

**Beginning**  
**Web Programming with**  
**HTML, XHTML, and CSS**

**Second Edition**

Jon Duckett



Wiley Publishing, Inc.



# **Beginning Web Programming with HTML, XHTML, and CSS**

<b>Introduction . . . . .</b>	<b>xxiii</b>
<b>Chapter 1: Creating Structured Documents . . . . .</b>	<b>1</b>
<b>Chapter 2: Links and Navigation. . . . .</b>	<b>53</b>
<b>Chapter 3: Images and Objects . . . . .</b>	<b>77</b>
<b>Chapter 4: Tables . . . . .</b>	<b>109</b>
<b>Chapter 5: Forms. . . . .</b>	<b>139</b>
<b>Chapter 6: Frames . . . . .</b>	<b>185</b>
<b>Chapter 7: Cascading Style Sheets . . . . .</b>	<b>211</b>
<b>Chapter 8: More Cascading Style Sheets . . . . .</b>	<b>273</b>
<b>Chapter 9: Page Layout . . . . .</b>	<b>323</b>
<b>Chapter 10: Design Issues. . . . .</b>	<b>361</b>
<b>Chapter 11: Learning JavaScript. . . . .</b>	<b>403</b>
<b>Chapter 12: Working with JavaScript . . . . .</b>	<b>453</b>
<b>Chapter 13: Putting Your Site on the Web . . . . .</b>	<b>501</b>
<b>Appendix A: Answers to Exercises . . . . .</b>	<b>539</b>
<b>Appendix B: XHTML Element Reference . . . . .</b>	<b>563</b>
<b>Appendix C: CSS Properties. . . . .</b>	<b>607</b>
<b>Appendix D: Color Names and Values . . . . .</b>	<b>637</b>
<b>Appendix E: Character Encodings. . . . .</b>	<b>645</b>
<b>Appendix F: Special Characters . . . . .</b>	<b>649</b>
<b>Appendix G: Language Codes. . . . .</b>	<b>665</b>
<b>Appendix H: MIME Media Types . . . . .</b>	<b>669</b>
<b>Appendix I: Deprecated and Browser-Specific Markup. . . . .</b>	<b>681</b>
<b>Index . . . . .</b>	<b>715</b>



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Published by

**Wiley Publishing, Inc.**

10475 Crosspoint Boulevard

Indianapolis, IN 46256

[www.wiley.com](http://www.wiley.com)

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ISBN: 978-0-470-25931-3

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

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Library of Congress Cataloging-in-Publication Data is available from the publisher.

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**Jon Duckett** published his first web site in 1996 while studying for a BSc (Hons) in Psychology at Brunel University, London. Since then, he has helped create a wide variety of web sites for companies of all sizes. He has also co-written more than ten programming-related books on topics from ASP to XML (via many other letters of the alphabet), covering diverse aspects of web programming including design, architecture, and coding.

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# Contents

<b>Introduction</b>	<b>xxiii</b>
<hr/>	
<b>Chapter 1: Creating Structured Documents</b>	<b>1</b>
A Web of Structured Documents <b>1</b>	
Introducing XHTML <b>2</b>	
Core Elements and Attributes <b>9</b>	
The <html> Element	9
The <head> Element	10
The <title> Element	11
The <body> Element	11
Attribute Groups <b>12</b>	
Core Attributes	12
Internationalization	14
UI Events	15
Basic Text Formatting <b>16</b>	
White Space and Flow	17
Creating Headings Using hn Elements	18
Creating Paragraphs Using the <p> Element	21
Creating Line Breaks Using the   Element	21
Creating Preformatted Text Using the <pre> Element	22
Presentational Elements <b>26</b>	
The <b> Element	26
The <i> Element	26
The <u> Element (deprecated)	27
The <s> and <strike> Elements (deprecated)	27
The <tt> Element	27
The <sup> Element	28
The <sub> Element	28
The <big> Element	28
The <small> Element	28
The <hr /> Element	28
Phrase Elements <b>29</b>	
The <em> Element Adds Emphasis	30
The <strong> Element Adds Strong Emphasis	30
The <abbr> Element Is for Abbreviations	31

# Contents

---

The <acronym> Element Is for Acronym Use	31
The <dfn> Element Is for Special Terms	32
The <blockquote> Element Is for Quoting Text	32
The <q> Element Is for Short Quotations	33
The <cite> Element Is for Citations	33
The <code> Element Is for Code	34
The <kbd> Element Is for Text Typed on a Keyboard	34
The <var> Element Is for Programming Variables	35
The <samp> Element Is for a Program Output	35
The <address> Element Is for Addresses	36
<b>Lists</b>	<b>36</b>
Using the <ul> Element to Create Unordered Lists	36
Ordered Lists	37
Definition Lists	39
Nesting Lists	40
How It Works	43
<b>Editing Text</b>	<b>45</b>
Using <ins> to Indicate New Additions to Text	46
Using <del> to Indicate Deleted Text	46
<b>Using Character Entities for Special Characters</b>	<b>47</b>
<b>Comments</b>	<b>47</b>
<b>The &lt;font&gt; Element (deprecated)</b>	<b>48</b>
<b>Understanding Block and Inline Elements</b>	<b>48</b>
<b>Grouping Elements with &lt;div&gt; and &lt;span&gt;</b>	<b>49</b>
<b>Summary</b>	<b>50</b>
<b>Exercises</b>	<b>51</b>
<b>Chapter 2: Links and Navigation</b>	<b>53</b>
<b>Basic Links</b>	<b>54</b>
Linking to Other Documents	54
Linking to E-mail Addresses	56
<b>Understanding Directories and Directory Structures</b>	<b>57</b>
What Are You Linking To?	58
What a URL Is Made Up Of	59
Absolute and Relative URLs	61
The <base> Element	64
<b>Creating Links with the &lt;a&gt; Element</b>	<b>65</b>
Creating a Source Anchor with the href Attribute	65
Creating a Destination Anchor Using the name and id Attributes (linking to a specific part of a page)	66

---

<b>Advanced E-mail Links</b>	<b>74</b>
<b>Summary</b>	<b>75</b>
<b>Exercises</b>	<b>76</b>
<b>Chapter 3: Images and Objects</b>	<b>77</b>
<b>Adding Images to Your Site</b>	<b>77</b>
Types of Image Formats	78
Bitmap Images	78
Vector Images	85
Adding Images Using the <img> Element	86
<b>Adding Other Objects with the &lt;object&gt; Element</b>	<b>93</b>
The <object> Element's Attributes	94
The <param> Element	97
Adding a Flash Movie To A Page	98
<b>Using Images as Links</b>	<b>99</b>
<b>Image Maps</b>	<b>100</b>
Server-Side Image Maps	101
Client-Side Image Maps	102
<b>Summary</b>	<b>105</b>
<b>Exercises</b>	<b>106</b>
<b>Chapter 4: Tables</b>	<b>109</b>
<b>Introducing Tables</b>	<b>109</b>
<b>Basic Table Elements and Attributes</b>	<b>112</b>
The <table> Element Creates a Table	113
The <tr> Element Contains Table Rows	117
The <td> and <th> Elements Represent Table Cells	119
<b>Advanced Tables</b>	<b>125</b>
Splitting Up Tables Using a Head, Body, and Foot	125
Adding a <caption> to a Table	128
Spanning Columns Using the colspan Attribute	128
Spanning Rows Using the rowspan Attribute	129
Grouping Columns Using the <colgroup> Element	130
Columns Sharing Styles Using the <col> Element	132
<b>Accessibility Issues with Tables</b>	<b>132</b>
How Tables Linearize	132
Linearization of Tables Used for Layout	133
Linearization of Tables Used for Data	135
<b>Summary</b>	<b>136</b>
<b>Exercises</b>	<b>136</b>

# Contents

---

<b>Chapter 5: Forms</b>	<b>139</b>
<b>Introducing Forms</b>	<b>140</b>
<b>Creating a Form with the &lt;form&gt; Element</b>	<b>141</b>
The action Attribute	142
The method Attribute	142
The id Attribute	142
The name Attribute (deprecated)	142
The onsubmit Attribute	143
The onreset Attribute	143
The enctype Attribute	144
The accept-charset Attribute	144
The accept Attribute	144
The target Attribute	145
White Space and the <form> Element	145
<b>Form Controls</b>	<b>145</b>
Text Inputs	145
Buttons	150
Checkboxes	154
Radio Buttons	156
Select Boxes	158
File Select Boxes	164
Hidden Controls	165
Object Controls	166
<b>Creating Labels for Controls and the &lt;label&gt; Element</b>	<b>169</b>
<b>Structuring Your Forms with &lt;fieldset&gt; and &lt;legend&gt; Elements</b>	<b>171</b>
<b>Focus</b>	<b>173</b>
Tabbing Order	173
Access Keys	175
<b>Disabled and Read-Only Controls</b>	<b>176</b>
<b>Sending Form Data to the Server</b>	<b>178</b>
HTTP get	178
HTTP post	179
<b>Summary</b>	<b>183</b>
<b>Exercises</b>	<b>183</b>
<b>Chapter 6: Frames</b>	<b>185</b>
<b>Introducing the Frameset</b>	<b>185</b>
<b>When to Use Frames</b>	<b>188</b>
<b>The &lt;frameset&gt; Element</b>	<b>189</b>
The cols Attribute	189
The rows Attribute	191

---

Browser-Specific Extensions to the <frameset> Element	192
<b>The &lt;frame&gt; Element</b>	<b>194</b>
The src Attribute	195
The name Attribute	195
The frameborder Attribute	195
The marginwidth and marginheight Attributes	196
The noresize Attribute	196
The scrolling Attribute	196
The longdesc Attribute	197
<b>The &lt;noframes&gt; Element</b>	<b>197</b>
<b>Creating Links Between Frames</b>	<b>198</b>
Setting a Default Target Frame Using the <base> Element	200
<b>Nested Framesets</b>	<b>200</b>
<b>Floating or Inline Frames with &lt;iframe&gt;</b>	<b>204</b>
The <iframe> Element	206
<b>Summary</b>	<b>209</b>
<b>Exercises</b>	<b>209</b>
<b>Chapter 7: Cascading Style Sheets</b>	<b>211</b>
<b>Introducing CSS</b>	<b>212</b>
A Basic Example	213
Inheritance	216
<b>Where You Can Add CSS Rules</b>	<b>217</b>
The <link> Element	218
The <style> Element	220
Advantages of External CSS Style Sheets	220
<b>CSS Properties</b>	<b>221</b>
<b>Controlling Fonts</b>	<b>223</b>
The font-family Property	224
The font-size Property	226
The font-weight Property	227
The font-style Property	228
The font-variant Property	229
The font-stretch Property	230
The font-size-adjust Property	230
<b>Text Formatting</b>	<b>230</b>
The color Property	231
The text-align Property	231
The vertical-align Property	232
The text-decoration Property	234
The text-indent Property	234
The text-shadow Property	235

# Contents

---

The text-transform Property	235
The letter-spacing Property	236
The word-spacing Property	237
The white-space Property	237
The direction Property	238
The unicode-bidi Property	239
<b>Text Pseudo-Classes</b>	<b>239</b>
The first-letter Pseudo-Class	239
The first-line Pseudo-Class	240
<b>Selectors</b>	<b>243</b>
Universal Selector	243
The Type Selector	243
The Class Selector	244
The ID Selector	244
The Child Selector	244
The Descendent Selector	245
The Adjacent Sibling Selector	245
Using Child and Adjacent Sibling Selectors to Reduce Dependence on Classes in Markup	245
Attribute Selectors	247
<b>Lengths</b>	<b>249</b>
Absolute Units	249
Relative Units	249
<b>Percentages</b>	<b>251</b>
<b>Introducing the Box Model</b>	<b>251</b>
An Example Illustrating the Box Model	252
The Border Properties	255
The padding Property	258
The margin Property	259
Dimensions	260
<b>Summary</b>	<b>270</b>
<b>Exercises</b>	<b>270</b>
<b>Chapter 8: More Cascading Style Sheets</b>	<b>273</b>
<b>Links</b>	<b>274</b>
<b>Backgrounds</b>	<b>275</b>
The background-color Property	276
The background-image Property	277
The background-repeat Property	278
The background-position Property (for fixing position of backgrounds)	281
The background-attachment Property (for watermarks)	282
The background Property (the well-supported shorthand)	283

---

<b>Lists</b>	<b>283</b>
The list-style-type Property	284
The list-style-position Property	285
The list-style-image Property	286
The list-style Property (the shorthand)	286
The marker-offset Property	287
<b>Tables</b>	<b>287</b>
Table-Specific Properties	289
The border-collapse Property	289
The border-spacing Property	291
The caption-side Property	292
The empty-cells Property	292
The table-layout Property	294
<b>Outlines</b>	<b>294</b>
The outline-width Property	295
The outline-style Property	295
The outline-color Property	295
The outline Property (the shorthand)	296
<b>The :focus and :active Pseudo-Classes</b>	<b>296</b>
<b>Generated Content</b>	<b>297</b>
The :before and :after Pseudo-Elements	297
The content Property	298
<b>Miscellaneous Properties</b>	<b>301</b>
The cursor Property	301
The display Property	302
The visibility Property	302
<b>Additional Rules</b>	<b>304</b>
The @import Rule: Modularized Style Sheets	304
The @charset Rule	305
The !important Rule	305
<b>Positioning with CSS</b>	<b>305</b>
Normal Flow	306
The position Property	306
Box Offset Properties	307
Relative Positioning	307
Absolute Positioning	309
Fixed Positioning	310
The z-index Property	311
Floating Using the float Property	312
The clear Property	314
<b>Summary</b>	<b>320</b>
<b>Exercises</b>	<b>321</b>

## Contents

---

<b>Chapter 9: Page Layout</b>	<b>323</b>
<b>Understanding the Site</b>	<b>323</b>
Understanding a Site's Aims	324
Whom You Expect to Visit	325
New Content	326
Defining Your Site's Content	326
Grouping and Categorization	327
Creating a Site Map	328
Identifying Key Elements for Every Page	329
<b>Page Size (and Screen Resolution)</b>	<b>330</b>
Fixed-Width vs. Liquid Designs	331
<b>Designing Pages</b>	<b>337</b>
Sketching the Placement of Elements	337
Introducing the Style	339
Navigation	342
Home Pages	345
Content Pages	345
<b>Structuring Pages</b>	<b>346</b>
Single-Column Layouts	348
Two-Column Layouts	350
Three-Column Layouts	353
Sacrificial Columns	354
Advanced Layout Using CSS	356
Creating a Layout Using Nested Tables	356
<b>Summary</b>	<b>359</b>
<b>Exercises</b>	<b>359</b>
<b>Chapter 10: Design Issues</b>	<b>361</b>
<b>Text</b>	<b>362</b>
White Space Helps Make More Attractive Pages	362
Carefully Aligned Text Is More Readable	365
Adjusting Line Height Makes Text More Readable	365
Wide Columns of Text Are Harder to Read	366
Background Images Can Make Text Hard to Read	366
Choose Fonts Carefully	367
Fixed-Size Fonts Are Affected by Screen Resolution	369
<b>Navigation</b>	<b>369</b>
Menus	369
Links	374
Site Search Features	375

<b>Shading Multiple Rows of a Table</b>	<b>378</b>
<b>Forms</b>	<b>380</b>
Before Designing the Form	380
Designing the Form	382
<b>Summary</b>	<b>401</b>
<b>Exercises</b>	<b>401</b>
 <b>Chapter 11: Learning JavaScript</b>	 <b>403</b>
 <b>What Is Programming About?</b>	 <b>404</b>
<b>How to Add a Script to Your Pages</b>	<b>406</b>
Comments in JavaScript	408
The <noscript> Element	408
<b>The Document Object Model</b>	<b>410</b>
Introducing the Document Object Model	410
Objects, Methods, and Properties	412
The Forms Collection	415
Form Elements	416
Images Collection	419
Different Types of Objects	422
<b>Starting to Program with JavaScript</b>	<b>422</b>
<b>Variables</b>	<b>423</b>
Assigning a Value to a Variable	424
Lifetime of a Variable	424
<b>Operators</b>	<b>424</b>
Arithmetic Operators	425
Assignment Operators	425
Comparison Operators	426
Logical or Boolean Operators	427
String Operator	427
<b>Functions</b>	<b>427</b>
How to Define a Function	428
How to Call a Function	428
The Return Statement	429
<b>Conditional Statements</b>	<b>429</b>
if Statements	429
if . . . else Statements	430
A switch Statement	431
Conditional (or Ternary) Operator	432
<b>Looping</b>	<b>432</b>
while	433
do . . . while	434

# Contents

---

for	434
Infinite Loops and the break Statement	435
<b>Events</b>	<b>435</b>
<b>Built-in Objects</b>	<b>437</b>
String	437
Date	441
Math	444
Array	446
Window	447
<b>Writing JavaScript</b>	<b>449</b>
A Word About Data Types	450
Keywords	451
<b>Summary</b>	<b>451</b>
<b>Exercises</b>	<b>452</b>
<b>Chapter 12: Working with JavaScript</b>	<b>453</b>
<b>Practical Tips for Writing Scripts</b>	<b>453</b>
Has Someone Already Written This Script?	454
Reusable Functions	454
Using External JavaScript Files	455
Place Scripts in a Scripts Folder	455
<b>Form Validation</b>	<b>456</b>
When to Validate	456
How to Validate	456
<b>Form Enhancements</b>	<b>470</b>
Focus on First Form Item	470
Auto-Tabbing Between Fields	471
Disabling a Text Input	472
Case Conversion	474
Trimming Spaces from Beginning and End of Fields	474
Selecting All the Content of a Text Area	475
Check and Uncheck All Checkboxes	476
<b>Image Rollovers</b>	<b>482</b>
<b>Random Script Generator</b>	<b>485</b>
<b>Pop-Up Windows</b>	<b>486</b>
<b>JavaScript Libraries</b>	<b>487</b>
Animated Effects using Scriptaculous	488
Drag-and-Drop Sortable Lists Using Scriptaculous	490
Sortable Tables with MochiKit	492
Creating Calendars with YUI	494
Auto-Completing Text Inputs with YUI	495

---

<b>When Not to Use JavaScript</b>	<b>496</b>
Drop-Down Navigation Menus	497
Hiding Your E-mail Address	497
Quick Jump Select Boxes	497
Anything the User Requires from Your Site	497
<b>Summary</b>	<b>498</b>
<b>Exercises</b>	<b>498</b>
<b>Chapter 13: Putting Your Site on the Web</b>	<b>501</b>
<b>Meta Tags</b>	<b>502</b>
name and content Attributes	503
http-equiv and content	505
The scheme Attribute	508
<b>Testing Your Site</b>	<b>508</b>
The Importance of Directory Structure and Relative URLs	509
Validating HTML, XHTML, and CSS	509
Link Checking	513
Checking Different Screen Resolutions and Color Depths	514
Accessibility Checkers	514
Development Server or Live Server	515
Checking in Different Versions of Browsers	515
Pilot Testing	516
Proofreading	517
<b>Taking the Leap to Live</b>	<b>517</b>
Getting a Domain Name	517
Hosting	518
Search Engine Strategies	522
Other Web Marketing Possibilities	525
Statistical Analysis	526
Version Control	527
<b>What Next?</b>	<b>529</b>
Blogs	529
Discussion Boards or Forums	530
Adding a Search Utility	530
<b>Introducing Other Technologies</b>	<b>531</b>
Server-Side Web Programming: ASP.NET, and PHP	531
Choosing a Server-Side Language	532
Content Management	532
Flash	535
Learning Graphics Packages	536
<b>Summary</b>	<b>537</b>

## Contents

---

<b>Appendix A: Answers to Exercises</b>	<b>539</b>
<b>Appendix B: XHTML Element Reference</b>	<b>563</b>
<b>Appendix C: CSS Properties</b>	<b>607</b>
<b>Appendix D: Color Names and Values</b>	<b>637</b>
<b>Appendix E: Character Encodings</b>	<b>645</b>
<b>Appendix F: Special Characters</b>	<b>649</b>
<b>Appendix G: Language Codes</b>	<b>665</b>
<b>Appendix H: MIME Media Types</b>	<b>669</b>
<b>Appendix I: Deprecated and Browser-Specific Markup</b>	<b>681</b>
<b>Index</b>	<b>715</b>

# Introduction

There are a lot of books about designing and building web pages, so thank you for picking up this one. Why do I think it is different? Well, the Web has been around for over a decade now, and during its life many technologies have been introduced to help you create web pages, some of which have lasted, others of which have disappeared. Many books that teach you to write web pages are revisions of earlier versions of the same book and therefore still take the same approach as the previous edition did. The purpose of this book, however, is to teach you how to create pages for the Web as it is today and will be for the next few years. Then, once you have worked through this book, it should continue to serve as a helpful reference text you can keep nearby and dip into when you need to.

