

Full-Stack Engineer PRO_

Resume

Path Progress

68%



 [Reset Progress](#)

Path Description

A full-stack engineer can get a project done from start to finish. This Career Path will start with the front-end, move on to the back-end, then teach you how to connect the two.

Details

Earn a certificate of completion
6 months to complete in total
Beginner

1. Welcome to the Full-Stack Engineer Path



Getting Started



See what's covered in the Full-Stack Engineer Career Path.



Info

Welcome to the Full-Stack Engineer Path



Info

Additional Resources

2. Getting Started with Full-Stack Engineering



Introduction: Getting Started with Full-Stack Engineering ^

See what you'll be learning in the Getting Started with Full-Stack Engineering Unit.



Info

Introduction: Getting Started with Full-Stack Engineering



Introduction to Software Engineering ^

Understand the basics of programming, software engineering, and the difference between front-end and back-end (and full-stack!)



Article

What is Programming?



Video

What Does a Software Engineer Do?



Video

What are the Differences Between Front-End and Back-End Engineering?



Review: Getting Started with Full-Stack Engineering ^

Review what you just learned in the Getting Started with Full-Stack Engineering Unit



Info

Review: Getting Started with Full-Stack Engineering

3. Setting Up Your Dev Environment



Introduction: Setting Up Your Dev Environment



See what you'll be learning in the Setting Up Your Dev Environment Unit.



Info

Introduction: Setting Up Your Dev Environment



Command Line for Building Websites



This unit will teach you the basics of the command line so that you can set up website files on your own computer.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

Navigation



Quiz

Navigating the File System



Article

Setting Up Command Line



Project

Bicycle World



Project

Daily Buzz



Text Editors



Learn to get set up with text editors!



Article

Getting Started with Visual Studio Code and Building HTML Websites



Tutorial

Getting Started with Visual Studio Code



Tutorial

Customize Visual Studio Code with Extension Marketplace



Article

Visual Studio Code and JavaScript



Review: Setting Up Your Dev Environment



Review what you just learned in the Setting Up Your Dev Environment Unit



Info

Review: Setting Up Your Dev Environment

4. JavaScript Syntax, Part I



Introduction: JavaScript Syntax, Part I



Get introduced to JavaScript and get comfortable with the basics of writing JavaScript programs



Info

Introduction: JavaScript Syntax, Part I



Introduction to Programming with JavaScript



Understand how JavaScript plays a significant role in web development.



Article

JavaScript: All the Cool Kids Are Doing It



Article

JavaScript Versions: ES6 and Before



Reading

JavaScript and JQuery, Introduction



Docs

MDN JavaScript



Running JavaScript



Learn how to run JavaScript in the browser and on your computer.



Tutorial

Get Started with Running JavaScript in The Console



Article

What is Node?

✓ Article Setting Up Node Locally

✓ Resource Repl.it IDE



Learn JavaScript Syntax: Introduction



In this course, you will learn about JavaScript data types, built-in methods, and variables.

[Cheatsheet](#) | [Practice Pack](#)

✓ Lesson Introduction to JavaScript

✓ Lesson Variables

✓ Quiz Introduction to JavaScript

✓ Reading JavaScript & JQuery, Chapter 1

✓ Project Kelvin Weather

✓ Project Dog Years



Learn JavaScript Syntax: Conditionals



Learn how to use if, else if, else, switch, and ternary syntax to control the flow of a program in JavaScript.

[Cheatsheet](#) | [Practice Pack](#)

✓ Lesson Conditional Statements

✓ Quiz Conditional Statements Quiz

✓ Reading JavaScript and JQuery, Chapter 4 (pp. 146-169)

✓ Project Magic Eight Ball

✓ Project Race Day



Learn JavaScript Syntax: Functions



Learn about JavaScript function syntax, passing data to functions, the return keyword, ES6 arrow functions, and concise body syntax.

[Cheatsheet](#) | [Practice Pack](#)



Lesson Functions



Quiz Functions Quiz



Reading JavaScript and JQuery, Chapter 3 (pp. 86–97)



Project Rock, Paper, or Scissors



Project Sleep Debt Calculator



Learn JavaScript Syntax: Scope



Learn about global and block level scope in JavaScript.

[Cheatsheet](#) | [Practice Pack](#)



Lesson Scope



Quiz Scope Quiz



Project Training Days



Practice JavaScript Syntax: Variables, Data Types, Conditionals, Functions



Practice what you've learned with JavaScript Syntax



Lesson Code Challenges: JavaScript Fundamentals



Article JavaScript Practice: Data Types, Conditional, Functions



Number Guesser





Number Guesser



Test your JavaScript knowledge with this challenge project



Project

Number Guesser



Review: JavaScript Syntax, Part I



Review what was covered in the JavaScript Syntax, Part I unit.



Info

Review: JavaScript Syntax, Part I

5. JavaScript Syntax, Part II



Introduction: JavaScript Syntax, Part II



See what's covered in the JavaScript Syntax, Part II unit.



Info

Introduction: JavaScript Syntax, Part 2



Learn JavaScript Syntax: Arrays



In this course, you will learn about arrays, a data structure in JavaScript used to store lists of data.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

Arrays



Quiz

Arrays Quiz



Reading

JavaScript and JQuery, Chapter 2 (pp. 70-73)



Project

Secret Message



Learn JavaScript Syntax: Loops



In this course, you will learn how to use for and while loops to execute blocks of code multiple times.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Loops
- ✓ Quiz Loops Quiz
- ✓ Reading JavaScript and JQuery, Chapter 4
- ✓ Project Whale Talk



Learn JavaScript Syntax: Objects



Learn about JavaScript ES6 object syntax to model real-world items.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Objects
- ✓ Lesson Advanced Objects
- ✓ Quiz Objects
- ✓ Reading JavaScript and JQuery, Chapter 3
- ✓ Project Meal Maker
- ✓ Project Team Stats
- ✓ Resource MDN - Introducing JavaScript objects
- ✓ Docs MDN - Object



Learn JavaScript Syntax: Iterators



In this course, you will learn how to use iterator methods to simplify the process of looping over arrays.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Higher-Order Functions
- ✓ Lesson Iterators
- ✓ Quiz Iterators Quiz
- ✓ Article How To Use Array Methods in JavaScript: Iteration Methods
- ✓ Docs MDN Documentation: Arrays
- ✓ Project Mini Linter



Learn JavaScript Syntax: Errors and Debugging



Learn how to address errors in this course all about JavaScript errors!

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Article Thinking About Errors in Your Code Differently
- ✓ Lesson Debugging JavaScript Code



Practice JavaScript Syntax: Arrays, Loops, Objects, Iterators



Practice what you've learned with JavaScript Syntax.

- ✓ Lesson Code Challenges: Intermediate JavaScript
- ✓ Article JavaScript Practice: Arrays, Loops, Objects, Iterators
- ✓ Project Lodash



Credit Card Checker



Test your intermediate JavaScript syntax knowledge with this challenge project.



Project

Credit Card Checker

Mysterious Organism



1 project



Review: JavaScript Syntax, Part II



Review what was covered in the JavaScript Syntax, Part II unit.



Info

Review: JavaScript Syntax, Part II

6. Git and Github, Part I



Introduction: Learn Git, Part I



See what you'll be learning in the Learn Git, Part I Unit.



Info

Introduction: Learn Git, Part I



Introduction to Git



Learn how to use the Git version control system to keep track of changes and document your work.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

Basic Git Workflow



Resource

Mastering Git



Quiz

Basic Git Workflow



Resource

Git Cheat Sheet

✓ Tutorial Git version control in VS Code



How to Backtrack in Git



Learn different ways to undo changes made to a Git project and when to use them.

