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2021

Applicazioni Web I Web Applications I

Introduction to the course

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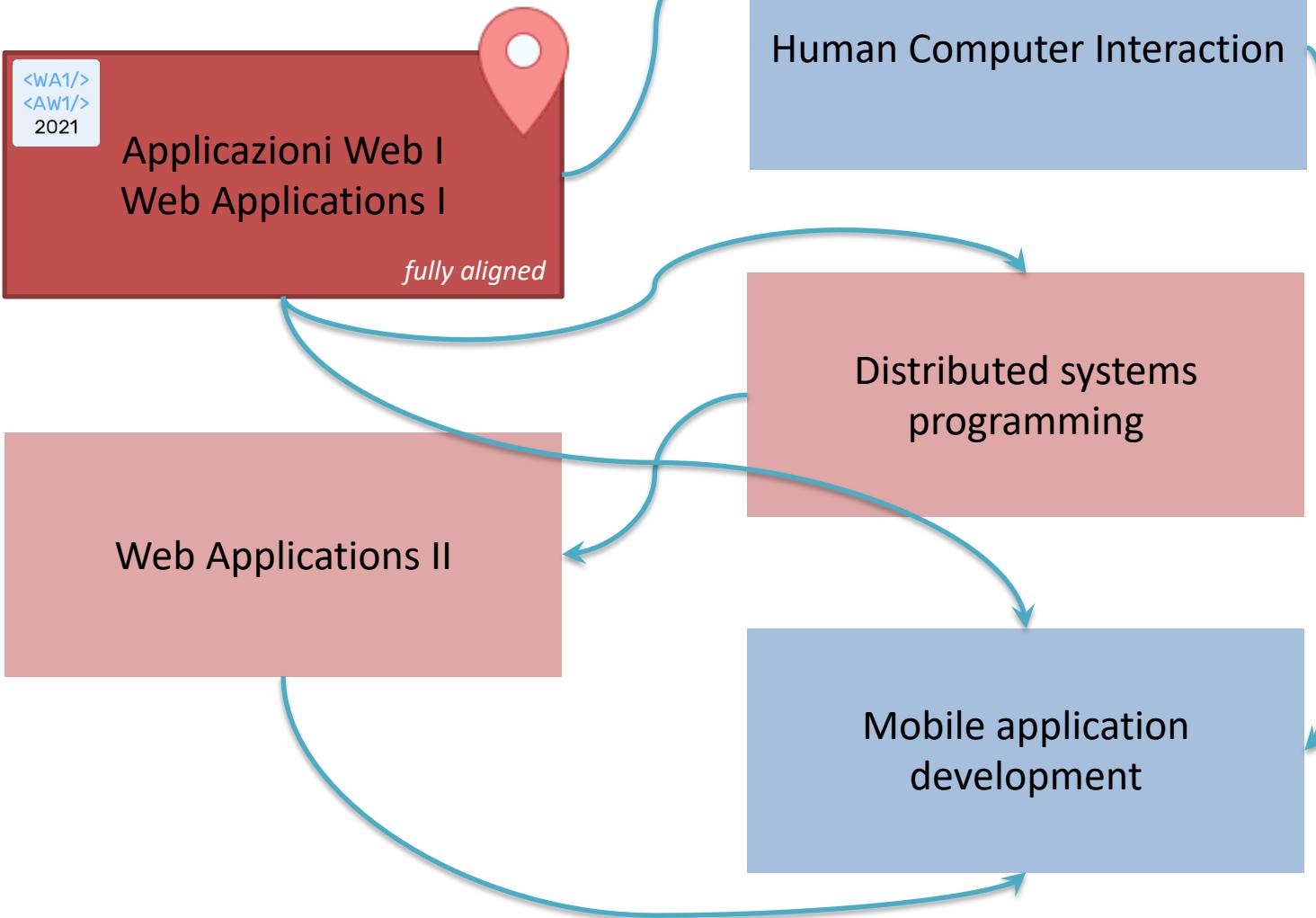


Goal

- 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

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 (Online + <room>)
 - 1.5 h/week
 - 2 Lab groups (online + in-presence)
 - 3 Labs + 2 BigLabs, starting 3rd week
- **Exception:** first 2 weeks
 - Class instead of Lab

