
Contents

Preface	xli
1 Introduction to Computers and the Internet	1
1.1 Introduction	2
1.2 What Is a Computer?	4
1.3 Types of Programming Languages	5
1.4 Other High-Level Languages	7
1.5 Structured Programming	7
1.6 History of the Internet	8
1.7 Personal Computing	9
1.8 History of the World Wide Web	10
1.9 World Wide Web Consortium (W3C)	10
1.10 Hardware Trends	11
1.11 Key Software Trend: Object Technology	12
1.12 JavaScript: Object-Based Scripting for the Web	13
1.13 Browser Portability	14
1.14 C and C++	15
1.15 Java	16
1.16 Internet and World Wide Web How to Program	16
1.17 Dynamic HTML	18
1.18 Tour of the Book	18
1.19 Internet and World Wide Web Resources	30
2 Microsoft® Internet Explorer 5.5	35
2.1 Introduction to the Internet Explorer 5.5 Web Browser	36
2.2 Connecting to the Internet	36
2.3 Internet Explorer 5.5 Features	37
2.4 Searching the Internet	41

2.5	Online Help and Tutorials	42
2.6	Keeping Track of Favorite Sites	43
2.7	File Transfer Protocol (FTP)	44
2.8	Outlook Express and Electronic Mail	46
2.9	NetMeeting	49
2.10	MSN Messenger Service	55
2.11	Customizing Browser Settings	56
3	Photoshop® Elements	63
3.1	Introduction	64
3.2	Image Basics	64
3.3	Vector and Raster Graphics	74
3.4	Toolbox	75
	3.4.1 Selection Tools	76
	3.4.2 Painting Tools	80
	3.4.3 Shape Tools	86
3.5	Layers	91
3.6	Screen Capturing	93
3.7	File Formats: GIF and JPEG	94
3.8	Internet and World Wide Web Resources	95
4	Introduction to XHTML: Part 1	101
4.1	Introduction	102
4.2	Editing XHTML	103
4.3	First XHTML Example	103
4.4	W3C XHTML Validation Service	106
4.5	Headers	108
4.6	Linking	109
4.7	Images	112
4.8	Special Characters and More Line Breaks	116
4.9	Unordered Lists	118
4.10	Nested and Ordered Lists	119
4.11	Internet and World Wide Web Resources	122
5	Introduction to XHTML: Part 2	127
5.1	Introduction	128
5.2	Basic XHTML Tables	128
5.3	Intermediate XHTML Tables and Formatting	131
5.4	Basic XHTML Forms	133
5.5	More Complex XHTML Forms	136
5.6	Internal Linking	143
5.7	Creating and Using Image Maps	146
5.8	meta Elements	148
5.9	frameset Element	150
5.10	Nested framesets	153
5.11	Internet and World Wide Web Resources	155

6	Cascading Style Sheets™ (CSS)	161
6.1	Introduction	162
6.2	Inline Styles	162
6.3	Embedded Style Sheets	163
6.4	Conflicting Styles	166
6.5	Linking External Style Sheets	169
6.6	W3C CSS Validation Service	172
6.7	Positioning Elements	173
6.8	Backgrounds	176
6.9	Element Dimensions	178
6.10	Text Flow and the Box Model	180
6.11	User Style Sheets	185
6.12	Internet and World Wide Web Resources	189
7	JavaScript: Introduction to Scripting	194
7.1	Introduction	195
7.2	Simple Program: Printing a Line of Text in a Web Page	195
7.3	Another JavaScript Program: Adding Integers	203
7.4	Memory Concepts	208
7.5	Arithmetic	209
7.6	Decision Making: Equality and Relational Operators	212
7.7	JavaScript Internet and World Wide Web Resources	219
8	JavaScript: Control Structures I	229
8.1	Introduction	230
8.2	Algorithms	230
8.3	Pseudocode	231
8.4	Control Structures	231
8.5	if Selection Structure	234
8.6	if/else Selection Structure	235
8.7	while Repetition Structure	240
8.8	Formulating Algorithms: Case Study 1 (Counter-Controlled Repetition)	241
8.9	Formulating Algorithms with Top-Down, Stepwise Refinement: Case Study 2 (Sentinel-Controlled Repetition)	245
8.10	Formulating Algorithms with Top-Down, Stepwise Refinement: Case Study 3 (Nested Control Structures)	251
8.11	Assignment Operators	255
8.12	Increment and Decrement Operators	256
8.13	Note on Data Types	259
8.14	JavaScript Internet and World Wide Web Resources	260
9	JavaScript: Control Structures II	271
9.1	Introduction	272
9.2	Essentials of Counter-Controlled Repetition	272
9.3	for Repetition Structure	275
9.4	Examples Using the for Structure	279

