LEARNING MADE EASY

2nd Edition

Web Coding & Development

ALL-IN-ONE

for dummies®

A Wiley Brand

7 Books in one!

Paul McFedries

Author of *HTML, CSS, & JavaScript All-in-One For Dummies*

Web Coding & Development

ALL-IN-ONE

2nd Edition

by Paul McFedries

for dummies®
A Wiley Brand

Web Coding & Development All-in-One For Dummies®, 2nd Edition

Published by: **John Wiley & Sons, Inc.,** 111 River Street, Hoboken, NJ 07030-5774, www.wiley.com

Copyright © 2024 by John Wiley & Sons, Inc., Hoboken, New Jersey

Media and software compilation copyright © 2024 by John Wiley & Sons, Inc. All rights reserved.

Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without the prior written permission of the Publisher. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at http://www.wiley.com/go/permissions.

Trademarks: Wiley, For Dummies, the Dummies Man logo, Dummies.com, Making Everything Easier, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and may not be used without written permission. All other trademarks are the property of their respective owners. John Wiley & Sons, Inc. is not associated with any product or vendor mentioned in this book.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: WHILE THE PUBLISHER AND AUTHORS HAVE USED THEIR BEST EFFORTS IN PREPARING THIS WORK, THEY MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES REPRESENTATIVES, WRITTEN SALES MATERIALS OR PROMOTIONAL STATEMENTS FOR THIS WORK. THE FACT THAT AN ORGANIZATION, WEBSITE, OR PRODUCT IS REFERRED TO IN THIS WORK AS A CITATION AND/OR POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE PUBLISHER AND AUTHORS ENDORSE THE INFORMATION OR SERVICES THE ORGANIZATION, WEBSITE, OR PRODUCT MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING PROFESSIONAL SERVICES. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR YOUR SITUATION. YOU SHOULD CONSULT WITH A SPECIALIST WHERE APPROPRIATE. FURTHER, READERS SHOULD BE AWARE THAT WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ. NEITHER THE PUBLISHER NOR AUTHORS SHALL BE LIABLE FOR ANY LOSS OF PROFIT OR ANY OTHER COMMERCIAL DAMAGES, INCLUDING BUT NOT LIMITED TO SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES.

For general information on our other products and services, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002. For technical support, please visit https://hub.wiley.com/community/support/dummies.

Wiley publishes in a variety of print and electronic formats and by print-on-demand. Some material included with standard print versions of this book may not be included in e-books or in print-on-demand. If this book refers to media such as a CD or DVD that is not included in the version you purchased, you may download this material at http://booksupport.wiley.com. For more information about Wiley products, visit www.wiley.com.

Library of Congress Control Number: 2023951076

ISBN 978-1-394-19702-6 (pbk); ISBN 978-1-394-19704-0 (ebk); ISBN 978-1-394-19703-3 (ebk)

Contents at a Glance

Introduction 1

Book 1: Getting Ready to Code for the Web 7

CHAPTER 1: How Web Coding and Development Work 9
CHAPTER 2: Setting Up Your Web Development Home 23
CHAPTER 3: Finding and Setting Up a Web Host 39

Book 2: Coding the Front End, Part 1: HTML and CSS 51

CHAPTER 1: Structuring the Page with HTML 53
CHAPTER 2: Styling the Page with CSS 85
CHAPTER 3: Sizing and Positioning Page Elements 123
CHAPTER 4: Creating the Page Layout 151

Book 3: Coding the Front End, Part 2: JavaScript 181

CHAPTER 1: An Overview of JavaScript 183
CHAPTER 2: Understanding Variables 203
CHAPTER 3: Building Expressions 217
CHAPTER 4: Controlling the Flow of JavaScript 247
CHAPTER 5: Harnessing the Power of Functions 273
CHAPTER 6: Playing with the Document Object Model 305
CHAPTER 7: Building Reactive Pages with Events 339
CHAPTER 8: Working with Arrays 349
CHAPTER 9: Manipulating Strings, Dates, and Numbers 379
CHAPTER 10: Storing User Data in the Browser 413
CHAPTER 11: More JavaScript Goodies 423

Book 4: Coding the Back End: PHP and MySQL 441

CHAPTER 1: Learning PHP Coding Basics 443
CHAPTER 2: Building and Querying MySQL Databases 473
CHAPTER 3: Using PHP to Access MySQL Data 501

Book 5: Debugging Your Code 519

CHAPTER 1: Debugging CSS Code 521
CHAPTER 2: Debugging JavaScript Code 537
CHAPTER 3: Debugging PHP Code 559

