Legacy JavaScript Algorithms and Data Structures

While HTML and CSS control the content and styling of a page, JavaScript is used to make it interactive. In the JavaScript Algorithm and Data Structures Certification, you'll learn the fundamentals of JavaScript including variables, arrays, objects, loops, and functions.

Once you have the fundamentals down, you'll apply that knowledge by creating algorithms to manipulate strings, factorialize numbers, and even calculate the orbit of the International Space Station.

Along the way, you'll also learn two important programming styles or paradigms: Object Oriented Programming (OOP) and Functional Programming (FP).

Note: Some browser extensions, such as ad-blockers and script-blockers can interfere with the tests. If you face issues, we recommend disabling extensions that modify or block the content of pages while taking the course.

Courses

Basic JavaScript

JavaScript is a scripting language you can use to make web pages interactive. It is one of the core technologies of the web, along with HTML and CSS, and is supported by all modern browsers.

In this course, you'll learn fundamental programming concepts in JavaScript. You'll start with basic data structures like numbers and strings. Then you'll learn to work with arrays, objects, functions, loops, if/else statements, and more.

▶ Expand course ○ 0/113

ES6

ECMAScript, or ES, is a standardized version of JavaScript. Because all major browsers follow this specification, the terms ECMAScript and JavaScript are interchangeable.

Most of the JavaScript you've learned up to this point was in ES5 (ECMAScript 5), which was finalized in 2009. While you can still write programs in ES5, JavaScript is constantly evolving, and new features are released every year.

ES6, released in 2015, added many powerful new features to the language. In this course, you'll learn these new features, including arrow functions, destructuring, classes, promises, and modules.

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▶ Expand course ○ 0/29

Regular Expressions

Regular expressions, often shortened to "regex" or "regexp", are patterns that help programmers match, search, and replace text. Regular expressions are very powerful, but can be hard to read because they use special characters to make more complex, flexible matches.

In this course, you'll learn how to use special characters, capture groups, positive and negative lookaheads, and other techniques to match any text you want.

▶ Expand course ○ 0/33

Debugging

Debugging is the process of going through your code, finding any issues, and fixing them.

Issues in code generally come in three forms: syntax errors that prevent your program from running, runtime errors where your code has unexpected behavior, or logical errors where your code doesn't do what you intended.

In this course, you'll learn how to use the JavaScript console to debug programs and prevent common issues before they happen.

▼ Collapse course ✔ 12/12

- ✔ Use the JavaScript Console to Check the Value of a Variable (/learn/javascript-algorithms-and-data-structures/debugging/use-the-javascript-console-to-check-the-value-of-a-variable)
- ✔ Understanding the Differences between the freeCodeCamp and Browser Console (/learn/javascript-algorithms-and-data-structures/debugging/understanding-the-differences-between-the-freecodecamp-and-browser-console)
- ✔ Use typeof to Check the Type of a Variable (/learn/javascript-algorithms-and-data-structures/debugging/use-typeof-to-check-the-type-of-a-variable)
- ✔ Catch Misspelled Variable and Function Names (/learn/javascript-algorithms-and-data-structures/debugging/catch-misspelled-variable-and-function-names)
- ✔ Catch Unclosed Parentheses, Brackets, Braces and Quotes (/learn/javascript-algorithms-and-data-structures/debugging/catch-unclosed-parentheses-brackets-braces-and-quotes)
- ✔ Catch Mixed Usage of Single and Double Quotes (/learn/javascript-algorithms-and-data-structures/debugging/catch-mixed-usage-of-single-and-double-quotes)
- ✔ Catch Use of Assignment Operator Instead of Equality Operator (/learn/javascript-algorithms-and-data-structures/debugging/catch-use-of-assignment-operator-instead-of-equality-operator)

- Catch Missing Open and Closing Parenthesis After a Function Call (/learn/javascript-algorithms-and-data-structures/debugging/catch-missing-open-and-closing-parenthesis-after-a-function-call)
- Catch Arguments Passed in the Wrong Order When Calling a Function (/learn/javascript-algorithms-and-data-structures/debugging/catch-arguments-passed-in-the-wrong-order-when-calling-a-function)
- Catch Off By One Errors When Using Indexing (/learn/javascript-algorithms-and-data-structures/debugging/catch-off-by-one-errors-when-using-indexing)
- Use Caution When Reinitializing Variables Inside a Loop (/learn/javascript-algorithms-and-data-structures/debugging/use-caution-when-reinitializing-variables-inside-a-loop)
- Prevent Infinite Loops with a Valid Terminal Condition (/learn/javascript-algorithms-and-data-structures/debugging/prevent-infinite-loops-with-a-valid-terminal-condition)

Basic Data Structures

Data can be stored and accessed in many ways. You already know some common JavaScript data structures — arrays and objects.