x

9.5	switch Multiple-Selection Structure	284
9.6	do/while Repetition Structure	289
9.7	break and continue Statements	291
9.8	Labeled break and continue Statements	294
9.9	Logical Operators	296
9.10	Summary of Structured Programming	301
10	JavaScript: Functions	315
10.1	Introduction	316
10.2	Program Modules in JavaScript	316
10.3	Programmer-Defined Functions	318
10.4	Function Definitions	318
10.5	Random-Number Generation	324
10.6	Example: Game of Chance	329
10.7	Duration of Identifiers	337
10.8	Scope Rules	338
10.9	JavaScript Global Functions	340
10.10	Recursion	341
10.11	Example Using Recursion: Fibonacci Series	345
10.12	Recursion vs. Iteration	349
10.13	JavaScript Internet and World Wide Web Resources	351
11	JavaScript: Arrays	365
11.1	Introduction	366
11.2	Arrays	366
11.3	Declaring and Allocating Arrays	368
11.4	Examples Using Arrays	369
11.5	References and Reference Parameters	376
11.6	Passing Arrays to Functions	377
11.7	Sorting Arrays	380
11.8	Searching Arrays: Linear Search and Binary Search	382
11.9	Multiple-Subscripted Arrays	388
11.10	JavaScript Internet and World Wide Web Resources	392
12	JavaScript: Objects	402
12.1	Introduction	403
12.2	Thinking About Objects	403
12.3	Math Object	405
12.4	String Object	407
12.4.1	Fundamentals of Characters and Strings	407
12.4.2	Methods of the String Object	407
12.4.3	Character Processing Methods	409
12.4.4	Searching Methods	411
12.4.5	Splitting Strings and Obtaining Substrings	413
12.4.6	XHTML Markup Methods	415
12.5	Date Object	417
12.6	Boolean and Number Objects	423

12.7	JavaScript Internet and World Wide Web Resources	424
13	Dynamic HTML: Object Model and Collections	435
13.1	Introduction	436
13.2	Object Referencing	436
13.3	Collections all and children	438
13.4	Dynamic Styles	441
13.5	Dynamic Positioning	444
13.6	Using the frames Collection	446
13.7	navigator Object	448
13.8	Summary of the DHTML Object Model	450
14	Dynamic HTML: Event Model	456
14.1	Introduction	457
14.2	Event onclick	457
14.3	Event onload	459
14.4	Error Handling with onerror	460
14.5	Tracking the Mouse with Event onmousemove	462
14.6	Rollovers with onmouseover and onmouseout	464
14.7	Form Processing with onfocus and onblur	468
14.8	More Form Processing with onsubmit and onreset	470
14.9	Event Bubbling	472
14.10	More DHTML Events	474
15	Dynamic HTML: Filters and Transitions	480
15.1	Introduction	481
15.2	Flip filters: flipv and fliph	482
15.3	Transparency with the chroma Filter	484
15.4	Creating Image masks	486
15.5	Miscellaneous Image filters: invert , gray and xray	487
15.6	Adding shadows to Text	489
15.7	Creating Gradients with alpha	491
15.8	Making Text glow	493
15.9	Creating Motion with blur	496
15.10	Using the wave Filter	499
15.11	Advanced Filters: dropShadow and light	501
15.12	Transitions I: Filter blendTrans	505
15.13	Transitions II: Filter revealTrans	509
16	Dynamic HTML: Data Binding with Tabular Data Control	517
16.1	Introduction	518
16.2	Simple Data Binding	519
16.3	Moving a Recordset	523
16.4	Binding to an img	526
16.5	Binding to a table	529
16.6	Sorting table Data	530