Book 6: Coding Dynamic and Static Web Pages 567
CHAPTER 1: Fetching Data with PHP, JavaScript, and JSON 569
CHAPTER 2: Building and Processing Web Forms 595
CHAPTER 3: Validating Form Data 629
CHAPTER 4: Coding Static Web Pages 657

Book 7: Building Web Apps 677
CHAPTER 1: Planning a Web App 679
CHAPTER 2: Making a Web App Responsive 687
CHAPTER 3: Making a Web App Accessible 725
CHAPTER 4: Securing a Web App 747

Index 781

Table of Contents

INTRODUCTION 1
About This Book 2
Foolish Assumptions 3
Icons Used in This Book 4
Beyond the Book 4

BOOK 1: GETTING READY TO CODE FOR THE WEB 7

CHAPTER 1: How Web Coding and Development Work 9
The Nuts and Bolts of Web Coding and Development 10
How the web works 10
How the web works, take two 14
Understanding the Front End: HTML and CSS 14
Adding structure: HTML 16
Adding style: CSS 17
Understanding the Back End: PHP and MySQL 18
Storing data on the server: MySQL 19
Accessing data on the server: PHP 19
How It All Fits Together: JavaScript 19
How Dynamic Web Pages Work 20
What Is a Web App? 21
Understanding the Difference between Web Coding and Web Development 22

CHAPTER 2: Setting Up Your Web Development Home 23
What Is a Local Web Development Environment? 24
Do You Need a Local Web Development Environment? 25
Setting Up the XAMPP for Windows Development Environment 25
Installing XAMPP for Windows 26
Running the XAMPP for Windows Control Panel 29
Accessing your local web server 30
Setting Up the XAMPP for OS X Development Environment 31
Installing XAMPP for OS X 32
Running XAMPP Application Manager 33
Accessing your local web server 34
Choosing Your Text Editor 36

CHAPTER 3: **Finding and Setting Up a Web Host** 39
Understanding Web Hosting Providers 40
Using your existing internet provider 41
Finding a free hosting provider 41
Signing up with a commercial hosting provider 41
A Buyer's Guide to Web Hosting 41
Finding a Web Host 44
Finding Your Way around Your New Web Home 45
Your directory and your web address 46
Making your hard disk mirror your web home 47
Uploading your site files 49
Making changes to your web files 49

BOOK 2: CODING THE FRONT END, PART 1: HTML AND CSS 51

CHAPTER 1: **Structuring the Page with HTML** 53
Getting the Hang of HTML 54
Understanding Tag Attributes 56
Learning the Fundamental Structure of a Web Page 57
Giving your page a title 59
Adding some text 60
Some Notes on Structure versus Style 61
Applying the Basic Text Tags 62
Emphasizing text 62
Marking important text 63
Nesting tags 64
Adding headings 65
Adding quotations 66
Creating Links 66
Linking basics 67
Anchors aweigh: Internal links 68
Building Bulleted and Numbered Lists 70
Making your point with bulleted lists 70
Numbered lists: Easy as one, two, three 72
Inserting Special Characters 73
Inserting Images 74
Carving Up the Page 76
The <header> tag 77
The <nav> tag 78
The <main> tag 79
The <article> tag 79
The <section> tag 80
The <aside> tag 80

The <footer> tag 81
Handling non-semantic content with 82
Handling words and characters with 83
Commenting Your HTML Code 83

CHAPTER 2: **Styling the Page with CSS** 85
Figuring Out Cascading Style Sheets 86
Styles: Bundles of formatting options 86
Sheets: Collections of styles 87
Cascading: How styles propagate 87
Getting the Hang of CSS Rules and Declarations 87
Adding Styles to a Page 89
Inserting inline styles 89
Embedding an internal style sheet 90
Linking to an external style sheet 92
Styling Page Text 94
Setting the type size 94
Getting comfy with CSS measurement units 95
Applying a font family 96
Changing the font weight 97
Styling text with italics 98
Styling links 98
Aligning text horizontally 99
Indenting a paragraph's first line 100
Working with Colors 100
Specifying a color 100
Coloring text 101
Coloring the background 102
Getting to Know the Web Page Family 102
Using CSS Selectors 104
The class selector (.) 104
The id selector (#) 105
The descendant combinator 106
The child combinator (>) 106
The subsequent-sibling combinator (~) 107
The next-sibling combinator (+) 108
A review of some pseudo-classes 108
A few pseudo-elements you need to know 113
Revisiting the Cascade 115
Understanding declaration types 115
Understanding origin types 116
Declaration type, origin type, and weight 116
Figuring out specificity 117
The ultimate tiebreaker: Source code order 120
Putting it all together: The cascade algorithm 121