- ✓ Lesson How to Backtrack
- ✓ Project Poem Fiasco
- ✓ Project ASCII Portfolio
- ✓ Quiz How to Backtrack in Git



Introduction to GitHub



Learn how to use GitHub to keep track of changes in collaborative projects.

- ✓ Article Set Up with Git and GitHub
- ✓ Article Getting Started with Git and Github (Videos)
- ✓ Video Starting a Code Base on Github
- ✓ Video How to Push Code to Github
- ✓ Article Understanding the GitHub Flow
- ✓ Tutorial Get Up and Running
- ✓ Tutorial GitHub Lab
- ✓ Docs GitHub Guides



Markdown



Learn how to write markdown, a language used on GitHub and GitHub

Learn how to write markdown, a language used on GitHub and GitHub Pages.

- ✓ Video What is Markdown?
- ✓ Article Mastering Markdown
- ✓ Resource Markdown Cheatsheet
- ✓ Resource Markdown and Visual Studio Code
- ✓ Article How to write a good README for your GitHub project?



Review: Git and Github, Part I



Review what you just learned in the Git and Github, Part I Unit

- ✓ Info Review: Git and Github, Part I

7. JavaScript Syntax Portfolio Project

Mixed Messages



Build a Node.js console app that generates random messages each time a user runs the program and version your project with Git/GitHub.

- ☆ Portfolio Mixed Messages

8. Web Development Fundamentals



Introduction: Web Development Fundamentals



See what you'll be learning in the Web Development Fundamentals

Unit.



Info

Introduction: Web Development Fundamentals



What is the Internet?



Learn the history of the internet and how web development has changed over time.



Lesson

Overview of the Internet



Reading

HTML & CSS, Introduction



Article

The Internet, Explained



What is Web Development?



Learn about the tools developers use to create websites.



Lesson

Languages for Web Development



Article

Web Development For Beginners



What is Front-End Development?



Learn about what front-end is and what frameworks are used in front-end development.



Video

What is Front-End?



Video

Front-End Frameworks



Resource

Front-End Developer Roadmap



Learn HTML: Elements



Learn about HTML elements and structure, the building blocks of websites.

[Cheatsheet](#) | [Practice Pack](#)

✓ Lesson Introduction to HTML

✓ Quiz Introduction to HTML



Learn HTML: Structure



Learn more about how to structure HTML documents and additional HTML elements.

[Cheatsheet](#) | [Practice Pack](#)

✓ Lesson HTML Document Standards

✓ Quiz HTML Document Standards

✓ Reading HTML & CSS, Chapters 1 - 5

✓ Article HTML on MDN Web Docs: Debugging

✓ Info Fashion Blog



Semantic HTML



Write clearer, more accessible HTML using Semantic HTML tags.

[Cheatsheet](#) | [Practice Pack](#)

✓ Lesson Semantic HTML

✓ Quiz Semantic HTML

✓ Article Semantic HTML

✓ Article Writing HTML with Accessibility in Mind

✓ Info New York City Blog



Learn CSS: Selectors and Visual Rules



In this course, you will learn how to style individual and groups of elements using various visual CSS rules.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson CSS Setup and Selectors
- ✓ Quiz CSS Setup and Selectors
- ✓ Lesson CSS Visual Rules
- ✓ Quiz CSS Visual Rules
- ✓ Reading HTML & CSS, Chapter 10
- ✓ Docs CSS on MDN Web Docs
- ✓ Project Healthy Recipes
- ✓ Project Olivia Woodruff Portfolio



Developing with CSS



Learn how to inspect webpages in the browser and add CSS to your website.

- ✓ Video Intro to Chrome Devtools
- ✓ Article CSS Visual Rules in Chrome Inspector
- ✓ Resource Chrome DevTools
- ✓ Project Dasmoto's Arts & Crafts
- ✓ Info Dasmoto Solution



Semantic CSS



Write clearer, more accessible CSS using Semantic CSS names.



Article

What Makes for a Semantic Class Name?



Article

Semantic CSS

Build Your Own Cheat Sheet



Test your HTML and CSS knowledge with this challenge project.



Project

Build Your Own Cheat Sheet



Review: Intro to Web Development Fundamentals



Review what you just learned in the Web Development Fundamentals Unit



Info

Review: Web Development Fundamentals

9. Bringing Your Site Online



Introduction: Bringing Your Site Online



See what you'll be learning in the Bringing Your Site Online Unit



Info

Introduction: Bringing Your Site Online



Wireframing



Learn about wireframing - a quick way to sketch out website architecture.



Video

What are Wireframes?

- ✓ Video From Design to Website
- ✓ Tutorial How to Create Your First Wireframe
- ✓ Article Everything You Need to Know about Wireframes and Prototypes



Deploy a Site with GitHub Pages



Learn how to bring your site online with GitHub pages

- ✓ Article What is GitHub Pages?
- ✓ Article Deploying to GitHub Pages
- ✓ Docs GitHub Pages

Off-Platform: Excursion Project



Create a web page which advertises a product called “Excursion” using HTML, CSS, Command Line Interface, Git, and GitHub.

- 🔗 Project Excursion Project
- 📄 Info Excursion Project Solution



Web Hosting



Learn how to set up a custom domain and find a hosting service for your website.

- ✓ Video What is Hosting?
- ✓ Video What is a Domain Name?
- ✓ Lesson Setting Up Your Domain



Reading

HTML & CSS, Chapter 19: Domain Names & Hosting



Review: Bringing Your Site Online



Review what you just learned in the Bringing Your site Online Unit



Info

Review: Bringing Your Site Online

10. Improved Styling with CSS



Introduction: Improved Styling of CSS



See what you'll be learning in the Improve Styling of CSS Unit



Info

Introduction: Improved Styling with CSS

Resume →



Learn CSS: Colors



In this course, you will learn all about choosing and setting CSS colors using a variety of techniques.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

CSS Color



Quiz

CSS Colors



Reading

HTML & CSS, Chapter 11



Project

Paint Store



Learn CSS: Typography



In this course, you will learn all about CSS typography, such as how to include fonts from other sources and how to style your text.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson CSS Typography
- ✓ Quiz CSS Typography
- ✓ Reading HTML & CSS, Chapter 12
- ✓ Project Typography
- ✓ Lesson Code Challenge: CSS Design



Learn CSS: The Box Model



In this course, you will learn how to use the Box Model to position HTML elements on your web page.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson The Box Model
- ✓ Lesson Changing the Box Model
- ✓ Quiz Box Model Quiz
- ✓ Article The Box Model in DevTools
- ✓ Video The Box Model in Devtools
- ✓ Reading HTML & CSS, Chapter 13
- ✓ Project The Box Model: Davie's Burgers



Learn CSS: Display and Positioning



In this course, you will learn CSS rules for displaying and positioning elements on your web page.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson CSS Display and Positioning

- ✓ Lesson CSS Display and Positioning
- ✓ Quiz CSS Display and Positioning
- ✓ Reading HTML & CSS, Chapter 15
- ✓ Project Broadway



Learn CSS: Documentation and Debugging



Learn how to look up things that you don't know in official documentation so that you can solve problems independently!

- ✓ Lesson Documentation and Research
- ✓ Docs CSS Documentation
- 📄 Info Project: Fotomatic
- 📄 Info Fotomatic Solution

Build A Website Design System



Test your HTML and CSS knowledge with this challenge project.

- 🔗 Project Build a Website Design System



Review: Improved Styling of CSS



Review what you just learned in the Improved Styling of CSS Unit

- ✓ Info Review: Improved Styling with CSS

11. Building Interactive Websites with JavaScript



Introduction: Building Interactive Websites with JavaScript



See what you'll be learning in the Building Interactive Websites with JavaScript Unit



Info

Introduction: Building Interactive Websites with JavaScript



JavaScript Interactive Websites



Learn how to bring JavaScript and HTML together with the script tag and begin to create interactive websites.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

The Script Element



Video

Create Your First JavaScript Website



Article

How To Add JavaScript to HTML



JavaScript and the DOM



Learn about the DOM model and how JavaScript interacts with it to alter a web page.