	MO	TU	WE	TH	FR
08:30					Online
10:00	Online				Online
11:30	R3				
13:00					
14:30					
16:00					
17:30					

Classes

- On-line
- Using Zoom
 - Link valid for all the lectures
 - <http://it.zoom.us/j/92949352213?pwd=UDFYeXdaZW92a3NFT1hWVWZ0SIIxUT09>
- During the lectures, comments and questions will be handled in a dedicated Slack channel
 - #live-lecture



Laboratories

- Starting 15/03/2021
- Text online, some days in advance
- Exercises to be done *during* the 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: <https://forms.gle/8nJ2G4zTgdnJCMot8> before March 14
- 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

Online Labs

- On Zoom
- Each group will enter a Zoom breakout room
 - Team members may work together
- Teachers will enter the rooms
 - When students request help
 - For a quick check

Learning Material

- Course website – <http://bit.ly/polito-aw1>
 - Slides (in English)
 - Full schedule
 - Links and supplementary material
- Video lectures (screencasts)
 - YouTube - https://www.youtube.com/playlist?list=PLs7DWGc_wmwSpuQoq51P9RekYzQc3Mvm2
 - Portale della Didattica
- GitHub - <https://github.com/polito-WA1-AW1-2021>
 - Examples, exercises, labs, exams, ...

The screenshot shows a university course page. At the top, there's a navigation bar with links to HOME, NEWS, PEOPLE, RESEARCH, TEACHING (which is highlighted in red), THESIS, and JOBS. Below the navigation is a breadcrumb trail: HOME • TEACHING • CURRENT COURSES • 01UDFOV - APPLICAZIONI WEB I (CORSO 2). The main content area is titled '01UDFOV - APPLICAZIONI WEB I (CORSO 2)' and includes a note about the page being last updated on February 19, 2021. It also lists the course details: Titolo: Applicazioni Web I, Crediti: 6 crediti, Divisione alfabetica: Corso 2 - cognomi M-Z, Anno: Primo anno della laurea magistrale, and Semestre: Secondo semestre (Marzo-Giugno). To the right, there's a sidebar titled 'ARTICLE INDEX' with links to various course sections like Calendario, Risorse per lo sviluppo, Comunicazioni, Esame, 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/aw1-2021-m-z/signup>
- During the lectures, comments and questions will be handled in the **#live-lecture** channel
 - not in the Zoom chat
- Announcements and official information in **#general**
- Feel free to contact the teachers for feedback and questions in **#discussion**

Office Hours

- Every **Wednesday** from **16:00 to 17:00**
- On Zoom:
 - <https://polito-it.zoom.us/j/91381036613?pwd=c2wwV2hndGkrVG1NdFJlOEZ3cVpwZz09>
- Starting from March 3
- Students can *freely* join the call at any moment, if they have questions, suggestions, doubts, ...
 - e.g., it could be useful for questions easier to answer by talking instead of writing, if there is the need to show multiple linked files, etc.

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 Ubuntu 20.10 (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. The main title is "Resources for developers, by developers." Below the header, there are several sections: "The browser built for devs" (with a screenshot of Firefox DevEdition showing a bug fix for a width CSS property), "Learn the best of web development" (with a "Sign up now" button), "Help improve MDN" (with links to "Getting started" and "Editorial review"), and "Securing Firefox with WebAssembly" (with a link to a blog post by Nathan Frey). At the bottom, there's a "Hacks Blog" section.

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

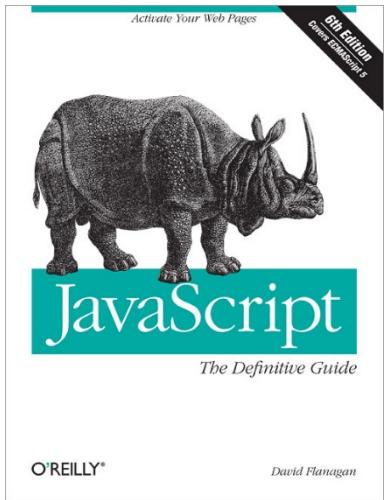
A screenshot of the MDN navigation menu. It includes two main categories: "Technologies" and "References & Guides". Under "Technologies", there are links to "Technologies Overview", "HTML", "CSS", "JavaScript", "Graphics", "HTTP", "APIs / DOM", "Browser Extensions", and "MathML". Under "References & Guides", there are links to "Learn web development", "Tutorials", "References", "Developer Guides", "Accessibility", "Game development", and "...more docs". A "Learn web development" button is also visible at the bottom of the menu.