CHAPTER 3: **Sizing and Positioning Page Elements** 123
Learning about the CSS Box Model 124
Styling Sizes 126
Adding Padding 128
Building Borders 129
Making Margins 131
Resetting the margin 132
Collapsing margins ahead! 132
Getting a Grip on Page Flow 134
Floating Elements 136
Clearing your floats 137
Collapsing containers ahead! 139
Positioning Elements 142
Using relative positioning 143
Giving absolute positioning a whirl 144
Trying out fixed positioning 146
Making elements stick (temporarily) 148

CHAPTER 4: **Creating the Page Layout** 151
What Is Page Layout? 152
Making Flexible Layouts with Flexbox 152
Setting up the flex container 153
Aligning flex items along the primary axis 156
Aligning flex items along the secondary axis 157
Centering an element horizontally and vertically 158
Laying out a navigation bar with Flexbox 160
Allowing flex items to grow 161
Allowing flex items to shrink 164
Laying out content columns with Flexbox 166
Shaping the Overall Page Layout with CSS Grid 170
Setting up the grid container 171
Specifying the grid rows and columns 171
Creating grid gaps 172
Assigning grid items to rows and columns 173
Aligning grid items 176
Laying out content columns with Grid 178

BOOK 3: CODING THE FRONT END, PART 2: JAVASCRIPT 181

CHAPTER 1: **An Overview of JavaScript** 183
JavaScript: Controlling the Machine 184
What Is a Programming Language? 185
Is JavaScript Hard to Learn? 186

What You Can Do with JavaScript 187
What You Can't Do with JavaScript 188
What You Need to Get Started 189
Basic Script Construction 189
The <script> tag 190
Where do you put the <script> tag? 190
Example #1: Displaying a message to the user. 191
Example #2: Writing text to the page 192
A Quick Introduction to the Console 194
Dealing with a Couple of Exceptional Cases 195
Handling browsers with JavaScript turned off. 195
Handling very old browsers 197
Adding Comments to Your Code. 198
Creating External JavaScript Files 199

CHAPTER 2: **Understanding Variables** 203
Understanding Variables 204
Declaring a variable with let. 204
Storing a value in a variable 205
Declaring a variable another way: const 206
Using variables in statements 207
Naming Variables: Rules and Best Practices 208
Rules for naming variables. 208
Ideas for good variable names 209
Understanding Literal Data Types 210
Working with numeric literals 210
Working with string literals 212
Working with Boolean literals 214
JavaScript Reserved Words 214
JavaScript Keywords 215

CHAPTER 3: **Building Expressions** 217
Understanding Expression Structure 218
Building Numeric Expressions. 219
A quick look at the arithmetic operators 219
Using the addition (+) operator 220
Using the increment (++) operator 220
Using the subtraction and negation (-) operators 222
Using the decrement (--) operator 223
Using the multiplication (*) operator 224
Using the division (/) operator 224
Using the modulus (%) operator 225
Using the arithmetic assignment operators 226

Building String Expressions 227
Building Comparison Expressions 229
The comparison operators. 229
Using the equality (==) operator 230
Using the inequality (!=) operator 231
Using the greater than (>) operator 231
Using the less than (<) operator 231
Using the greater than or equal (>=) operator 232
Using the less than or equal (<=) operator 232
The comparison operators and data conversion 233
Using the strict equality (===) operator 234
Using the strict inequality (!==) operator 235
Using strings in comparison expressions 235
Using the ternary (?:) operator 236
Building Logical Expressions 237
The logical operators 237
Using the AND (&&) operator 238
Using the OR (||) operator. 239
Using the NOT (!) Operator 239
Advanced notes on the && and || operators. 240
Understanding Operator Precedence 242
The order of precedence 242
Controlling the order of precedence 244

CHAPTER 4: **Controlling the Flow of JavaScript** 247
Making True/False Decisions with if Statements 248
Branching with if. . .else Statements 250
Making Multiple Decisions 251
Using the AND (&&) and OR (||) operators 252
Stringing together multiple if statements 252
Using the switch statement 253
Understanding Code Looping 256
Using while Loops 257
Using for Loops 259
Using do. . .while Loops 265
Controlling Loop Execution 267
Exiting a loop using the break statement 267
Bypassing loop statements using the continue statement 270
Avoiding Infinite Loops 271

