

# **Web Development**

## **from Beginner to**

## **Paid Professional**

*Volume 3*

**Learn JavaScript Algorithms & Data Structures Step By Step.**  
**Examples, Practice Exercises and Projects Included.**

By

*Bolakale Aremu*

*Ojula Technology Innovations*

**Web Development**  
**from Beginner to Paid Professional**

*Volume 3*

Learn JavaScript Algorithms & Data Structures Step by Step.

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## Table of Contents

How to Learn HTML5, CSS & JavaScript Well .....	16
1. Basic JavaScript .....	17
1.0. Getting Started .....	17
1.1. JavaScript Fundamental .....	18
1.2. Comment Your JavaScript Code .....	19
1.3. Declare JavaScript Variables .....	19
1.4. Storing Values with the Assignment Operator .....	20
1.5. Assigning the Value of One Variable to Another.....	21
1.6. Initializing Variables with the Assignment Operator .....	21
1.7. Declare String Variables .....	22
1.8. Understanding Uninitialized Variables.....	<b>Error! Bookmark not defined.</b>
1.9. Explore Differences Between the var and let Keywords	<b>Error! Bookmark not defined.</b>
1.10. Declare a Read-Only Variable with the const Keyword	<b>Error! Bookmark not defined.</b>
1.11. Add Two Numbers with JavaScript.....	<b>Error! Bookmark not defined.</b>
1.12. Subtract One Number from Another with JavaScript	<b>Error! Bookmark not defined.</b>
1.13. Multiply Two Numbers with JavaScript.....	<b>Error! Bookmark not defined.</b>
1.14. Divide One Number by Another with JavaScript	<b>Error! Bookmark not defined.</b>
1.15. Increment a Number with JavaScript.....	<b>Error! Bookmark not defined.</b>
1.16. Decrement a Number with JavaScript .....	<b>Error! Bookmark not defined.</b>
1.17. Create Decimal Numbers with JavaScript .....	<b>Error! Bookmark not defined.</b>
1.18. Multiply Two Decimals with JavaScript .....	<b>Error! Bookmark not defined.</b>
1.19. Divide One Decimal by Another with JavaScript	<b>Error! Bookmark not defined.</b>
1.20. Increment a Number with JavaScript.....	<b>Error! Bookmark not defined.</b>
1.21. Decrement a Number with JavaScript .....	<b>Error! Bookmark not defined.</b>
1.22. Create Decimal Numbers with JavaScript .....	<b>Error! Bookmark not defined.</b>

- 1.23. Multiply Two Decimals with JavaScript ..... **Error! Bookmark not defined.**
- 1.24. Divide One Decimal by Another with JavaScript **Error! Bookmark not defined.**
- 1.25. Finding a Remainder in JavaScript ..... **Error! Bookmark not defined.**
- 1.26. Compound Assignment With Augmented Addition **Error! Bookmark not defined.**
- 1.27. Compound Assignment With Augmented Subtraction **Error! Bookmark not defined.**
- 1.28. Compound Assignment With Augmented Multiplication **Error! Bookmark not defined.**
- 1.29. Compound Assignment With Augmented Division **Error! Bookmark not defined.**
- 1.30. Escaping Literal Quotes in Strings ..... **Error! Bookmark not defined.**
- 1.31. Quoting Strings with Single Quotes ..... **Error! Bookmark not defined.**
- 1.32. Escape Sequences in Strings ..... **Error! Bookmark not defined.**
- 1.33. Concatenating Strings with Plus Operator ..... **Error! Bookmark not defined.**
- 1.34. Concatenating Strings with the Plus Equals Operator **Error! Bookmark not defined.**
- 1.35. Constructing Strings with Variables ..... **Error! Bookmark not defined.**
- 1.36. Appending Variables to Strings ..... **Error! Bookmark not defined.**
- 1.37. Find the Length of a String ..... **Error! Bookmark not defined.**
- 1.38. Use Bracket Notation to Find the First Character in a String **Error! Bookmark not defined.**
- 1.39. Understand String Immutability ..... **Error! Bookmark not defined.**
- 1.40. Use Bracket Notation to Find the Nth Character in a String **Error! Bookmark not defined.**
- 1.41. Use Bracket Notation to Find the Last Character in a String **Error! Bookmark not defined.**
- 1.42. Use Bracket Notation to Find the Nth-to-Last Character in a String **Error! Bookmark not defined.**
- 1.43. Word Blanks ..... **Error! Bookmark not defined.**
- 1.44. Store Multiple Values in one Variable using JavaScript Arrays **Error! Bookmark not defined.**
- 1.45. Nest one Array within Another Array ..... **Error! Bookmark not defined.**
- 1.46. Access Array Data with Indexes ..... **Error! Bookmark not defined.**