At one time, you needed to learn only one language to write web pages: HTML. As the Web has advanced, however, so have the technologies you need to learn in order to create effective and attractive web pages. As the title of this book suggests, you will be learning a few different languages:

- ❑ **HTML and XHTML:** HTML and XHTML are needed to explain the *structure* of any web pages. They're used to indicate what text should be considered a heading, where paragraphs start and end, and what images should appear in the document, and to specify links between different pages. As you might be relieved to hear, you shouldn't think of HTML and XHTML as two separate languages. Rather, you can consider XHTML as more like the latest version of HTML.
- ❑ **CSS:** CSS is used to control how a document should appear. For example, you can use it to specify that a typeface should be a large, bold, Arial typeface or that the background of a page should be a light green. It can also be used to control where different items appear on a page. For example, you can use CSS to present text in two columns on the same page.
- ❑ **JavaScript:** You learn a little bit of JavaScript to add interactivity to the web pages you create, and to work with the browser displaying the web page.

Despite the fact that you are looking at several languages, not just HTML, you can consider it a very good time to be coming to the Web because many of the technologies used to create web pages have matured, and favored methods, or "best practices," for creating web sites have been emerging. It is these that you will be learning.

## About the Book

As you have already seen, you'll be learning how to control the structure of a web page with HTML and XHTML, how to style it with CSS, and how to add interactivity with JavaScript. Just learning about the latest technologies, however, is not enough to ensure that you can write great web pages. As these technologies to write web pages have improved, so too have browsers (the programs and devices used to access the Web). Browsers have reflected — and on occasion even informed — the way the languages used to create web pages have developed. The problem, as you can probably imagine, is that not everyone has the latest software installed on his or her computer, and as a result you will not only want to be able to write

## Introduction

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pages that take advantage of some of the latest features of browsers, but you will also want to make sure that your pages work in some older browsers that are still popular today.

Because there has been so much change in the way web pages are built, and because there are so many different versions of web browsers, some features are listed in the book but are marked as “deprecated”; this means that while that section should still work in modern browsers, you are no longer advised to use it because software might not support it much longer.

Another issue you need to be aware of when writing web pages is the increasing number of devices capable of accessing the Web, such as mobile phones, PDAs (personal digital assistants), and TV set-top boxes. You will be relieved to know that many of these devices employ the same languages that you will be learning in this book — and by learning to use XHTML with CSS you will be able to create web sites that will last much longer than those written in plain old HTML.

Another area where the Web has changed from a few years back is the increased emphasis on usability and accessibility. *Usability* refers to making the site easy for users to get around (or navigate) and achieve what they came to your site for, whereas *accessibility* addresses making a site available to as many users as possible, in particular people with disabilities (who may have impaired vision or difficulty using a mouse). Many governments around the world will not issue a contract to build web sites for them unless the site will meet strict accessibility guidelines. A little careful thought before you build your web site means that people with vision impairments can either view your site with larger text or have it read to them by a screen reader. There are books dedicated to the topics of usability and accessibility and that are aimed at web developers who need to learn how to make their code more accessible and usable, but my aim is to teach you to code with many of these principles in mind from the start.

By the end of this book, you will be writing web pages that not only use the latest technologies, but also are still viewable by older browsers. Pages that look great can still be accessed by those with visual and physical impairments. These are pages that not only address the needs of today’s audiences but can also work on emerging technologies — and the skills you learn should be relevant longer.

## Whom This Book Is For

This book is written for anyone who wants to learn how to create web pages, and for people who might have dabbled in writing web pages (perhaps using some kind of web-page authoring tool) but want to really understand the languages of the Web to create better pages.

More experienced web developers can also benefit from this book because it teaches some of the latest technologies, such as XHTML, and encourages you to embrace web standards that not only meet the needs of the new devices that access the Web, but also help make your sites available to more visitors.

You don’t need any previous programming experience to work with this book. This is one of the first steps on the programming ladder. Whether you are just a hobbyist or want to make a career of web programming, this book teaches you the basics of programming for the Web. Sure, the term “programmer” might be associated with geeks, but as you will see by the end of the book, even if you prefer to be known as a web designer, you *need* to know how to code in order to write great web sites.

## What This Book Covers

By the end of this book, you will be able to create professional looking and well-coded web pages.

Not only will you learn the code that makes up markup languages such as XHTML, but you will also see how to apply this code so you can create sophisticated layouts for your pages, positioning text and images where you would like them to appear and getting the colors and fonts you want. Along the way, you will see how to make your pages easy to use and available to the biggest audience possible. You will also learn practical techniques such as how to make your web site available on the Internet and how to get search engines to recognize your site.

The main technologies covered in this book are HTML, XHTML, and CSS. You will also learn the basics of JavaScript, enough to work on some examples that add interactivity to your pages and allow you to work with basic scripts. Along the way, I introduce and point you to other technologies you might want to learn in the future.

The code I will encourage you to write is based on what are known as *web standards*; HTML, XHTML, and CSS are all created and maintained by the World Wide Web Consortium, or W3C ([www.w3.org/](http://www.w3.org/)), an organization dedicated to creating specifications for the Web. You will also learn about some features that are not standards; it is helpful to know some of these in case you come across such markup and need to know what it does. (In such cases, I make it clear that the features are not part of the standard.)

## What You Need to Use This Book

All you need to work through this book is a computer with a web browser (preferably Firefox 2 or higher, Safari 2 or higher, or Internet Explorer 6 or higher), and a simple text editor such as Notepad on Windows or TextEdit on Mac.

If you have a web-page editor program, such as Macromedia Dreamweaver or Microsoft FrontPage, you are welcome to use it, but I will not be teaching you how to use these programs. Each of these programs is different and entire books have been written about them. Even with such programs available, you can write much better sites when you really understand the code these programs generate because you'll often want to go in and edit this by hand.

## How This Book Is Organized

The first chapter of this book will show you how the main task in creating a web site is *marking up* the text you want to appear on your site using things called *elements* and *attributes*. As you will see, these elements and attributes describe the structure of a document (what is a heading, what is a paragraph of text, what is a link, and so on).

The first six chapters of the book describe the different elements and attributes that make up HTML and XHTML and how you can use them to write web pages. The chapters are organized into task-related areas,

## Introduction

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such as structuring a document into headings and paragraphs, creating links between pages, adding color and images, displaying tables, and so on. With each task or topic that is introduced you will see an example first to give you an idea of what is possible; then you can look at the elements and attributes used in detail.

I should mention that you do not need to read all the detailed explanations of every aspect of an element on your first reading of the book — as long as you have an idea of what is possible. For the sake of completeness (and to keep related information in the same place), I have included some functionality that you will rarely want to use. You can always come back to the finer detail later when you find the need to use some of the more obscure functionality. So, if you want to move on at a faster pace, feel free to get the gist of the markup and then move on.

Each chapter ends with exercises designed to get you working with the concepts you've just learned. Don't worry if you have to go back and review the content of the chapter in order to complete the exercises; this book has been created with the intention that it should be a helpful reference for years to come, so don't feel you need to learn everything by heart. Along the way, you'll see which browsers support each element, and you'll learn plenty of handy tips, tricks, and techniques for creating professional web pages.

Once you have seen how to create and structure a document using HTML and XHTML, you then learn how to make your pages look more attractive using cascading style sheets (CSS). You learn how to change the typefaces and size of fonts used, color of text, backgrounds and borders around items, and alignment of objects to the center, left, or right of the page.

Having worked through these two chapters, and using the examples in the book, you should be able to write quite complex web pages. These chapters will serve as a helpful reference you can keep coming back to and the examples will act as a toolkit for building your own sites.

Chapters 9 and 10 look at important web-page design issues. You see some examples of popular page layouts and how to construct them; you learn how to create a good navigation bar to allow users to find the pages they want on your site; you find out what makes a form effective; and you learn how to make your web sites available to as many people as possible. These chapters really build upon the theory you learned in the first half of the book and help you create professional-looking pages that attract users and make your site easy to use.

Chapters 11 and 12 introduce you to JavaScript, a programming language known as a *scripting language* that you use in web pages. While the entire JavaScript language is too large to teach you in two chapters, you should get a feel for how it works and see how to integrate scripts into your pages.

Chapter 13, the final chapter, prepares you to put your site on the Internet and covers web hosting, FTP, and validating your code. Finally, I give you some ideas of where you can go now that you've worked through this book; there are a lot of other things you might want to add to your site or learn in order to advance your web skills, and this chapter gives you an idea of what else is possible and what you need to learn to do that.

I have included several helpful appendixes, including a reference to the XHTML elements and CSS properties. There is an appendix that explains how XHTML and CSS specify colors. Other appendixes show you available character encodings, language codes, and escape characters that can be used with HTML, XHTML, CSS and JavaScript. Finally, there is an appendix on old markup that should not really be used any longer, in case you come across some of these older techniques when working on a site.

## Conventions

To help you get the most from the text and keep track of what's happening, this book uses a number of typographical conventions.

**Boxes like this one hold important, not-to-be forgotten information that is directly relevant to the surrounding text.**

*Tips, hints, tricks, and asides to the current discussion are set off and placed in italics like this.*

As for styles in the text:

- ❑ Important words are *italicized* when first introduced.
- ❑ Keystrokes appear like this: Ctrl+A.
- ❑ Filenames, URLs, and code within the text appear in monospace, like so: `www.wrox.com`.
- ❑ Code appears two different ways: General code examples are shown without a background. When I want to draw particular attention to a line of code, it will be highlighted on a gray background.

## Source Code

As you work through the examples in this book, you may choose either to type in all the code manually or to use the source code files that accompany the book. All of the source code used in this book is available for download at [www.wrox.com](http://www.wrox.com). Once at the site, simply locate the book's title (either by using the Search box or by using one of the title lists) and click the Download Code link on the book's detail page to obtain all the source code for the book.

*Because many books have similar titles, you may find it easiest to search by ISBN; this book's ISBN is 9780470259313.*

Once you download the code, just decompress it with your favorite compression tool. Alternately, you can go to the main Wrox code download page at [www.wrox.com/dynamic/books/download.aspx](http://www.wrox.com/dynamic/books/download.aspx) to see the code available for this book and all other Wrox books.

## Errata

I've made every effort to ensure that there are no errors in the text or in the code. However, no one is perfect, and mistakes do occur. If you find an error in this book, such as a spelling mistake or faulty piece of code, I would be very grateful for your feedback. By sending in errata, you may save another reader hours of frustration, and at the same time you will be helping to provide even higher quality information.

To find the errata page for this book, go to [www.wrox.com](http://www.wrox.com) and locate the title using the Search box or one of the title lists. Then, on the book details page, click the Book Errata link. On this page you can view all

## Introduction

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errata that has been submitted for this book and posted by Wrox editors. A complete book list including links to each book's errata is also available at [www.wrox.com/misc-pages/booklist.shtml](http://www.wrox.com/misc-pages/booklist.shtml).

If you don't spot "your" error on the Book Errata page, go to [www.wrox.com/contact/techsupport.shtml](http://www.wrox.com/contact/techsupport.shtml) and complete the form there to send us the error you discovered. We'll check the information and, if appropriate, post a message to the book's errata page and fix the problem in subsequent editions of the book.

## p2p.wrox.com

For author and peer discussion, join the P2P forums at [p2p.wrox.com](http://p2p.wrox.com). The forums are a web-based system for you to post messages related to Wrox books and related technologies and interact with other readers and technology users. The forums offer a subscription feature to e-mail you about topics of your choosing when new posts are made to the forums. Wrox authors, editors, other industry experts, and your fellow readers are present on these forums.

At <http://p2p.wrox.com> you will find a number of different forums that will help you not only as you read this book, but also as you develop your own applications. To join the forums, just follow these steps:

- 1.** Go to [p2p.wrox.com](http://p2p.wrox.com) and click the Register link.
- 2.** Read the terms of use and click Agree.
- 3.** Complete the required information to join as well as any optional information you wish to provide and click Submit.
- 4.** You will receive an e-mail with information describing how to verify your account and complete the registration process.

*You can read messages in the forums without joining P2P, but in order to post your own messages, you must join.*

Once you join, you can post new messages and respond to messages other users post. You can read messages at any time on the Web. If you would like to have new messages from a particular forum e-mailed to you, click the Subscribe to this Forum icon by the forum name in the forum listing.

For more information about how to use the Wrox P2P, be sure to read the P2P FAQs for answers to questions about how the forum software works as well as many common questions specific to P2P and Wrox books. To read the FAQs, click the FAQ link on any P2P page.

# 1

## Creating Structured Documents

In this chapter, you meet the first technologies you need to learn in order to write web pages: HTML and XHTML. In fact, what you will really be learning is XHTML—although I will be explaining the differences between HTML and XHTML as we go along. (As I already mentioned, you can consider XHTML simply to be the latest version of HTML.)

The main goal of this chapter is to demonstrate how the primary role of XHTML is to describe the structure of your documents.

In this chapter, then, you:

- Learn the difference between tags, elements, and attributes
- See how a web page uses markup to describe how the page should be structured
- Meet the elements that allow you to mark up text such as headings and paragraphs
- Learn many other elements that can add additional presentation information and phrasing to your documents
- See how to add bulleted and numbered lists to documents
- Are introduced to some core concepts that distinguish different types of elements in XHTML

By the end of the chapter you will have a good idea of how to structure a page in XHTML and will have written your first web pages.

### A Web of Structured Documents

Every day, you come across all kinds of printed documents—newspapers, train timetables, insurance forms. The Web is like a sea of documents all linked together; these documents bear a strong similarity to the documents that you meet in everyday life. So let's think for a moment about the structure of some of the documents we see around us, and how they compare to web pages.

## Chapter 1: Creating Structured Documents

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Every morning I used to read a newspaper. A newspaper is made up of several stories or articles (and probably a fair smattering of advertisements, too). Each story has a headline and then some paragraphs, perhaps a subheading, and then some more paragraphs; it may also include a picture or two.

I don't buy a daily paper anymore, as I tend to look at news online, but the structure of articles on news web sites is very similar to the structure of articles in newspapers. Each article is made up of headings, paragraphs of text, and the odd picture. The parallel is quite clear; the only real difference is that each story gets its own page on a web site, and that page is accessed by clicking on a headline or a brief summary either on the site's main home page or one of the home pages for a subsection of the site (such as the politics, sports, or entertainment sections).

Consider another example: Say I'm catching a train to see a friend, so I check the schedule to see what time the trains go that way. The main part of the schedule is a *table* telling me what times trains arrive and when they depart from different stations. In the same way that a lot of documents have headings and paragraphs, a lot of other documents use tables; from the stocks and shares pages in the financial supplement of your paper to the TV listings at the back, you come across tables of information every day—and these are often recreated on the Web.

Another kind of document you often come across is a form. For example, I have a form sitting on my desk (which I really must mail) from an insurance company. This form contains fields for me to write my name, address, and the amount of coverage I want, and boxes I have to check to indicate the number of rooms in the house and what type of lock I have on my front door. Indeed, there are lots of forms on the Web, from a simple search box that asks what you are looking for to the registration forms you are required to go through before you can place an online order for books or CDs.

As you can see, there are many parallels between the structure of printed documents you come across every day and pages you see on the Web. So you will hardly be surprised to learn that when it comes to writing web pages, your code tells the web browser the structure of the information you want to display—what text to put in a heading, or in a paragraph, or in a table, and so on—so that the browser can present it properly to the user.

In order to tell a web browser the structure of a document—how to make a heading, a paragraph, a table, and so on—you need to learn HTML and XHTML.

## Introducing XHTML

XHTML, or Extensible Hypertext Markup Language, and its predecessor HTML, are the most widely used languages on the Web. As its name suggests, XHTML is a *markup language*, which may sound complicated, until you realize that you come across markup every day.

When creating a document in a word processor, you can add styles to the text to explain the document's structure. For example, you can distinguish headings from the main body of the text using a heading style (usually with a larger font). You can use the Enter (or Return) key to start a new paragraph. You can insert tables into your document to hold data, or create bulleted lists for a series of related points, and so on. While this does affect the presentation of the document, the key purpose of this kind of markup is to provide a structure that makes the document easier to understand.