CHAPTER 5: **Harnessing the Power of Functions** 273
What Is a Function? 274
The Structure of a Function 274
Where Do You Put a Function? 275

Calling a Function 276
Calling a function when the <script> tag is parsed 276
Calling a function after the page is loaded 278
Calling a function in response to an event 279
Passing Values to Functions 280
Passing a single value to a function 281
Passing multiple values to a function 282
Making an argument optional 284
Returning a Value from a Function 285
Getting Your Head around Anonymous Functions 286
Assigning an anonymous function to a variable 287
Replacing a function call with an anonymous function 288
Moving to Arrow Functions 290
Running Functions in the Future 292
Using a timeout to perform a future action once 292
Using an interval to perform a future action repeatedly 294
Understanding Variable Scope 295
Working with block scope 296
Working with function scope 297
Working with global scope 298
Using Recursive Functions 299

CHAPTER 6: **Playing with the Document Object Model** 305
Working with Objects 306
What is an object, anyway? 306
Manipulating object properties 307
Working with object methods 310
Rolling your own objects 311
Introducing the web APIs 314
Getting to Know the Document Object Model 315
Specifying Elements 317
Specifying an element by ID 317
Specifying elements by tag name 318
Specifying elements by class name 318
Specifying elements by selector 319
Working with collections of elements 320
Traversing the DOM 322
Getting the children of a parent element 322
Getting the parent of a child element 326
Getting the siblings of an element 326
Manipulating Elements 328
Adding an element to the page 328
Inserting text or HTML into an element 330
Removing an element 332

Modifying CSS with JavaScript 332
Changing an element's styles 332
Adding a class to an element 333
Tweaking HTML Attributes with JavaScript 336
Reading an attribute value 337
Setting an attribute value 337
Removing an attribute 338

CHAPTER 7: **Building Reactive Pages with Events** 339
What's an Event? 340
Understanding the Event Types 341
Listening for an Event 341
Getting Data about the Event 343
Preventing the Default Event Action 344
Example: The DOMContentLoaded Event 346
Example: The dblclick Event 347

CHAPTER 8: **Working with Arrays** 349
What Is an Array? 350
Declaring an Array 350
Populating an Array with Data 351
Declaring and populating an array at the same time 353
Using a loop to populate an array 354
How Do I Iterate Thee? Let Me Count the Ways 355
Iterating an array: forEach() 356
Iterating an array: for. . .of 358
Iterating to test an array's elements: every() and some() 359
Iterating to create a new array: map() 361
Iterating an array down to a value: reduce() 362
Iterating to locate an element: find() 364
Creating Multidimensional Arrays 366
Manipulating Arrays 367
Working with the length property 367
Concatenating to create an array: concat() 368
Creating a string from an array's elements: join() 369
Removing an array's last element: pop() 370
Adding elements to the end of an array: push() 371
Reversing the order of an array's elements: reverse() 372
Removing an array's first element: shift() 372
Returning a subset of an array: slice() 373
Ordering array elements: sort() 374
Removing, replacing, and inserting elements: splice() 376
Inserting elements at the beginning of an array: unshift() 378

CHAPTER 9: **Manipulating Strings, Dates, and Numbers** 379
Manipulating Text with the String Object 379
Working with string templates 380
Determining the length of a string 382
Searching for substrings 383
Methods that extract substrings 387
Dealing with Dates and Times 396
Arguments used with the Date object 396
Working with the Date object 396
Extracting information about a date 398
Setting the date 402
Performing date calculations 405
Working with Numbers: The Math Object 408
Converting between strings and numbers 409
The Math object's properties and methods 411

CHAPTER 10: **Storing User Data in the Browser** 413
Understanding Web Storage 414
Introducing JSON 414
Learning the JSON syntax 415
Declaring and using JSON variables 416
Converting a JavaScript object to JSON 417
Converting a JSON string to a JavaScript object 418
Adding Data to Web Storage 419
Getting Data from Web Storage 421
Removing Data from Web Storage 422

CHAPTER 11: **More JavaScript Goodies** 423
Expanding Arrays and Objects with the Spread Operator 424
Using the spread operator with an array 424
Using the spread operator with an object 429
Using the spread operator with a string 433
Condensing Arrays with the Rest Parameter 434
Exporting and Importing Code 436
Exporting variables, functions, and other strangers 437
Importing what you've exported 439