[Cheatsheet](#) | [Practice Pack](#)



Video

What is the DOM?



Lesson

The Document Object Model



Lesson

Javascript and the DOM



Reading

JavaScript & JQuery, Chapter 5



DOM Events with JavaScript



Learn to create webpage interactivity by leveraging JavaScript events in the browser.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson DOM Events with JavaScript
- ✓ Quiz DOM Events
- ✓ Reading JavaScript & JQuery, Chapter 6
- ✓ Project Piano Keys



HTML Forms



Take this course and learn about the inner workings of an HTML form! Learn how to create your own form and integrate HTML5 validations.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Introduction to Form Validation
- ✓ Lesson HTML Forms
- ✓ Lesson Form Validation
- ✓ Quiz HTML Forms
- ✓ Reading HTML & CSS, Chapter 7
- ✓ Article Client-Side Form Validation
- ✓ Project Form a Story



Review: Building Interactive Websites with JavaScript



Review what you just learned in the Building Interactive Websites with JavaScript Unit

- ✓ Info Review: Building Interactive Websites with JavaScript

12. Making a Website Responsive



Introduction: Making a Website Responsive



See what you'll be learning in the Making a Website Responsive Unit



Info

Introduction: Making a Website Responsive



Learn Responsive Design



Learn responsive design techniques, like relative sizing units and media queries, to create websites viewable on devices of all sizes.

[Cheatsheet](#) | [Practice Pack](#)



Article

Responsive Web Design



Lesson

Sizing Elements



Quiz

Sizing Elements



Lesson

Media Queries



Quiz

Media Queries Quiz



Article

Simulate Different Screen Sizes with Device Mode in Chrome DevTools



Project

Tsunami Coffee



Article

You Don't Need a Framework: Understanding the Fundamentals of Responsive Design



Layout with Flexbox



Learn CSS Flexbox to create flexible page layouts.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Flexbox
- ✓ Quiz Flexbox Quiz
- ✓ Project Flexbox: To-Do App
- ✓ Project Tea Cozy

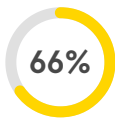


Learn Responsive Design: Grids and Spacing



Learn how designers use grids to create flexible page layouts.

- ✓ Lesson Grids and Spacing
- ✓ Quiz Grids And Spacing Quiz 1



Learn CSS: Grid



Learn CSS Grid to create flexible page layouts.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson CSS Grid Essentials
- ✓ Quiz CSS Grid
- ✓ Lesson Advanced CSS Grid
- ✓ Quiz CSS Grid
- ✓ Article A Complete Guide to CSS Grid
- ✓ Article Things I've Learned About CSS Grid Layout
- 🧩 Project CSS Grid: PupSpa
- 🧩 Project CSS Grid: Task Board
- 🧩 Project CSS Grid: Architecture Blog

Company Home Page



Test your flexbox knowledge with this challenge project.



Project

Company Home Page with Flexbox

Responsive Club Website



Test your responsive web design knowledge with this challenge project.



Project

Responsive Club Website



Review: Making a Website Responsive



Review what you just learned in the Making a Website Responsive Unit



Info

Review: Making a Website Responsive

13. Making a Website Accessible



Introduction: Making a Website Accessible



See what's covered in the Making a Website Accessible unit.



Info

Introduction: Making a Website Accessible



Learn Web Accessibility



Learn simple changes you can make to ensure that your website is accessible and usable to everyone.



Article

Accessibility (a11y)



Article

What is Digital Accessibility?



Lesson

Accessible Design



Lesson

Accessibility



Quiz

Accessibility Quiz 1



Article

Setting Up and Using Screen Readers



Article

The A11y Project Checklist



Article

CSS and JavaScript Accessibility Best Practices



Review: Making a Website Accessible



Review what was covered in the Making a Website Accessible unit.



Info

Review: Making a Website Accessible

14. HTML, CSS, and JS Portfolio Project

Personal Portfolio Website



Bring together what you have learned in the previous lessons and build a project off of Codecademy.



Portfolio

Portfolio Website

15. JavaScript Syntax, Part III



Introduction: JavaScript Syntax, Part III



See what's covered in the JavaScript, Part III unit.



Info

Introduction: JavaScript Syntax, Part III



Learn JavaScript Syntax: Classes



Learn how to create classes and use inheritance to minimize redundancy in your code.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

Classes



Quiz

Classes



Project

Build a Library



Project

School Catalogue



Article

Understanding Classes in JavaScript



Docs

Reference: Classes



Learn JavaScript Syntax: Modules



Learn how to use JavaScript modules, a way to define and utilize reusable logic in your programs.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

Intermediate JavaScript Modules



Quiz

Modules



Docs

JavaScript Modules



Article

What are CJS, AMD, UMD, and ESM in JavaScript?



Project

Message Mixer



Project

WorkAround



Learn JavaScript Syntax: Error Handling



Learn how to address errors in this course all about JavaScript errors!

[Cheatsheet](#) | [Practice Pack](#)



Lesson

Learn JavaScript: Error Handling



Quiz

Error Handling



Reading

JavaScript & JQuery, Chapter 10



Practice JavaScript Syntax: Classes



Practice what you've learned with JavaScript syntax.



Article

JavaScript Practice: Classes

Find Your Hat



Test your JavaScript knowledge with this challenge project.



Project

Find Your Hat



Review: JavaScript Syntax, Part III



Review what was covered in the JavaScript Syntax, Part III.



Info

Review: JavaScript Syntax, Part III

16. Test Driven Development with JavaScript



Introduction: TDD Fundamentals



See what's covered in the TDD Fundamentals unit.



Info

Introduction: TDD Fundamentals



Why Test?



Learn about testing and how it can help you write more robust, maintainable code.



Lesson

Why Test?



Article

Test-Driven Development



Article

Unit Testing



Article

Integration Testing



Article

Introduction to Test-Driven Development



Quiz

Why Test?



Project

Cake O'Clock



Write Good Tests with Mocha



Learn to use the Mocha framework and the Node.js assert library to write, automate, and organize tests in Javascript.



Lesson

Automate and Organize Tests



Lesson

Write Expressive Tests



Project

Rooster Regulation



Quiz

Learn Mocha



Learn TDD with Mocha



Learn test-driven development with Mocha.

- ✓ Lesson Learn TDD With Mocha
- ✓ Docs Mocha Documentation
- ✓ Docs Chai Documentation
- ✓ Quiz TDD With Mocha
- ✓ Project Factorial Feature



Review: TDD Fundamentals



Review what was covered in the TDD Fundamentals unit.

- ✓ Info Review: TDD Fundamentals

17. Async JavaScript and HTTP Requests



Introduction: Async JavaScript and HTTP Requests



See what you'll be learning in the Async JavaScript and HTTP Requests Unit

- ✓ Info Introduction: Async JavaScript and HTTP Requests



Basics of Asynchronous JavaScript



Learn about the general programming concepts behind asynchronous JavaScript.

- ✓ Article General Asynchronous Programming Concepts
- ✓ Article Introducing Asynchronous JavaScript
- ✓ Article Cooperative Asynchronous JavaScript: Timeouts



Learn JavaScript Syntax: Promises



Learn how to write asynchronous JavaScript with the Promises Syntax.

[Cheatsheet](#) | [Practice Pack](#)



Lesson JavaScript Promises



Quiz JavaScript Promises



Article Graceful Asynchronous Programming with Promises



Article JavaScript Promises for Dummies



Learn JavaScript Syntax: Async-Await



Learn about asynchronous programming and leverage promises in JavaScript.