- 1.47. Modify Array Data With Indexes ..... **Error! Bookmark not defined.**
- 1.48. Access Multi-Dimensional Arrays With Indexes **Error! Bookmark not defined.**
- 1.49. Manipulate Arrays With push Method ..... **Error! Bookmark not defined.**
- 1.50. Manipulate Arrays With pop Method ..... **Error! Bookmark not defined.**
- 1.51. Manipulate Arrays With shift Method ..... **Error! Bookmark not defined.**
- 1.52. Manipulate Arrays With unshift Method ..... **Error! Bookmark not defined.**
- 1.53. Shopping List ..... **Error! Bookmark not defined.**
- 1.54. Write Reusable JavaScript with Functions .... **Error! Bookmark not defined.**
- 1.55. Passing Values to Functions with Arguments **Error! Bookmark not defined.**
- 1.56. Return a Value from a Function with Return. **Error! Bookmark not defined.**
- 1.57. Global Scope and Functions ..... **Error! Bookmark not defined.**
- 1.58. Local Scope and Functions ..... **Error! Bookmark not defined.**
- 1.59. Global vs. Local Scope in Functions ..... **Error! Bookmark not defined.**
- 1.60. Understanding Undefined Value returned from a Function **Error! Bookmark not defined.**
- 1.61. Assignment with a Returned Value ..... **Error! Bookmark not defined.**
- 1.62. Stand in Line ..... **Error! Bookmark not defined.**
- 1.63. Understanding Boolean Values ..... **Error! Bookmark not defined.**
- 1.64. Use Conditional Logic with If Statements.... **Error! Bookmark not defined.**
- 1.65. Comparison with the Equality Operator ..... **Error! Bookmark not defined.**
- 1.66. Comparison with the Strict Equality Operator **Error! Bookmark not defined.**
- 1.67. Practice comparing different values ..... **Error! Bookmark not defined.**
- 1.68. Comparison with the Inequality Operator ..... **Error! Bookmark not defined.**
- 1.69. Comparison with the Strict Inequality Operator **Error! Bookmark not defined.**
- 1.70. Comparison with the Greater Than Operator **Error! Bookmark not defined.**
- 1.71. Comparison with the Greater Than Or Equal To Operator **Error! Bookmark not defined.**
- 1.72. Comparison with the Less Than Operator ..... **Error! Bookmark not defined.**

- 1.73. Comparison with the Less Than Or Equal To Operator**Error! Bookmark not defined.**
- 1.74. Comparisons with the Logical And Operator **Error! Bookmark not defined.**
- 1.75. Comparisons with the Logical Or Operator... **Error! Bookmark not defined.**
- 1.76. Introducing Else Statements ..... **Error! Bookmark not defined.**
- 1.77. Introducing Else If Statements..... **Error! Bookmark not defined.**
- 1.78. Logical Order in If Else Statements..... **Error! Bookmark not defined.**
- 1.79. Chaining If Else Statements..... **Error! Bookmark not defined.**
- 1.80. Golf Code..... **Error! Bookmark not defined.**
- 1.81. Selecting from Many Options with Switch Statements**Error! Bookmark not defined.**
- 1.82. Adding a Default Option in Switch Statements**Error! Bookmark not defined.**
- 1.83. Multiple Identical Options in Switch Statements**Error! Bookmark not defined.**
- 1.84. Replacing If Else Chains with Switch ..... **Error! Bookmark not defined.**
- 1.85. Returning Boolean Values from Functions.... **Error! Bookmark not defined.**
- 1.86. Return Early Pattern for Functions ..... **Error! Bookmark not defined.**
- 1.87. Counting Cards ..... **Error! Bookmark not defined.**
- 1.88. Build JavaScript Objects..... **Error! Bookmark not defined.**
- 1.89. Accessing Object Properties with Dot Notation**Error! Bookmark not defined.**
- 1.90. Accessing Object Properties with Bracket Notation**Error! Bookmark not defined.**
- 1.91. Accessing Object Properties with Variables.. **Error! Bookmark not defined.**
- 1.92. Updating Object Properties..... **Error! Bookmark not defined.**
- 1.93. Add New Properties to a JavaScript Object... **Error! Bookmark not defined.**
- 1.94. Delete Properties from a JavaScript Object... **Error! Bookmark not defined.**
- 1.95. Using Objects for Lookups ..... **Error! Bookmark not defined.**
- 1.96. Testing Objects for Properties ..... **Error! Bookmark not defined.**
- 1.97. Manipulating Complex Objects ..... **Error! Bookmark not defined.**
- 1.98. Accessing Nested Objects..... **Error! Bookmark not defined.**

