

EDITION

# The Complete Reference

Online support  
at [webdesignref.com](http://webdesignref.com)  
Includes tools and samples  
for use on your own site

For sale in  
India,  
Nepal, Bangladesh,  
Sri Lanka and Bhutan  
Only

# Web Design

## Second Edition

Provides up-to-date Web design solutions for home and corporate users

Covers modern Web building practices, and features practical and focused examples

Explains common design theories, techniques, technologies, and practical applications

**Thomas A. Powell**

Instructor, UCSD Computer Science Department, and best-selling author

# Contents at a Glance

---

## Part I Foundation

---

■	<b>1</b> What Is Web Design? .....	3
■	<b>2</b> User-Centered Design .....	23
■	<b>3</b> The Web Medium .....	65
■	<b>4</b> The Web Design Process .....	107
■	<b>5</b> Evaluating Web Sites .....	133

## Part II Site Organization and Navigation

---

■	<b>6</b> Site Types and Architectures .....	153
■	<b>7</b> Navigation Theory .....	187
■	<b>8</b> Basic Navigation Practices .....	221
■	<b>9</b> Search .....	275
■	<b>10</b> Site Maps and Other Navigational Aids .....	313

**Part III Elements of Page Design**

<b>11</b>	Pages and Layout .....	351
<b>12</b>	Text .....	417
<b>13</b>	Color .....	477
<b>14</b>	Images .....	505
<b>15</b>	GUI Widgets and Forms .....	543

**Part IV Technology and Web Design**

<b>16</b>	Web Technology Best Practices .....	621
<b>17</b>	Site Delivery and Management .....	691

**Part V Appendixes**

<b>A</b>	Core Web Site Design Principles .....	743
<b>B</b>	Site Evaluation Form .....	767
<b>C</b>	XHTML Chart .....	793
<b>D</b>	CSS Quick Reference .....	811
<b>E</b>	Fonts .....	827
<b>F</b>	Color Reference .....	839
<b>G</b>	HTTP .....	851

# Contents

---

Acknowledgments.....	xxi
Introduction.....	xxiii

## Part I

### Foundation

<b>1</b>	<b>What Is Web Design? .....</b>	<b>3</b>
	Defining Web Design .....	4
	The Web Design Pyramid .....	5
	The Medium of the Web .....	6
	Types of Web Sites .....	8
	A Clearer Definition of Web Design .....	14
	Web Design Themes .....	15
	User-Focused Design .....	16
	Form and Function .....	17
	Execution: The Easy Part? .....	18
	Conformity versus Innovation .....	19
	Learning Web Design .....	19
	Summary .....	21

<b>2</b>	<b>User-Centered Design</b> .....	23
	Usability .....	23
	Who Are Web Users? .....	24
	Common User Characteristics .....	27
	Vision .....	29
	Memory .....	29
	Response and Reaction Times .....	31
	Dealing with Stimulus .....	34
	Thresholds .....	40
	Cocktail Party Effect .....	40
	Sensory Adaptation .....	41
	Movement Capabilities .....	41
	The User's World .....	42
	User Environments .....	44
	General Types of Users .....	45
	GUI Conventions .....	47
	Web Conventions .....	49
	Accessibility .....	50
	Building a Usable Site .....	53
	Usability Above All Else .....	57
	Who's in Control of the Experience? .....	61
	Summary .....	62
		63
<b>3</b>	<b>The Web Medium</b> .....	65
	Core Web Technologies .....	66
	Web Browsers .....	66
	Markup Languages .....	66
	HTML .....	74
	XHTML .....	74
	XML .....	75
	Style Sheet Technologies .....	76
	CSS .....	79
	XSL .....	79
	Images .....	79
	GIF .....	82
	JPEG .....	83
	PNG .....	83
	Flash .....	83
	SVG .....	84
	VML .....	84
	Other Image Formats .....	84
	Animation .....	85
	Sound .....	85

Video .....	86
Programming Technologies .....	89
Client-side Programming .....	90
Helpers .....	90
Netscape Plug-Ins .....	91
ActiveX .....	93
Java .....	94
JavaScript .....	98
Document Object Model .....	98
Server-Side Technologies .....	99
Web Servers .....	99
CGI .....	99
Server-Side Scripting .....	100
Server APIs .....	102
Network and Related Protocols .....	102
HTTP .....	102
MIME .....	103
Addressing: URL/URI/URNs/URCs .....	103
Meta Data .....	104
Web Services .....	104
Summary .....	105
<b>4 The Web Design Process .....</b>	<b>107</b>
The Need for Process .....	108
Ad Hoc Web Process .....	109
Basic Web Process Model .....	110
Modified Waterfall .....	111
Joint Application Development .....	112
Approaching a Web Site Project .....	114
Goals and Problems .....	114
Audience .....	116
Site Requirements .....	118
The Site Plan .....	118
Design Phase Dissected .....	122
Block Composites .....	122
Screen and Paper Comps .....	122
The Mock Site .....	126
Beta Site Implementation .....	127
Testing .....	127
User Acceptance Testing .....	129
Release and Beyond .....	129
Welcome to the Real World .....	129
Summary .....	130

