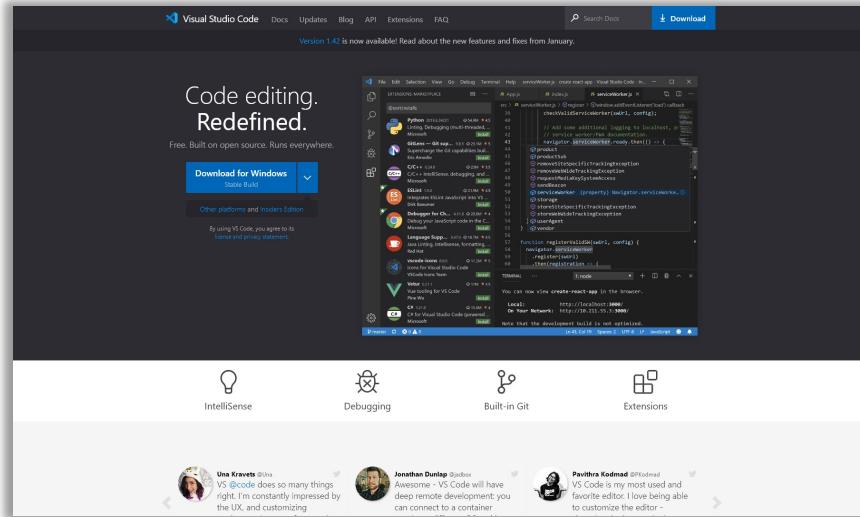
Node.js runtime
Version 16.14 LTS
<https://nodejs.org/en/>

Install on Linux using the instructions on
<https://github.com/nodesource/distributions>



React Developer Tools
Extension for [Chrome](#) and [Firefox](#)

Programming Environment



Visual Studio Code

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



License

- These slides are distributed under a Creative Commons license “**Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)**”
- **You are free to:**
 - **Share** — copy and redistribute the material in any medium or format
 - **Adapt** — remix, transform, and build upon the material
 - The licensor cannot revoke these freedoms as long as you follow the license terms.
- **Under the following terms:**
 - **Attribution** — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
 - **NonCommercial** — You may not use the material for commercial purposes.
 - **ShareAlike** — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.
 - **No additional restrictions** — You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.
- <https://creativecommons.org/licenses/by-nc-sa/4.0/>