When marking up documents for the Web, you are performing a very similar process, except you do it by adding things called *tags* to the text. With XHTML the key thing to remember is that you are adding

## Chapter 1: Creating Structured Documents

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the tags to indicate the *structure* of the document, which part of the document is a heading, which parts are paragraphs, what belongs in a table, and so on. Browsers such as Internet Explorer, Firefox, and Safari will use this markup to help present the text in a familiar fashion, similar to that of a word processor (headings are bigger than the main text, there is space between each paragraph, lists of bullet points have a circle in front of them). However the way these are presented is up to the browser; the XHTML specification does not say which font should be used or what size that font should be.

*While earlier versions of HTML allowed you to control the presentation of a document—things like which typefaces and colors a document should use—XHTML markup is not supposed to be used to style the document; that is the job of CSS, which you meet in Chapter 7.*

Let's have a look at a very simple web page. As I mentioned in the introduction, you don't need any special programs to write web pages—you can simply use a text editor such as Notepad on Windows orTextEdit on a Mac, and save your files with an .html file extension. You can download this example along with all the code for this book from the Wrox web site at [www.wrox.com](http://www.wrox.com); the example is in the Chapter 1 folder and is called ch01\_eg01.html.

```
<html>
  <head>
    <title>Popular Websites: Google</title>
  </head>
  <body>
    <h1>About Google</h1>
    <p>Google is best known for its search engine, although
       Google now offers a number of other services.</p>
    <p>Google's mission is to organize the world's
       information and make it universally accessible and
       useful.</p>
    <p>Its founders Larry Page and Sergey Brin started
       Google at Stanford University.</p>
  </body>
</html>
```

This may look a bit confusing at first, but it will all make sense soon. As you can see, there are several sets of angle brackets with words or letters between them, such as `<html>`, `<head>`, `</title>`, and `</body>`. These angle brackets and the words inside them are known as *tags*, and these are the markup we have been talking about. Figure 1-1 illustrates what this page would look like in a web browser.



Figure 1-1

## Chapter 1: Creating Structured Documents

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As you can see, this document contains the heading “About Google” and a paragraph of text to introduce the company. Note also that it says “Popular Websites: Google” in the top-left of the browser window; this is known as the *title* of the page.

To understand the markup in this first example, you need to look at what is written between the angle brackets and compare that with what you see in the figure, which is what you will do next.

### Tags and Elements

If you look at the first and last lines of the code for the last example, you will see pairs of angle brackets containing the letters `<html>`. The two brackets and all of the characters between them are known as a *tag*, and there are lots of tags in the example. All the tags in this example come in pairs; there are *opening tags* and *closing tags*. The closing tag is always slightly different from the opening tag in that it has a forward slash after the first angled bracket `</html>`.

A pair of tags and the content these include are known as an *element*. In Figure 1-2, you can see the heading for the page of the last example.

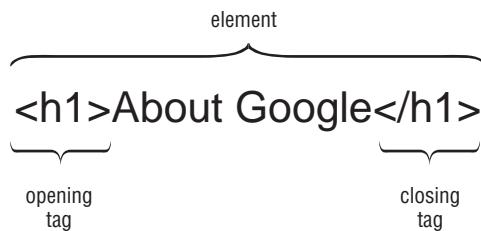


Figure 1-2

The opening tag says “This is the beginning of a heading” and the closing tag says “This is the end of a heading.” Like most of the tags in XHTML, the text inside the angled brackets explains the purpose of the tag—here `h1` indicates that it is a level 1 heading (or top-level heading). As you will see shortly, there are also tags for subheadings (`<h2>`, `<h3>`, `<h4>`, `<h5>`, and `<h6>`). Without the markup, the words “About Google” in the middle of the tags would just be another bit of text; it would not be clear that they formed the heading.

Now look at the three paragraphs of text about the company; each one is held between an opening `<p>` tag and a closing `</p>` tag. And, you guessed it, the `p` stands for paragraph.

Because this basic concept is so important to understand, I think it bears repeating: *tags* are the angle brackets and the letters and numbers between them, whereas *elements* are tags and anything between the opening and closing tags.

# Chapter 1: Creating Structured Documents

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As you can see, the markup in this example actually describes what you will find between the tags, and the added meaning the tags give is describing the structure of the document. Between the opening `<p>` and closing `</p>` tags are paragraphs, and between the `<h1>` and `</h1>` tags is a heading. Indeed, the whole document is contained between opening `<html>` and closing `</html>` tags.

You will often find that terms from a family tree are used to describe the relationships between elements. For example, an element that contains another element is known as the *parent*, while the element that is between the parent element's opening and closing tags is called a *child* of that element. So, the `<title>` element is a child of the `<head>` element, the `<head>` element is the parent of the `<title>` element, and so on. Furthermore, the `<title>` element can be thought of as a grandchild of the `<html>` element.

XHTML tags should always be written in lowercase letters.

## Separating Heads from Bodies

Whenever you write a web page in XHTML, the whole of the page is contained between the opening `<html>` and closing `</html>` tags, just as it was in the last example. Inside the `<html>` element, there are two main parts to the page:

- ❑ **The `<head>` element:** Often referred to as the head of the page, this contains information *about* the page (this is not the main content of the page). It is information such as a title and a description of the page, or keywords that search engines can use to index the page. It consists of the opening `<head>` tag, the closing `</head>` tag, and everything in between.
- ❑ **The `<body>` element:** Often referred to as the body of the page, this contains the information you actually see in the main browser window. It consists of the opening `<body>` tag, closing `</body>` tag, and everything in between.

Inside the `<head>` element of the first example page, you can see a `<title>` element:

```
<head>
  <title>Popular Websites: Google</title>
</head>
```

Between the opening and closing `title` tags are the words `Popular Websites: Google`, which is the title of this web page. If you remember Figure 1-1, which showed the screenshot of this page, I brought your attention to the words right at the top of the browser window. This is where browsers like Internet Explorer, Firefox, and Safari display the title of a document; it is also the name they use when you save a page in your favorites.

The real content of your page is held in the `<body>` element, which is what you want users to read, and is shown in the main browser window.

# Chapter 1: Creating Structured Documents

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The **head** element contains information about the document, which is not displayed within the main page itself. The **body** element holds the actual content of the page that is viewed in your browser.

You may have noticed that the tags in the example you have been looking at appear in a symmetrical order. If you want to have one element inside another, then both the element's opening and closing tags must be inside the containing element. For example, the following is allowed:

```
<p> This paragraph contains some <em>emphasized text.</em></p>
```

Whereas the following is wrong because the closing `</em>` tag is not inside the paragraph element:

```
<p> This paragraph contains some <em>emphasized text. </p></em>
```

In other words, if an element is to contain another element, it must wholly contain that element. This is referred to as *nesting* your elements correctly.

## Attributes Tell Us About Elements

What really differentiates web documents from standard documents are the links (or hyperlinks) that take you from one web page to another. Let's take a look at an example of a link by adding one to the example you just looked at. Links are created using an `<a>` element (the `a` stands for anchor).

Here we will add a link from this page to Google in a new paragraph at the end of the document. There is just one new line in this example (code sample `ch01_eg02.html`) and that line is highlighted:

```
<html>
  <head>
    <title>Popular Websites: Google</title>
  </head>
  <body>
    <h1>About Google</h1>
    <p>Google is best known for its search engine, although Google now offers a
       number of other services.</p>
    <p>Google's mission is to organize the world's information and make it
       universally accessible and useful.</p>
    <p>Its founders Larry Page and Sergey Brin started Google at Stanford
       University.</p>
    <p><a href="http://www.Google.com/">Click here to visit Google's Web
       site.</a></p>
  </body>
</html>
```

Inside this new paragraph is the `<a>` element that creates the link. Between the opening `<a>` tag and the closing `</a>` tag is the text that you can click on, which says "Click here to visit Google's Web site." Figure 1-3 shows you what this page looks like in a browser.



**Figure 1-3**

If you look closely at the opening tag of the link, it carries something called an *attribute*. In this case it's the `href` attribute; this is followed by an equal sign, and then the URL for Google's web site in quotation marks. In this case, the `href` attribute is telling you where the link should take you. You look at links in greater detail in the next chapter, but for the moment this illustrates the purpose of attributes.

Attributes are used to say something about the element that carries them, and they always appear on the opening tag of the element that carries them. All attributes are made up of two parts: a *name* and a *value*:

- ❑ The *name* is the property of the element that you want to set. In this example, the `<a>` element carries an attribute whose name is `href`, which you can use to indicate where the link should take you.
- ❑ The *value* is what you want the value of the property to be. In this example, the value was the URL that the link should take you to, so the value of the `href` attribute is `http://www.Google.com`.

The value of the attribute should always be put in double quotation marks, and it is separated from the name by the equal sign. If you wanted the link to open in a new window, you could add a `target` attribute to the opening `<a>` tag as well, and give it a value of `_blank`:

```
<a href="http://www.Google.com" target="_blank">
```

This illustrates that elements can carry several attributes, although an element should never have two attributes of the same name.

**All attributes are made up of two parts, the attribute's name and its value, separated by an equal sign. Values should be held within double quotation marks. All XHTML attribute names should be written in lowercase letters.**

# Chapter 1: Creating Structured Documents

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## The XML Declaration

Sometimes you will see something that is known as the XML Declaration at the beginning of an XHTML document. The XHTML language was actually written using another language called XML (Extensible Markup Language, which is used to create markup languages), and any XML document can begin with this optional XML declaration:

```
<?xml version="1.0" encoding="UTF-8" ?>
```

If you include the XML declaration, it must be right at the beginning of the document; there must be nothing before it, not even a space. The encoding attribute indicates the encoding used in the document.

*An encoding (short for character encoding) represents how a program or operating system stores characters that you might want to display. Because different languages have different characters, and indeed because some programs support more characters than others, there are several different encodings.*

## Document Type Declaration

As mentioned previously, XHTML is the successor to HTML—although you can just think of it as being the latest version. XHTML employs a stricter syntax than its predecessor HTML. For example, your element and attribute names in XHTML must all be written in lowercase (whereas earlier versions of HTML were not case-sensitive), every element that has some content must have a corresponding closing element, and some of the elements and attributes may be marked as deprecated—meaning that they were likely to be phased out in future versions of XHTML.

Each XHTML page should therefore begin with a DOCTYPE declaration to indicate to a browser (or any other program) the version of HTML or XHTML that is being used in that page.

While I have been talking about XHTML as one language, there were actually three versions or flavors of XHTML released—this was done to help existing web developers make the transition from HTML to XHTML:

- ❑ **Transitional XHTML 1.0**, which still allowed developers to use the deprecated markup from HTML 4.1 (which is likely to be phased out) but required the author to use the new stricter syntax.
- ❑ **Strict XHTML 1.0**, which was to signal the path forward for XHTML, without the deprecated stylistic markup and obeying the new stricter syntax.
- ❑ **Frameset XHTML 1.0**, which is used to create web pages that use a technology called *frames* (you meet frames in Chapter 6).

If by now you are feeling a little overwhelmed by all the different versions of HTML and XHTML, don't be! Throughout this book, you will be primarily learning Transitional XHTML 1.0. In the process, you will learn which elements and attributes have been marked as deprecated and what the alternatives for using these are. If you avoid the deprecated elements and attributes, you will automatically be writing Strict XHTML 1.0.

The DOCTYPE declaration goes before the opening `<html>` tag in a document, and after the optional XML Declaration if you have used it.

# Chapter 1: Creating Structured Documents

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If you are writing Transitional XHTML 1.0 (and include stylistic markup in your document), then your DOCTYPE declaration should look like this:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
```

If you are writing Strict XHTML 1.0, your DOCTYPE declaration will look like this:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"  
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
```

For frameset documents (discussed in Chapter 6), your DOCTYPE declaration would look like this:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Frameset//EN"  
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-frameset.dtd">
```

**A Strict XHTML document *must* contain the DOCTYPE declaration before the root element; however, you are not required to include the DOCTYPE declaration if you are creating a transitional or frameset document.**

Having learned Transitional XHTML 1.0, you should be able to understand older versions of HTML and be safe in the knowledge that (unless specifically warned), your XHTML code will work in the majority of browsers used on the Web today.

## Core Elements and Attributes

Now that you understand how the contents of a web page are marked up using elements that describe the structure of the document, the next step is to learn all the elements you can use to describe the structure of the various kinds of document you might wish to display on the Web. The rest of this chapter, and much of the next few chapters, will introduce you to all these elements.

As each element is introduced, I will be quite thorough about how it may be used, and which attributes it may take. This allows the book to act as a complete reference once you have learned how to write web pages. But, when you are first going through it, if you feel you understand what an element is used for, feel free to skip further ahead in that chapter if you want to—you can always come back later and read about it again.

Let's start by taking a closer look at the four main elements that form the basic structure of every document: `<html>`, `<head>`, `<title>`, and `<body>`. These four elements should appear in every XHTML document that you write, and you will see them referred to throughout this book as the *skeleton* of the document.

### The `<html>` Element

The `<html>` element is the containing element for the whole XHTML document. After the optional XML declaration and required DOCTYPE declaration, each XHTML document should have an opening `<html>` tag and each document should end with a closing `</html>` tag.

# Chapter 1: Creating Structured Documents

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If you are writing Strict XHTML 1.0, the opening tag must also include something known as a *namespace identifier* (this indicates that the markup in the document belongs to the XHTML 1.0 namespace). Therefore the opening tag should look like this:

```
<html xmlns="http://www.w3.org/1999/xhtml">
```

While it is not strictly required in Transitional XHTML documents, it is a good practice to use it on all XHTML documents.

Only two elements appear as direct children of an `<html>` element: `<head>` and `<body>` (although the `<head>` and `<body>` elements will usually contain many more elements).

The `<html>` element can also carry the following attributes, which you will meet in the “Attribute Groups” section later in this chapter:

`id` `dir` `lang` `xml:lang`

You may sometimes come across the use of the `version` attribute in HTML 4.1 and earlier to indicate which version of HTML the document uses, although it is usually left off. XHTML documents should use the DOCTYPE declaration along with the `xmlns` attribute instead to indicate which version of XHTML they use.

## The `<head>` Element

The `<head>` element is just a container for all other header elements. It should be the first thing to appear after the opening `<html>` tag.

Each `<head>` element should contain a `<title>` element indicating the title of the document, although it may also contain any combination of the following elements, in any order:

- ❑ `<base>`, which you will meet in Chapter 2.
- ❑ `<object>`, which is designed to include images, JavaScript objects, Flash animations, MP3 files, QuickTime movies, and other components of a page. It is covered in Chapter 3.
- ❑ `<link>` to link to an external file, such as a style sheet or JavaScript file, as you will see in Chapter 7.
- ❑ `<style>` to include CSS rules inside the document; it is covered in Chapter 7.
- ❑ `<script>` for including script in the document, which you’ll see in Chapter 11.
- ❑ `<meta>`, which includes information about the document such as keywords and a description, which are particularly helpful for search applications; this is covered in Chapter 13.

The `profile` attribute is not actually in use yet, although it was included so it could be used in the future to specify a URL for something known as a *profile* that would describe the content of the document. The other attributes are covered in the “Attribute Groups” section later in this chapter.

The opening `<head>` tag can carry the following attributes:

```
id dir lang xml:lang profile
```

## The `<title>` Element

You should specify a title for every page that you write. It lives inside the `<title>` element (which, as you saw earlier in the chapter, is a child of the `<head>` element). It is used in several ways:

- At the very top of a browser window (as you saw in the first example and Figure 1-1)
- As the default name for a bookmark in browsers such as IE, Firefox, and Safari
- By search engines that use its content to help index pages

Therefore, it is important to use a title that really describes the content of your site. For example, the home page of our site should not just say “Home Page”; rather it should describe what your site is about. For example, rather than just saying Wrox Home Page, it is more helpful to write:

```
<title>Wrox: Books for programmers written by programmers</title>
```

The test for a good title is whether a visitor can tell what she will find on that page just by reading the title, without looking at the actual content of the page.

The `<title>` element should contain only the text for the title; it may not contain any other elements. The `<title>` element can carry the following attributes, which are covered in the “Attribute Groups” section later in the chapter:

```
id dir lang xml:lang
```

## The `<body>` Element

The `<body>` element appears after the `<head>` element and contains the part of the web page that you actually see in the main browser window, which is sometimes referred to as *body content*. It may contain anything from a couple of paragraphs under a heading to more complicated layouts containing forms and tables, and is likely to constitute the majority of any XHTML document. Most of what you will be learning in this and the following four chapters will be written between the opening `<body>` tag and closing `</body>` tag.

The `<body>` element may carry all of the attributes from the *attribute groups* you are about to meet in the next section. If you are using Transitional XHTML or HTML 4.1, you can use any of the following deprecated attributes on the `<body>` element (which are covered in Appendix I):

```
background bgcolor alink link vlink text
```

There are also several browser specific attributes that you might see used on the `<body>` element; these also are covered in Appendix I:

```
language, topmargin, bottommargin, leftmargin, rightmargin, scroll,  
bgproperties, marginheight, marginwidth
```

# Attribute Groups

As you have seen, attributes live on the opening tag of an element and provide extra information about the element that carries them. All attributes consist of a *name* and a *value*; the name reflects a property of the element the attribute is describing, and the value is a value for that property. For example, the `xml:lang` attribute describes the language used within that element; a value such as `EN-US` would indicate that the language used inside the element is U.S. English. Many of the elements in XHTML can carry some or all of the attributes you will meet in this section.

There are three groups of attributes that many of the XHTML elements can carry (as you have already seen, the `<html>`, `<head>`, `<title>`, and `<body>` elements share some of these attributes). Don't worry if they seem a little abstract at the moment; they will make more sense as you read on, but because they are used by so many elements I have grouped them here to avoid having to repeat them each time they come up. As I say, don't worry if they do not make complete sense at the moment, as long as you remember where you read this. You can keep referring back to them when you need to. The three attribute groups are:

- ❑ **Core attributes:** The `class`, `id`, and `title` attributes
- ❑ **Internationalization attributes:** The `dir`, `lang`, and `xml:lang` attributes
- ❑ **UI events:** Attributes associated with events `onclick`, `ondoubleclick`, `onmousedown`, `onmouseup`, `onmouseover`, `onmousemove`, `onmouseout`, `onkeypress`, `onkeydown`, and `onkeyup` (these are covered in more detail in Chapter 11)

Together, the core attributes and the internationalization attributes are known as the *universal attributes*.

## Core Attributes

The four core attributes that can be used on the majority of XHTML elements (although not all) are:

`id title class style`

Where these attributes occasionally have special meaning for an element that differs from the description given here, I revisit them; otherwise their use can generally be described as you see in the subsections that follow.

### ***The id Attribute***

The `id` attribute can be used to uniquely identify any element within a page. You might want to uniquely identify an element so that you can link to that specific part in the document, or to specify the element so that you can associate a CSS style or JavaScript to the content of that one element within the document.

The syntax for the `id` attribute is as follows (where *string* is your chosen value for the attribute):

`id="string"`

For example, the `id` attribute could be used to distinguish between two paragraph elements, like so:

```
<p id="accounts">This paragraph explains the role of the accounts department.</p>
<p id="sales">This paragraph explains the role of the sales department.</p>
```

Note that there are some special rules for the value of the `id` attribute. It must:

- ❑ Begin with a letter (A-Z or a-z) and can then be followed by any number of letters, digits (0-9), hyphens, underscores, colons, and periods (you may not start the value with a digit, hyphen, underscore, colon, or period).
- ❑ Remain unique within that document; no two `id` attributes may have the same value within that XHTML document.

Before the `id` attribute was introduced, the `name` attribute served a similar purpose in HTML documents, but its use was deprecated in HTML 4.01, and now you should generally use the `id` attribute in XHTML documents. If you need to use the `name` attribute, it is available in Transitional XHTML, but not Strict XHTML (you might want to use the `name` attribute if you are dealing with older browsers that were written before the `id` attribute was introduced).

## The `class` Attribute

Although the `id` attribute uniquely identifies a particular element, the `class` attribute is used to specify that an element belongs to a *class* of element. It is commonly used with CSS, so you will learn more about the use of the `class` attribute in Chapter 7, which introduces CSS. The syntax of the `class` attribute is as follows:

```
class="className"
```

The value of the attribute may also be a space-separated list of class names. For example:

```
class="className1 className2 className3"
```

## The `title` Attribute

The `title` attribute gives a suggested title for the element. The syntax for the `title` attribute is as follows:

```
title="string"
```

The behavior of this attribute will depend upon the element that carries it, although it is often displayed as a tooltip or while the element is loading.

Not every element that *can* carry a `title` attribute really needs one, so when we meet an element that particularly benefits from use of this attribute, I will show you the behavior it has when used with that element.

## The `style` Attribute (*deprecated*)

The `style` attribute allows you to specify CSS rules within the element. You meet CSS in Chapter 7, but for the moment here is an example of how it might be used:

```
<p style="font-family:arial; color:#FF0000;">Some text </p>
```

# Chapter 1: Creating Structured Documents

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As a general rule, however, it is best to avoid the use of this attribute. This attribute is marked as deprecated in XHTML 1.0 (which means it will be removed from future versions of XHTML). If you want to use CSS rules to govern how an element appears, it is better to use a separate style sheet instead. You will see each of these techniques in Chapter 7, which introduces CSS.

## Internationalization

There are three internationalization attributes that help users write pages for different languages and character sets, and they are available to most (although not all) XHTML elements (which is important in multi-lingual documents).

`dir lang xml:lang`

Even in current browsers, support for these attributes is still very patchy, and you are best off specifying a character set that will create text in the direction you require, although the `xml:lang` attribute could be used by other XML-aware applications.

Here is the web address of a helpful W3C document that describes internationalization issues in greater detail, although we will briefly look at each of these attributes next:

<http://www.w3.org/TR/i18n-html-tech/>

*The internationalization attributes are sometimes referred to as the i18n attributes, an odd name that comes from the draft-ietf-html-i18n specification in which they were first defined.*

### The `dir` Attribute

The `dir` attribute allows you to indicate to the browser the direction in which the text should flow. When you want to indicate the directionality of a whole document (or the majority of the document), it should be used with the `<html>` element rather than the `<body>` element for two reasons: the `<html>` element has better support in browsers, and it will then apply to the header elements as well as those in the body. The `dir` attribute can also be used on elements within the body of the document if you want to change the direction of a small portion of the document.

The `dir` attribute can take one of two values, as you can see in the table that follows.

Value	Meaning
<code>ltr</code>	Left to right (the default value)
<code>rtl</code>	Right to left (for languages such as Hebrew or Arabic that are read right to left)

### The `lang` Attribute

The `lang` attribute allows you to indicate the main language used in a document, but this attribute was kept in XHTML only for backwards compatibility with earlier versions of HTML. It has been replaced by the `xml:lang` attribute in new XHTML documents (which is covered in the next section). However, the

# Chapter 1: Creating Structured Documents

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XHTML recommendation suggests that you use both the `lang` and the `xml:lang` attributes on the `<html>` element in your XHTML 1.0 documents (to achieve maximum compatibility across different browsers).

The `lang` attribute was designed to offer language-specific display to users, although it has little effect in the main browsers. The real benefit of using the `lang` attribute is with search engines (which can tell the user which language the document is authored in), screen readers (which might need to pronounce different languages in different ways), and applications (which can alert users when they either do not support that language or it is a different language than their default language). When used with the `<html>` element it applies to the whole document, although it can be used on other elements, in which case it just applies to the content of those elements.

The values of the `lang` attribute are ISO-639 standard two-character language codes. If you want to specify a dialect of the language, you can follow the language code with a dash and a subcode name. The table that follows offers some examples.

Value	Meaning
ar	Arabic
en	English
en-us	U. S. English
zh	Chinese

A list of language codes for most of the main languages in use today can be found in Appendix G.

## ***The `xml:lang` Attribute***

The `xml:lang` attribute is the XHTML replacement for the `lang` attribute. It is an attribute that is available in all languages that are written in XML (you may remember earlier in the chapter that I mentioned that XHTML was written in XML), which is why it is prefixed by the characters `xml:`. The value of the `xml:lang` attribute should be an ISO-639 country code like those listed in the previous section; a full list appears in Appendix G.

While it has no effect in the main browsers, other XML-aware applications and search engines may use this information, and it is good practice to include the `xml:lang` attribute in your documents. When used with the `<html>` element, it applies to the whole document, although it can be used on other elements, in which case it just applies to the content of those elements.

## ***UI Events***

The UI event attributes allow you to associate an *event*, such as a key press or the mouse being moved over an element, with a script (a portion of programming code that runs when the event occurs). For example, when someone moves a mouse over the content of a certain element you might use a script to make it change color.

## Chapter 1: Creating Structured Documents

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You will meet the UI events in more detail in Chapter 14, although their names indicate quite clearly what event they are associated with; for example, `onclick` fires when a user clicks on that element's content, `onmousemove` fires when a mouse moves, and `onmouseout` fires when a user moves the mouse out of the content of a particular element.

There are ten events, known collectively as *common events*:

```
onclick, ondoubleclick, onmousedown, onmouseup, onmouseover, onmousemove,  
onmouseout, onkeypress, onkeydown, onkeyup
```

The `<body>` and `<frameset>` elements also have the following events for when a page opens or is closed:

```
onload onunload
```

Finally, there are a number of events that work with forms only (which are mentioned in Chapter 5 and again in Chapter 11):

```
onfocus, onblur, onsubmit, onreset, onselect, onchange
```

Now that you have made your way through the preliminaries and learned about the elements that make up the skeleton of an XHTML document, it's time to get down to business marking up the text that will appear on your web pages.

## Basic Text Formatting

You've seen the skeleton structure of an XHTML document and the core attributes, so it is now time to get back to looking at how you mark up text in order to describe its structure. Because almost every document you create will contain some form of text, the elements you are about to meet are the fundamental building blocks of most pages.

While going through this section it is important to remember that, while one browser might display each of these elements in a certain way, another browser could display very different results; the font sizes (and therefore the amount of space a section of text takes up) will change between browsers, as will the typefaces used. You will not really be learning how to control the appearance (typefaces, colors, and font sizes) of text until Chapter 7.

In this section, you learn how to use what are known as *basic text formatting elements*:

```
h1, h2, h3, h4, h5, h6
```

```
p, br, pre
```

If you want people to read what you have written, then structuring your text well is even more important on the Web than when writing for print. People have trouble reading long, wide paragraphs of text on web sites unless they are broken up well (as you will see in Chapter 9), so getting into good habits from the start of your web development career will help ensure that your pages get the attention they deserve.

Before you get started on the elements that you will use to mark up your text, it helps to know how text is displayed by default (it is up to you to tell the browser if you want it to treat text differently).

## White Space and Flow

Before you start to mark up your text, it is best to understand what XHTML does when it comes across spaces and how browsers treat long sentences and paragraphs of text.

You might think that if you put several consecutive spaces between two words, the spaces would appear between those words onscreen, but this is not the case; by default, only one space will be displayed. This is known as *white space collapsing*. Similarly, if you start a new line in your source document, or you have consecutive empty lines, these will be ignored and simply treated as one space, as will tab characters. For example look at the following paragraph (taken from ch01\_eg03.html in the code samples):

```
<p>This paragraph shows how multiple spaces between words are treated as a single space. This is known as white space collapsing, and the big spaces between some of the words will not appear in the browser.
```

It also demonstrates how the browser will treat multiple carriage returns (new lines) as a single space, too.</p>

As you can see in Figure 1-4, the browser treats the multiple spaces and several carriage returns (where text appears on a new line) as if there were only one single space.

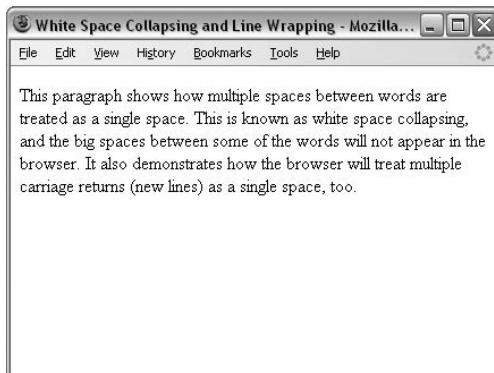


Figure 1-4

As Figure 1-4 also shows, when a browser displays text it will automatically *wrap* the text onto new lines when it runs out of space. If you look again at the code for this example, and look at where each new line starts, the results are different on the screen than they are in the code. You can try this out for yourself, as all of the examples are available with the download code for this book; just try resizing the browser window (making it smaller and larger) and notice how the text wraps at new places on the screen.

## Chapter 1: Creating Structured Documents

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This can be particularly helpful because it allows you to add spaces to your code that will not show up in the actual document, and these spaces can be used to indent your code, which makes it easier to read. The first two examples in this chapter demonstrated indented code, where child elements are indented from the left to distinguish them from their parent elements. This is something that I do throughout this book to make the code more readable. (If you want to preserve the spaces in a document, you need to use either the `<pre>` element, which you learn about later in the chapter or the `&nbsp;` entity reference, which you learn about in Appendix F.)

It is therefore extremely important that you learn how to use the elements in the rest of this chapter to break up and control the presentation of your text.

### **Creating Headings Using *hn* Elements**

No matter what sort of document you are creating, most documents have headings in some form or other. Newspapers use headlines, a heading on a form tells you the purpose of the form, the title of a table of sports results tells you the league or division the teams play in, and so on.

In longer pieces of text, headings can also help structure a document. If you look at the table of contents for this book, you can see how different levels of headings have been arranged to add structure to the book, with subheadings under the main headings.

XHTML offers six levels of headings, which use the elements `<h1>`, `<h2>`, `<h3>`, `<h4>`, `<h5>`, and `<h6>`. While browsers *can* display headings differently, they tend to display the `<h1>` element as the largest of the six and `<h6>` as the smallest, CSS can be used to override the size and style of any of the elements. The levels of heading would look something like those in Figure 1-5 (ch01\_eg04.html).

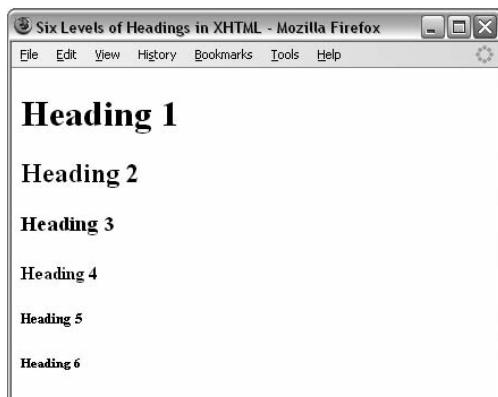


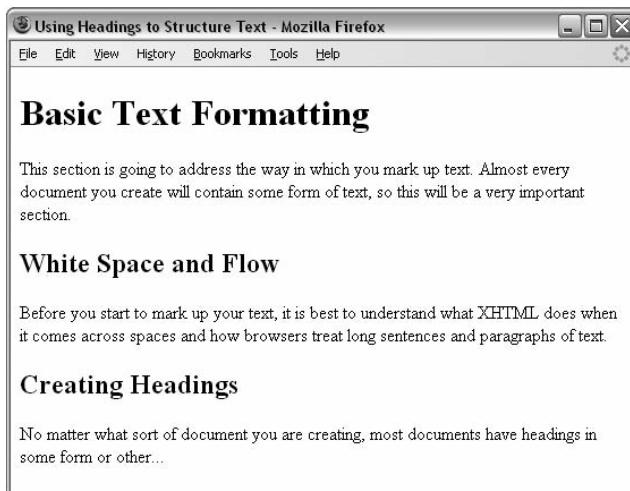
Figure 1-5

By default, most browsers display the contents of the `<h1>`, `<h2>`, and `<h3>` elements larger than the default size of text in the document. The content of the `<h4>` element would be the same size as the default text, and the content of the `<h5>` and `<h6>` elements would be smaller.

Here is another example of how you might use headings to structure a document (`ch01_eg05.html`), where the `<h2>` elements are subheadings of the `<h1>` element (this actually models the structure of this section of the chapter):

```
<h1>Basic Text Formatting</h1>
<p> This section is going to address the way in which you mark up text.
Almost every document you create will contain some form of text, so this
will be a very important section. </p>
<h2>Whitespace and Flow</h2>
<p> Before you start to mark up your text, it is best to understand what
XHTML does when it comes across spaces and how browsers treat long sentences
and paragraphs of text.</p>
<h2>Creating Headings Using hn Elements</h2>
<p> No matter what sort of document you are creating, most documents have
headings in some form or other...</p>
```

Figure 1-6 shows how this will look.



**Figure 1-6**

The six heading elements can all carry the universal attributes as well as a deprecated attribute called `align`:

```
align class id style title dir lang xml:lang
```

### ***The `align` Attribute (deprecated)***

The deprecated `align` attribute indicates whether the heading appears to the left, center, or right of the page (the default is the left). It can take the three values discussed in the table that follows.

## Chapter 1: Creating Structured Documents

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Value	Meaning
left	The heading is displayed to the left of the browser window (or other containing element if it is nested within another element). This is the default value if the align attribute is not used.
center	The heading is displayed in the center of the browser window (or other containing element if it is nested within another element).
right	The heading is displayed to the right of the browser window (or other containing element if it is nested within another element).

I mention the align attribute here because you are likely to see it used on various elements. It has been marked as deprecated because it does not help describe the structure of the document—rather it is used to affect the presentation of the page, which should now be done using CSS. Here is an example of using the deprecated align attribute (ch01\_eg06.html):

```
<h1 align="left">Left-Aligned Heading</h1>
<p>This heading uses the align attribute with a value of left.</p>
<h1 align="center">Centered Heading</h1>
<p>This heading uses the align attribute with a value of center.</p>
<h1 align="right">Right-Aligned Heading</h1>
<p>This heading uses the align attribute with a value of right.</p>
```

Figure 1-7 shows the effect of the align attribute in a browser.

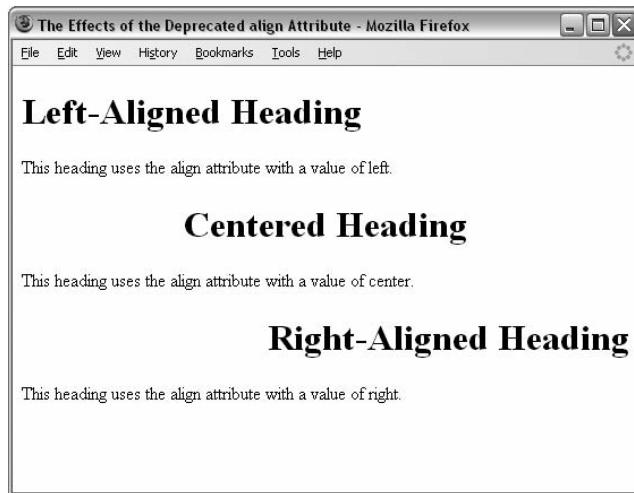


Figure 1-7

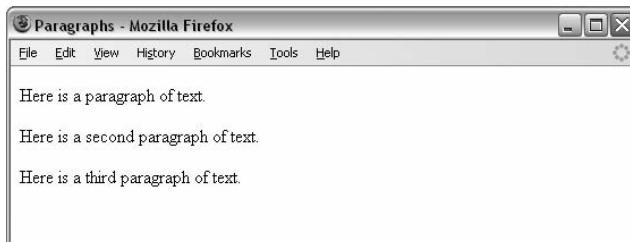
The `align` attribute has been replaced with the `text-align` property in CSS and the ability to float block-level elements (as you will see in Chapter 7). The `align` attribute is covered in more detail in Appendix I.

## ***Creating Paragraphs Using the <p> Element***

The `<p>` element offers another way to structure your text. Each paragraph of text should go in between an opening `<p>` and closing `</p>` tag, as in this example (`ch01_eg07.html`):

```
<p>Here is a paragraph of text.</p>
<p>Here is a second paragraph of text.</p>
<p>Here is a third paragraph of text.</p>
```

When a browser displays a paragraph, it usually inserts a new line before the next paragraph and adds a little bit of extra vertical space, as in Figure 1-8.



**Figure 1-8**

The `<p>` element can carry all of the universal attributes and the deprecated `align` attribute:

```
align class id style title dir lang xml:lang
```

## ***Creating Line Breaks Using the <br /> Element***

Whenever you use the `<br />` element, anything following it starts on the next line. The `<br />` element is an example of an *empty element*, where you do not need opening *and* closing tags, because there is nothing to go in between them.

*The <br /> element has a space between the characters br and the forward slash. If you omit this space, older browsers will have trouble rendering the line break, whereas if you miss the forward slash character and just use <br>, it is not valid XHTML.*

Most browsers allow you to use multiple `<br />` elements to push text down several lines, and many designers use two line breaks between paragraphs of text rather than using the `<p>` element to structure text, as follows:

```
Paragraph one<br /><br />
Paragraph two<br /><br />
Paragraph three<br /><br />
```

## Chapter 1: Creating Structured Documents

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While this creates a similar effect to using the `<p>` element, if you do not use the `<p>` element itself for each paragraph then the document is no longer describing where each paragraph starts and finishes. Furthermore, in Strict XHTML the `<br />` element can be used only within what are known as block-level elements. These are elements such as the `<p>` element—elements that tend to naturally act as though they have a line break before and after them. You learn more about block-level elements near the end of the chapter.

*Avoid using `<br />` elements just to position text; such usage can produce unexpected results because the amount of space created when you do so depends upon the size of the font. Instead, you should use CSS, which you learn about in Chapter 7.*

Here you can see an example of the `<br />` element in use within a paragraph (`ch01_eg08.html`):

```
<p>When you want to start a new line you can use the &lt;br /&gt; element.  
So, the next<br />word will appear on a new line.</p>
```

Figure 1-9 shows you how the line breaks after the words “next” and “do” look.

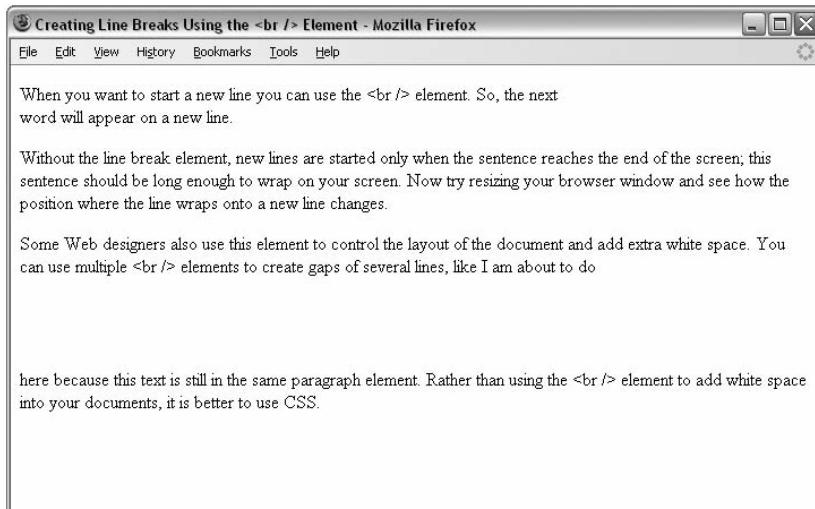


Figure 1-9

The `<br />` element can carry the core attributes as well as an attribute called `clear`, which can be used with images, and is covered in Appendix I.

```
clear class id style title
```

## ***Creating Preformatted Text Using the `<pre>` Element***

Sometimes you want your text to follow the exact format of how it is written in the XHTML document—you don’t want the text to wrap onto a new line when it reaches the edge of the browser; you don’t want it to ignore multiple spaces; and you want the line breaks where you put them.

# Chapter 1: Creating Structured Documents

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Any text between the opening `<pre>` tag and the closing `</pre>` tag will preserve the formatting of the source document. You should be aware, however, that most browsers would display this text in a monospaced font by default. (Courier is an example of a monospaced font, because each letter of the alphabet takes up the same width. In non-monospaced fonts, an *i* is usually narrower than an *m*.)

Two of the most common uses of the `<pre>` element are to display tabular data without the use of a table (in which case you must use the monospaced font or columns will not align correctly) and to represent computer source code. For example, the following shows some JavaScript inside a `<pre>` element (`ch01_eg09.html`):

```
<pre>
function testFunction(strText) {
    alert (strText)
}
</pre>
```

You can see in Figure 1-10 how the content of the `<pre>` element is displayed in the monospaced font; more important, you can see how it follows the formatting shown inside the `<pre>` element—the white space is preserved.

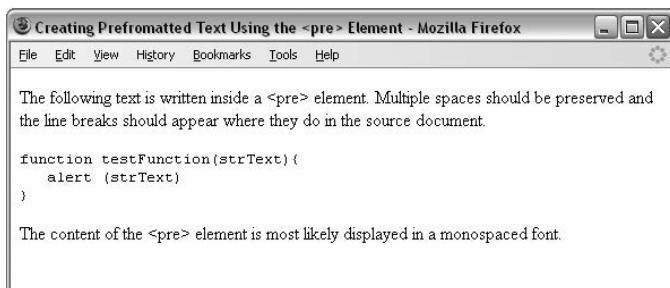


Figure 1-10

*While tab characters can have an effect inside a `<pre>` element, and a tab is supposed to represent eight spaces, the implementation of tabs varies across browsers, so it is advisable to use spaces instead.*

You will come across more elements that can be used to represent code later in this chapter in the section “Phrase Elements,” which covers the `<code>`, `<kbd>`, and `<var>` elements.

*Firefox, IE, and Safari support an extension to the XHTML recommendation that prevents line breaks: the `<nobr>` element. (This retains the normal style of its containing element and does not result in the text being displayed in a monospaced font.) Because it is an extension, it is not valid XHTML. The `<nobr>` element is covered in Appendix I.*

---

## Try It Out

## Basic Text Formatting

Now that you’ve seen the basic elements that you will be using to format your text—headings and paragraphs—it’s time to try putting that information to work.

## Chapter 1: Creating Structured Documents

---

In this example, you create a new page for a site about jazz legends, and this page tells people about Miles Davis. So, start up your text editor or web page authoring tool and follow these steps:

1. You will be creating a Strict XHTML document, so add the XML declaration and a DOCTYPE declaration to indicate that you will be writing Strict XHTML:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
```

2. Add the skeleton of the document: the `<html>`, `<head>`, `<title>`, and `<body>` elements. The root `<html>` element carries the `xmlns` attribute to indicate that the markup belongs to the XHTML namespace.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
  <head>
    <title>Jazz Legends - Miles Davis</title>
  </head>
  <body>
  </body>
</html>
```

3. Your page will have a main heading and some level 2 headings, which show the general structure of the page people will see:

```
<body>
  <h1>Jazz Legends - Miles Davis</h1>
  <h2>Styles of Miles</h2>
  <h2>Davis the Painter</h2>
</body>
```

4. You can now fill out the page with some paragraphs that follow the headings:

```
<body>
  <h1>Jazz Legends - Miles Davis</h1>
  <p>Miles Davis is known to many as one of the world's finest jazz musicians and an outstanding trumpet player. He also earned great respect in the world of music as an innovative bandleader and composer.</p>
  <h2>Styles of Miles</h2>
  <p>Miles Davis played and wrote in a variety of styles throughout his career, from tunes that have become jazz standards to his more experimental improvisational work. </p>
  <p>In the 1950s Miles was known for a warm, rich, wispy sound and was able to vary the color of his sound, pitch. He was also adept in using a Harmon mute. In the 1960s Miles began to play more in the upper register. In 1969 he even incorporated the use of electronic instruments in his music.</p>
  <h2>Davis the Painter</h2>
  <p>Miles' love was not only for music; he is also considered a fine painter. Inspired by a Milan-based design movement known as Memphis, Miles painted a series of abstract paintings in 1988.</p>
</body>
</html>
```

5. Save the file as `miles.html` and then open it in a web browser. The result should look something like Figure 1-11.

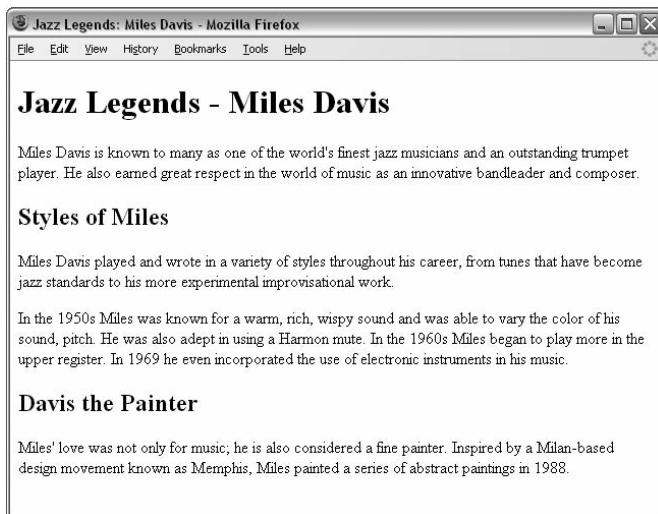


Figure 1-11

## How It Works

The opening line of this page is the optional XML declaration. Because this is a Strict XHTML document (and therefore is an XML document), it has been included here. The next line is the DOCTYPE declaration, which is required in Strict XHTML documents. The DOCTYPE declaration indicates which version of XHTML the document conforms to.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
```

The entire page is then contained in the root `<html>` element. The opening `<html>` tag carries the namespace identifier, which is just another way of indicating that the markup your document contains is XHTML. The `<html>` element also carries the `lang` attribute, which indicates the language that the document is written in. Our web page is written in English, so it uses the two-letter ISO code for English (the full list of country codes can be found in Appendix G). While the `lang` attribute has little practical use at the moment, it will help future-proof your documents.

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
```

The `<html>` element can contain only two child elements: the `<head>` element and `<body>` element. The `<head>` element contains the title for the page, and you should be able to tell from the title of the page the type of information the page will contain.

```
<head>
  <title>Jazz Legends: Miles Davis</title>
</head>
```

## Chapter 1: Creating Structured Documents

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Meanwhile, the `<body>` element contains the main part of the web page—the part that viewers will actually see in the main part of the web browser. Note how this page contains headings to structure the information on the page just as you would find in a word-processed document.

There are different levels of headings to help enforce structure. In this example, there is a main heading introducing Miles Davis—the main topic for this page—and then subheadings, each containing specific information about his music and other interests.

Don't forget the closing `</html>` tag at the end—after all, you must close every element correctly.

---

## Presentational Elements

If you use a word processor, you are familiar with the ability to make text bold, italic, or underlined; these are just three of the ten options available to indicate how text can appear in HTML and XHTML. The full list is bold, italic, monospaced, underlined, strikethrough, teletype, larger, smaller, superscripted, and subscripted text.

Technically speaking, these elements affect only the presentation of a document, and the markup is of no other use, but they remain in both Transitional and Strict XHTML 1.0. As you will see later in the chapter, there are dedicated elements for indicating things like emphasis within a piece of text, and these will result in a similar presentation of the information.

All of the following presentational elements can carry the universal attributes and the UI event attributes you met earlier in the chapter.

*You should also be aware that you can use CSS to get similar results, as you will see in Chapter 7.*

### The `<b>` Element

Anything that appears in a `<b>` element is displayed in **bold**, like the word bold here:

The following word uses a `<b>bold</b>` typeface.

This does not necessarily mean the browser will use a boldface version of a font. Some browsers use an algorithm to take a font and make the lines thicker (giving it the appearance of being bold), while others (if they cannot find a boldface version of the font) may highlight or underline the text.

*This `<b>` element has the same effect as the `<strong>` element, which you will meet later, and is used to indicate that its contents have strong emphasis.*

### The `<i>` Element

The content of an `<i>` element is displayed in *italicized* text, like the word italic here:

The following word uses an `<i>italic</i>` typeface.

This does not necessarily mean the browser will look for an oblique or italicized version of the font. Most browsers use an algorithm to put the lines on a slant to simulate an italic font.

*The <i> element has the same effect as the <em> element, which you will meet later, and which is used to indicate that its contents have emphasis.*

## **The <u> Element (deprecated)**

The content of a <u> element is *underlined* with a simple line:

The following word would be <u>underlined</u>

The <u> element is deprecated in HTML 4 and XHTML 1.0, although it is still supported by current browsers. The preferred method is to use CSS to achieve this effect, which you'll learn about in Chapter 7.

## **The <s> and <strike> Elements (deprecated)**

The content of an <s> or <strike> element is displayed with a *strikethrough*, which is a thin line through the text (<s> is just the abbreviated form of <strike>).

The following word would have a <s>strikethrough</s>.

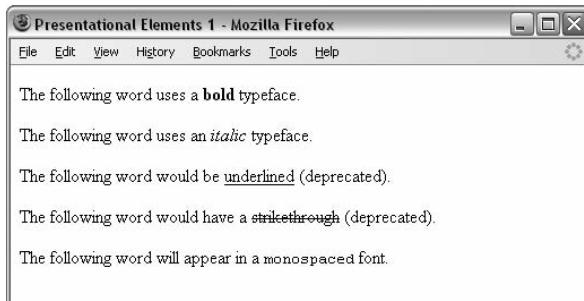
Both the <s> and <strike> elements are deprecated in HTML 4.1 and Transitional XHTML 1.0, and were removed from Strict XHTML 1.0, although they are still supported by current browsers. The preferred method is to use CSS to achieve this effect, which you learn about in Chapter 7.

## **The <tt> Element**

The content of a <tt> element is written in *monospaced* font.

The following word will appear in a <tt>monospaced</tt> font.

Figure 1-12 shows the use of the <b>, <i>, <u>, <s>, and <tt> elements (ch01\_eg10.html).



**Figure 1-12**

# Chapter 1: Creating Structured Documents

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## The **<sup>** Element

The content of a **<sup>** element is written in *superscript*; the font size used is the same size as the characters surrounding it but is displayed half a character's height above the other characters.

Written on the 31<sup>st</sup> February.

The **<sup>** element is especially helpful in adding exponential values to equations, and adding the *st*, *nd*, *rd*, and *th* suffixes to numbers such as dates. However, in some browsers, you should be aware that it can create a taller gap between the line with the superscript text and the line above it.

## The **<sub>** Element

The content of a **<sub>** element is written in *subscript*; the font size used is the same as the characters surrounding it, but is displayed half a character's height beneath the other characters.

The EPR paradox<sub>2</sub> was devised by Einstein, Podolsky, and Rosen.

The **<sub>** element is particularly helpful when combined with the **<a>** element (which you meet in the next chapter) to create footnotes.

## The **<big>** Element

The content of the **<big>** element is displayed one font size larger than the rest of the text surrounding it. If the font is already the largest size, it has no effect. You can nest several **<big>** elements inside one another, and the content of each will get one size larger for each element.

The following word should be **<big>bigger</big>** than those around it.

In general, you should use CSS rather than the **<big>** element for formatting purposes.

## The **<small>** Element

The content of the **<small>** element is displayed one font size smaller than the rest of the text surrounding it. If the font is already the smallest, it has no effect. You can nest several **<small>** elements inside one another, and the content of each gets one size smaller for each element.

The following word should be **<small>smaller</small>** than those around it.

In general, you should use CSS rather than the **<small>** element for formatting purposes.

## The **<hr />** Element

The **<hr />** element creates a horizontal rule across the page. It is an empty element, rather like the **<br />** element.

`<hr />`

This is frequently used to separate distinct sections of a page where a new heading is not appropriate.

Figure 1-13 shows the use of the `<sup>`, `<sub>`, `<big>`, `<small>`, and `<hr />` elements (ch01\_eg11.html).

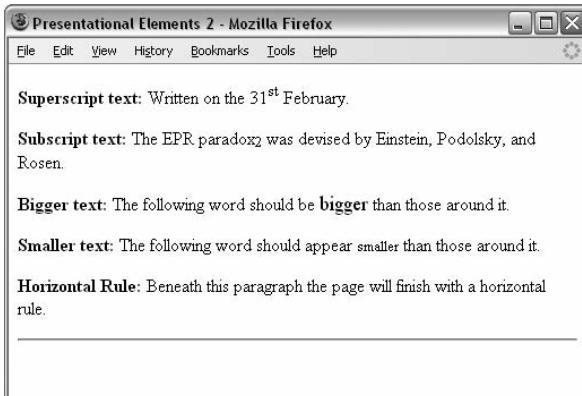


Figure 1-13

## Phrase Elements

The following elements are not used as widely as the elements you have met so far. As the element names indicate, they are designed to describe their content:

- ❑ `<em>` and `<strong>` for emphasis
- ❑ `<blockquote>`, `<cite>`, and `<q>` for quotations and citations
- ❑ `<abbr>`, `<acronym>`, and `<dfn>` for abbreviations, acronyms, and key terms
- ❑ `<code>`, `<kbd>`, `<var>`, and `<samp>` for computer code and information
- ❑ `<address>` for addresses

While some of these phrase elements are displayed in a manner similar to the `<b>`, `<i>`, `<pre>`, and `<tt>` elements you have already seen, they are designed for specific purposes. For example, the `<em>` and `<strong>` elements give text emphasis and strong emphasis respectively and there are several elements for marking up quotes.

It is tempting to ignore these elements and just use the presentational elements you just met to create the same visual effect, but you should be aware of them and preferably get into the habit of using them where appropriate. For example, where you want to add emphasis to a word within a sentence you should use the `<em>` and `<strong>` elements rather than the presentational elements you just met; there are several good reasons for this, such as:

- ❑ Applications such as screen readers (which can read pages to web users with visual impairments) could add suitable intonation to the reading voice so that users with visual impairments could hear where the emphasis should be placed.
- ❑ Automated programs could be written to find the words with emphasis and pull them out as keywords within a document, or specifically index those words so that a user could find important terms in a document.

## Chapter 1: Creating Structured Documents

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As you can see, appropriate use of these elements adds more information to a document (such as which words should have emphasis, which are parts of programming code, which parts are addresses, and so on) rather than just saying how it should be presented visually.

All of the following phrase elements can carry the universal attributes and the UI event attributes you met earlier in the chapter.

### The **<em>** Element Adds Emphasis

The content of an **<em>** element is intended to be a point of emphasis in your document, and it is usually displayed in italicized text. The kind of emphasis intended is on words such as “must” in the following sentence:

```
<p>You <em>must</em> remember to close elements in XHTML.</p>
```

You should use this element only when you are trying to add emphasis to a word, not just because you want to make the text appear italicized. If you just want italic text for stylistic reasons—without adding emphasis—you can use either the **<i>** element or CSS.

### The **<strong>** Element Adds Strong Emphasis

The **<strong>** element is intended to show strong emphasis for its content—stronger emphasis than the **<em>** element. As with the **<em>** element, the **<strong>** element should be used only when you want to add strong emphasis to part of a document. Rather than being rendered in an italic font, most visual browsers display the strong emphasis in a bold font.