<b>5</b>	Evaluating Web Sites .....	133
	The Goals of Expert Evaluation .....	134
	Conducting an Evaluation .....	135
	First Impression .....	135
	Home Page Pretests .....	136
	Site Navigation Testing .....	138
	Task Analysis .....	139
	Execution Analysis .....	140
	The Final Question .....	146
	Evaluation Reports .....	146
	User Testing .....	147
	Summary .....	149

**Part II**

**Site Organization and Navigation**

<b>6</b>	Site Types and Architectures .....	153
	Site Types .....	154
	Grouping by Interactivity .....	155
	Grouping by Frequency of Change .....	156
	Grouping by Size .....	159
	Grouping by Technology Usage .....	159
	Grouping by Look .....	160
	Grouping by Purpose .....	161
	Commercial Sites .....	161
	Informational .....	163
	Entertainment .....	164
	Navigational .....	164
	Community .....	165
	Artistic .....	165
	Personal .....	165
	Site Structure .....	166
	Site Organization Models .....	167
	Linear .....	167
	Grid .....	170
	Hierarchy .....	171
	Usability and Site Structures .....	177
	Porous and Solid Site Structure .....	180
	Deep vs. Shallow Sites .....	182
	Picking a Site Structure and Type .....	184
	Summary .....	185

<b>7</b>	<b>Navigation Theory</b> .....	187
	Navigation .....	188
	Where Am I? .....	189
	Precise Location on the Web: URLs .....	189
	Page and Site Labels .....	190
	Page and Site Style and Location .....	195
	Where Have I Been? .....	196
	Where Can I Go? .....	199
	Placing Navigation .....	199
	Top Navigation .....	199
	Bottom Navigation .....	202
	Left Navigation .....	202
	Right Navigation .....	205
	Center Navigation .....	207
	Consistency of Navigation .....	208
	Navigation Hierarchy .....	210
	Navigation and Scrolling .....	211
	Navigation and Mouse Travel .....	211
	Frames .....	212
	Subwindows .....	215
	Navigation Remotes .....	216
	Bookmarking .....	217
	Navigation No-No's .....	217
	Summary .....	219
<b>8</b>	<b>Basic Navigation Practices</b> .....	221
	Link Types .....	222
	A Taxonomy of Link Forms .....	223
	Text Links .....	224
	Graphic Text Links .....	224
	Buttons .....	225
	Icons .....	227
	Image Maps .....	231
	Other Link Forms .....	234
	Usable Links .....	241
	Link Conventions .....	241
	Rollovers .....	248
	Understanding User Expectations .....	251
	Using Scope Notes .....	253
	title Attribute .....	254
	Rollover Messages .....	255
	Status Bar Messages .....	256
	Keyboard Support for Links .....	257

	Advanced Web Linking Models .....	259
	Link Maintenance .....	259
	Redirection Pages .....	260
	Frames .....	262
	Using Frames .....	263
	Multiple Windows and Navigation .....	272
	Summary .....	274
<b>9</b>	<b>Search .....</b>	<b>275</b>
	How Users Search .....	276
	How Search Engines Work .....	277
	Gathering Pages .....	278
	Indexing Pages .....	278
	Adding a Search Facility .....	282
	Designing the Search Interface .....	283
	Accessing Search .....	283
	Designing a Basic Search Interface .....	285
	Advanced Search Form Design .....	288
	Result Page Design .....	289
	Negative Results Page .....	294
	Improving Local Search .....	297
	Public Searching .....	302
	Full Web Searching Overview .....	302
	Search Engine Promotion .....	303
	Adding to the Engines .....	304
	Robot Exclusion .....	305
	Robots.txt .....	305
	Robot Control with <meta> .....	306
	Optimizing for Search Engines .....	307
	<meta> Tags .....	307
	Titles and File Naming .....	309
	Relevant Text Content .....	309
	Links and Entry Points .....	310
	Tricky Business .....	311
	Summary .....	312
<b>10</b>	<b>Site Maps and Other Navigational Aids .....</b>	<b>313</b>
	Beyond Search .....	314
	Site Maps .....	314
	Textual Site Maps .....	315
	Graphical Site Maps .....	319
	Site Map Design .....	324
	Showing Scope and Destination Choices .....	325
	“You Are Here” Indication .....	326