[Cheatsheet](#) | [Practice Pack](#)



Lesson Async Await



Quiz Async Await



Article Making Asynchronous Programming Easier with async and await



Article Choosing the Right Approach



APIs and HTTP Requests



Learn about the basics of HTTP requests, what an API is, and JSON data.



Article HTTP Requests

- ✓ Article An Overview of HTTP
- ✓ Video What is an API?
- ✓ Article Introduction to Web APIs
- ✓ Article What Is JSON?
- ✓ Article Working with JSON in JavaScript



Learn JavaScript: Requests



Learn the benefits of asynchronous JavaScript properties and create calls to various APIs.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Requests I
- ✓ Quiz JavaScript Requests Quiz I
- ✓ Lesson Requests II
- ✓ Quiz JavaScript Requests Quiz II
- ✓ Reading JavaScript & JQuery, Chapter 8
- ✓ Article Fetching Data from the Server
- ✓ Article Using Fetch
- ✓ Article Third-Party APIs
- ✓ Project Wanderlust



Review: Async JavaScript and HTTP Requests



Review what you just learned in the Async JavaScript and HTTP Requests Unit

- ✓ Info Review: Async JavaScript and HTTP Requests

18. Web Apps



Introduction: Web Apps



See what's covered in the Web Apps unit.



Info

Introduction: Web Apps



What is a Web App?



Learn about what web apps are and how they differ from static web sites.



Article

What is a Web App?



Article

What is a SPA?



Article

Poll Results: "Sites" vs "Apps"



Review: Web Apps



Review what was covered in the Web Apps unit.



Info

Review: Web Apps

19. React, Part I



Introduction: React, Part I



See what's covered in the React, Part I unit.



Info

Introduction: React, Part I



Review: ES6 Syntax



Review ES6 syntax to prepare for working in React.



Article

A Re-Introduction to JavaScript



Article

Destructuring with JavaScript



Review: Functional JavaScript



Review functional programming concepts to prepare for working in React.



Article

Introduction to Functional JavaScript



Introduction to React.js



Learn about the React.js library and get an overview of its basic functionality.



Tutorial

Intro to React



Tutorial

Thinking in React



The Virtual DOM



Learn about what the Virtual DOM is and how it helps make React apps more efficient.



Video

The Virtual DOM



Article

React: The Virtual DOM



Article

What the Fork is the React Virtual DOM







JSX



Learn to use JSX, the basic syntax of React.js

[Cheatsheet](#) | [Practice Pack](#)

-  Lesson Intro to JSX
-  Lesson Advanced JSX
-  Quiz JSX
-  Project Animal Fun Facts









React Components



Learn to make React Components, the building blocks of all React.js applications.

[Cheatsheet](#) | [Practice Pack](#)

-  Lesson Your First React Component
-  Lesson Components and Advanced JSX
-  Quiz React Components
-  Project Authorization Form
-  Article Creating a React App
-  Docs Create React App



Review: React, Part I



Review what was covered in the React, Part I unit.

-  Info Review: React, Part I

20. React, Part II



Introduction: React, Part II



See what you'll be learning in the React, Part II Unit



Info

Introduction: React, Part II



Components and Props



Learn how to make React components interact with one another with props.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

Components Render Other Components



Lesson

this.props



React State



Learn how to make React components interact with one another with state.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

this.state



Quiz

Components Interacting



Project

Random Color Picker



React Development Tools



Learn how to debug your react app with react dev tools.

- ✓ Info React Developer Tools
- ✓ Resource React DevTools
- ✓ Tutorial Debugging React in VS Code



Stateless Components from Stateful Components



Learn React programming patterns for mixing components with and without state.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Stateless Components From Stateful Components
- ✓ Lesson Child Components Update Their Parents' state
- ✓ Lesson Child Components Update Their Siblings' props
- ✓ Quiz Stateful and Stateless Programming Patterns
- ✓ Project Video Player



Lifecycle Methods



Hook actions to specific moments in a component's life.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Component Lifecycle Methods
- ✓ Project Social Network for Pets
- ✓ Quiz Lifecycle Quiz



Jammming



Test your React knowledge with this challenge project.

- ✓ Project Jammming
- ✓ Project Feature Request: Jammming



Deploying React Apps with Netlify



Learn how to deploy your React apps with Netlify.

- ✓ Tutorial Deploy to Netlify with GitHub



Function Components and Hooks



Learn how to use Hooks in React, a powerful feature of function components.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Function Components
- ✓ Lesson The State Hook
- ✓ Lesson The Effect Hook
- ✓ Project Passing Thoughts
- ✓ Quiz React Hooks



Advanced React



Learn the most essential remaining React fundamentals.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Style
- ✓ Lesson Container Components From Presentational Components
- ✓ Lesson PropTypes
- ✓ Lesson React Forms

- ✓ Lesson React Forms
- ✓ Project Copycat
- ✓ Quiz Advanced React



React Router



Learn how to use the popular React Router library to easily create navigation components

- ✓ Docs A Simple React Router v4 Tutorial
- ✓ Article React Router Tutorial | React For Beginners
- ✓ Docs React Router



Learn React Testing with Jest



Learn to use the Jest framework to write, automate, and organize tests for React code.

- ✓ Article Getting Started with Jest for JavaScript Testing
- ✓ Docs Testing React Apps with Jest
- ✓ Docs Enzyme
- ✓ Article Unit Testing React Applications with Jest and Enzyme
- ✓ Tutorial Advanced Testing with React and Jest
- ✓ Article Testing in React: Best Practices, Tips, and Tricks



Review: React, Part II



Review what you just learned in the React, Part II Unit



Info

Review: React, Part II

21. Redux



Introduction: Redux



See what's covered in the Redux unit.



Info

Introduction: Redux



Why Redux?



Learn about the Redux library, why you would (and would not) use it.



Tutorial

Getting Started with Redux



Article

Redux Core Concepts



Article

Three Principles of Redux



Article

You Might Not Need Redux



Article

Live React - Hot Reloading with Time Travel



Introduction to Redux



Get started with Redux by learning basic concepts and use cases.



Article

Redux Essentials Tutorial, Part 1



Docs

Redux DevTools Extension



Article

Redux DevTools



Article

Redux Essentials Tutorial, Part 2

- ✓ Docs Redux API Reference
- ✓ Tutorial Tutorial: Getting Started with Redux
- ✓ Tutorial Leveling Up with React: Redux
- ✓ Article Why Use React Redux?
- ✓ Tutorial Building React Applications with Idiomatic Redux



Advanced Redux



Dig deeper into Redux by learning more complex concepts and their use cases.

- ✓ Article Redux Essentials Tutorial, Part 3
- ✓ Article Redux Essentials Tutorial, Part 4
- ✓ Article Redux Essentials Tutorial, Part 5



Testing Redux



Learn to use the Jest framework to write tests for Redux code.

- ✓ Article Writing Tests in Redux
- ✓ Article Testing Redux for Real Life Apps
- ✓ Article Testing Strategies for React and Redux
- ✓ Tutorial Testing React-Redux Connected Components
- ✓ Tutorial How to Test Redux
- ✓ Article React-Redux Testing Best Practices



Review: Redux



Review what was covered in the Redux unit.



Info

Review: Redux

22. Git and GitHub, Part II

Introduction: Git and Github, Part II



See what you'll be learning in the Git and GitHub, Part II Unit



Info

Introduction: Git and GitHub, Part II



Git Branching



Learn How to Manage Multiple Versions of a Project with Branching



Lesson

Git Branching



Project

Birthday Party



Project

Ruby Time Calculator



Quiz

Git Branching



Git Teamwork



An introduction to Git collaborations with remotes, pulling and pushing



Lesson

Git Teamwork



Project

JavaScript Homework



Project

Recipe Book



Quiz

Git Teamwork





Collaborating with GitHub

Learn how to use Git and GitHub to collaborate on software projects, including open source codebases.