16.7	Advanced Sorting and Filtering	533
16.8	Data Binding Elements	540
16.9	Internet and World Wide Web Resources	541
17	Dynamic HTML: Structured Graphics ActiveX Control	545
17.1	Introduction	546
17.2	Shape Primitives	546
17.3	Moving Shapes with Translate	550
17.4	Rotation	552
17.5	Mouse Events and External Source Files	554
17.6	Scaling	556
17.7	Internet and World Wide Web Resources	560
18	Dynamic HTML: Path, Sequencer and Sprite ActiveX Controls	564
18.1	Introduction	565
18.2	DirectAnimation Path Control	565
18.3	Multiple Path Controls	567
18.4	Time Markers for Path Control	570
18.5	DirectAnimation Sequencer Control	573
18.6	DirectAnimation Sprite Control	576
18.7	Animated GIFs	579
18.8	Internet and World Wide Web Resources	581
19	Macromedia[®] Flash[™]: Building Interactive Animations	584
19.1	Introduction	585
19.2	Flash [™] Movie Development	586
19.3	Learning Flash with Hands-on Examples	589
19.3.1	Creating a Shape With the Oval Tool	590
19.3.2	Adding Text to a Button	593
19.3.3	Converting a Shape into a Symbol	594
19.3.4	Editing Button Symbols	595
19.3.5	Adding Keyframes	597
19.3.6	Adding Sound to a Button	597
19.3.7	Verifying Changes with Test Movie	600
19.3.8	Adding Layers to a Movie	600
19.3.9	Animating Text with Tweening	602
19.3.10	Adding a Text Field	604
19.3.11	Adding ActionScript	605
19.4	Creating a Projector (.exe) File With Publish	608
19.5	Manually Embedding a Flash Movie in a Web Page	609
19.6	Creating Special Effects with Flash	610
19.6.1	Importing and Manipulating Bitmaps	610
19.6.2	Create an Advertisement Banner with Masking	611
19.6.3	Adding Online Help to Forms	613
19.7	Creating a Web-Site Introduction	622

19.8	ActionScript	627
19.9	Internet and World Wide Web Resources	628
20	Extensible Markup Language (XML)	633
20.1	Introduction	634
20.2	Structuring Data	635
20.3	XML Namespaces	641
20.4	Document Type Definitions (DTDs) and Schemas	643
20.4.1	Document Type Definitions	643
20.4.2	W3C XML Schema Documents	645
20.5	XML Vocabularies	648
20.5.1	MathML™	648
20.5.2	Chemical Markup Language (CML)	652
20.5.3	Other Markup Languages	654
20.6	Document Object Model (DOM)	654
20.7	DOM Methods	655
20.8	Simple API for XML (SAX)	662
20.9	Extensible Stylesheet Language (XSL)	663
20.10	Microsoft BizTalk™	670
20.11	Simple Object Access Protocol (SOAP)	671
20.12	Internet and World Wide Web Resources	672
21	Web Servers (IIS, PWS and Apache)	681
21.1	Introduction	682
21.2	HTTP Request Types	683
21.3	System Architecture	684
21.4	Client-Side Scripting versus Server-Side Scripting	685
21.5	Accessing Web Servers	686
21.6	Microsoft Internet Information Services (IIS)	687
21.7	Microsoft Personal Web Server (PWS)	690
21.8	<i>Apache Web Server</i>	692
21.9	Requesting Documents	692
21.9.1	XHTML	692
21.9.2	ASP	694
21.9.3	Perl	694
21.9.4	Python	695
21.9.5	PHP	697
21.10	Internet and World Wide Web Resources	698
22	Database: SQL, MySQL, DBI and ADO	702
22.1	Introduction	703
22.2	Relational Database Model	704
22.3	Relational Database Overview	705
22.4	Structured Query Language	709
22.4.1	Basic SELECT Query	710
22.4.2	WHERE Clause	711
22.4.3	GROUP BY Clause	713