The screenshot shows the React library homepage. The main title is "React" with the subtitle "A JavaScript library for building user interfaces". There are two buttons: "Get Started" and "Take the Tutorial". Below the title, there are three main sections: "Declarative" (explaining how React makes it painless to create interactive UIs using simple views for each state), "Component-Based" (explaining how React uses encapsulated components to manage their own state), and "Learn Once, Write Anywhere" (explaining how React can render on the server using Node.js or power mobile apps using React Native). At the bottom, there's a "LIVE JSX EDITOR" section showing a code editor with JSX and a preview window.

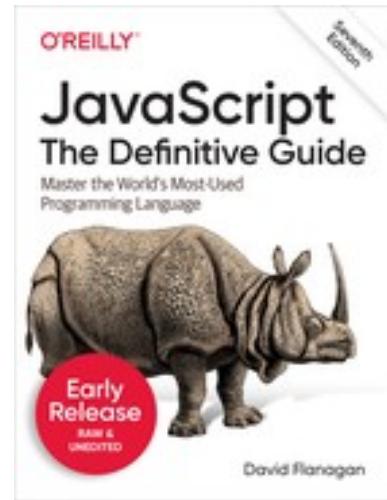
React Library
<https://reactjs.org/>

A screenshot of the React library documentation. The left sidebar has sections for "MAIN CONCEPTS": "Hello World", "Introducing JSX", "Rendering Elements", "Components and Props", "State and Lifecycle", "Handling Events", "Conditional Rendering", "Lists and Keys", "Forms", "Lifting State Up", "Composition vs Inheritance", and "Thinking In React". The right sidebar has sections for "ADVANCED GUIDES": "API Reference", "Hooks", "Testing", "Concurrent Mode (Experimental)", and "Contributing". 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", "Option 1: Write Code in the Browser", "Option 2: Local Development Environment", "Help, I'm Stuck!", "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".

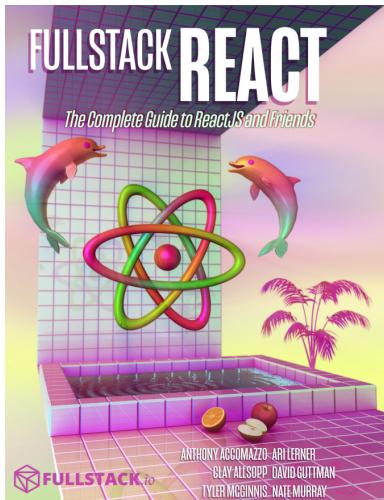
Resources (books)



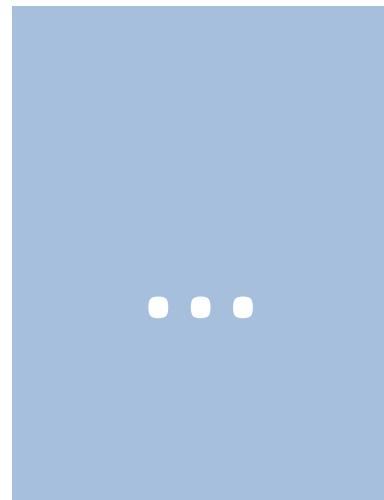
JavaScript: The Definitive Guide,
6th Edition
By David Flanagan
ISBN 978-0596805524
Release Date: May 2011
(not very updated...)