"Where You Were" Indicators .....	326
Producing Site Maps .....	327
Site Indexes .....	329
Miscellaneous Site Navigation Aids .....	335
Glossary .....	336
"What's New" Sections .....	338
Keyword Jump Systems .....	338
Site Tours .....	339
Following Traveled-Path Systems .....	340
Help Systems .....	340
When to Use Help .....	340
Complex Help Systems .....	343
Navigation Aid Trends .....	346
Summary .....	348

**Part III**

**Elements of Page Design**

<b>11</b> Pages and Layout .....	351
What Is a Page? .....	352
Page Sizes .....	352
Dealing with Screen Size .....	359
Page Margins .....	371
Page Types .....	372
Entrance Pages .....	373
Splash Pages .....	374
Home Pages .....	375
Subpages: Navigation vs. Content .....	378
Content Pages .....	381
Task-Specific Pages .....	386
Exit Pages .....	392
Web Design Schools .....	395
Text .....	395
Metaphor and Thematic .....	397
GUI Oriented .....	398
Unconventional .....	401
Layout Examples .....	402
"TLB" .....	403
Header-Footer .....	406
Centered and Floating Window Style .....	408
Stretchable .....	414
The Road to Common Site "Looks" .....	415
Summary .....	416

<b>12</b>	Text .....	417
	The Medium Matters .....	418
	Taking Control of Text .....	418
	Throwing Up Your Arms .....	421
	Modern-Day Baskerville .....	423
	Typography Terminology 101 .....	423
	Fonts .....	425
	Proportional versus Monospaced Fonts .....	426
	Setting Fonts in Web Pages .....	429
	Using Downloadable Fonts .....	430
	Setting Font Styles .....	432
	Sizing Font .....	436
	Text Layout .....	438
	Text Alignment .....	439
	Line Length .....	441
	Line Spacing .....	444
	Letter Spacing and Word Spacing .....	445
	Setting Type Hierarchy .....	448
	Headings and Subheadings .....	449
	Formatting Paragraphs and Sections .....	450
	Formatting Tables .....	457
	Text Details .....	461
	Fancy Text Layouts .....	463
	Special Text Effects .....	465
	Text Design Issues for the Web .....	468
	Font Usage .....	468
	Number of Fonts to Use .....	470
	Columns on the Web .....	470
	Is White Space Good or Bad? .....	471
	Print vs. Screen .....	472
	Writing for the Web .....	473
	Reading vs. Scanning .....	473
	Nonlinear Writing .....	474
	Danger Words .....	475
	Summary .....	475
<b>13</b>	Color .....	477
	Color Basics .....	478
	Computer Color .....	479
	Web Color Basics .....	480
	HTML Color Use .....	483
	CSS1 Color Use .....	486

	CSS2 Color Use .....	488
	Possible CSS3 Color Use .....	489
	Practical Web Color .....	490
	Browser-Safe Color .....	491
	Hybrid Colors .....	493
	Color Detection .....	494
	Troublesome Color Reproduction Issues .....	495
	Color Shifting and the Reality of the Web Palette .....	495
	Gamma Correction .....	496
	Monitor Types: CRT vs. LCD .....	497
	Using Color .....	498
	Color Harmony .....	499
	Color and Usability .....	499
	The Hidden Meaning of Colors .....	501
	Summary .....	503
<b>14</b>	<b>Images .....</b>	<b>505</b>
	Image Formats .....	506
	GIF .....	508
	JPEG .....	514
	PNG .....	518
	Flash .....	521
	Other Image Formats .....	522
	HTML and Images .....	523
	Alternative Text .....	523
	Sizing Images in HTML .....	525
	Image Borders .....	525
	Image Toolbar .....	526
	Background Images in HTML .....	527
	Images and CSS .....	532
	CSS and Backgrounds .....	533
	Image Usage .....	535
	Usability and Images .....	535
	Delivery Image Distortion .....	539
	Image Management .....	539
	Protecting Images .....	540
	Summary .....	542
<b>15</b>	<b>GUI Widgets and Forms .....</b>	<b>543</b>
	Web Sites vs. GUI Applications .....	544
	GUI Design Implications .....	545
	Windows .....	549
	Creating New Windows .....	550