In this Basic Data Structures course, you'll learn more about the differences between arrays and objects, and which to use in different situations. You'll also learn how to use helpful JS methods like `splice()` and `Object.keys()` to access and manipulate data.

▶ Expand course ○ 0/20

Basic Algorithm Scripting

An algorithm is a series of step-by-step instructions that describe how to do something.

To write an effective algorithm, it helps to break a problem down into smaller parts and think carefully about how to solve each part with code.

In this course, you'll learn the fundamentals of algorithmic thinking by writing algorithms that do everything from converting temperatures to handling complex 2D arrays.

▶ Expand course ○ 0/16

Object Oriented Programming

OOP, or Object Oriented Programming, is one of the major approaches to the software development process. In OOP, objects and classes organize code to describe things and what they can do.

In this course, you'll learn the basic principles of OOP in JavaScript, including the `this` keyword, prototype chains, constructors, and inheritance.

▶ Expand course ○ 0/26

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Functional Programming

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Functional Programming is another popular approach to software development. In Functional Programming, code is organized into smaller, basic functions that can be combined to build complex programs.

In this course, you'll learn the core concepts of Functional Programming including pure functions, how to avoid mutations, and how to write cleaner code with methods like `.map()` and `.filter()`.

▶ Expand course ○ 0/24

Intermediate Algorithm Scripting

Now that you know the basics of algorithmic thinking, along with OOP and Functional Programming, test your skills with the Intermediate Algorithm Scripting challenges.

▶ Expand course ○ 0/21

JavaScript Algorithms and Data Structures Projects

This is it — time to put your new JavaScript skills to work. These projects are similar to the algorithm scripting challenges you've done before – just much more difficult.

Complete these 5 JavaScript projects to earn the JavaScript Algorithms and Data Structures certification.

Palindrome Checker ○ (/learn/javascript-algorithms-and-data-structures/javascript-algorithms-and-data-structures-projects/palindrome-checker)

Roman Numeral Converter ○ (/learn/javascript-algorithms-and-data-structures/javascript-algorithms-and-data-structures-projects/roman-numeral-converter)

Caesars Cipher ○ (/learn/javascript-algorithms-and-data-structures/javascript-algorithms-and-data-structures-projects/caesars-cipher)

Telephone Number Validator ○ (/learn/javascript-algorithms-and-data-structures/javascript-algorithms-and-data-structures-projects/telephone-number-validator)

Cash Register ○ (/learn/javascript-algorithms-and-data-structures/javascript-algorithms-and-data-structures-projects/cash-register)

Go to settings to claim your certification (/settings#cert-javascript-algorithms-and-data-structures)

Browse our other free certifications (we recommend doing these in order)

Earn free verified certifications with freeCodeCamp's core curriculum:

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JavaScript Algorithms and Data Structures (Beta) Certification (/learn/javascript-algorithms-and-data-structures-v8/)

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Our mission: to help people learn to code for free. We accomplish this by creating thousands of videos, articles, and interactive coding lessons - all freely available to the public.

Donations to freeCodeCamp go toward our education initiatives, and help pay for servers, services, and staff.

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Trending Guides

Date Formatting in JS (https://www.freecodecamp.org/news/how-to-format-dates-in-javascript/)

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Python Import from File (https://www.freecodecamp.org/news/how-to-import-a-function-from-another-file-in-python/)

Python Merge Dictionaries (https://www.freecodecamp.org/news/how-to-merge-dictionaries-in-python/)

Reactive Programming Guide (https://www.freecodecamp.org/news/what-is-reactive-programming-a-beginners-guide/)

What's a Greedy Algorithm? (https://www.freecodecamp.org/news/greedy-algorithms/)

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Mobile App

(https://apps.apple.com/us/app/freecodecamp/id6446908151?itsct=apps_box_link&itscg=30200)

(https://play.google.com/store/apps/details?id=org.freecodecamp)

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