- 1.99. Accessing Nested Arrays ..... **Error! Bookmark not defined.**
- 1.100. Record Collection ..... **Error! Bookmark not defined.**
- 1.101. Iterate with JavaScript While Loops..... **Error! Bookmark not defined.**
- 1.102. Iterate with JavaScript For Loops ..... **Error! Bookmark not defined.**
- 1.103. Iterate Odd Numbers With a For Loop ..... **Error! Bookmark not defined.**
- 1.104. Count Backwards With a For Loop ..... **Error! Bookmark not defined.**
- 1.105. Iterate Through an Array with a For Loop .. **Error! Bookmark not defined.**
- 1.106. Nesting For Loops ..... **Error! Bookmark not defined.**
- 1.107. Iterate with JavaScript Do...While Loops.... **Error! Bookmark not defined.**
- 1.108. Replace Loops using Recursion..... **Error! Bookmark not defined.**
- 1.109. Profile Lookup ..... **Error! Bookmark not defined.**
- 1.110. Generate Random Fractions with JavaScript **Error! Bookmark not defined.**
- 1.111. Generate Random Whole Numbers with JavaScript **Error! Bookmark not defined.**
- 1.112. Generate Random Whole Numbers within a Range **Error! Bookmark not defined.**
- 1.113. Use the parseInt Function ..... **Error! Bookmark not defined.**
- 1.114. Use the parseInt Function with a Radix..... **Error! Bookmark not defined.**
- 1.115. Use the Conditional (Ternary) Operator ..... **Error! Bookmark not defined.**
- 1.116. Use Multiple Conditional (Ternary) Operators **Error! Bookmark not defined.**
- 1.117. Use Recursion to Create a Countdown ..... **Error! Bookmark not defined.**
- 1.118. Use Recursion to Create a Range of Numbers **Error! Bookmark not defined.**
- 2. ECMAScript 6 ..... **Error! Bookmark not defined.**
  - 2.1. Compare Scopes of the var and let Keywords. **Error! Bookmark not defined.**
  - 2.2. Mutate an Array Declared with const ..... **Error! Bookmark not defined.**
  - 2.3. Prevent Object Mutation ..... **Error! Bookmark not defined.**
  - 2.4. Use Arrow Functions to Write Concise Anonymous Functions **Error! Bookmark not defined.**

- 2.5. Write Arrow Functions with Parameters ..... **Error! Bookmark not defined.**
- 2.6. Set Default Parameters for Your Functions..... **Error! Bookmark not defined.**
- 2.7. Use the Rest Parameter with Function Parameters**Error! Bookmark not defined.**
- 2.8. Use the Spread Operator to Evaluate Arrays In-Place**Error! Bookmark not defined.**
- 2.9. Use Destructuring Assignment to Extract Values from Objects**Error! Bookmark not defined.**
- 2.10. Use Destructuring Assignment to Assign Variables from Objects**Error! Bookmark not defined.**
- 2.11. Use Destructuring Assignment to Assign Variables from Nested Objects**Error! Bookmark not defined.**
- 2.12. Use Destructuring Assignment to Assign Variables from Arrays**Error! Bookmark not defined.**
- 2.13. Destructuring via rest elements..... **Error! Bookmark not defined.**
- 2.14. Use Destructuring Assignment to Pass an Object as a Function's Parameters**Error! Bookmark not defined.**
- 2.15. Create Strings using Template Literals..... **Error! Bookmark not defined.**
- 2.16. Write Concise Object Literal Declarations Using Object Property Shorthand**Error! Bookmark not defined.**
- 2.17. Write Concise Declarative Functions with ES6**Error! Bookmark not defined.**
- 2.18. Use class Syntax to Define a Constructor Function**Error! Bookmark not defined.**
- 2.19. Use getters and setters to Control Access to an Object**Error! Bookmark not defined.**
- 2.20. Create a Module Script ..... **Error! Bookmark not defined.**
- 2.21. Use export to Share a Code Block ..... **Error! Bookmark not defined.**
- 2.22. Reuse JavaScript Code Using import ..... **Error! Bookmark not defined.**
- 2.23. Use \* to Import Everything from a File..... **Error! Bookmark not defined.**
- 2.24. Create an Export Fallback with export default**Error! Bookmark not defined.**
- 2.25. Import a Default Export..... **Error! Bookmark not defined.**
- 2.26. Create a JavaScript Promise ..... **Error! Bookmark not defined.**