-  Article Forking - GitHub & Git Foundations
-  Article Pull Requests - Github & Git Foundations
-  Article Rebase - GitHub & Git Foundations
-  Tutorial Merge Conflicts
-  Article How to Contribute to Open Source

Project Management and Workflows on GitHub

Learn how to integrate different GitHub features in order to enhance your project management and workflows.

-  Docs GitHub Features - Project Management
-  Article Webcast - GitHub for Project Management
-  Article How to Use GitHub for Agile Management
-  Article An Introduction to Continuous Integration & GitHub Actions for Julia

Review: Git and GitHub, Part II

Review what you just learned in the Git and GitHub, Part II Unit

-  Info Review: Git and GitHub, Part II

23. React and Redux Portfolio Project

Reddit Client



Bring together what you have learned in the previous lessons and build a project off of Codecademy.



Portfolio

Reddit Client

24. Basics of Back-End Development



Introduction: Basics of Back-End Development



Intro informational for Basics of Back-End Development module.



Info

Introduction: Basics of Back-End Development

33%

What is a Back-End?



Learn the basics of what a back-end is.



Video

What is Back-End?



Lesson

What is the Back-end?



Article

Web Architecture 101

What is a Server?



Learn about servers, the underpinning architecture of back-ends.



Resource

Server



Article

What is a web server?



Article

Introduction to the server side



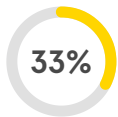
Article

Client-Server Overview



Article

Client-Side Overview



Introduction to RESTful APIs



Learn about the concept of a REST API.



Article

REST API concepts and examples



Article

What is REST?



Article

REST Resource Naming Guide

Review: Basics of Back-End Development



Review informational for Basics of Back-End Development module.



Info

Review: Basics of Back-End Development

25. Build a Back-End with Node/Express.js

Introduction: Build a Back-End with Node/Express.js

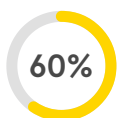


Intro informational for Build a Back-End with Node/Express.js module.



Info

Introduction: Build a Back-End with Node/Express.js



Learn Node.js



Explore the Node.js JavaScript runtime environment.

[Cheatsheet](#) | [Practice Pack](#)







Lesson

Learn Node.js



Tutorial





The only Node.js introduction you'll ever need

-  Tutorial The only NodeJS introduction you'll ever need
-  Docs Node.js
-  Resource learnyounode
-  Quiz Intro to Node.js

Introduction to Express



Learn about and install the popular Express framework.

-  Article Server-side web frameworks
-  Article Express/Node introduction
-  Tutorial Setting up a Node development environment
-  Docs Express








57%



Learn Express: Routes



Build an Application Programming Interface (API) in JavaScript using the popular Express framework.

-  Lesson Learn Express Routes
-  Lesson Learn Express Routers
-  Docs Express - Routing
-  Article Setting Up Postman
-  Tutorial How to Make API Requests with Postman or cURL
-  Lesson Express Routes Code Challenges
-  Quiz Express Routes Quiz

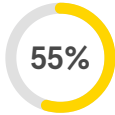
Challenge Project: Quote API



Use your knowledge of Express.js to build a small JSON API to serve up famous and interesting quotes about technology.



Project Quote API



Learn Express: Middleware



Learn about how to use Express middleware to improve your API's code quality and readability



Article What is Middleware? A simple explanation.



Lesson Middleware



Lesson Router Parameters



Article What is CORS?



Docs Writing Express Middlewares



Docs Using Express Middlewares



Docs Express Error Handling



Lesson Express Middleware Code Challenges



Quiz Middleware Quiz



Documenting APIs with Swagger



Learn how to document your APIs using Swagger with Node and Express.



Article Adding Swagger to Node Projects



Tutorial YAML Tutorial



Tutorial API Development in Node.js with Swagger



Tutorial Swagger and Node.js



API Project: Boss Machine



Create an entire API to serve information to a Boss Machine, a unique management application for today's most accomplished entrepreneurs.



Info

Cumulative Project: Boss Machine



Info

Cumulative Project: Boss Machine Solution

Review: Build a Back-End with Node/Express.js



Review informational for Build a Back-End with Node/Express.js module.



Info

Review: Node/Express.js

26. Back-End and Feature Testing

Introduction: Back-End and Feature Testing



Intro informational for Back-End and Feature Testing module.



Info

Introduction: Back-End and Feature Testing



Outside-in TDD



Learn about the different layers of the testing pyramid in full-stack web applications.



Article

The Testing Pyramid



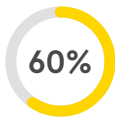
Article

Outside-In Test-Driven Development



Article

Outside in Test Driven Development



Learn Feature Testing with TDD



Learn feature development for a full-stack web application by writing JavaScript tests that use headless browsing to simulate user interacti



Article

Introduction to headless browser testing



Lesson

TDD Feature-Level Tests



Project

Quote Keeper



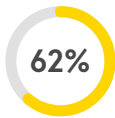
Docs

PhantomJS



Quiz

TDD Feature-Level Tests



Learn Server Testing with TDD



Learn to use test-driven development to create a JavaScript server using the Express framework.



Lesson

Server Testing Stack



Docs

jsdom



Tutorial

API testing using SuperTest



Docs

SuperTest



Quiz

Server Testing Stack



Lesson

Server Testing Patterns



Quiz

Server Testing Patterns



Project

Quote Keeper: Server Layer

Review: Back-End and Feature Testing



Review informational for Back-End and Feature Testing module.



Info

Review: Back-End and Feature Testing

27. SQL for Back-End Development

Introduction: SQL for Back-End Development



Intro informational for SQL for Back-End Development module.



Info

Introduction: SQL for Back-End Development

Introduction to SQL and Relational Databases in Web Development



What is SQL and why is it used in web development?



Article

What is a Relational Database Management System?



Article

PostgreSQL: What is SQL And Relational Database



SQL: Creating, Updating, and Deleting Data



Learn how to create new SQL tables, insert new rows, and update or delete existing data.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

Manipulation



Project

Create a Table



Quiz

Manipulation



Lesson

PostgreSQL Constraints



Project

Building an Inventory Database with PostgreSQL



Quiz

PostgreSQL Constraints



80%

SQL Queries



Learn how to customize SQL queries to retrieve specific, ordered data from a database.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

Queries



Article

SQL queries don't start with SELECT



Lesson

Queries Challenge



Project

New York Restaurants



Quiz

Queries



Performing SQL Calculations



Learn to use SQL Aggregate Functions to perform calculations on result sets.

[Cheatsheet](#) | [Practice Pack](#)



Lesson

Aggregate Functions



Project

Trends in Startups



Lesson

Aggregate Functions Challenge



Quiz

Aggregate Functions



80%

Working with Multiple SQL Tables



Learn how to work with SQL data from multiple tables in the same query.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Lesson Multiple Tables
- 📋 Tutorial Writing Subqueries in SQL
- ✓ Lesson Multiple Tables Challenge
- ✓ Project Lyft Trip Data
- ✓ Quiz Multiple Tables



Practice SQL Syntax



Practice what you've learned with SQL Syntax

- ✓ Resource SQL Exercises
- ✓ Resource SQLZOO



Review: SQL for Back-End Development



Review informational for SQL for Back-End Development module.

- ✓ Info Review: SQL for Back-End Development

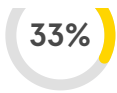
28. PostgreSQL Database

Introduction: PostgreSQL Database



Intro informational for PostgreSQL Database module.




- 📋 Info Introduction: PostgreSQL Database



Introduction to Databases





Databases store data and can be updated with new information.