BOOK 4: CODING THE BACK END: PHP AND MYSQL 441

CHAPTER 1: **Learning PHP Coding Basics** 443
Understanding How PHP Scripts Work 444
Learning the basic syntax of PHP scripts 445
Declaring PHP variables 446
Building PHP expressions 446

Outputting Text and Tags 447
Adding line breaks 448
Mixing and escaping quotation marks 450
Outputting variables in strings 450
Outputting long strings 451
Outputting really long strings 452
Working with PHP Arrays 453
Declaring arrays 453
Giving associative arrays a look 454
Outputting array values 455
Sorting arrays 456
Looping through array values 458
Creating multidimensional arrays 458
Controlling the Flow of Your PHP Code 459
Making decisions with if() 460
Making decisions with switch() 462
Looping with while() 463
Looping with for() 463
Looping with do. . .while() 464
Working with PHP Functions 465
Passing values to functions 466
Returning a value from a function 466
Working with PHP Objects 467
Rolling your own objects 467
Creating a custom class 467
Adding properties to the class 468
Adding methods to the class 469
Creating an object 470
Working with object properties 470
Working with object methods 471

CHAPTER 2: **Building and Querying MySQL Databases** 473
What Is MySQL? 474
Tables: Containers for your data 474
Queries: Asking questions of your data 475
Introducing phpMyAdmin 476
Importing data into MySQL 477
Backing up MySQL data 479
Creating a MySQL Database and Its Tables 479
Creating a MySQL database 480
Designing your table 480
Creating a MySQL table 484
Adding data to a table 485
Creating a primary key 486

Querying MySQL Data 487
What is SQL? 487
Creating a SELECT query 487
Understanding query criteria 489
Querying multiple tables 492
Adding table data with an INSERT query 497
Modifying table data with an UPDATE query 498
Removing table data with a DELETE query 499

CHAPTER 3: **Using PHP to Access MySQL Data** 501
Understanding the Role of PHP and MySQL in Your Web App 502
Using PHP to Access MySQL Data 503
Parsing the query string 504
Connecting to the MySQL database 506
Creating and running the SELECT query 507
Storing the query results in an array 508
Looping through the query results 510
Incorporating query string values in the query 511
Rendering the data to the browser 512
Creating and Running Insert, Update, and Delete Queries 516
Separating Your MySQL Login Credentials 517

BOOK 5: DEBUGGING YOUR CODE 519

CHAPTER 1: **Debugging CSS Code** 521
Displaying the Web Development Tools 522
Inspecting an Element 523
Inspecting an element's styles 525
Inspecting an element's box model 526
Inspecting an element's computed styles 527
Inspecting an element's layout 528
Editing a Property Value 529
Disabling a Declaration 530
Adding an Inline Declaration to an Element 531
Adding an Element Declaration to the Inspector Stylesheet 532
Adding a Class to an Element 534
Simulating a Pseudo-Class State 535

CHAPTER 2: **Debugging JavaScript Code** 537
Understanding JavaScript's Error Types 538
Syntax errors 538
Runtime errors 538
Logic errors 539
Getting to Know Your Debugging Tools 540

Debugging with the Console Window 542
Displaying the Console window in various browsers 542
Logging data to the Console window 543
Executing code in the Console window 543
Pausing Your Code 544
Entering break mode 544
Exiting break mode 547
Stepping Through Your Code 547
Stepping one statement at a time 547
Stepping into some code 548
Stepping over some code 549
Stepping out of some code 549
Monitoring Script Values 550
Viewing a single variable value 550
Viewing all variable values 551
Adding a watch expression 552
More Debugging Strategies 553
The 10 Most Common JavaScript Errors 554
The 10 Most Common JavaScript Error Messages 556

CHAPTER 3: **Debugging PHP Code** 559
Configuring php.ini for Debugging 560
Accessing the PHP Error Log 561
Outputting Variable Values 562
Debugging with echo statements 563
Debugging with print_r() statements 564
Debugging with var_dump() statements 565

BOOK 6: CODING DYNAMIC AND STATIC WEB PAGES . . . 567

CHAPTER 1: **Fetching Data with PHP, JavaScript, and JSON** 569
Getting Your Head Around Asynchronous Operations 570
Solving synchronous problems with async functions 572
Using await to wait for an asynchronous operation to complete 573
Chaining multiple asynchronous operations 575
Handling asynchronous rejection responses 576
Getting Remote Data Asynchronously with the Fetch API 578
Fetching data with the fetch() method 578
Running a script on the server 578
Updating an element with fetched data 580
Learning more about GET and POST requests 584
Handling form POST requests in PHP 585