- 2.27. Complete a Promise with resolve and reject.. **Error! Bookmark not defined.**
- 2.28. Handle a Fulfilled Promise with then ..... **Error! Bookmark not defined.**
- 2.29. Handle a Rejected Promise with catch..... **Error! Bookmark not defined.**
- 3. Regular Expressions..... **Error! Bookmark not defined.**
  - 3.1. Using the Test Method..... **Error! Bookmark not defined.**
  - 3.2. Match Literal Strings ..... **Error! Bookmark not defined.**
  - 3.3. Match a Literal String with Different Possibilities**Error! Bookmark not defined.**
  - 3.4. Ignore Case While Matching ..... **Error! Bookmark not defined.**
  - 3.5. Extract Matches ..... **Error! Bookmark not defined.**
  - 3.6. Find More Than the First Match..... **Error! Bookmark not defined.**
  - 3.7. Match Anything with Wildcard Period..... **Error! Bookmark not defined.**
  - 3.8. Match Single Character with Multiple Possibilities**Error! Bookmark not defined.**
  - 3.9. Match Letters of the Alphabet ..... **Error! Bookmark not defined.**
  - 3.10. Match Numbers and Letters of the Alphabet. **Error! Bookmark not defined.**
  - 3.11. Match Single Characters Not Specified..... **Error! Bookmark not defined.**
  - 3.12. Match Characters that Occur One or More Times**Error! Bookmark not defined.**
  - 3.13. Match Characters that Occur Zero or More Times**Error! Bookmark not defined.**
  - 3.14. Find Characters with Lazy Matching..... **Error! Bookmark not defined.**
  - 3.15. Find One or More Criminals in a Hunt..... **Error! Bookmark not defined.**
  - 3.16. Match Beginning String Patterns..... **Error! Bookmark not defined.**
  - 3.17. Match Ending String Patterns ..... **Error! Bookmark not defined.**
  - 3.18. Match All Letters and Numbers..... **Error! Bookmark not defined.**
  - 3.19. Match Everything But Letters and Numbers . **Error! Bookmark not defined.**
  - 3.20. Match All Numbers ..... **Error! Bookmark not defined.**
  - 3.21. Match All Non-Numbers ..... **Error! Bookmark not defined.**
  - 3.22. Restrict Possible Usernames..... **Error! Bookmark not defined.**

- 3.23. Match Whitespace..... **Error! Bookmark not defined.**
- 3.24. Match Non-Whitespace Characters ..... **Error! Bookmark not defined.**
- 3.25. Specify Upper and Lower Number of Matches**Error! Bookmark not defined.**
- 3.26. Specify Only the Lower Number of Matches **Error! Bookmark not defined.**
- 3.27. Specify Exact Number of Matches ..... **Error! Bookmark not defined.**
- 3.28. Check for All or None ..... **Error! Bookmark not defined.**
- 3.29. Positive and Negative Lookahead..... **Error! Bookmark not defined.**
- 3.30. Check For Mixed Grouping of Characters .... **Error! Bookmark not defined.**
- 3.31. Reuse Patterns Using Capture Groups..... **Error! Bookmark not defined.**
- 3.32. Use Capture Groups to Search and Replace .. **Error! Bookmark not defined.**
- 3.33. Remove Whitespace from Start and End..... **Error! Bookmark not defined.**
- 4. Debugging..... **Error! Bookmark not defined.**
  - 4.1. Use the JavaScript Console to Check the Value of a Variable**Error! Bookmark not defined.**
  - 4.2. Use typeof to Check the Type of a Variable.... **Error! Bookmark not defined.**
  - 4.3. Use typeof to Check the Type of a Variable.... **Error! Bookmark not defined.**
  - 4.4. Catch Misspelled Variable and Function Names**Error! Bookmark not defined.**
  - 4.5. Catch Unclosed Parentheses, Brackets, Braces and Quotes**Error! Bookmark not defined.**
  - 4.6. Catch Mixed Usage of Single and Double Quotes**Error! Bookmark not defined.**
  - 4.7. Catch Use of Assignment Operator Instead of Equality Operator**Error! Bookmark not defined.**
  - 4.8. Catch Missing Open and Closing Parenthesis After a Function Call**Error! Bookmark not defined.**
  - 4.9. Catch Arguments Passed in the Wrong Order When Calling a Function**Error! Bookmark not defined.**
  - 4.10. Catch Off By One Errors When Using Indexing**Error! Bookmark not defined.**
  - 4.11. Use Caution When Reinitializing Variables Inside a Loop**Error! Bookmark not defined.**
  - 4.12. Prevent Infinite Loops with a Valid Terminal Condition**Error! Bookmark not defined.**