-  Resource Database
-  Article What Is a Database?
-  Article What is CRUD?

Introduction to PostgreSQL







Learn about PostgreSQL, a popular, open-source database.

-  Article PostgreSQL: What is PostgreSQL AKA Postgres
-  Article SQLite vs MySQL vs PostgreSQL

Setting up PostgreSQL





Install PostgreSQL in order to work with database files on your own computer.

-  Article Installing and Using PostgreSQL Locally
-  Resource Postgres.app
-  Resource pgAdmin
-  Info Off Platform Project: Making a Database of Movies

PostgreSQL Basics



Learn how to create and modify databases, tables, and add data in Postgres.

-  Tutorial Getting Started (Official Postgres Tutorial)
-  Docs PostgreSQL



Review: PostgreSQL Database



Review informational for PostgreSQL Database module.



Info

Review: PostgreSQL Database

29. Designing Relational Databases

Introduction: Designing Relational Databases



Intro informational for Designing Relational Databases module.



Info

Introduction: Designing Relational Databases

Introduction to Database Design



Get a high-level understanding of database design, why database integrity is important, and common terms.



Article

Relational Database Schema Design Overview



Article

10 Best Database Design Practices



Resource

Data Integrity









Article

Atomic Values

Designing a Database




Learn about the different types of database relations, including one to one, one to many, and many to many and how to use them in your datab

-  Lesson What Is A Database Schema?
-  Lesson What Are Database Keys?
-  Lesson What Are Database Relationships?
-  Article Design pattern: many-to-many
-  Project Build A Menu For Bytes Of China
-  Quiz Database Schemas, Keys, and Relationships





Designing A Database Schema Off Platform Project

Use your knowledge about schemas to build a database from scratch on your own computer!

-  Info Off Platform Project: Designing a Database From Scratch

Entity Relationship Diagrams





Learn how to design entity relationship diagrams (ERD).

-  Article What is Entity Relationship Diagram (ERD)?
-  Article Entity Relationship Diagram (ERD) Tutorial - Part 1
-  Article Entity Relationship Diagram (ERD) Tutorial - Part 2
-  Resource ERDPlus

Database Normalization

Learn how to structure a relational database in order to reduce data redundancy and data integrity.

-  Resource Database normalization

-  Lesson Database Normalization with PostgreSQL
-  Article Database Normalization Basics
-  Quiz Database Normalization
-  Project Database Normalization at Fred's Furniture

Review: Designing Relational Databases



Review informational for Designing Relational Databases module.

-  Info Review: Designing Relational Databases

30. Advanced PostgreSQL

Introduction: Advanced PostgreSQL






Intro informational for Advanced PostgreSQL module.

-  Info Introduction: Advanced PostgreSQL

ACID












Learn about the database principle of ACID.

-  Resource ACID
-  Article ACID Properties in DBMS
-  Article ACID versus BASE Data Stores

Postgres Database Performance








Learn the basics of database performance in Postgres.

-  Lesson Introduction To Indexes
-  Project Book Store Indexes
-  Quiz Introduction To Indexes
-  Lesson Intermediate Indexes
-  Article Understanding Postgres Performance
-  Article More on Postgres Performance
-  Article How To Improve Postgres Performance: Our Tips and Tricks
-  Project Intermediate Book Store Indexes
-  Quiz Intermediate Indexes

Postgres Database Tuning and Benchmarking

Learn about database tuning and how to fine tune your queries as well as database benchmarking and how it relates to tracking performance.

-  Resource Database tuning
-  Article Supercharge Your SQL Queries for Production Databases
-  Resource Benchmark
-  Article How to Benchmark PostgreSQL Performance
-  Docs PostgreSQL - pgbench

Database Maintenance and Monitoring Software

Track database performance and maintain a database using built-in tools with pgAdmin or external tools like pgbadger.

-  Article Key Things to Monitor in PostgreSQL



Resource pgBadger



Article PostgreSQL Log Analysis With pgBadger



Resource Performance Analysis Tools

Review: Advanced PostgreSQL



Review informational for Advanced PostgreSQL module.



Info Review: Advanced PostgreSQL

31. Back-End Portfolio Project

E-Commerce App (REST API)



Build an e-commerce REST API using Node/Express and PostgreSQL.



Portfolio E-Commerce App (REST API)

32. Connecting Front-End to Back-End

Introduction: Connecting Front-End to Back-End



See what you'll be learning in the Connecting Front-End to Back-End Unit.








Info Introduction: Connecting Front-End to Back-End

Client-Side Rendering







Learn about client-side rendering, when HTML content is created by JavaScript.

-  Article How Does the Frontend Communicate with the Backend?
-  Article What is Client-side Rendering?
-  Article Pros and Cons of Client-Side Rendering
-  Article The Drawback of Client Side Rendering
-  Article Way to organize REST API endpoints in a React project

Server-Side Rendering










Learn about server-side rendering, for dynamic page loading.

-  Article What's Server Side Rendering and do I need it?
-  Article What is Server-Side Rendering?
-  Article Server Side Rendering pros and cons
-  Tutorial How to Enable Server-Side Rendering for a React App

How to Structure Your Apps







Learn about best practices for project architecture and file structures.

-  Article MVC: Model, View, Controller
-  Article MVC Architecture in 5 minutes
-  Article Bulletproof node.js project architecture
-  Resource Express application generator
-  Resource React - File Structure
-  Article React Folder Structure in 5 Steps
-  Resource Create a New React App

Server-Side API Calls to External APIs








Learn how to make calls to external APIs from the server.

-  Tutorial Consume Remote API Data From Within A Node.js Application
-  Tutorial How to use an API with Node.js
-  Article Should Your Browser Make Client-Side Web API Calls?
-  Article Keeping credentials secure when making API calls with JavaScript

The Server Can Do More: Server-Side Use Cases



Learn about various ways the back-end can be used to elevate your applications.

-  Tutorial Build a Node.js HTTP Proxy Server in Under 10 minutes
-  Tutorial How to Send Emails with Node.js
-  Tutorial How to listen for webhooks with Node.js and Express
-  Tutorial Node.js Cron Jobs by Examples
-  Tutorial Introduction to Stripe Payments in Node.js Using Express

Review: Connecting Front-End to Back-End



Review what you just learned in the Connecting Front-End to Back-End Unit



Info

Review: Connecting Front-End to Back-End

33. Adding a PostgreSQL Database

Introduction: Adding a PostgreSQL Database



See what you'll be learning in the Adding a PostgreSQL Database Unit.



Info

Introduction: Adding a PostgreSQL Database

PostgreSQL with Node and Express



Learn how to interact with a SQL database from within your JavaScript programs using PostgreSQL



Tutorial

How to set up a RESTful API with Node.js and PostgreSQL



Tutorial

How to Build Your Own Blog Using Express, Hooks, & Postgres



Docs

node-postgres



Resource

Suggested Project Structure

Deploying a PERN App to Heroku



Learn how to deploy a full-stack application using Heroku.



Tutorial

Build a Node.js, Express, & PostgreSQL REST API



Docs

Heroku - Postgres Basics






Docs

Heroku - Connecting in Node.js

Using an ORM with Sequelize







Learn how to use the Sequelize ORM to add a layer of abstraction to your application.

-  Article What is an ORM and Why You Should Use it
-  Tutorial Node.js, Express.js, Sequelize.js and PostgreSQL RESTful API
-  Docs Sequelize

Query Builders and Data Seeding



Learn how to use a query builder like Knex.js and how to use Faker.js to seed your database or use free database resources like Mockaroo to

-  Tutorial Seeding your Database with Thousands of Users using Knex.js and Faker.js
-  Docs Knex.js
-  Tutorial Mockaroo - An easy way to generate millions of test data
-  Resource Mockaroo

Review: Adding a PostgreSQL Database



Review what you just learned in the Adding a PostgreSQL Database Unit

-  Info Review: Adding a PostgreSQL Database

34. Security, Authentication, and Authorization

Introduction: Security, Authentication, and Authorization

See what you'll be learning in the Security, Authentication, and Authorization Unit.