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

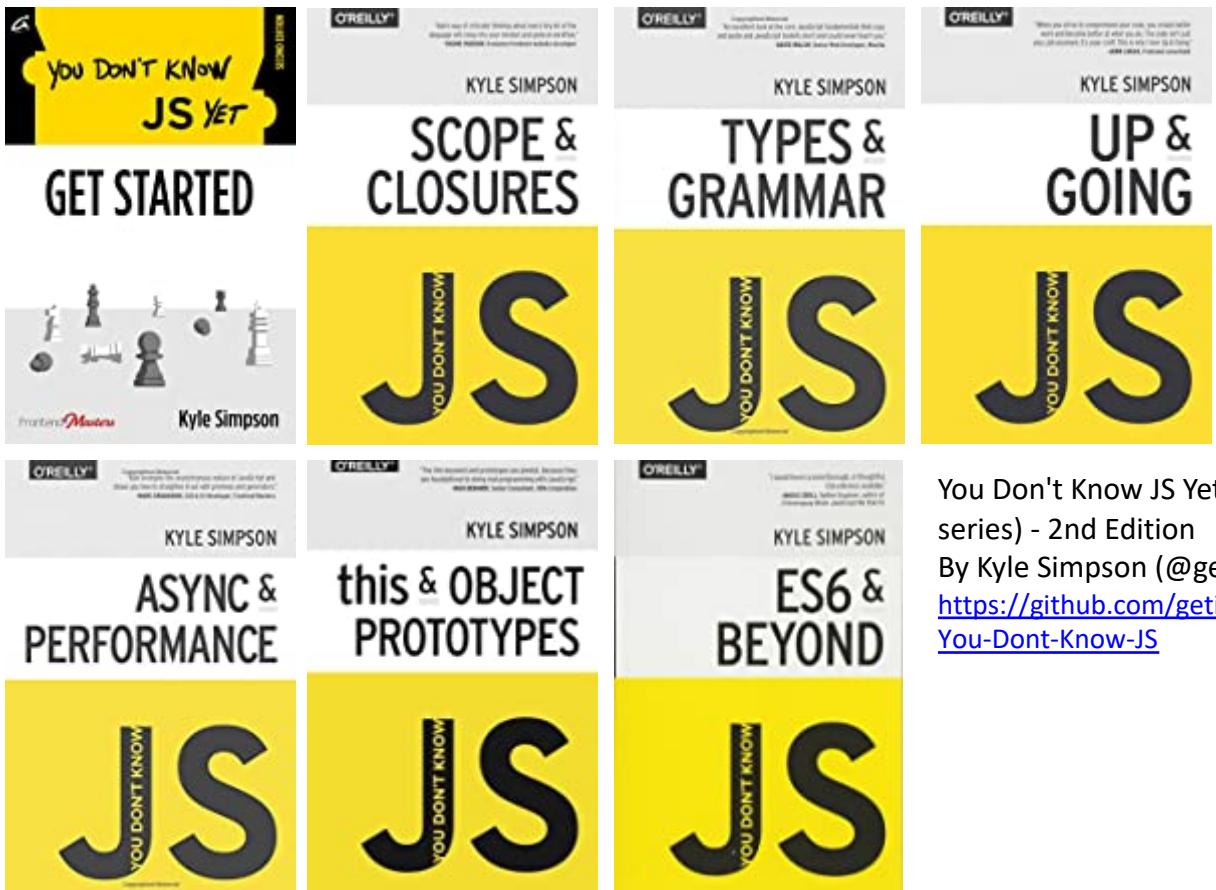


Fullstack React
By Anthony Accomazzo, Nate Murray, Ari Lerner, Clay Allsopp, David Guttman, and Tyler McGinnis
<https://www.newline.co/fullstack-react>
Release: r40 (January 2020)