- 5. Basic Data Structures ..... **Error! Bookmark not defined.**
- 5.1. Use an Array to Store a Collection of Data ..... **Error! Bookmark not defined.**
- 5.2. Access an Array's Contents Using Bracket Notation**Error! Bookmark not defined.**
- 5.3. Add Items to an Array with push() and unshift()**Error! Bookmark not defined.**
- 5.4. Remove Items from an Array with pop() and shift()**Error! Bookmark not defined.**
- 5.5. Remove Items Using splice()**Error! Bookmark not defined.**
- 5.6. Add Items Using splice()**Error! Bookmark not defined.**
- 5.7. Copy Array Items Using slice()**Error! Bookmark not defined.**
- 5.8. Copy an Array with the Spread Operator ..... **Error! Bookmark not defined.**
- 5.9. Combine Arrays with the Spread Operator..... **Error! Bookmark not defined.**
- 5.10. Check For The Presence of an Element With indexOf()**Error! Bookmark not defined.**
- 5.11. Iterate Through All an Array's Items Using For Loops**Error! Bookmark not defined.**
- 5.12. Create complex multi-dimensional arrays ..... **Error! Bookmark not defined.**
- 5.13. Add Key-Value Pairs to JavaScript Objects .. **Error! Bookmark not defined.**
- 5.14. Modify an Object Nested Within an Object .. **Error! Bookmark not defined.**
- 5.15. Access Property Names with Bracket Notation**Error! Bookmark not defined.**
- 5.16. Use the delete Keyword to Remove Object Properties**Error! Bookmark not defined.**
- 5.17. Check if an Object has a Property ..... **Error! Bookmark not defined.**
- 5.18. Iterate Through the Keys of an Object with a for...in Statement**Error! Bookmark not defined.**
- 5.19. Generate an Array of All Object Keys with Object.keys()**Error! Bookmark not defined.**
- 5.20. Modify an Array Stored in an Object ..... **Error! Bookmark not defined.**
- 6. Basic Algorithm Scripting ..... **Error! Bookmark not defined.**
- 6.1. Convert Celsius to Fahrenheit..... **Error! Bookmark not defined.**
- 6.2. Reverse a String ..... **Error! Bookmark not defined.**
- 6.3. Factorialize a Number..... **Error! Bookmark not defined.**

- 6.4. Find the Longest Word in a String..... **Error! Bookmark not defined.**
- 6.5. Return Largest Numbers in Arrays ..... **Error! Bookmark not defined.**
- 6.6. Confirm the Ending ..... **Error! Bookmark not defined.**
- 6.7. Repeat a String Repeat a String ..... **Error! Bookmark not defined.**
- 6.8. Truncate a String..... **Error! Bookmark not defined.**
- 6.9. Finders Keepers ..... **Error! Bookmark not defined.**
- 6.10. Boo who..... **Error! Bookmark not defined.**
- 6.11. Title Case a Sentence ..... **Error! Bookmark not defined.**
- 6.12. Slice and Splice..... **Error! Bookmark not defined.**
- 6.13. Falsy Bouncer ..... **Error! Bookmark not defined.**
- 6.14. Where do I Belong..... **Error! Bookmark not defined.**
- 6.15. Mutations ..... **Error! Bookmark not defined.**
- 6.16. Chunky Monkey ..... **Error! Bookmark not defined.**
- 7. Object Oriented Programming..... **Error! Bookmark not defined.**
  - 7.1. Create a Basic JavaScript Object..... **Error! Bookmark not defined.**
  - 7.2. Use Dot Notation to Access the Properties of an Object**Error! Bookmark not defined.**
  - 7.3. Create a Method on an Object ..... **Error! Bookmark not defined.**
  - 7.4. Make Code More Reusable with the this Keyword**Error! Bookmark not defined.**
  - 7.5. Define a Constructor Function..... **Error! Bookmark not defined.**
  - 7.6. Use a Constructor to Create Objects..... **Error! Bookmark not defined.**
  - 7.7. Extend Constructors to Receive Arguments .... **Error! Bookmark not defined.**
  - 7.8. Verify an Object's Constructor with instanceof**Error! Bookmark not defined.**
  - 7.9. Understand Own Properties ..... **Error! Bookmark not defined.**
  - 7.10. Use Prototype Properties to Reduce Duplicate Code**Error! Bookmark not defined.**
  - 7.11. Iterate Over All Properties ..... **Error! Bookmark not defined.**
  - 7.12. Understand the Constructor Property ..... **Error! Bookmark not defined.**

- 7.13. Change the Prototype to a New Object.....**Error! Bookmark not defined.**
- 7.14. Remember to Set the Constructor Property when Changing the Prototype**Error! Bookmark not defined.**
- 7.15. Understand Where an Object's Prototype Comes From**Error! Bookmark not defined.**
- 7.16. Understand the Prototype Chain.....**Error! Bookmark not defined.**
- 7.17. Use Inheritance So You Don't Repeat Yourself**Error! Bookmark not defined.**
- 7.18. Inherit Behaviors from a Supertype.....**Error! Bookmark not defined.**
- 7.19. Set the Child's Prototype to an Instance of the Parent**Error! Bookmark not defined.**
- 7.20. Reset an Inherited Constructor Property.....**Error! Bookmark not defined.**
- 7.21. Add Methods After Inheritance .....**Error! Bookmark not defined.**
- 7.22. Override Inherited Methods.....**Error! Bookmark not defined.**
- 7.23. Use a Mixin to Add Common Behavior Between Unrelated Objects**Error! Bookmark not defined.**
- 7.24. Use Closure to Protect Properties Within an Object from Being Modified Externally **Error! Bookmark not defined.**
- 7.25. Understand the Immediately Invoked Function Expression (IIFE)**Error! Bookmark not defined.**
- 7.26. Use an IIFE to Create a Module .....**Error! Bookmark not defined.**