Info

Introduction: Security, Authentication, and Authorization

Introduction to Web Security

Learn about the basic ideas of adding security features to a web application.



Resource

Web application security



Article

Website security



Article

The Basics of Web Application Security

Introduction to Authentication/Authorization

Learn about the different usages of authentication and authorization and how they protect applications in complimentary ways.



Resource

Authentication and Authorization



Article

RESTful API Authentication Basics



Docs

MDN - HTTP authentication






Tutorial

NodeJS - Basic Authentication Tutorial with Example API

OAuth 2.0

Learn how to incorporate the OAuth2.0 protocol in your application to secure access to your data.





secure access to your data.

-  Article What is OAuth? Definition and How it Works
-  Article OAuth2 Overview
-  Tutorial Implementing OAuth 2.0 in Node.js

Passport.js






Learn how to use the popular middleware library Passport.js for authentication purposes.

-  Tutorial Node Authentication with Passport & Postgres
-  Docs Passport.js
-  Article OAuth Login (Passport.js) Tutorial
-  Article 6 JavaScript User Authentication Libraries for 2019

Authentication/Authorization in Postgres



Learn how to implement authentication and authorization techniques in a PostgreSQL database.

-  Tutorial PostgreSQL security: a quick look at authentication best practices
-  Docs PostgreSQL - Client Authentication
-  Article How to Secure Your PostgreSQL Database






Roles in Postgres



Learn how to leverage roles to set permissions for advanced access control and database security.








Database Data-based access control

-  Resource Role-based access control
-  Docs PostgreSQL – Database Roles
-  Article What is Role-Based Access Control (RBAC)?
-  Article PostgreSQL Privileges & User Management
-  Tutorial Learn how to manage security in PostgreSQL

Sessions & Cookies



Learn how to use cookies to store data in the browser.

-  Resource HTTP cookie
-  Article Web security essentials – Sessions and cookies
-  Article JavaScript Cookies vs Local Storage vs Session
-  Article Session Authentication in Express
-  Tutorial Sessions in Node.js

JWTs







Learn how to use JSON Web Tokens (JWT) for authentication.

-  Resource JSON Web Token
-  Article What Is JWT and Why Should You Use JWT
-  Tutorial JSON Web Tokens (JWTs) in Express.js
-  Article Node.JS REST API Auth using JWTs
-  Article Where to Store your JWTs – Cookies vs HTML5 Web Storage

Protecting Data in Transit






Learn about the SSL (Secure Sockets Layer) and TLS (Transport Layer Security) protocols for establishing authenticated and encrypted links.

-  Resource Transport Layer Security
-  Article What is SSL?
-  Article Why is SSL Important?
-  Resource Heroku SSL





Protecting Data at Rest

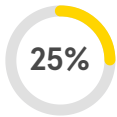
Find out about the hashing process, including how to protect against password attacks.

-  Article Hashing vs. Encryption vs. Encoding vs. Obfuscation
-  Article Adding Salt to Hashing
-  Tutorial Using Bcrypt to Hash & Check Passwords in NodeJS

Secure Collaborative Development

Protect your API keys with environment variables when sharing your code.





-  Article Managing Environment Variables in Node.js with dotenv
-  Docs dotenv
-  Article Hiding API Keys with Environment Variables (dotenv) and Pushing Code to GitHub
-  Docs GitHub - Permission levels for a user account repository



Browser Security







Learn about the cross-origin resource sharing (CORS) policy and how to handle it in Express.

-  Article What is CORS?
-  Docs MDN - Same-origin policy
-  Docs MDN - Cross-Origin Resource Sharing (CORS)
-  Tutorial Handling CORS in Express

Cross-Site Request Forgery (CSRF)







Learn about Cross-site request forgery (CSRF) attacks and how to prevent them.



-  Resource Cross-site request forgery
-  Article Cross-site Request Forgery (CSRF)
-  Article CSRF Tutorial
-  Article Protecting against CSRF attacks in Node

Cross-Site Scripting (XSS)








Learn about cross site scripting (XSS) attacks and how to protect against them.

-  Resource Cross-site scripting
-  Article What is Cross-Site Scripting (XSS)
-  Article Cross-site scripting
-  Article Hacking Websites With Cross-Site Scripting (XSS Attack Basics)

-  Article Running a XSS Attack + How to defend
-  Resource Sanitize HTML





SQL Injection

Learn about SQL injection attacks and how to protect against them.

-  Resource SQL injection
-  Article What is SQL Injection?
-  Article Protecting Against SQL Injection
-  Article Running an SQL Injection Attack
-  Article Sql Injection Explained by Example with Express and PostgreSQL

Data Validation & Sanitization

Sanitize your form inputs so that hackers aren't able to attack your site with malicious data.

-  Resource Data validation
-  Article Sanitizing Data
-  Article Sanitize Your Inputs?
-  Tutorial How to Escape/Sanitise Untrusted Data/Params in SQL Queries to avoid SQL Injection in node.js

Review: Security, Authentication, and Authorization

Review what you just learned in the Security, Authentication, and Authorization Unit



Info

Review: Security, Authentication, and Authorization

35. Advanced Concepts in TDD

Introduction: Advanced Concepts in TDD



See what's covered in the Advanced Concepts in TDD unit.



Info

Introduction: Advanced Concepts in TDD

Advanced Testing: Mocking



Learn about more advanced tools and concepts for creating fast, reliable tests for your web apps.



Article

What is Test Coverage?



Article

Mocking, Stubbing, and Contract Testing



Docs

Jest Mock Functions Documentation



Article

Writing Tests for React Applications Using Jest and Enzyme

Advanced Testing: Browser Automation



Learn how to leverage Selenium to test using emulated user behavior.



Docs

Selenium Documentation



Article

Automating Functional Testing using Selenium



Article

Setting up Your Own Test Automation Environment

Review: Advanced Concepts in TDD



Review what was covered in the Advanced Concepts in TDD unit.



Info

Review: Advanced Concepts in TDD

36. Full-Stack Portfolio Project

E-Commerce App (Client)



Expand the e-commerce REST API with a React client app, creating a full-stack e-commerce experience.



Portfolio

E-Commerce App (Client)

37. Linear Data Structures



Introduction: Linear Data Structures



See what's covered in the Linear Data Structures unit.



Info

Introduction: Linear Data Structures



Intro to Data Structures



Get started with an overview of the how and why of data structures.



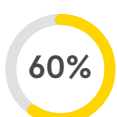
Article

Why Data Structures?



Article

Data Structure APIs



Nodes



Learn about nodes, the building-block data structure.

[Cheatsheet](#) | [Practice Pack](#)

- ✓ Info Nodes
- ✓ Lesson Nodes: Conceptual
- ✓ Quiz Nodes: Conceptual
- 📖 Lesson Nodes: JavaScript
- 📝 Quiz Nodes: JavaScript

Singly Linked Lists



Learn the basics of singly linked lists and how to build them in JavaScript.










- 📖 Info Linked Lists
- 📖 Lesson Linked Lists: Conceptual
- 📝 Quiz Linked Lists: Conceptual
- 📖 Lesson Learn Linked Lists: JavaScript
- 📝 Quiz Learn Linked Lists: JavaScript
- 🎥 Video Video: Singly Linked Lists
- 📖 Info Interactive: Singly Linked Lists
- 📖 Info Github Cheat Sheet: Singly Linked Lists
- 📖 Article Swapping Elements in a Linked List
- 📖 Article Two-Pointer Linked List Techniques
- 📖 Info Practice: Singly Linked Lists

Doubly Linked Lists



Learn the basics of and build your own doubly linked list data









structure.