Handling object POST requests in PHP 585
Sending and retrieving data 586
Returning Fetch API Data as JSON Text 589
Converting server data to the JSON format 589
Handling JSON data returned by the server 591

CHAPTER 2: **Building and Processing Web Forms** 595
What Is a Web Form? 596
Understanding How Web Forms Work 597
Building an HTML Web Form 598
Setting up the form 598
Adding a form button 599
Looking at the HTMLFormElement Object 600
Taking a Peek at the HTMLInputElement Object 601
Programming Text Fields 601
Referencing text fields by field type 605
Getting a text field value 605
Setting a text field value 606
Coding Check Boxes 607
Referencing check boxes 607
Getting the check box state 608
Setting the check box state 609
Dealing with Radio Buttons 610
Referencing radio buttons 610
Getting a radio button state 611
Setting the radio button state 612
Programming Selection Lists 613
Checking out the HTMLSelectElement object 614
Checking out the HTMLOptionElement object 615
Referencing selection list options 615
Getting the selected list option 616
Changing the selected option 617
Handling and Triggering Form Events 618
Setting the focus 618
Monitoring the focus event 619
Monitoring the blur event 620
Listening for element changes 620
Creating Keyboard Shortcuts for Form Controls 621
Submitting the Form 623
Triggering the submit event 624
Preventing the default form submission 624
Preparing the data for submission 624
Submitting the form data 625

CHAPTER 3: **Validating Form Data** 629
Validating Form Data in the Browser 630
Making a form field mandatory 630
Restricting the length of a text field 631
Setting maximum and minimum values on a numeric field 632
Validating email fields 633
Making field values conform to a pattern 634
Styling invalid fields 636
Validating Form Data on the Server 639
Checking for required fields 640
Validating text data 644
Validating a field based on the data type 645
Validating against a pattern 647
Regular Expressions Reference 648

CHAPTER 4: **Coding Static Web Pages** 657
Static? Dynamic? What Am I Even Talking About? 658
Building Your Own Static Site Generator 659
Using GitHub to Store Your Static Site Files 660
Getting started with GitHub 660
Setting up a GitHub repository for your project 663
Cloning the GitHub repository to your computer 665
Staging, committing, and pushing changes to the repository . . . 668
Forging Your HTML Template File 668
Using PHP to Generate the Static Pages 670
Access the unique page data 670
Building the rest of the static site generator 671
Generating the static files 673
Pushing your files to GitHub 674
Deploying Your Static Website 674

BOOK 7: BUILDING WEB APPS 677

CHAPTER 1: **Planning a Web App** 679
What Is a Web App? 680
Planning Your Web App: The Basics 681
What is my app's functionality? 681
What are my app's data requirements? 682
How will my app work? 683
How many pages will my app require? 684
What will my app's pages look like? 684

CHAPTER 2: **Making a Web App Responsive** 687
Defining a Responsive Layout 688
Going with the Flow: Fluid Layouts 691
How Flexbox makes an app fluid 691
How CSS Grid makes an app fluid 694
Taking advantage of viewport units 697
Making typography fluid 700
Introducing your best fluid friend: clamp() 701
Querying Your Way to Responsiveness: Adaptive Layouts 702
Interrogating the screen with media queries 703
Laying out trees instead of forests with container queries 706
Respecting your visitors with user preference queries 713
Working with Images Responsively 715
Making images responsive 715
Delivering images responsively 716
Exploring the Principles of Mobile-First Development 719
Embracing mobile-first web development 719
Mobile first means content first 720
Pick a testing width that makes sense for your site 721
Get your content to scale with the device 721
Build your CSS the mobile-first way 722
Choose a non-mobile breakpoint that makes sense for your content 722

CHAPTER 3: **Making a Web App Accessible** 725
Why You Need to Make Your Apps Accessible 726
Accessibility is a right 726
Accessibility brings other benefits 727
Understanding Web Accessibility 727
Understanding who needs accessibility 728
Learning about assistive technologies for web surfing 729
Making Your App Structure Accessible 731
Using headings hierarchically 731
Using semantic sectioning elements 732
Making Text Accessible 732
Making Media Accessible 733
Specifying alt text for images 734
Making other media accessible 734
Buffing Up Your App Accessibility Semantics 735
Adding form field labels 736
Understanding ARIA roles, state, and properties 736