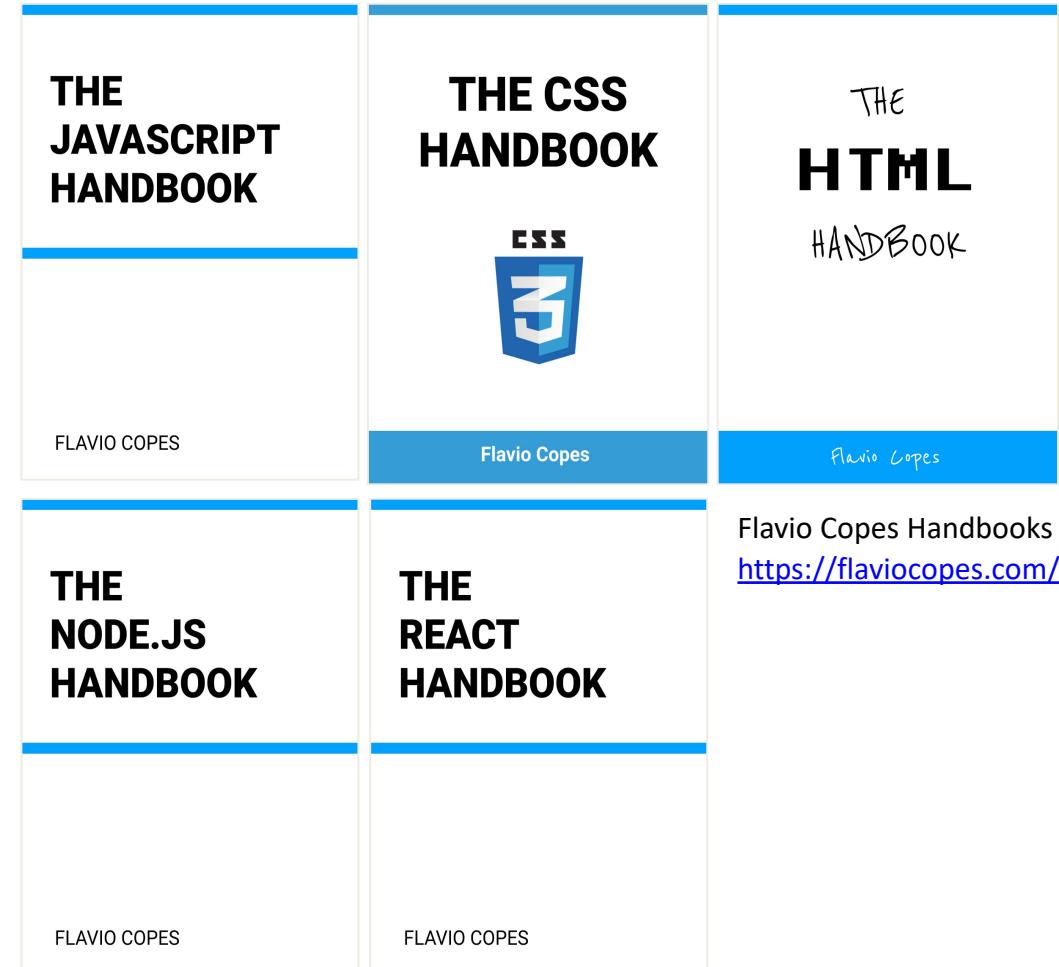


... and many others

Resources (on-line books)

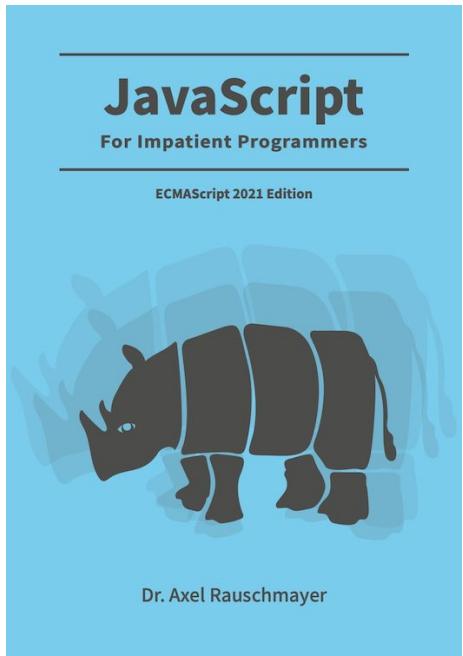


You Don't Know JS Yet (book series) - 2nd Edition
By Kyle Simpson (@getify)
<https://github.com/getify/You-Dont-Know-JS>



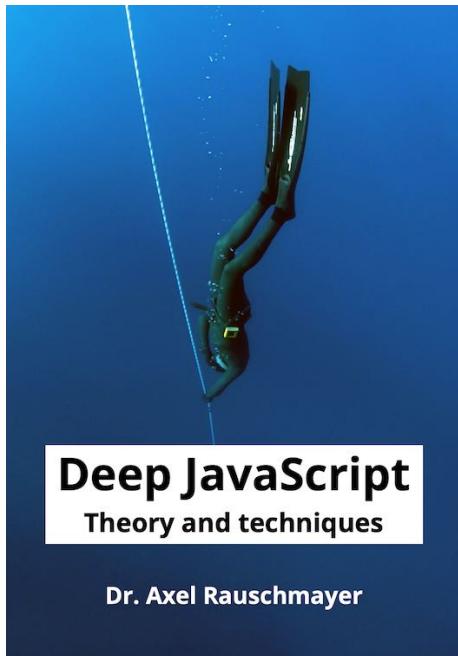
Flavio Copes Handbooks
<https://flaviocopes.com/>