Full-Screen Windows .....	553
Sub-Windows .....	554
Alerts .....	555
Confirms .....	559
Prompts .....	561
Forms .....	563
Labels .....	563
Text Fields .....	564
Password Fields .....	566
Multi-Line Text Entry .....	567
Check Boxes .....	570
Radio Buttons .....	572
Pull-Down Menus .....	580
Using Pull-Downs for Navigation .....	583
Scrolled Lists .....	587
Push Buttons .....	588
Reset Buttons .....	589
Submit Buttons .....	589
Image Buttons .....	590
File Upload Controls .....	591
Usable Forms .....	593
Required Fields .....	596
Tabbing Forms .....	597
First Field Focus .....	598
Keyboard Shortcuts .....	599
Form Validation .....	604
Field Masks .....	606
Disabling Fields .....	608
Read-Only Fields .....	609
Default Data .....	610
Internet Explorer AutoComplete .....	610
Advanced Web GUI Widgets .....	613
Tree Navigation .....	614
Tabbed Dialogs .....	615
Sliders .....	615
Context Menus .....	617
When Web Applications Are Just Applications .....	618
Summary .....	618

## Part IV

### Technology and Web Design

<b>16</b> Web Technology Best Practices .....	621
Pragmatic Web Development .....	622

Browser Best Practices .....	623
Browser Detection Basics .....	624
Browser Capabilities Detection .....	628
Browser Detection in Practice .....	630
HTML Best Practices .....	631
Doctypes .....	632
Move to XHTML .....	635
Avoid HTML/XHTML for Presentation .....	637
Miscellaneous HTML Best Practices .....	639
CSS Best Practices .....	646
Consider HTML Usage .....	649
Include CSS Carefully .....	650
Address CSS Browser Issues .....	652
Miscellaneous CSS Best Practices .....	654
XML Best Practices .....	657
Web Programming Best Practices .....	663
Server-Side Programming Best Practices .....	663
Client-Side Programming .....	666
JavaScript Best Practices .....	667
Netscape Plug-in Best Practices .....	680
ActiveX Best Practices .....	682
Java Applets Best Practices .....	685
Cookie Best Practices .....	686
Multimedia Best Practices .....	688
Summary .....	689
<b>17</b> Site Delivery and Management .....	691
The Importance of Delivery .....	692
The Web Request Cycle .....	694
Request Formation and DNS Lookup .....	695
Request Transmission .....	697
HTTP .....	698
Web Servers .....	702
Web Server Components .....	703
Web Server Software .....	704
Making the Choice .....	708
Server Capacity Issues .....	708
Server Location .....	709
Outsourcing Web Hosting .....	711
Delivering the Payload .....	713
Networking, Protocols, and Web Design .....	713
Exploiting Expiration and Caches .....	714
Dealing with State .....	715

Browser Rendering .....	717
Managing Web Servers .....	717
Web Server Security .....	717
Content Management .....	721
Usage Analysis .....	725
Analyzing Site Usage .....	729
Privacy .....	734
Content Concerns .....	736
Summary .....	739

**Part V****Appendixes**

<b>A</b> Core Web Site Design Principles .....	743
What Is Web Design? .....	744
User-Centered Design .....	744
The Web Medium .....	746
The Web Design Process .....	747
Evaluating Web Sites .....	747
Site Types and Architectures .....	748
Navigation Theory .....	749
Basic Navigation Practices .....	751
Search .....	752
Site Maps and Other Navigational Aids .....	753
Pages and Layout .....	753
Text .....	756
Color .....	756
Images .....	756
Forms and GUI .....	757
Web Technology Best Practices .....	760
Site Delivery .....	764
<b>B</b> Site Evaluation Form .....	767
GENERAL SITE CHARACTERISTICS .....	769
Site Structure .....	769
Visuals and Layout .....	770
General Content Statistics .....	773
TECHNOLOGY USAGE .....	774
PROGRAMMING .....	777
Server-side Technology .....	777
Client-side Component Technology .....	779
BROWSER SUPPORT .....	782

	NAVIGATION .....	783
	Navigation Aids .....	787
	THE FINAL SCORE .....	792
	<b>C</b> XHTML Chart .....	793
	Basic Rules .....	794
	XHTML Tags and Attributes .....	794
	Attribute Reference .....	809
	Core Attributes .....	810
	International Attributes .....	810
	Event Attributes .....	810
	<b>D</b> CSS Quick Reference .....	811
	<b>E</b> Fonts .....	827
	Specifying Fonts .....	828
	Downloadable Fonts .....	836
	Microsoft's Dynamic Fonts .....	836
	<b>F</b> Color Reference .....	839
	Browser-Safe Colors .....	840
	Color Names and Numerical Equivalents .....	843
	CSS Color Values .....	848
	Three-Digit Hexadecimal Color Values .....	849
	RGB Color Values .....	849
	RGB Color Values Using Percentages .....	849
	Color Practices .....	849
	<b>G</b> HTTP .....	851
	HTTP in Action .....	852
	Index .....	873