Making Your Apps Keyboard-Friendly 742
Adding an element to the tab order 743
Removing an element from the tab order 743
Ensuring Sufficient Color Contrast 744
Validating the Accessibility of an App 745

CHAPTER 4: **Securing a Web App** 747
Web App Security: Nutshell Version 748
Understanding the Dangers 748
SQL injection 748
Cross-site scripting (XSS) 750
Insecure file uploads 751
Unauthorized access 751
Sanitizing Incoming Data 751
Converting incoming data 752
Filtering incoming data 754
Checking the data type of incoming data 757
Whitelisting incoming data 761
Using prepared statements 761
Escaping Outgoing Data 767
Securing File Uploads 768
Securing Passwords 768
Setting Up a Secure Directory Structure 772
Defining PHP constants 773
Including code from another PHP file 774
Understanding PHP Sessions 775
Starting a PHP session 775
Securing a PHP session 776
Creating a Back-End Initialization File 778

INDEX 781

Introduction

When the web first came to the attention of the world's non-geeks back in the mid-1990s, the vastness and variety of its treasures were a wonder to behold. However, it didn't take long before a few courageous and intrepid souls dug a little deeper into this phenomenon and discovered something truly phenomenal: *They* could make web pages, too!

Why was that so amazing? Well, think back to (or, if you're not old enough, *imagine*) those old days and consider, in particular, what it meant to create what we now call *content.* Consider television shows, radio programs, magazines, newspapers, books, and the other media of the time. The one thing they all had in common was that their creation was a decidedly *un*common thing. It required a team of professionals, a massive distribution system, and a lot of money. In short, it wasn't something that your average Okie from Muskogee would have any hope of duplicating.

The web appeared to change all that because learning HTML was within the grasp of all of us who could feed ourselves, it had a built-in massive distribution system (the internet, natch), and it required little or no money. For the first time in history, content was democratized and was no longer defined as the sole province of governments and mega-corporations.

Then reality set in.

People soon realized that merely building a website wasn't enough to attract "eyeballs," as the marketers say. A site had to have interesting, useful, or fun content, or people would stay away in droves. Not only that, but this good content had to be combined with a solid site design, which meant that web designers needed a thorough knowledge of HTML and CSS.

But, alas, eventually even all that was not enough. To make their websites dynamic and interesting, to make their sites easy to navigate, and to give their sites those extra bells and whistles that surfers had come to expect, people needed something more than content, HTML, and CSS.

That missing link was *code*.

What we've all learned the hard way over the past few years is that you simply can't put together a world-class website unless you have some coding prowess in your site design toolkit. You need to know how to program your way out of the basic problems that afflict most sites; how to use scripting to go beyond the inherent limitations of HTML and CSS; and how to use code to send and receive data from a web server. And it isn't enough just to copy the generic scripts available on the web and paste them into your pages. Most of those scripts are poorly written, and they invariably need some customization to work properly on your site.

About This Book

In this book, I give you a complete education on web coding and development. You learn how to set up the tools you need, how to use HTML and CSS to design and build your site, how to use JavaScript to program your pages, and how to use PHP and MySQL to program your web server. I show you that these technologies aren't hard to learn, and that even the greenest rookie programmers can learn how to put together web pages that will amaze their family and friends (and themselves).

If you're looking for lots of programming history, computer science theory, and long-winded explanations of concepts, you won't find them here. My philosophy throughout this book comes from Linus Torvalds, the creator of the Linux operating system: "Talk is cheap. Show me the code." I explain what needs to be explained and then I move on without further ado (or, most of the time, without any ado at all) to examples and scripts that do more to illuminate a concept that any verbose explanations I could muster (and believe me, I can muster verbosity with the best of them).

How you approach this book depends on your current level of web coding expertise (or lack thereof):

- If you're just starting out, begin at the beginning with Book 1 and work at your own pace sequentially through to Books 2 and 3. This approach will give you all the knowledge you need to pick and choose what you want to learn throughout the rest of the book.
- If you know HTML and CSS, you can probably get away with taking a fast look at Book 2 and then settling in with Book 3 and beyond.
- If you've done some JavaScript coding, I suggest working quickly through the material in Book 3, and then digging into the first two chapters of Book 5 to bring your debugging skills up to snuff. You'll then be ready to branch out and explore the rest of the book as you see fit.