Resources (on-line books)

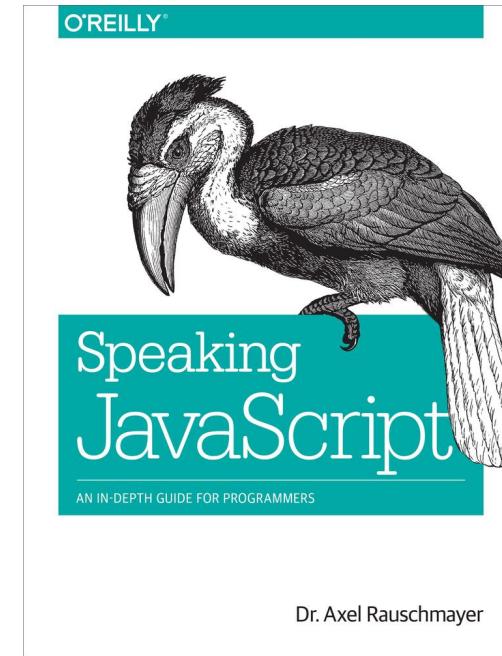


<https://exploringjs.com/impatient-js/index.html>

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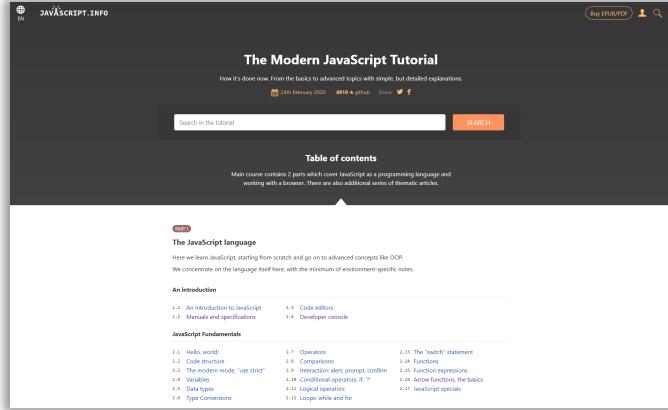


<https://exploringjs.com/deep-js/index.html>

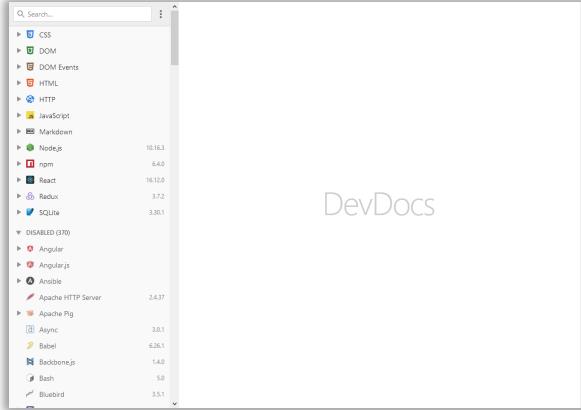


<http://speakingjs.com/>

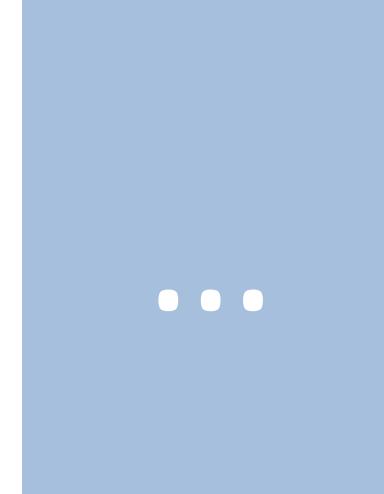
More resources...