	Info	Doubly Linked Lists
	Lesson	Doubly Linked Lists: Conceptual
	Quiz	Doubly Linked Lists: Conceptual
	Lesson	Doubly Linked Lists: JavaScript
	Quiz	Doubly Linked Lists: JavaScript
	Video	Video: Doubly Linked Lists
	Info	Interactive: Doubly Linked Lists
	Info	Github Cheat Sheet: Doubly Linked Lists
	Info	Practice: Doubly Linked Lists

Queues












Learn how to build Queues, the first-in-first-out linear data structure.

	Info	Queues
	Lesson	Queues: Conceptual
	Quiz	Queues: Conceptual
	Lesson	Learn Queues: JavaScript
	Quiz	Learn Queues: JavaScript
	Video	Video: Stacks & Queues
	Info	Interactive: Queues
	Info	Github Cheat Sheet: Queues

Stacks




Learn how to build and use stacks, the last-in, first-out data structure.

	Info	Stacks
	Lesson	Stacks: Conceptual
	Quiz	Stacks: Conceptual
	Lesson	Learn Stacks: Javascript
	Quiz	Learn Stacks Javascript Quiz
	Project	Web Navigator
	Video	Video: Stacks & Queues
	Info	Interactive: Stacks
	Info	Github Cheat Sheet: Stacks

Review: Linear Data Structures



Review what was covered in the Linear Data Structures unit.

	Info	Review: Linear Data Structures
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38. Complex Data Structures

Introduction: Complex Data Structures











See what's covered in the Complex Data Structures unit.

	Info	Introduction: Complex Data Structures
---	------	---------------------------------------

Hash Maps








Learn hash map basics and build them in JavaScript.

	Info	Hash Maps
	Lesson	Hash Maps: Conceptual
	Quiz	Hash Maps: Conceptual
	Lesson	Learn Hash Maps: JavaScript
	Quiz	Learn Hash Maps: JavaScript
	Video	Video: Hash Maps
	Info	Interactive: Hash Maps
	Info	Github Cheat Sheet: Hash Maps

Trees






Build the tree data structure, used to represent hierarchical data and many real-life data sources.






	Info	Trees
	Lesson	Trees: Conceptual
	Quiz	Trees: Conceptual
	Lesson	Learn Trees: Javascript
	Quiz	Learn Trees Javascript Quiz

Heaps



Learn the concepts of the Heap data structure and how to build a `MinHeap` class in JavaScript.






	Info	Heaps
	Lesson	Heaps: Conceptual
	Quiz	Heaps: Conceptual

	Lesson	Heaps: Javascript
	Quiz	Heaps: Javascript Quiz
	Video	Video: Heaps
	Info	Interactive: Heaps
	Info	Github Cheat Sheet: Heaps

Graphs



Learn the basics of Graphs: weighted, unweighted, directed, undirected, cyclic, acyclic, and more!

	Info	Graphs
	Lesson	Graphs: Conceptual
	Quiz	Graphs: Conceptual
	Lesson	Graphs: JavaScript
	Quiz	Graphs: Javascript

Review: Complex Data Structures



Review what was covered in the Complex Data Structures unit.

	Info	Review: Complex Data Structures
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39. Algorithms

Introduction: Algorithms









See what's covered in the Algorithms unit.

	Info	Introduction: Algorithms
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Recursion









Learn recursion, the technique of solving a problem with functions that call themselves!

-  Info Recursion
-  Lesson Recursion: Conceptual
-  Quiz Recursion: Conceptual
-  Lesson Recursion in JavaScript
-  Quiz Recursion in JavaScript
-  Lesson Recursive vs. Iterative Traversal

Asymptotic Notation








Learn Big-O notation and how to determine the complexity of algorithms.

-  Article Why Asymptotic Notation?
-  Lesson Asymptotic Notation: Conceptual
-  Quiz Asymptotic Notation: Conceptual
-  Article Asymptotic Notation: JavaScript
-  Quiz Asymptotic Notation: JavaScript
-  Article Space Complexity

Bubble Sort







Learn how to implement the bubble sort algorithm for sorting data sets.

	Info	Sorting Algorithms
	Lesson	Bubble Sort: Conceptual
	Quiz	Bubble Sort: Conceptual
	Lesson	Bubble Sort: JavaScript
	Quiz	Bubble Sort: JavaScript

Merge Sort



Learn about merge sort, an efficient algorithm for divide-and-conquer sorting.

	Lesson	Merge Sort: Conceptual
	Quiz	Merge Sort: Conceptual
	Lesson	Merge Sort: JavaScript
	Quiz	Merge Sort: JavaScript

Quicksort



Learn quicksort, a recursive divide-and-conquer sorting algorithm based on pivot elements.

	Lesson	Quicksort: Conceptual
	Quiz	Quicksort: Conceptual
	Lesson	Quicksort: Javascript
	Quiz	Quicksort: Javascript Quiz

Review: Algorithms



See what was covered in the Algorithms unit.



Info

Review: Algorithms

40. Search & Graph Search Algorithms

Introduction: Search & Graph Search Algorithms



See what's covered in the Search & Graph Search Algorithms unit.



Info

Introduction: Search & Graph Search Algorithms

Binary Search and Search Trees



Learn binary search and binary trees for efficient search of sorted data and efficient construction of sorted data sets.



Info

Binary Search and Search Trees



Lesson

Binary Search: Conceptual



Lesson

Binary Search in JavaScript



Lesson

Learn Binary Search Trees: Javascript



Quiz

Learn Binary Trees in JavaScript

Graph Traversals



Learn how to implement depth-first and breadth-first traversals of graphs.



Info

Graph Traversals

**Lesson****Graph Search: Conceptual**

Quiz

Graph Search: Conceptual



Lesson

Graph Traversal: JavaScript



Quiz

Graph Traversal: Javascript

Review: Search & Graph Search Algorithms

Review what was covered in the Search & Graph Search Algorithms unit.



Info

Review: Search & Graph Search Algorithms

41. Interview Skills**Introduction: Interview Skills**

See what's covered in the Interview Skills unit.



Info

Introduction: Interview Skills

Technical Interviews: Whiteboarding

Practice your whiteboarding skills and learn how to break a technical interview problem down into manageable pieces.



Lesson

Technical Interviews: Whiteboarding



Quiz

Technical Interviews: Whiteboarding



Reading






Cracking the Coding Interview Chapter 7:
Technical Questions**JavaScript Algorithm Practice**

Practice implementing classic algorithms in JavaScript.






Article

Sieve of Eratosthenes

-  Article Capturing Rainwater
-  Article Sorting with Custom Comparator Functions
-  Article Introduction To Dynamic Programming in JavaScript
-  Article The Knapsack Problem
-  Info Next Steps





Soft Skills

Hard skills are great, but soft skills play a large part in determining fit. Learn to present your best self by putting them on display.

-  Article Behavioral Interviews: How to Prepare and Ace Interview Questions
-  Article How to Succeed in A Behavioral Interview
-  Reading Cracking the Coding Interview Chapter 5: Behavioral Questions

Real World Interview Problems

See some real-world technical interview problems in action.

-  Video Google - First Recurring Character
-  Video Facebook - How Many Ways to Decode a Message
-  Video Amazon - Recursive Staircase Problem
-  Video Google - Universal Value Tree

Review: Interview Skills

Review what was covered in the Interview Skills unit.



Info

Review: Interview Skills

42. Final Portfolio Project

Final PERN App



Build a PERN app of your choosing and deploy it to Heroku.



Portfolio

Final PERN App

43. Next Steps in Your Full-Stack Engineer Journey

Next Steps



Take the next steps in your technical career!



Info

Congratulations!



Info

Next Steps