- If you're a relatively experienced JavaScript programmer, use Books 3 and 5 as a refresher, and then tackle Book 4 to learn how to code the back end. I have a few tricks in there that you might find interesting. After that, feel free to consider the rest of the book as a kind of coding smorgasbord that you can sample as your web development taste buds dictate.

As I began updating this edition of the book, the world was awash in posts and talk and endless speculation about artificial intelligence, to the point where it seemed we'd soon be welcoming our new AI overlords. That's not likely to happen anytime soon, but AI is here to stay and has already established itself as a significant part of many people's workaday routines.

I've been as enamored of ChatGPT and its ilk as the biggest AI boosters. I use AI for entertainment and curiosity, but I don't use it for work. That is to say, not one word of the text, code, or examples used in this book has been generated by AI. Everything you read here is, for good or ill, the product of my warped-from-birth brain.

Foolish Assumptions

This book is not a primer on the internet or using the World Wide Web. It's a coding and development book, pure and simple, where I assume the following:

- You know how to operate a basic text editor and how to get around the operating system and file system on your computer.
- You have an internet connection.
- You know how to use your web browser.

Yep, that's it.

If you've never done a stitch of computer programming before, even if you're not quite sure what programming really is, don't worry about it for a second because I had you in mind when I wrote this book. For too many years, programming has been the property of hackers and other technowizards. That made some sense because the programming languages they were using — with bizarre names such as C++ and Perl — were exceedingly difficult to learn and even harder to master.

This book's main coding technologies — HTML, CSS, JavaScript, PHP, and MySQL — are different. They're nowhere near as hard to learn as those for-nerds-only languages. I honestly believe that *anyone* can become a savvy and successful

web coder, and this book is, I hope, the proof of that assertion. If you just follow along, examine my code carefully (particularly in the first few chapters), and practice what you learn, you *will* master web coding and development.

What if you've done some programming in the past? For example, you might have dipped a toe or two in the JavaScript waters already, or you might have dabbled with HTML and CSS. Will this book be too basic for you? No, not at all. In this book, I provide you with a ton of truly useful examples that you can customize and incorporate into your own site. The book's first few chapters start slowly to avoid scaring off those new to this programming business. But once you get past the basics, I introduce you to lots of great techniques and tricks that will take your web coding skills to a higher level.

Icons Used in This Book

REMEMBER

This icon points out juicy tidbits that are likely to be repeatedly useful to you — so please don't forget them.

TIP

Think of these icons as the fodder of advice columns. They offer (I hope) wise advice or a bit more information about a topic under discussion.

WARNING

Look out! In this book, you see this icon when I'm trying to help you avoid mistakes that can cost you time, money, or embarrassment.

TECHNICAL STUFF

When you see this icon, you've come across material that isn't critical to understand but will satisfy the curious. Think "inquiring minds want to know" when you see this icon.

Beyond the Book

Some extra content for this book is available on the web. Go online to find the following:

- **The examples used in the book:** You can find these on my website:

  `https://paulmcfedries.com/books/web-coding-dev-aio-fd-2e/`

Alternatively, the examples are also available via the book's GitHub repository:

```
https://github.com/paulmcfe/web-coding-and-dev-fd-2e
```

The examples are organized by book and then by chapter within each book. For each example, you can view the code, copy it to your computer's clipboard, and run the code in the browser.

- **The WebDev Workshop:** To view a few web coding tools and tutorials, as well as try your own code and see instant results, fire up the following site:

```
https://webdevworkshop.io
```

You won't break anything, so feel free to use the site to run some experiments and play around with HTML, CSS, and JavaScript.

1 Getting Ready to Code for the Web

Contents at a Glance

CHAPTER 1: **How Web Coding and Development Work** 9
The Nuts and Bolts of Web Coding and Development 10
Understanding the Front End: HTML and CSS 14
Understanding the Back End: PHP and MySQL. 18
How It All Fits Together: JavaScript 19
How Dynamic Web Pages Work 20
What Is a Web App?. 21
Understanding the Difference between Web Coding and Web Development. 22

CHAPTER 2: **Setting Up Your Web Development Home** 23
What Is a Local Web Development Environment? 24
Do You Need a Local Web Development Environment? 25
Setting Up the XAMPP for Windows Development Environment. 25
Setting Up the XAMPP for OS X Development Environment. 31
Choosing Your Text Editor 36

CHAPTER 3: **Finding and Setting Up a Web Host** 39
Understanding Web Hosting Providers 40
A Buyer's Guide to Web Hosting 41
Finding a Web Host 44
Finding Your Way around Your New Web Home 45