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

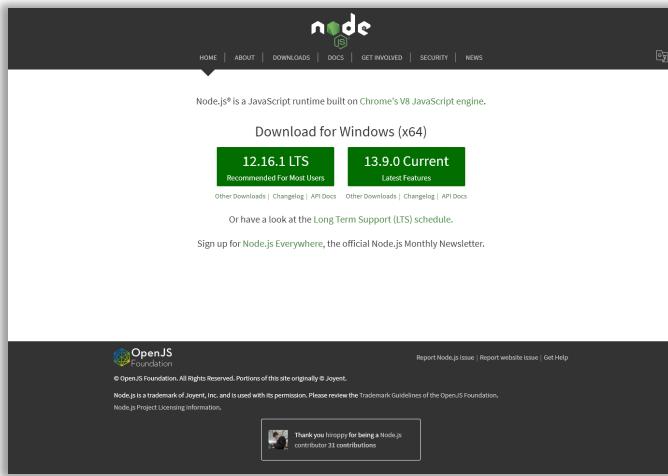


DevDocs: API Documentation
Browser
<https://devdocs.io/>



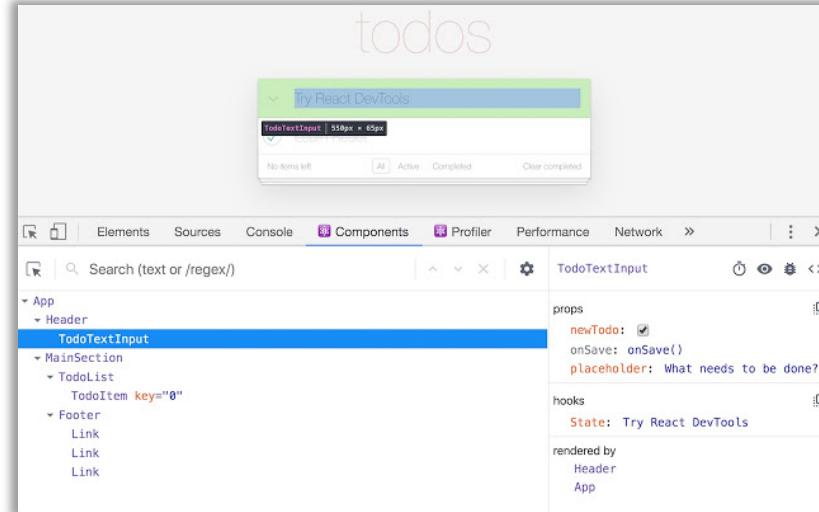
... and many others

Tools



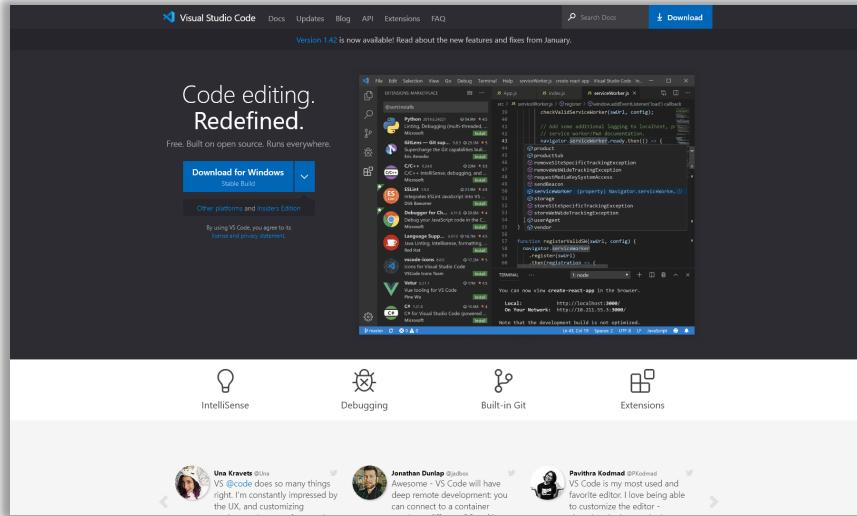
Node.js runtime
Version 14.15 LTS
<https://nodejs.org/en/>

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



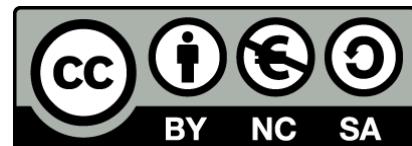
React Developer Tools
Extension for [Chrome](#) and [Firefox](#)

Programming Environment



Visual Studio Code

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



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