```
<p><em>Always</em> look at burning magnesium through protective colored  
glass as it <strong>can cause blindness</strong>.</p>
```

Figure 1-14 shows how the **<em>** and **<strong>** elements are rendered in Firefox (ch01\_eg12.html).

You need to remember that how the elements are presented (italics or bold) is largely irrelevant. You should use these elements to add emphasis to phrases, and therefore give your documents greater meaning, rather than to control how they appear visually. As you will see in Chapter 7, it is quite simple with CSS to change the visual presentation of these elements—for example to highlight any words inside an **<em>** element with a yellow background and make them bold rather than italic.

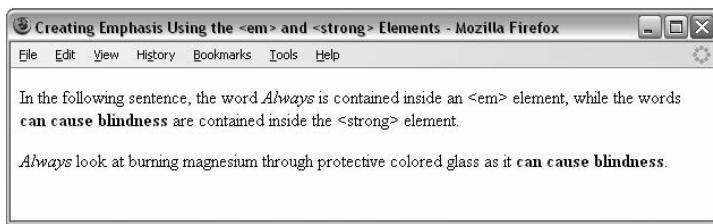


Figure 1-14

## The **<abbr>** Element Is for Abbreviations

You can indicate when you are using an abbreviated form by placing the abbreviation between opening `<abbr>` and closing `</abbr>` tags.

When possible, consider using a `title` attribute whose value is the full version of the abbreviations. If you are abbreviating a foreign word, you can also use the `xml:lang` attribute in XHTML (or the `lang` attribute in HTML).

For example, if you want to indicate that Bev is an abbreviation for Beverly, you can use the `<abbr>` element like so:

```
I have a friend called <abbr title="Beverly">Bev</abbr>.
```

## The **<acronym>** Element Is for Acronym Use

The `<acronym>` element allows you to indicate that the text between an opening `<acronym>` and closing `</acronym>` tags is an acronym.

When possible use a `title` attribute whose value is the full version of the acronyms on the `<acronym>` element, and if the acronym is in a different language, include an `xml:lang` attribute in XHTML documents (or a `lang` attribute in HTML documents).

For example, if you want to indicate that XHTML was an acronym, you can use the `<acronym>` element like so (ch01\_eg13.html):

```
This chapter covers marking up text in <acronym title="Extensible Hypertext Markup Language">XHTML</acronym>.
```

As you can see from Figure 1-15, Firefox gives the `<abbr>` and `<acronym>` elements a dashed-underline, and when you hover your mouse over the word, the value of the `title` attribute shows as a tooltip. Internet Explorer 7 does not change the appearance of the element, although it does show the title as a tooltip.

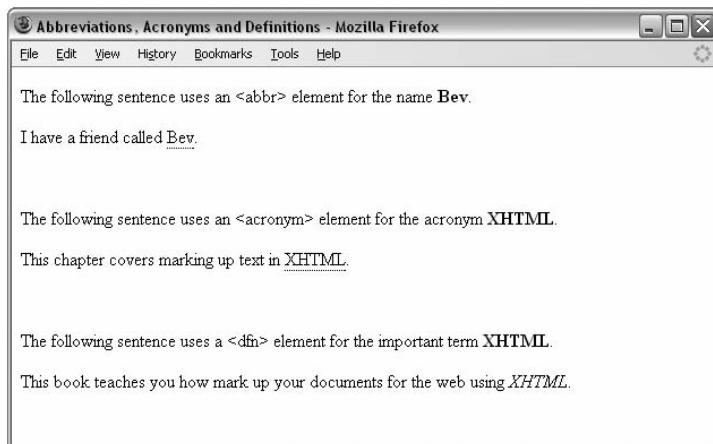


Figure 1-15

### The `<dfn>` Element Is for Special Terms

The `<dfn>` element allows you to specify that you are introducing a special term. Its use is similar to the words that are in italics in the midst of paragraphs in this book when new key concepts are introduced.

Typically, you would use the `<dfn>` element the first time you introduce a key term and only in that instance. Most recent browsers render the content of a `<dfn>` element in an italic font.

For example, you can indicate that the term “XHTML” in the following sentence is important and should be marked as such:

```
This book teaches you how mark up your documents for the Web using  
<dfn>XHTML</dfn>.
```

Figure 1-15, on the previous page, shows the use of the `<dfn>` element (`ch01_eg13.html`).

### The `<blockquote>` Element Is for Quoting Text

When you want to quote a passage from another source, you should use the `<blockquote>` element. Note that there is a separate `<q>` element for use with smaller quotations, as discussed in the next section. Here's `ch01_eg14.html`:

```
<p>The following description of XHTML is taken from the W3C Web site:</p>  
<blockquote> XHTML 1.0 is the W3C's first Recommendation for XHTML,  
 following on from earlier work on HTML 4.01, HTML 4.0, HTML 3.2 and HTML  
 2.0. </blockquote>
```

Text inside a `<blockquote>` element is usually indented from the left and right edges of the surrounding text, and sometimes uses an italicized font (but it should be used only for quotes; if you simply want this effect on a paragraph of text, you should use CSS). You can see what this looks like in Figure 1-16.

### Using the `cite` Attribute with the `<blockquote>` Element

You can use the `cite` attribute on the `<blockquote>` element to indicate the source of the quote. The value of this attribute should be a URL pointing to an online document, if possible the exact place in that document. Browsers will not actually do anything with this attribute, but it means the source of the quote is there should you need it in the future—it could also be used by other processing applications (`ch01_eg14.html`).

```
<blockquote cite="http://www.w3.org/markup/"> XHTML 1.0 is the W3C's first  
Recommendation for XHTML, following on from earlier work on HTML 4.01, HTML  
4.0, HTML 3.2 and HTML 2.0.</blockquote>
```

*At the time of this writing, some validators had trouble with the `cite` attribute, such as the W3C validator, which does not recognize the presence of the `cite` attribute on the `<blockquote>` element.*

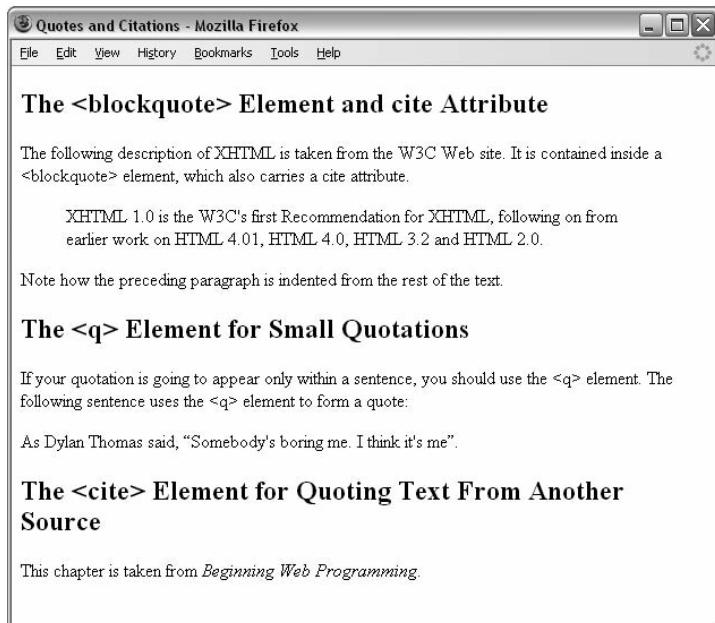


Figure 1-16

## The <q> Element Is for Short Quotations

The <q> element is intended to be used when you want to add a quote within a sentence rather than as an indented block on its own (ch01\_eg14.html):

```
<p>As Dylan Thomas said, <q>Somebody's boring me. I think it's me</q>.</p>
```

The HTML and XHTML recommendations say that the text enclosed in a <q> element should begin and end in double quotes. Firefox inserts these quotation marks for you, whereas IE7 does not. So, if you want your quote to be surrounded by quotation marks, be warned that inserting them in the document will result in two sets of quotes in Firefox. Neither IE nor Firefox changes the appearance of this element in any other way.

The <q> element can also carry the `cite` attribute. The value should be a URL pointing to the source of the quote.

## The <cite> Element Is for Citations

If you are quoting a text, you can indicate the source by placing it between an opening <code><cite></code> tag and closing <code></cite></code> tag. As you would expect in a print publication, the content of the <code><cite></code> element is rendered in italicized text by default (ch01\_eg12.html).

This chapter is taken from <code><cite>Beginning Web Development</code></cite>.</code>.

## Chapter 1: Creating Structured Documents

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If you are referencing an online resource, you should place your `<cite>` element inside an `<a>` element, which, as you'll see in Chapter 2, creates a link to the relevant document.

There are several applications that potentially could make use of the `<cite>` element. For example, a search application could use `<cite>` tags to find documents that reference certain works, or a browser could collect the contents of `<cite>` elements to generate a bibliography for any given document, although at the moment it is not widely enough used for either feature to exist.

You can see the `<blockquote>`, `<q>`, and `<cite>` elements in Figure 1-16.

## The `<code>` Element Is for Code

If your pages include any programming code (which is not uncommon on the Web), the following four elements will be of particular use to you. Any code to appear on a web page should be placed inside a `<code>` element. Usually the content of the `<code>` element is presented in a monospaced font, just like the code in most programming books (including this one).

**Note that you cannot just use the opening and closing angle brackets inside these elements if you want to represent XHTML markup. The browser could mistake these characters for actual markup. You should use &lt;; instead of the left-angle bracket <, and you should use &gt;; instead of the right-angle bracket >. A list of all these character entities is in Appendix F.**

Here you can see an example of using the `<code>` element to represent an `<h1>` element and its content in XHTML (ch01\_eg15.html):

```
<p><code>&lt;h1&gt;This is a primary heading&lt;/h1&gt;</code></p>
```

Figure 1-17 shows you how this would look in a browser.

The use of the `<code>` element could theoretically allow search applications to look at the content of `<code>` elements to help them find a particular code segment. The `<code>` element is often used in conjunction with the `<pre>` element so that the formatting of the code is retained.

## The `<kbd>` Element Is for Text Typed on a Keyboard

If, when talking about computers, you want to tell a reader to enter some text, you can use the `<kbd>` element to indicate what should be typed in, as in this example (ch01\_eg15.html):

```
<p>Type in the following: <kbd>This is the kbd element</kbd>.</p>
```

The content of a `<kbd>` element is usually represented in a monospaced font, rather like the content of the `<code>` element. Figure 1-17 shows you what this would look like in a browser.

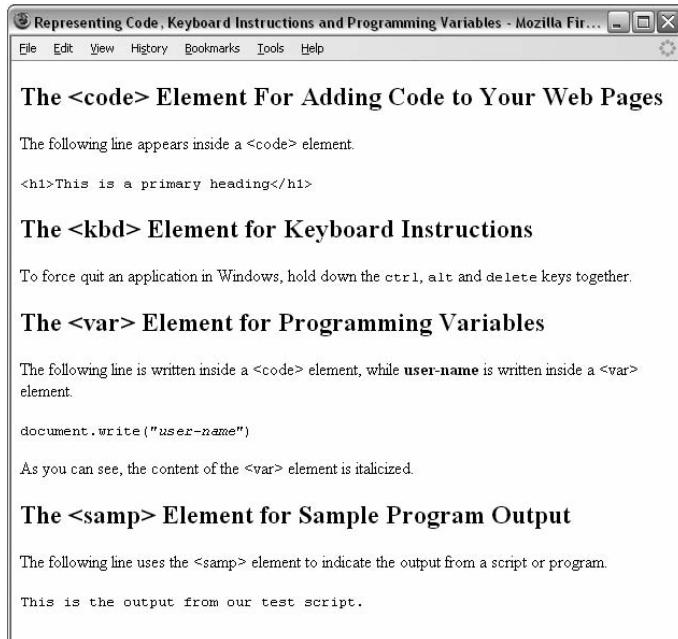


Figure 1-17

## ***The <var> Element Is for Programming Variables***

The <var> element is another of the elements added to help programmers. It is usually used in conjunction with the <pre> and <code> elements to indicate that the content of that element is a variable that can be supplied by a user (ch01\_eg15.html).

```
<p><code>document.write ("<var>user-name</var>" )</code></p>
```

Typically the content of a <var> element is italicized, as you can see in Figure 1-17.

If you are not familiar with the concept of variables, they are covered in Chapter 11.

## ***The <samp> Element Is for a Program Output***

The <samp> element indicates sample output from a program, script, or the like. Again, it is mainly used when documenting programming concepts. For example (ch01\_eg15.html):

```
<p>If everything worked you should see the result <samp>Test completed  
OK</samp>. </p>
```

This tends to be displayed in a monospaced font, as you can see in Figure 1-15.

### The **<address>** Element Is for Addresses

Many documents need to contain a snail-mail address, and there is a special **<address>** element that is used to contain addresses. For example, here is the address for Wrox, inside an **<address>** element (ch01\_eg16.html):

```
<address>Wrox Press, 10475 Crosspoint Blvd, Indianapolis, IN 46256</address>
```

A browser can display the address differently than the surrounding document, and IE, Firefox, and Safari display it in italics, as you can see in Figure 1-18 (although you can override this with CSS).

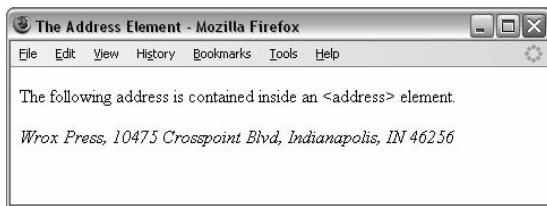


Figure 1-18

Indicating who wrote a document or who is responsible for it adds credibility to a document that is otherwise anonymous. The **<address>** element is a good way to add this at the end of the document. It can also help automated applications read addresses from documents.

That brings you to the end of the phrase elements, but not quite the end of all the text elements.

## Lists

There are many reasons why you might want to add a list to your pages, from putting your five favorite albums on your home page to including a numbered set of instructions for visitors to follow (like the steps you follow in the Try It Out examples in this book).

You can create three types of lists in XHTML:

- Unordered lists**, which are like lists of bullet points
- Ordered lists**, which use a sequence of numbers or letters instead of bullet points
- Definition lists**, which allow you to specify a term and its definition

I'm sure you will think of more uses for the lists as you meet them and start using them.

### Using the **<ul>** Element to Create Unordered Lists

If you want to make a list of bullet points, you write the list within the **<ul>** element (which stands for unordered list). Each bullet point or line you want to write should then be contained between opening **<li>** tags and closing **</li>** tags (the **li** stands for *list item*).

You should always close the `<li>` element, even though you might see some HTML pages that leave off the closing tag. This is a bad habit you should avoid.

If you want to create a bulleted list, you can do so like this (`ch01_eg17.html`):

```
<ul>
    <li>Bullet point number one</li>
    <li>Bullet point number two</li>
    <li>Bullet point number three</li>
</ul>
```

In a browser, this list would look something like Figure 1-19.

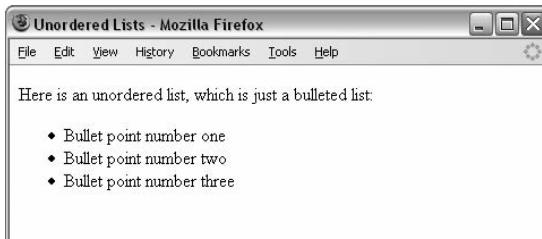


Figure 1-19

The `<ul>` and `<li>` elements can carry all the universal attributes and UI event attributes.

The `<ul>` element could also carry an attribute called `compact` in HTML 4.1—which is still allowed in Transitional XHTML but not in Strict XHTML 1.0—the purpose of which was to make the bullet points vertically closer together. Its value should also be `compact`, like so:

```
<ul compact="compact">
    <li>Item one</li>
    <li>Item two</li>
    <li>Item three</li>
</ul>
```

## Ordered Lists

Sometimes, you want your lists to be ordered. In an ordered list, rather than prefixing each point with a bullet point, you can use either numbers (1, 2, 3), letters (A, B, C), or Roman numerals (i, ii, iii) to prefix the list item.

An ordered list is contained inside the `<ol>` element. Each item in the list should then be nested inside the `<ol>` element and contained between opening `<li>` and closing `</li>` tags (`ch01_eg18.html`).

```
<ol>
    <li>Point number one</li>
    <li>Point number two</li>
    <li>Point number three</li>
</ol>
```

# Chapter 1: Creating Structured Documents

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The result should be similar to what you see in Figure 1-20.



Figure 1-20

If you would rather have letters or Roman numerals than Arabic numbers, you must use the now-deprecated `type` attribute on the `<ol>` element.

## ***Using the type Attribute to Select Numbers, Letters, or Roman Numerals in Ordered Lists (deprecated)***

The `type` attribute on the `<ol>` element allows you to change the ordering of list items from the default of numbers to the options listed in the table that follows, by giving the `type` attribute the corresponding character.

Value for type Attribute	Description	Examples
1	Arabic numerals (the default)	1, 2, 3, 4, 5
A	Capital letters	A, B, C, D, E
a	Small letters	a, b, c, d, e
I	Large Roman numerals	I, II, III, IV, V
i	Small Roman numerals	i, ii, iii, iv, v

For example, here is an ordered list that uses small Roman numerals (`ch01_eg18.html`):

```
<ol type="i">
  <li>This is the first point</li>
  <li>This is the second point</li>
  <li>This is the third point</li>
</ol>
```

You can see what this might look like in Figure 1-21.

The `type` attribute was deprecated in HTML 4.1 in favor of the CSS `list-style-type` property; it will therefore work only in Transitional XHTML not Strict XHTML 1.0. The CSS replacement will work only in browsers since IE4 and Netscape 4 browsers.

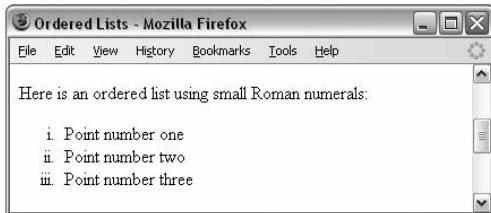


Figure 1-21

You used to be able to use the `type` attribute on `<li>` elements, which would override the value in the `<ol>` element, but it was deprecated in HTML 4.1 and its use should be avoided. All of the universal attributes and UI event attributes can be used with the `<ol>` elements, and also a special attribute `start`, to control the number a list starts at.

## **Using the `start` Attribute to Change the Starting Number in Ordered Lists (deprecated)**

If you want to specify the number that a numbered list should start at, you can use the `start` attribute on the `<ol>` element. The value of this attribute should be the numeric representation of that point in the list, so a D in a list that is ordered with capital letters would be represented by the value 4 (ch01\_eg18.html).

