

CONTENTS IN DETAIL

ACKNOWLEDGMENTS	xvii
------------------------	-------------

INTRODUCTION	xix
---------------------	------------

Who Is This Book For?	xx
Why JavaScript?	xx
What Can You Expect to Learn?	xxi
Online Resources	xxii

PART I: THE LANGUAGE	1
-----------------------------	----------

1	
GETTING STARTED	3

Using the JavaScript Console	4
Using a Text Editor	5
Summary	7

2	
THE BASICS	9

Expressions and Statements	10
Numbers and Operators	10
Order of Operations	11
Floating Point	11
Bindings	12
Variables	13
Constants	14
Naming Conventions	15
Incrementing and Decrementing	16
Addition and Subtraction Assignment	18
Multiplication and Division Assignment	18
Strings	19
Joining Strings	20
Finding the Length of a String	20
Getting a Character from a String	21
Getting Multiple Characters from a String	21
Trimming Whitespace from a String	22
Other Useful String Methods	22
Escape Sequences	23
Template Literals	24
Undefined and Null	26
Booleans	26
Logical Operators	27
Comparison Operators	29

Type Coercion	30
Equality with Coercion	31
Truthiness	32
Uses for Truthiness	33
Summary	35

3 COMPOUND DATA TYPES 37

Arrays	38
Creation and Indexing	38
Arrays of Arrays	39
Array Methods	41
Objects	47
Creating Objects	47
Accessing Object Values	48
Setting Object Values	49
Working with Objects	49
Nesting Objects and Arrays	52
Nesting with Literals	52
Nesting with Variables	53
Exploring Nested Objects in the Console	54
Printing Nested Objects with JSON.stringify	55
Summary	56

4 CONDITIONALS AND LOOPS 57

Making Decisions with Conditionals	58
if Statements	58
if...else Statements	59
More Complex Conditions	60
Chained if...else Statements	61
Repeating Code with Loops	63
while Loops	63
for Loops	65
for...of Loops	67
for...in Loops	70
Summary	71

5 FUNCTIONS 73

Declaring and Calling Functions	74
Return Values	75
Parameter Types	77
Side Effects	77
Passing a Function as an Argument	78
Other Function Syntaxes	79
Function Expressions	80
Arrow Functions	82

Rest Parameters	84
Higher-Order Functions	85
Array Methods That Take Callbacks	85
Custom Functions That Take Callbacks	88
Functions That Return Functions	89
Summary	91

6
CLASSES **93**

Creating Classes and Instances	94
Inheritance	97
Prototype-Based Inheritance	101
Using Constructors and Prototypes	102
Comparing Constructors and Classes	104
Exploring Object.prototype	105
Walking the Prototype Chain	106
Overriding a Method	107
Summary	108

PART II: INTERACTIVE JAVASCRIPT **109**

7
HTML, THE DOM, AND CSS **111**

HTML	111
Creating an HTML Document	112
Understanding Nested Relationships	114
The Document Object Model	114
The DOM API	115
Element Identifiers	116
script Elements	118
CSS	120
link Elements	120
Rulesets	121
Selectors	121
Using CSS Selectors in JavaScript	124
Summary	125

8
EVENT-BASED PROGRAMMING **127**

Event Handlers	128
Event Bubbling	130
Event Delegation	131
Mouse Movement Events	134
Keyboard Events	137
Summary	139

9	THE CANVAS ELEMENT	141
	Creating a Canvas	142
	Making Static Drawings	142
	Drawing Outlined Rectangles	144
	Drawing Other Shapes Using Paths	145
	Interacting with the Canvas	147
	Animating the Canvas	152
	Summary	154

PART III: PROJECTS **155**

PROJECT 1: CREATING A GAME

10	PONG	159
	The Game	159
	Setup	160
	The Ball	161
	Refactoring	162
	The Game Loop	163
	Bouncing	165
	The Paddles	166
	Moving the Paddles with Player Input	169
	Detecting Paddle Collisions	170
	Bouncing Near the Paddle Ends	174
	Scoring Points	176
	Computer Control	180
	Game Over	182
	The Complete Code	185
	Summary	188

11	OBJECT-ORIENTED PONG	189
	Object-Oriented Design	190
	The File Structure	191
	The GameView Class	191
	The Game Elements	193
	The Paddles	194
	The Ball	195
	The Scores and Computer Classes	197
	The Game Class	198
	Starting the Game	201
	Summary	202

PROJECT 2: MAKING MUSIC

12

GENERATING SOUNDS

205

The Web Audio API	206
Setting Up	206
Generating a Tone with the Web Audio API	207
The Tone.js Library	210
Generating a Tone with Tone.js	210
Understanding the Tone.Synth Options	211
Playing More Notes in Sequence	215
Playing Multiple Notes at Once	216
The Tone.js Transport	217
Tone.Loop	218
Tone.Sequence	221
Tone.Part	223
Making Drum Sounds	224
Hi-Hat Synthesis	224
Snare Synthesis	226
Kick Synthesis	228
Reverb	228
A Drum Loop	230
Working with Samples	232
Summary	234

13

WRITING A SONG

235

Getting Organized	235
Event Handling	236
Making the Drumbeat	237
Adding the Bass Lines	240
Adding Chords	242
Playing a Tune	244
The Complete Code	247
Summary	252

PROJECT 3: VISUALIZING DATA

14

INTRODUCING THE D3 LIBRARY

255

The SVG Graphics Format	256
Grouping Elements	258
Drawing Circles	260
Defining Paths	261
Styling Elements with CSS	264
Adding Interactivity with JavaScript	266

The D3 Library	268
Setup	268
Selections	269
Data Binding	270
Data Joins	271
Real-Time Updates	273
Transitions and Key Functions	275
Advanced Joins	276
Creating a Bar Graph	279
Setting Up	279
Calculating Character Frequencies	280
Drawing the Bar Graph	282
Styling with CSS and Regular Expressions	292
Cleaning the Data	295
Animating the Changes	296
Summary	297

15

VISUALIZING DATA FROM THE GITHUB SEARCH API 299

Setting Up	300
Fetching Data	300
The Basic Visualization	304
Creating the Elements	304
Drawing the Axes	305
Drawing the Bars	308
Improving the Visualization	310
Showing Repository Info	310
Color-Coding the Bars	314
Labeling the Left Axis	318
Adding Interactivity	319
Filtering the Data by License	319
Animating the Changes	322
The Complete Code	325
Summary	328

AFTERWORD 329

INDEX 337