- 8. Functional Programming .....**Error! Bookmark not defined.**
  - 8.1. Learn About Functional Programming .....**Error! Bookmark not defined.**
  - 8.2. Understand Functional Programming Terminology**Error! Bookmark not defined.**
  - 8.3. Understand the Hazards of Using Imperative Code**Error! Bookmark not defined.**
  - 8.4. Avoid Mutations and Side Effects Using Functional Programming**Error! Bookmark not defined.**
  - 8.5. Pass Arguments to Avoid External Dependence in a Function**Error! Bookmark not defined.**
  - 8.6. Refactor Global Variables Out of Functions ...**Error! Bookmark not defined.**
  - 8.7. Use the map Method to Extract Data from an Array**Error! Bookmark not defined.**
  - 8.8. Implement map on a Prototype .....**Error! Bookmark not defined.**

8.9. Use the filter Method to Extract Data from an Array**Error! Bookmark not defined.**

8.10. Implement the filter Method on a Prototype.. **Error! Bookmark not defined.**

8.11. Return Part of an Array Using the slice Method**Error! Bookmark not defined.**

8.12. Remove Elements from an Array Using slice Instead of splice**Error! Bookmark not defined.**

8.13. Combine Two Arrays Using the concat Method**Error! Bookmark not defined.**

8.14. Add Elements to the End of an Array Using concat Instead of push**Error! Bookmark not defined.**

8.15. Use the reduce Method to Analyze Data ..... **Error! Bookmark not defined.**

8.16. Use Higher-Order Functions map, filter, or reduce to Solve a Complex Problem **Error! Bookmark not defined.**

8.17. Sort an Array Alphabetically using the sort Method**Error! Bookmark not defined.**

8.18. Return a Sorted Array Without Changing the Original Array**Error! Bookmark not defined.**

8.19. Split a String into an Array Using the split Method**Error! Bookmark not defined.**

8.20. Combine an Array into a String Using the join Method**Error! Bookmark not defined.**

8.21. Apply Functional Programming to Convert Strings to URL Slugs**Error! Bookmark not defined.**

8.22. Use the every Method to Check that Every Element in an Array Meets a Criteria **Error! Bookmark not defined.**

8.23. Use the some Method to Check that Any Elements in an Array Meet a Criteria **Error! Bookmark not defined.**

8.24. Introduction to Currying and Partial Application**Error! Bookmark not defined.**

9. Intermediate Algorithm Scripting ..... **Error! Bookmark not defined.**

9.1. Sum All Numbers in a Range ..... **Error! Bookmark not defined.**

9.2. Diff Two Arrays..... **Error! Bookmark not defined.**

9.3. Seek and Destroy ..... **Error! Bookmark not defined.**

9.4. Wherefore art thou..... **Error! Bookmark not defined.**

9.5 Spinal Tap Case ..... **Error! Bookmark not defined.**

- 9.6. Pig Latin..... **Error! Bookmark not defined.**
- 9.7. Search and Replace..... **Error! Bookmark not defined.**
- 9.8. DNA Pairing ..... **Error! Bookmark not defined.**
- 9.9. Missing letters..... **Error! Bookmark not defined.**
- 9.10. Sorted Union..... **Error! Bookmark not defined.**
- 9.11. Convert HTML Entities ..... **Error! Bookmark not defined.**
- 9.12. Sum All Odd Fibonacci Numbers..... **Error! Bookmark not defined.**
- 9.13. Sum All Primes..... **Error! Bookmark not defined.**
- 9.14. Smallest Common Multiple ..... **Error! Bookmark not defined.**
- 9.15. Drop it..... **Error! Bookmark not defined.**
- 9.16. Steamroller..... **Error! Bookmark not defined.**
- 9.17. Binary Agents ..... **Error! Bookmark not defined.**
- 9.18. Everything Be True..... **Error! Bookmark not defined.**
- 9.19. Arguments Optional..... **Error! Bookmark not defined.**
- 9.20. Make a Person..... **Error! Bookmark not defined.**
- 9.21. Map the Debris..... **Error! Bookmark not defined.**
- 10. JavaScript Projects ..... **Error! Bookmark not defined.**
  - 10.1 Palindrome Checker..... **Error! Bookmark not defined.**
  - 10.2. Roman Numeral Converter..... **Error! Bookmark not defined.**
  - 10.3. Caesars Cipher ..... **Error! Bookmark not defined.**
  - 10.4. Telephone Number Validator ..... **Error! Bookmark not defined.**
  - 10.5. Cash Register ..... **Error! Bookmark not defined.**
  - 10.6. Coding Interview Preparation ..... **Error! Bookmark not defined.**
  - 10.7. How to Get Further Help ..... **Error! Bookmark not defined.**



## How to Learn HTML5, CSS & JavaScript Well

I know there are more than sufficient resources online to teach absolute beginners everything they need to learn web development from scratch. But this book is different because it addresses a few web development problems. The credibility of a web developer is much more than their credentials. It's actually about the strength of their portfolio.