22.4.4	ORDER BY Clause	714
22.4.5	Merging Data from Multiple Tables	715
22.4.6	Inserting a Record	718
22.4.7	Updating a Record	719
22.4.8	DELETE FROM Statement	720
22.4.9	TitleAuthor Query from Books.mdb	720
22.5	MySQL	723
22.6	Introduction to DBI	723
22.6.1	Perl Database Interface	724
22.6.2	Python DB-API	724
22.6.3	PHP dbx module	725
22.7	ActiveX Data Objects (ADO)	725
22.8	Internet and World Wide Web Resources	727
23	Wireless Internet and m-Business	734
23.1	Introduction	735
23.2	M-Business	736
23.3	Identifying User Location	736
23.3.1	E911 A\ct	737
23.3.2	Location-Identification Technologies	737
23.4	Wireless Marketing, Advertising and Promotions	738
23.5	Wireless Payment Options	740
23.6	Privacy and the Wireless Internet	741
23.7	International Wireless Communications	742
23.8	Wireless-Communications Technologies	743
23.9	WAP and WML	744
23.10	Phone Simulator and Setup Instructions	745
23.11	Creating WML Documents	746
23.12	WMLScript Programming	753
23.13	string Object Methods	760
23.14	Wireless Protocols, Platforms and Programming Languages	770
23.14.1	WAP 2.0	770
23.14.2	Handheld Devices Markup Languages (HDML)	771
23.14.3	Compact HTML (cHTML) and i-mode	771
23.14.4	Java and Java 2 Micro Edition (J2ME)	771
23.14.5	Binary Run-Time Environment for Wireless (BREW)	772
23.14.6	Bluetooth Wireless Technology	772
23.15	Internet and World Wide Web Resources	773
24	VBScript	783
24.1	Introduction	784
24.2	Operators	784
24.3	Data Types and Control Structures	787
24.4	VBScript Functions	791
24.5	VBScript Example Programs	795
24.6	Arrays	803
24.7	String Manipulation	807

24.8	Classes and Objects	811
24.9	Operator Precedence Chart	820
24.10	Internet and World Wide Web Resources	820
25	Active Server Pages (ASP)	831
25.1	Introduction	832
25.2	How Active Server Pages Work	832
25.3	Setup	833
25.4	Active Server Page Objects	833
25.5	Simple ASP Examples	834
25.6	File System Objects	839
25.7	Session Tracking and Cookies	849
25.8	Accessing a Database from an Active Server Page	859
25.9	Server-Side ActiveX Components	870
25.10	Internet and World Wide Web Resources	878
26	Case Study: Active Server Pages and XML	884
26.1	Introduction	885
26.2	Setup and Message Forum Documents	885
26.3	Forum Navigation	886
26.4	Adding Forums	889
26.5	Forum XML Documents	894
26.6	Posting Messages	898
26.7	Other Documents	902
26.8	Internet and World Wide Web Resources	906
27	Perl and CGI (Common Gateway Interface)	908
27.1	Introduction	909
27.2	Perl	910
27.3	String Processing and Regular Expressions	916
27.4	Viewing Client/Server Environment Variables	921
27.5	Form Processing and Business Logic	924
27.6	Server-Side Includes	930
27.7	Verifying a Username and Password	934
27.8	Using DBI to Connect to a Database	939
27.9	Cookies and Perl	945
27.10	Operator Precedence Chart	950
27.11	Internet and World Wide Web Resources	950
28	Python	962
28.1	Introduction	963
28.1.1	First Python Program	963
28.1.2	Python Keywords	965
28.2	Basic Data Types, Control Structures and Functions	965
28.3	Tuples, Lists and Dictionaries	969
28.4	String Processing and Regular Expressions	974
28.5	Exception Handling	979
28.6	Introduction to CGI Programming	981