[Employment opportunities](http://www.turing.com/jobs) ([www.turing.com/jobs](http://www.turing.com/jobs)) often come from work samples and concrete skills, rather than a college degree. So, you need to learn well enough. This book will not only help you learn well and build a stunning portfolio, it will also provide you continuous help and support.

With this book and my **dedicated 24/7 help and support team**, there's nothing for you to fear. I have helped many web developers update their development skills, launch successful careers and get hired for [remote jobs](https://vanhack.com/jobs) (<https://vanhack.com/jobs>). I notice that even the most ambitious beginners can run into problems, such as unable to decide where to begin. Sometimes they get completely lost on the way and therefore need further help.

The truth is everyone needs help at one point or the other to learn html5, CSS or JavaScript correctly in their web development journey. I put sufficient coding challenges, hints and solutions in volumes 1, 2 and 3 of the series. In this volume, you will get **practice projects in this book to test your skills. You will also get further help if you use the free support link at the bottom of this book. I will help you learn well.**

Finally, if you buy this book, I will add you to my web development community so you can continue to learn and get more help until you become a well-paid professional.

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# 1. Basic JavaScript

## 1.0. Getting Started

This book is volume 3 of *Web Development from Beginner to Paid Professional*. In this volume, you'll learn 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 this volume, 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)**.

The great thing about web development is it's very suitable for people coming from many different backgrounds. So, it doesn't matter if you have little or no technical experience, or if you do have a technical background and you're looking to transition your skill sets into web development.

For the lessons in the subsequent sections, you will need to create a few files and open them in Visual Studio. How to install and use Visual Studio was explained in Book 1 of the series. If you don't already have them, I highly recommend you download and install Visual Studio editor (<https://code.visualstudio.com/download>) and Google Chrome browser (<https://www.google.com/chrome/>) right now to get started. They are very easy to install, and they have a bunch of developer tools pre-installed.

There are tons of videos on YouTube on how to install the latest versions of Visual Studio ([www.youtube.com/watch?v=m9mIwKeTJhk](https://www.youtube.com/watch?v=m9mIwKeTJhk)) and Chrome browser ([www.youtube.com/watch?v=ThQAkabE0J8](https://www.youtube.com/watch?v=ThQAkabE0J8)).

Alternatively, with W3schools' online JavaScript editor ([www.w3schools.com/js/tryit.asp?filename=tryjs\\_editor](https://www.w3schools.com/js/tryit.asp?filename=tryjs_editor)), you can edit HTML, CSS and JavaScript code, and view the result in your browser.

Below are the six simple steps you should follow to create a new folder in your portfolio and open it in Visual Studio:

1. Create a new folder and name it **JS\_Course**, similar to the folder you created in volume 2 of the series.
2. In visual Studio, click the **File** menu at the top and select **Open Folder...**.
3. Navigate to the location where you saved your folder and select it.

4. Select this folder to load/open it on your **Visual Studio** explorer.
5. Close the *Get Started* tab.
6. Get ready to start coding.

Practice **exercises** (shown in color) are provided near the end of every section of this book. Each exercise is immediately followed by one or more **hints** that point to the correct results on your browser when you run your codes.

**Note:** Some browser extensions, such as ad-blockers and script-blockers can interfere with the codes. If you face issues, I recommend taking the following steps to disable extensions that modify or block the content of your pages while taking the course.

#### **Google Chrome:**

1. Open Chrome and click on the three-dot menu icon in the top-right corner.
2. Hover over "More tools" in the dropdown menu.
3. Select "Extensions" to open the Extensions page.
4. Disable the extensions that you suspect are causing issues by toggling the switch next to each extension.

#### **Mozilla Firefox:**

1. Open Firefox and click on the three-line menu icon in the top-right corner.
2. Select "Add-ons" to open the Add-ons Manager.
3. In the left sidebar, click on "Extensions."
4. Disable the extensions that may be causing problems by clicking the toggle switch next to each extension.

#### **Microsoft Edge:**

1. Open Edge and click on the three-dot menu icon in the top-right corner.
2. Select "Extensions" to open the Extensions page.
3. Disable the extensions causing issues by toggling the switch next to each extension.

## **1.1. JavaScript Fundamental**

JavaScript (JS) 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.

The name "JavaScript" was chosen by Netscape, the company that originally developed the language, to leverage the popularity of Java at the time. However, it's important to note that despite the similar name, JavaScript and Java are distinct and unrelated programming languages.

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 so much more.

This book in particular identifies the three main pillars around which the JavaScript language is organized: scope/closures, prototypes/objects, and types/coercion. JavaScript is a broad and sophisticated language, with many features and capabilities. But all of it is founded on these three mentioned foundational pillars.

## 1.2. Comment Your JavaScript Code

Comments are lines of code that JavaScript will intentionally ignore. Comments are a great way to leave notes to yourself and to other people who will later need to figure out what that code does. There are two ways to write comments in JavaScript:

Using `//` will tell JavaScript to ignore the remainder of the text on the current line. This is an in-line comment:

```
1 // This is an in-line comment.
```

You can make a multi-line comment beginning with `/*` and ending with `*/`. This is a multi-line comment:

```
1 /* This is a
2 multi-line comment */
```

**NOTE:** As you write code, you should regularly add comments to clarify the function of parts of your code. Good commenting can help communicate the intent of your code—both for others *and* for your future self. Try creating one of each type of comment.

Line numbers like 1, 2, 3 are not included in the codes in this book. When you copy JS code from this book and paste it in your IDE, or as you write the code directly in your chosen IDE (such as **Visual Studio**), line numbers are automatically be added.

## 1.3. Declare JavaScript Variables

In computer science, *data* is anything that is meaningful to the computer. JavaScript provides eight different *data types* which are `undefined`, `null`, `boolean`, `string`, `symbol`, `bigint`, `number`, and `object`.

For example, computers distinguish between numbers, such as the number `12`, and `strings`, such as `"12"`, `"dog"`, or `"123 cats"`, which are collections of characters. Computers can perform mathematical operations on a number, but not on a string.

*Variables* allow computers to store and manipulate data in a dynamic fashion. They do this by using a "label" to point to the data rather than using the data itself. Any of the eight data types may be stored in a variable.

Variables are similar to the x and y variables you use in mathematics, which means they're a simple name to represent the data we want to refer to. Computer variables differ from mathematical variables in that they can store different values at different times.

We tell JavaScript to create or *declare* a variable by putting the keyword `var` in front of it, like so:

```
var ourName;
```

creates a variable called `ourName`. In JavaScript we end statements with semicolons. Variable names can be made up of numbers, letters, and \$ or \_, but may not contain spaces or start with a number.

Use the `var` keyword to create a variable called `myName`.

### Hints

Look at the `ourName` example above if you get stuck.

You should declare `myName` with the `var` keyword, ending with a semicolon

## 1.4. Storing Values with the Assignment Operator

In JavaScript, you can store a value in a variable with the *assignment* operator (=).

```
myVariable = 5;
```

This assigns the `Number` value 5 to `myVariable`.

If there are any calculations to the right of the = operator, those are performed before the value is assigned to the variable on the left of the operator.

```
var myVar;  
myVar = 5;
```

First, this code creates a variable named `myVar`. Then, the code assigns 5 to `myVar`. Now, if `myVar` appears again in the code, the program will treat it as if it is 5.

In the following exercise, assign the value 7 to variable `a`.

```
// Setup  
var a;
```

```
// Only change code below this line
```

## Hints

- You should not change code above the specified comment.
- `a` should have a value of 7.

## 1.5. Assigning the Value of One Variable to Another

After a value is assigned to a variable using the *assignment* operator, you can assign the value of that variable to another variable using the *assignment* operator.

```
var myVar;  
myVar = 5;  
var myNum;  
myNum = myVar;
```

The above declares a `myVar` variable with no value, then assigns it the value 5. Next, a variable named `myNum` is declared with no value. Then, the contents of `myVar` (which is 5) is assigned to the variable `myNum`. Now, `myNum` also has the value of 5.

In the following exercise, assign the contents of `a` to variable `b`.

```
// Setup  
var a;  
a = 7;  
var b;  
  
// Only change code below this line
```

## Hints

- You should not change code above the specified comment.
- `b` should have a value of 7.
- `a` should be assigned to `b` with `=`.

## 1.6. Initializing Variables with the Assignment Operator

It is common to *initialize* a variable to an initial value in the same line as it is declared.

```
var myVar = 0;
```

Creates a new variable called `myVar` and assigns it an initial value of 0.

Define a variable `a` with `var` and initialize it to a value of `9`.

#### Hints

You should initialize `a` to a value of `9`.

### 1.7. Declare String Variables

Previously you used the following code to declare a variable:

```
var myName;
```