28.7	Form Processing and Business Logic	983
28.8	Cookies	989
28.9	Database Application Programming Interface (DB-API)	994
28.9.1	Setup	994
28.9.2	Simple DB-API Program	994
28.10	Operator Precedence Chart	999
28.11	Internet and World Wide Web Resources	1000
29	PHP	1008
29.1	Introduction	1009
29.2	PHP	1010
29.3	String Processing and Regular Expressions	1019
29.4	Viewing Client/Server Environment Variables	1024
29.5	Form Processing and Business Logic	1026
29.6	Verifying a Username and Password	1031
29.7	Connecting to a Database	1039
29.8	Cookies	1043
29.9	Operator Precedence	1048
29.10	Internet and World Wide Web Resources	1048
30	Servlets	1056
30.1	Introduction	1057
30.2	Servlet Overview and Architecture	1059
30.2.1	Interface Servlet and the Servlet Life Cycle	1060
30.2.2	HttpServlet Class	1062
30.2.3	HttpServletRequest Interface	1063
30.2.4	HttpServletResponse Interface	1064
30.3	Handling HTTP get Requests	1064
30.3.1	Setting Up the Apache Tomcat Server	1069
30.3.2	Deploying a Web Application	1071
30.4	Handling HTTP get Requests Containing Data	1076
30.5	Handling HTTP post Requests	1079
30.6	Redirecting Requests to Other Resources	1082
30.7	Session Tracking	1086
30.7.1	Cookies	1087
30.7.2	Session Tracking with HttpSession	1095
30.8	Multi-tier Applications: Using JDBC from a Servlet	1103
30.8.1	Configuring animalsurvey Database and SurveyServlet	1109
30.9	HttpUtils Class	1111
30.10	Internet and World Wide Web Resources	1111
31	JavaServer Pages (JSP) (on CD)	1119
31.1	Introduction	1120
31.2	JavaServer Pages Overview	1121
31.3	A First JavaServer Page Example	1122
31.4	Implicit Objects	1124
31.5	Scripting	1125

31.5.1	Scripting Components	1126
31.5.2	Scripting Example	1127
31.6	Standard Actions	1130
31.6.1	<jsp:include> Action	1131
31.6.2	<jsp:forward> Action	1135
31.6.3	<jsp:plugin> Action	1139
31.6.4	<jsp:useBean> Action	1143
31.7	Directives	1160
31.7.1	page Directive	1160
31.7.2	include Directive	1162
31.8	Custom Tag Libraries	1164
31.8.1	Simple Custom Tag	1165
31.8.2	Custom Tag with Attributes	1169
31.8.3	Evaluating the Body of a Custom Tag	1173
31.9	World Wide Web Resources	1179
32	e-Business & e-Commerce (on CD)	1186
32.1	Introduction	1188
32.2	E-Business Models	1189
32.2.1	Storefront Model	1189
32.2.2	Shopping-Cart Technology	1190
32.2.3	Auction Model	1191
32.2.4	Portal Model	1194
32.2.5	Name-Your-Price Model	1195
32.2.6	Comparison-Pricing Model	1195
32.2.7	Demand-Sensitive Pricing Model	1195
32.2.8	Bartering Model	1195
32.3	Building an e-Business	1196
32.4	e-Marketing	1197
32.4.1	Branding	1197
32.4.2	Marketing Research	1197
32.4.3	e-Mail Marketing	1197
32.4.4	Promotions	1198
32.4.5	Consumer Tracking	1198
32.4.6	Electronic Advertising	1198
32.4.7	Search Engines	1199
32.4.8	Affiliate Programs	1199
32.4.9	Public Relations	1200
32.4.10	Customer Relationship Management (CRM)	1200
32.5	Online Payments	1201
32.5.1	Credit-Card Payment	1201
32.5.2	Digital Cash and e-Wallets	1201
32.5.3	Micropayments	1201
32.5.4	Smart Cards	1202
32.6	Security	1202
32.6.1	Public-Key Cryptography	1203
32.6.2	Secure Sockets Layer (SSL)	1205

32.6.3	WTLS	1207
32.6.4	IPSec and Virtual Private Networks (VPN)	1207
32.6.5	Security Attacks	1208
32.6.6	Network Security	1208
32.7	Legal Issues	1209
32.7.1	Privacy	1209
32.7.2	Defamation	1209
32.7.3	Sexually Explicit Speech	1210
32.7.4	Copyright and Patents	1210
32.8	XML and e-Commerce	1211
32.9	Internet and World Wide Web Resources	1212

33 Multimedia: Audio, Video, Speech Synthesis and Recognition **1223**

33.1	Introduction	1224
33.2	Audio and Video	1225
33.3	Adding Background Sounds with the bgsound Element	1225
33.4	Adding Video with the img Element's dynsrc Property	1228
33.5	Adding Audio or Video with the embed Element	1230
33.6	Using the Windows Media Player ActiveX Control	1232
33.7	Microsoft® Agent Control	1236
33.8	RealPlayer™ Plug-in	1249
33.9	Synchronized Multimedia Integration Language (SMIL)	1252
33.10	Scalable Vector Graphics (SVG)	1254
33.11	Internet and World Wide Web Resources	1259

34 Accessibility **1267**

34.1	Introduction	1268
34.2	Web Accessibility	1268
34.3	Web Accessibility Initiative	1269
34.4	Providing Alternatives for Images	1271
34.5	Maximizing Readability by Focusing on Structure	1272
34.6	Accessibility in XHTML Tables	1272
34.7	Accessibility in XHTML Frames	1276
34.8	Accessibility in XML	1277
34.9	Using Voice Synthesis and Recognition with VoiceXML™	1277
34.10	CallXML™	1284
34.11	JAWS® for Windows	1289
34.12	Other Accessibility Tools	1291
34.13	Accessibility in Microsoft® Windows® 2000	1292
34.13.1	Tools for People with Visual Impairments	1294
34.13.2	Tools for People with Hearing Impairments	1296
34.13.3	Tools for Users Who Have Difficulty Using the Keyboard	1296
34.13.4	Microsoft Narrator	1302
34.13.5	Microsoft On-Screen Keyboard	1303
34.13.6	Accessibility Features in Microsoft Internet Explorer 5.5	1304

34.14	Internet and World Wide Web Resources	1305
A	XHTML Special Characters	1313
B	Operator Precedence Chart	1314
C	ASCII Character Set	1316
D	Number Systems	1317
D.1	Introduction	1318
D.2	Abbreviating Binary Numbers as Octal Numbers and Hexadecimal Numbers	1321
D.3	Converting Octal Numbers and Hexadecimal Numbers to Binary Numbers	1322
D.4	Converting from Binary, Octal, or Hexadecimal to Decimal	1322
D.5	Converting from Decimal to Binary, Octal, or Hexadecimal	1323
D.6	Negative Binary Numbers: Two's Complement Notation	1325
E	XHTML Colors	1330
F	Career Opportunities (on CD)	1333
F.1	Introduction	1334
F.2	Resources for the Job Seeker	1335
F.3	Online Opportunities for Employers	1336
F.3.1	Posting Jobs Online	1338
F.3.2	Problems with Recruiting on the Web	1340
F.3.3	Diversity in the Workplace	1340
F.4	Recruiting Services	1341
F.4.1	Testing Potential Employees Online	1342
F.5	Career Sites	1343
F.5.1	Comprehensive Career Sites	1343
F.5.2	Technical Positions	1344
F.5.3	Wireless Positions	1345
F.5.4	Contracting Online	1345
F.5.5	Executive Positions	1346
F.5.6	Students and Young Professionals	1347
F.5.7	Other Online Career Services	1348
F.6	Internet and World Wide Web Resources	1349
G	Unicode[®]	1357
G.1	Introduction	1358
G.2	Unicode Transformation Formats	1359
G.3	Characters and Glyphs	1360
G.4	Advantages/Disadvantages of Unicode	1360
G.5	Unicode Consortium's Web Site	1361
G.6	Using Unicode	1362
G.7	Character Ranges	1366
	Bibliography	1370
	Index	1372