```
<ol type="i" start="4">
    <li>Point number one</li>
    <li>Point number two</li>
    <li>Point number three</li>
</ol>
```

You can see the result in Figure 1-22 .

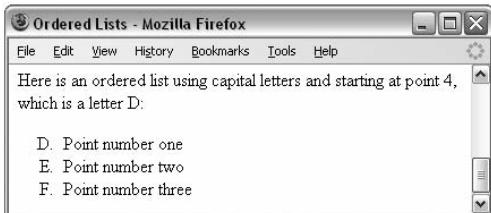


Figure 1-22

The `start` attribute was deprecated in HTML 4.1; it will therefore work in Transitional XHTML 1.0 but not in Strict XHTML 1.0.

## **Definition Lists**

The definition list is a special kind of list for providing terms followed by a short text definition or description for them. Definition lists are contained inside the `<dl>` element. The `<dl>` element then contains alternating `<dt>` and `<dd>` elements. The content of the `<dt>` element is the term you will be defining.

## Chapter 1: Creating Structured Documents

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The `<dd>` element contains the definition of the previous `<dt>` element. For example, here is a definition list that describes the different types of lists in XHTML (`ch01_eg19.html`):

```
<dl>
  <dt>Unordered List</dt>
    <dd>A list of bullet points.</dd>
  <dt>Ordered List</dt>
    <dd>An ordered list of points, such as a numbered set of steps.</dd>
  <dt>Definition List</dt>
    <dd>A list of terms and definitions.</dd>
</dl>
```

In a browser, this would look something like Figure 1-23 (`ch01_eg19.html`).

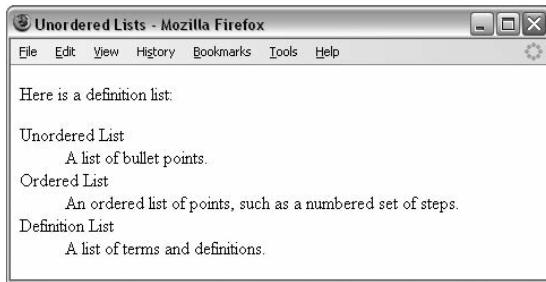


Figure 1-23

Each of these elements can carry the universal attributes and UI event attributes.

## Nesting Lists

You can nest lists inside other lists. For example, you might want a numbered list with separate points corresponding to one of the list items. Each list will be numbered separately unless you specify otherwise using the `start` attribute. And each new list should be placed inside a `<li>` element (`ch01_eg20.html`):

```
<ol type="I">
  <li>Item one</li>
  <li>Item two</li>
  <li>Item three</li>
  <li>Item four
    <ol type="i">
      <li>Item 4.1</li>
      <li>Item 4.2</li>
      <li>Item 4.3</li>
    </ol>
  </li>
  <li>Item Five</li>
</ol>
```

In a browser, this will look something like Figure 1-24.

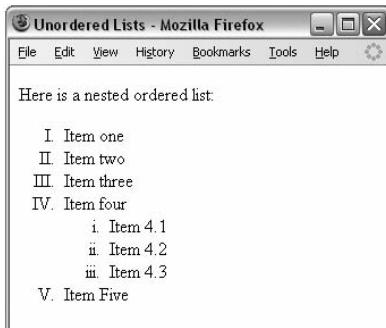


Figure 1-24

## Try It Out Using Text Markup

Now that you've looked at the different elements and attributes you can use to mark up text, it is time to put the information into practice. In this example, you use a mixture of the text markup to create a page that displays a recipe. So, open up your text editor or web page authoring tool and follow these steps:

1. You will be writing this example in Transitional XHTML 1.0, so add the optional XML declaration, and the DOCTYPE declaration:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
```

2. Add the skeleton elements for the document: `<html>`, `<head>`, `<title>`, and `<body>`. Don't forget to put the namespace identifier on the root element, along with an attribute to indicate the language of the document:

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
  <head>
    <title>Wrox Recipes - World's Best Scrambled Eggs</title>
  </head>
  <body>
  </body>
</html>
```

3. Add some appropriate heading elements into the body of the document:

```
<body>
  <h1>Wrox Recipes - World's Best Scrambled Eggs</h1>
  <h2>Ingredients</h2>
  <h2>Instructions</h2>
</body>
```

## Chapter 1: Creating Structured Documents

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4. After the `<h1>` element, there will be a bit of an explanation about the recipe (and why it is the World's Best). You can see that several of the elements you have met so far are tucked away in these two paragraphs.

```
<h1>Wrox Recipes - World's Best Scrambled Eggs</h1>
<p>I adapted this recipe from a book called
<cite cite="http://www.amazon.com/exec/obidos/tg/detail/-/
0864119917/">Sydney Food</cite> by Bill Grainger. Ever since tasting
these eggs on my 1st visit to Bill's restaurant in Kings
Cross, Sydney, I have been after the recipe. I have since transformed
it into what I really believe are the <em>best</em> scrambled eggs
I have ever tasted.</p>
<p>This recipe is what I call a <q>very special breakfast</q>; just look at
the ingredients to see why. It has to be tasted to be believed.</p>
```

5. After the first `<h2>` element, you will list the ingredients in an unordered list:

```
<h2>Ingredients</h2>
<p>The following ingredients make one serving:</p>
<ul>
<li>2 eggs</li>
<li>1 tablespoon of butter (10g)</li>
<li>1/3 cup of cream <i>(2 3/4 fl ounces)</i></li>
<li>A pinch of salt</li>
<li>Freshly milled black pepper</li>
<li>3 fresh chives (chopped)</li>
</ul>
```

6. Add the instructions after the second `<h2>` element; these will go in a numbered list:

```
<h2>Instructions</h2>
<ol>
<li>Whisk eggs, cream, and salt in a bowl.</li>
<li>Melt the butter in a non-stick pan over a high heat <i>(taking care
not to burn the butter)</i>.</li>
<li>Pour egg mixture into pan and wait until it starts setting around
the edge of the pan (around 20 seconds).</li>
<li>Using a wooden spatula, bring the mixture into the center as if it
were an omelet, and let it cook for another 20 seconds.</li>
<li>Fold contents in again, leave for 20 seconds, and repeat until
the eggs are only just done.</li>
<li>Grind a light sprinkling of freshly milled pepper over the eggs
and blend in some chopped fresh chives.</li>
</ol>
<p>You should only make a <strong>maximum</strong> of two servings per
frying pan.</p>
```

7. Save this example as `eggs.html`. When you open it in a browser you should see something like Figure 1-25.



Figure 1-25

## How It Works

You have seen the XML declaration and the skeleton of this document enough times already, so now it's time to focus on the new elements you have available to mark up text.

After the main heading for the document, which is contained in the `<h1>` elements, you can see two paragraphs of text. Start by looking at the first paragraph.

In the first sentence, the `<cite>` element has been used to indicate a reference to the book this recipe is adapted from. The next sentence makes use of the `<sup>` element so you can write "1<sup>st</sup>" and use superscript text—although you will note that this makes the gap between the first line and the second line of text larger than the gap between the second and third lines of text (as the superscript letters poke above

# Chapter 1: Creating Structured Documents

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the line). In the final sentence there is emphasis on the word “best,” as these really are the *best* scrambled eggs I have ever tasted:

```
<h1>Wrox Recipes- World's Best Scrambled Eggs</h1>
<p>I adapted this recipe from a book called
<cite cite="http://www.bills.com.au">Sydney Food</cite> by Bill Grainger.
Ever since tasting these eggs on my 1st visit to Bill's
restaurant in Kings Cross, Sydney, I have been after the recipe. I have
since transformed it into what I really believe are the <em>best</em>
scrambled eggs I have ever tasted. </p>
```

You can see another new element at work in the second element: the `<q>` element for quotes that are sprinkled into a sentence:

```
<p>Although this recipe may be what I call a <q>very special breakfast</q>,
just look at the ingredients to see why, it has to be tasted to be
believed.</p>
```

The ingredients (listed under an `<h2>` element) contain an unordered list, and an italicized alternative measure for the amount of cream required:

```
<ul>
<li>2 eggs</li>
<li>10g butter</li>
<li>1/3 cup of cream <i>(2 3/4 fl ounces)</i></li>
<li>a pinch of salt</li>
<li>freshly milled black pepper</li>
<li>3 fresh chives (chopped)</li>
</ul>
```

The instructions for cooking the eggs (listed under the second `<h2>` element) contain a numbered list and a couple of additional paragraphs. You might note that the numbered list contains an italicized comment about not burning the butter, and the final paragraph contains a strong emphasis that you should cook no more than two batches of these eggs in a pan.

```
<h2>Instructions</h2>
<p>The following ingredients make one serving.</p>
<ol>
<li>Whisk eggs, cream, and salt in a bowl.</li>
<li>Melt the butter in a non-stick pan over a high heat <i>(taking care
not to burn the butter)</i>.</li>
<li>Pour egg mixture into pan, and wait until it starts setting
around the edge of the pan (around twenty seconds).</li>
<li>Using a wooden spatula, bring the mixture into the center as
if it was an omelet, and let it cook for another 20 seconds.</li>
<li>Fold contents in again, leave for 20 seconds, and repeat until
the eggs are only just done.</li>
<li>Grind a light sprinkling of freshly milled pepper over the eggs
and blend in some chopped fresh chives.</li>
</ol>
<p>You should only make a <strong>maximum</strong> of two servings per
frying pan.</p>
```

The page then finishes up as usual with closing `</body>` and `</html>` tags. I hope you will enjoy the eggs—go on, you know you want to try them now.

---

## Editing Text

When working on a document with others, it helps if you can see changes that another person has made. Even when working on your own documents, it can be helpful to keep track of changes you make. Two elements are specifically designed for revising and editing text:

- ❑ The `<ins>` element for when you want to add text
- ❑ The `<del>` element for when you want to delete some text

Here you can see some changes made to the following XHTML (`ch01_eg21.html`):

```
<h1>How to Spot a Wrox Book</h1>
<p>Wrox-spotting is a popular pastime in bookshops. Programmers like to find
the distinctive <del>blue</del><ins>red</ins> spines because they know that
Wrox books are written by <del>1000 monkeys</del><ins>Programmers</ins> for
Programmers.</p>
<ins><p>Both readers and authors, however, have reservations about the use
of photos on the covers.</p></ins>
```

This example would look something like Figure 1-26 in a browser.

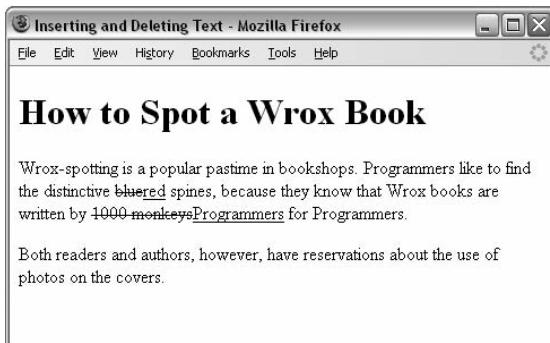


Figure 1-26

These features would also be particularly helpful in editing tools to note changes and modifications made by different authors.

*If you are familiar with Microsoft Word, the `<ins>` and `<del>` elements are very similar to a feature called Track Changes (which you can find under the Tools menu). The track changes feature underlines new text additions and crosses through deleted text.*

## Chapter 1: Creating Structured Documents

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You must be careful when using `<ins>` and `<del>` to ensure that you do not end up with a block-level element (such as a `<p>` or an `<h2>` element) inside an inline element such as a `<b>` or `<i>` element. You learn more about block-level elements and inline elements at the end of the chapter.

### Using `<ins>` to Indicate New Additions to Text

Any text added to a document inside an `<ins>` element will be underlined to indicate that it is new text (refer to Figure 1-26).

```
<ins><p>This paragraph is contained inside an &lt;ins&gt; element.</p></ins>
```

You can use the `cite` attribute on the `<ins>` and `<del>` element to indicate the source or reason for a change, although this attribute is quite limiting as the value must be a URI.

You might also use the `title` attribute to provide information as to who added the `<ins>` or `<del>` element and why it was added or deleted; this information is offered to users as a tooltip in the major browsers.

The `<ins>` and `<del>` elements can also carry a `datetime` attribute whose value is a date and time in the following format:

YYYY-MM-DDThh:mm:ssTZD

This formula breaks down as follows:

- ❑ YYYY represents the year.
- ❑ MM represents the month.
- ❑ DD represents the day of the month.
- ❑ T is just a separator between the date and time.
- ❑ hh is the hour.
- ❑ mm is the number of minutes.
- ❑ ss is the number of seconds.
- ❑ TZD is the time zone designator.

For example, 2004-04-16T20:30-05:00 represents 8:30 p.m. on April 16, 2004, according to U.S. Eastern Standard Time.

*The datetime attribute is likely to be entered only by a program or authoring tool, as the format is rather long to be entered by hand.*

### Using `<del>` to Indicate Deleted Text

If you want to delete some text from a document, you can place it inside a `<del>` element to indicate that it is marked to be deleted. Text inside a `<del>` element will have a line or strikethrough (refer to Figure 1-26).

```
<del><p>This paragraph is contained inside a &lt;del&gt; element.</p></del>
```

The `<del>` element can carry the `cite`, `datetime`, and `title` attributes just like the `<ins>` element.

*When you learn how to use CSS, you will see how it would be possible to show and hide the inserted and deleted content as required.*

# Using Character Entities for Special Characters

You can use most alphanumeric characters in your document and they will be displayed without a problem. There are, however, some characters that have special meaning in XHTML, and for some characters there is not an equivalent on the keyboard you can enter. For example, you cannot use the angle brackets that start and end tags, as the browser can mistake the following letters for markup. You can, however, use a set of different characters known as a *character entity* to represent these special characters. Sometimes you will also see character entities referred to as *escape characters*.

All special characters can be added into a document using the numeric entity for that character, and some also have named entities, as you can see in the table that follows.

Character	Numeric Entity	Named Entity
"	&#034;	&quot;
&	&#038;	&amp;
<	&#060;	&lt;
>	&#062;	&gt;

A full list of character entities (or special characters) appears in Appendix F.

# Comments

You can put comments between any tags in your XHTML documents. Comments use the following syntax:

```
<!-- comment goes here -->
```

Anything after `<!--` until the closing `-->` will not be displayed. It can still be seen in the source code for the document, but it is not shown onscreen.

It is good practice to comment your code, especially in complex documents, to indicate sections of a document, and any other notes to anyone looking at the code. Comments help you and others understand your code.

## Chapter 1: Creating Structured Documents

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You can even comment out whole sections of code. For example, in the following snippet of code you would not see the content of the `<h2>` element. You can also see there are comments indicating the section of the document, who added it, and when it was added.

```
<!-- Start of Footnotes Section added 04-24-04 by Bob Stewart -->
<!-- <h2>Character Entities</h2> -->
<p><strong>Character entities</strong> can be used to escape special
characters that the browser might otherwise think have special meaning.</p>
<!-- End of Footnotes section -->
```

## The `<font>` Element (deprecated)

You should be aware of the `<font>` element, which was introduced in HTML 3.2 to allow users more control over how text appears. It was deprecated in HTML 4.0, and has since been removed from XHTML. In its short life, however, it got a lot of use, and if you look at other people's code you will see it used a lot. If you want to read more about the `<font>` element, it is covered in Appendix I. You might see the `<font>` element used like so:

```
<h3>Using the &lt;font&gt; element</h3>
<font face="arial, verdana, sans-serif" size="2" color="#666666">The
&lt;font&gt; element has been deprecated since HTML 4.0. You should now use
CSS to indicate how text should be styled. </font>
```

## Understanding Block and Inline Elements

Now that you have seen many of the elements that can be used to mark up text, it is important to make an observation about all of these elements that live inside the `<body>` element because each one can fall into one of two categories:

- Block-level elements
- Inline elements

This is quite a conceptual distinction, but it will have important ramifications for other features of XHTML (some of which you are about to meet).

Block-level elements appear on the screen as if they have a carriage return or line break before and after them. For example the `<p>`, `<h1>`, `<h2>`, `<h3>`, `<h4>`, `<h5>`, `<h6>`, `<ul>`, `<ol>`, `<dl>`, `<pre>`, `<hr />`, `<blockquote>`, and `<address>` elements are all block-level elements. They all start on their own new line, and anything that follows them appears on its own new line, too.

Inline elements, on the other hand, can appear within sentences and do not have to appear on a new line of their own. The `<b>`, `<i>`, `<u>`, `<em>`, `<strong>`, `<sup>`, `<sub>`, `<big>`, `<small>`, `<li>`, `<ins>`, `<del>`, `<code>`, `<cite>`, `<dfn>`, `<kbd>`, and `<var>` elements are all inline elements.

For example, look at the following heading and paragraph. These elements start on their own new line and anything that follows them goes on a new line, too. Meanwhile the inline elements in the paragraph are not placed on their own new line. Here is the code (`ch02_eg22.html`):

```
<h1>Block-Level Elements</h1>
<p><strong>Block-level elements</strong> always start on a new line. The
<code>&lt;h1&gt;</code> and <code>&lt;p&gt;</code> elements will not sit
on the same line, whereas the inline elements flow with the rest of the
text.</p>
```

You can see what this looks like in Figure 1-27.



Figure 1-27

You should also be aware that in Strict XHTML, block-level elements can contain other block-level elements, and inline elements. However, inline elements can appear only within block-level elements, and they may not contain block-level elements (so you should not have a `<b>` element outside a block-level element).

## Grouping Elements with `<div>` and `<span>`

The `<div>` and `<span>` elements allow you to group several elements to create sections or subsections of a page. On their own, they will not affect the appearance of a page, but they are commonly used with CSS to allow you to attach a style to a section of a page (as you will see in Chapter 7). For example, you might want to put all of the footnotes on a page within a `<div>` element to indicate that all of the elements within that `<div>` element relate to the footnotes. You might then attach a style to this `<div>` element so that they appear using a special set of style rules.

The `<div>` element is used to group block-level elements:

```
<div class="footnotes">
  <h2>Footnotes</h2>
  <p><b>1</b> The World Wide Web was invented by Tim Berners-Lee</p>
  <p><b>2</b> The W3C is the World Wide Web Consortium who maintain many Web
  standards</p>
</div>
```

## Chapter 1: Creating Structured Documents

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The `<span>` element, on the other hand, can be used to group inline elements only. So, if you had a part of a sentence or paragraph you wanted to group, you could use the `<span>` element. Here you can see that I have added a `<span>` element to indicate which content refers to an inventor. It contains both a bold element and some text:

```
<div class="footnotes">
  <h2>Footnotes</h2>
  <p><span class="inventor"><b>1</b> The World Wide Web was invented by Tim
    Berners Lee</span></p>
  <p><b>2</b> The W3C is the World Wide Web Consortium who maintain many Web
    standards</p>
</div>
```

On its own, this would have no effect at all on how the document looks visually, but it does add extra meaning to the markup, which now groups the related elements. This grouping can either be used by a processing application, or (as you will see in Chapter 7) can be used to attach special styles to these elements using CSS rules.

The `<div>` and `<span>` elements can carry all of the universal attributes and UI event attributes, as well as the deprecated `align` attribute (which is no longer available in Strict XHTML 1.0).

## Summary

In this chapter you have seen how XHTML is used to add structure to the text that appears in a document.

You have learned that the contents of a web page is marked up using elements that describe the structure of the document. These elements consist of an opening tag, a closing tag, and some content between the opening and closing tags. In order to alter some properties of elements, the opening tag may carry attributes, and attributes are always written as name value pairs. You know that XHTML can be thought of as the latest version of HTML, and that there are three different flavors of XHTML—in order to tell the browser which you are using, you can use a DOCTYPE declaration.

You also met a lot of new elements and learned the attributes they can carry. You've seen how every XHTML document should contain at least the `<html>`, `<head>`, `<title>`, and `<body>` elements, and how the `<html>` element should carry a namespace identifier.

You then met some attributes: the core attributes (`class`, `id`, and `title`), the internationalization attributes (`dir`, `lang`, and `xml:lang`), and the UI event attributes, each of which will crop up regularly throughout the book, as most of the elements can support them.

The rest part of this chapter dealt with elements that describe the structure of text:

- ❑ The six levels of headings: `<h1>`, `<h2>`, `<h3>`, `<h4>`, `<h5>`, and `<h6>`
- ❑ Paragraphs `<p>`, preformatted sections `<pre>`, line breaks `<br />`, and addresses `<address>`
- ❑ Presentational elements `<b>`, `<i>`, `<u>`, `<s>`, `<tt>`, `<sup>`, `<sub>`, `<strike>`, `<big>`, `<small>`, and `<hr />`

- Phrase elements such as `<em>`, `<strong>`, `<abbr>`, `<acronym>`, `<dfn>`, `<blockquote>`, `<q>`, `<cite>`, `<code>`, `<kbd>`, `<var>`, `<samp>`, and `<address>`
- Lists such as unordered lists using `<ul>` and `<li>`, ordered lists using `<ol>` and `<li>`, and definition lists using `<dl>`, `<dt>`, and `<dd>`
- Editing elements such as `<ins>` and `<del>`
- Grouping elements `<div>` and `<span>`

You will obviously use some of these elements more than others, but where an element fits the content you are trying to mark up, from paragraphs to addresses, you should try to use it. Structuring your text properly will help it last longer than if you just format it using line breaks and presentational elements.

You will come across many of these elements in later examples in this book, starting with the next chapter, which introduces you to the very important topic of linking between documents (and linking to specific parts of a document).

Finally, I should mention that you can learn a lot from looking at how other people have written their pages, and you can view the HTML or XHTML of pages on the Web by going to the View or Tools menu in your browser and selecting the Source (sometimes listed as View Source or Page Source) options. (You can also learn a lot of bad habits this way too—so you still need to read on in order to avoid them.)

## Exercises

The answers to all of the exercises are in Appendix A.

- 1.** Mark up the following sentence with the relevant presentational elements.

The 1<sup>st</sup> time the **bold** man wrote in *italics*, he underlined several key words.

- 2.** Mark up the following list, with inserted and deleted content:

Ricotta pancake ingredients:

- 1 ~~1/2~~ 3/4 cups ricotta
- 3/4 cup milk
- 4 eggs
- 1 cup plain white flour
- 1 teaspoon baking powder
- ~~75g~~ 50g butter
- pinch of salt



# 2

## Links and Navigation

What really distinguishes the Web from other mediums is the way in which web pages can contain links that take you directly to other pages (and even specific parts of a given page). Known as *hyperlinks*, these links are often credited with being the secret behind the Web's phenomenal success. Hyperlinks allow visitors to navigate between web sites by clicking on words, phrases, and images.

The average web site is a group of pages users navigate between using hypertext links. These pages often include links to other web sites as well as to other pages in the same site.

In this chapter, you learn how to create links between the different pages of your site and to specific points within pages of your sites, as well as how to link to other sites known as *external sites*.

In the same way that the markup you learned in Chapter 1 described the structure of the document, links describe which parts of the document can link to which parts of other documents — so they also form relationships between different documents.

When you learn about links, it is also important to learn some of the key concepts regarding structuring your site into folders known as *directories*, and how you can use *relative URLs* to link between pages within your site.

In this chapter, then, you will learn:

- How to structure the folders on your web site
- How to link between pages of your site
- How to link to specific parts of a page in your site
- How to link to other sites

*This chapter covers only linking to web pages; it does not cover the mechanisms for linking to and embedding other files, in particular the <link> element (which is covered in Chapter 7 on style sheets) or the <img> and <object> elements (which are covered in Chapter 3).*

# Basic Links

In order to get started with links, we will take a look at a couple of simple examples. Once you know the basics of linking, there's still a lot more that you can learn, but these simple examples will actually teach you a lot of what you need to use 90 percent of the time.

A link is specified using the `<a>` element. Anything between the opening `<a>` tag and the closing `</a>` tag becomes part of the link a user can click in a browser. The following sections discuss linking to other documents and to e-mail addresses.

## Linking to Other Documents

To link to another document, the opening `<a>` tag must carry an attribute called `href`; the value of the `href` attribute is the page you are linking to.

As an example, here is the `<body>` of a document called `ch02_eg01.html`. This page contains a link to a second page called `index.html`:

```
<body>
    Return to the <a href="index.html">index page</a>.
</body>
```

As long as `index.html` is in the same folder as `ch02_eg01.html`, when you click the words "index page," the `index.html` page will be loaded into the same window, replacing the current `ch02_eg01.html` page. As you can see from Figure 2-1, the content of the `<a>` element forms the link.



Figure 2-1

*This is how the links for the download code for this chapter work. Remember that you can click the View menu in your browser and then select the View Source option at any time to see what is going on in an HTML or XHTML page.*

While you can put all kinds of elements inside an `<a>` element, it is a good idea to make your links concise and to make the content of the `<a>` element actually describe what is at the other end of the link. Because the content of the `<a>` element clearly sticks out more than the text around it (usually because it's presented in a different color), many people *scan* pages for links when they want to go to the next page without really reading the entire page. Therefore, users are less likely to stay on your site and follow your links if all of them just say "click here" because the link will not show them clearly and quickly where they are going.

*Many web designers also use images inside the <a> element, which is something you will see in the next chapter, but when you do use an image, make sure that the image gives a clear indication of where the link will take you.*

If you want to link to a different site, you can use the following syntax, where you specify a full URL (*Uniform Resource Locator*) for the page you want to link to rather than just the filename ch02\_eg02.html (you learn more about URLs later in the chapter):

```
<body>
    Why not visit the <a href="http://www.wrox.com/">Wrox Web site</a>?
</body>
```

This link points to the Wrox web site. As you can see, the value of the href attribute is the same as you would type into a browser if you wanted to visit the Wrox web site. This is known as a qualified URL because it contains the domain name for the web site.

When you are linking to pages that make up part of the same web site, you can use a shorthand form called *relative URLs*; the first example (in which I did not start the value of the href attribute with the domain name) was an illustration of this. This not only saves you from having to type the full URL but also has other advantages.

It's also good practice to use the title attribute on a link, as this will be displayed in a tooltip (a little bubble that appears stating the title) in most browsers when the user hovers over the link (or in the case of voice browsers — often used by the visually impaired — the title will be read aloud).

The value of the title attribute should be a description of what the link will take you to. This is especially important if you use an image for a link. For example, here is a link to the Google home page ch02\_eg03.html:

```
<a href="http://www.Google.com/" title="Search the Web with Google">Google</a>
is a very popular search engine.
```

Figure 2-2 shows the title attribute, which gives further information about the link to the user when the mouse is held over the link.



Figure 2-2

You should be aware that everything inside the <a> element gets rendered as a link, including white space around the text or images, and therefore it is best to avoid spaces directly after an opening <a> tag

## Chapter 2: Links and Navigation

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or before the closing `</a>` tag. For example, consider the following link with opening and trailing spaces (`ch02_eg03.html`):

```
Why not visit the<a href="http://www.wrox.com/"> Wrox Web site </a>?
```

As you can see in Figure 2-3, these spaces in the link will be underlined.



Figure 2-3

It is far better to use white space outside of these tags, like so:

```
Why not visit the<a href="http://www.wrox.com/">Wrox Web site</a>?
```

Of course, you should still have spaces between words inside the `<a>` element; it's just best if they are not at the beginning or end of the link.

## Linking to E-mail Addresses

You've probably seen links on many sites that show an e-mail address, and you have probably noticed that clicking one of these links will open a new e-mail in your default e-mail program, ready for you to send an e-mail to that address.

To create a link to an e-mail address, you need to use the following syntax with the `<a>` element:

```
<a href="mailto:name@example.com">name@example.com</a>
```

Here, the value of the `href` attribute starts with the keyword `mailto`, followed by a colon, and then the e-mail address you want the mail sent to. As with any other link, the content of the `<a>` element is the visible part of the link shown in the browser, so you might choose to use the following:

```
<a href="mailto:name@example.com">E-mail us</a>.
```

Or, if you want users to see the e-mail address before clicking it, you can use the following:

```
For sales enquiries e-mail <a href="mailto:name@example.com">sales@example .com</a>.
```

There is one drawback to using this technique, however: Some less scrupulous inhabitants of the Web use little programs to automatically search web sites for e-mail addresses. After they have found e-mail addresses on web sites, they will start sending spam (junk mail) to those addresses.

There are a few main alternatives to creating a link to an e-mail address:

- Use an e-mail form instead so that visitors fill in a form on your web site to send you an e-mail. Once you have received the mail, you can then reply as normal because automated programs do not use contact forms to collect e-mail addresses. Use of an e-mail form requires either a CGI script or a server-side scripting language such as ASP.net, JSP, PHP, Cold Fusion, or Ruby. Chapter 5 provides an example of an e-mail form.
- Write your e-mail address into the page using JavaScript (covered in Chapter 12). The idea behind this technique is that the programs that scour the Web for e-mail addresses cannot read the JavaScript version of an address.

You have seen how to create the most basic types of links, and you are now ready to delve into the more in-depth topics regarding linking. In order to look at linking between pages in greater depth, you need to get through a few pages that explain more about how you should organize the files in your web site into folders, and also the anatomy of a URL (the address that identifies pages and other resources on your web site).

## Understanding Directories and Directory Structures

A *directory* is simply the name for a folder on a web site. (In the same way that your hard drive contains different folders, a web site contains directories.) Usually you will find that a web site contains several directories, and that each directory contains different parts of a web site. For example, a big site with several subsections will have a separate directory for each section of that site, and different types of files (such as images and style sheets) are usually kept in their own specific directories.

In the same way that you probably organize the files on your hard drive into separate folders, it is important to organize the files on your web site into directories so that you can find what you are looking for more easily and keep control of all the files. As you can imagine, if all the files used in a web site resided in the same folder, things would get complicated very quickly.

Figure 2-4 shows an example directory structure for a news site, with separate folders for each section and separate folders for different types of files. There are folders for images, scripts, and style sheets in the main folder. Note also how the Music section has its own folders for Features, MP3s, and Reviews.

Furthermore, a directory structure like this will help users navigate the site without knowing exact filenames; they can just pick the section they want, such as <http://www.ExampleNewsSite.com/Business/> to get to the business news or <http://www.ExampleNewsSite.com/Entertainment/Music/> to get to the music pages.

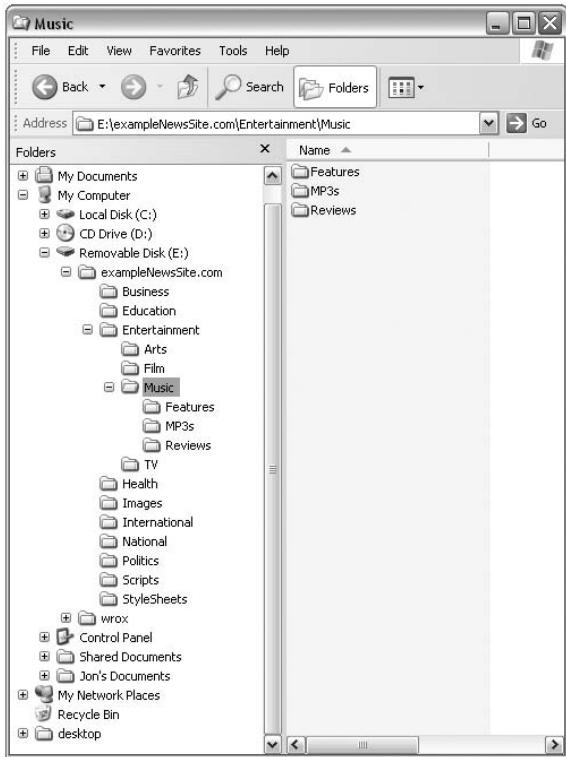


Figure 2-4

It's very important to keep any web site well organized; it's surprising how a small web site can quickly grow and contain many more files than you initially imagined. Therefore, when you start to build any web site you should create a good directory structure that can withstand growth.

As you learn about linking, it's important to learn some of the terms that are used in describing directory structures and the relationships between directories, so look back at Figure 2-4 to see an example directory structure:

- ❑ The main directory that holds the whole of your web site is known as the *root folder* of your web site; in this case, it is called `exampleNewSite.com`.
- ❑ A directory that is within another directory is known as a *subdirectory*. Here, Film is a subdirectory of Entertainment.
- ❑ A directory that contains another directory is known as the *parent directory* of the subdirectory. Here, Entertainment is the parent directory of Arts, Film, Music, and TV.

### What Are You Linking To?

At the start of this chapter you saw examples of creating links to pages in the same directory and to pages on different web sites.

Now that you've seen how you should organize your site into separate folders, you need to look at how you can link to pages in different folders of your own site — for example, how to link from the main home page to a page in the Entertainment section, which will be in the Entertainment folder.

You *can* use the full URL you would type into a web browser's address bar — known as *absolute URLs* — on every link on your site, although it is better to use *relative URLs*, which are a kind of shorthand, to link between files in different folders of your site. Relative URLs specify where a file is *in relation* to the current one.

Before looking at how to create a relative URL and how it differs from an absolute URL, you need to understand the anatomy of a URL.

### What a URL Is Made Up Of

A URL is made up of several parts, each of which offers information to the web browser to help find the page you are after. It is easier to learn the parts of a URL if you look at the most common ones first. If you look at the example URL in Figure 2-5, there are three key parts: the scheme, the host address, and the file path. The following sections discuss each of these in turn.



Figure 2-5

### The Scheme

The scheme identifies the type of URL you are linking to and therefore how the resource should be retrieved. For example, most web pages use something called the *Hypertext Transfer Protocol* (HTTP) to pass information to you, which is why most web pages start with `http://`, but you might have noticed other prefixes when doing banking online or downloading large files.

The following table lists the most common schemes.

Scheme	Description
<code>http://</code>	Hypertext Transfer Protocol (HTTP) is used to request pages from web servers and send them back from web servers to browsers.
<code>https://</code>	Secure Hypertext Transfer Protocol (HTTPS) encrypts the data sent between the browser and the web server using a digital certificate.
<code>ftp://</code>	File Transfer Protocol is another method for transferring files on the Web. While HTTP is a lot more popular for viewing web sites because of its integration with browsers, FTP is still commonly used to transfer large files across the Web and to upload source files to your web server.
<code>file://</code>	Used to indicate that a file is on the local hard disk or a shared directory on a LAN.

## Chapter 2: Links and Navigation

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### The Host Address

The host address is the address where a web site can be found. It can either be an IP address (four sets of numbers between 0 and 255, for example, 192.0.110.255) or more commonly the domain name for a site such as [www.wrox.com](http://www.wrox.com).

*All computers connected to the Internet can be found using an IP address; however, domain names are far easier to remember than IP addresses, so domain names are more commonly used. However, behind the scenes, all domain names are converted into the IP address for the computer(s) that hold the web site by consulting a domain name server (DNS), which contains a directory of domain names and the IP address of the computer that runs that web site.*

Note that “www” is not actually part of the domain name although it is often used in the host address — it has nothing to do with the HTTP protocol used.

### The Filepath

The filepath always begins with a forward slash character, and may consist of one or more directory names (remember, a directory is just another name for a folder on the web server); each directory name is separated by forward slash characters and the filepath may end with a filename at the end. Here, `Overview.html` is the filename:

```
/books/newReleases/BEGINNINGWEBDEVELOPMENT/Overview.html
```

If a filename is not given, the web server will usually do one of three things (depending upon how it is configured):

- Return a default file (for web sites written in HTML this is often `index.html` or `default.html`)
- Offer a list of files in that directory
- Show a message saying that the page cannot be found or that you cannot browse the files in a folder

### Other Parts of the URL

A URL may, less commonly, contain a number of other parts.

*Credentials* are a way of specifying a username and password for a password-protected part of a site. The credentials come before the host address, and are separated from the host address by an @ sign. Note how the username is separated from the password by a colon. The following URL shows the username `administrator` and the password `letmein`:

```
http://administrator:letmein@www.wrox.com/administration/index.html
```

*Ports* are like the doors to a web server. A web server often has several server programs running on the same machine, and each program communicates using a different port. For example, `http://` and `https://` by default use different ports (standard `http://` usually uses port 80 and `https://` usually uses port 443).

You will rarely have to specify a port, but if you do, it comes after the domain name and is separated from it with a colon. For example, if you wanted to specify that a web server was running on port 8080 you could use the following address:

```
http://www.wrox.com:8080/index.html
```

*Fragment identifiers* can be used after a filename to indicate a specific part of the page that a browser should go to immediately. These are often used in long pages when you want to allow a user to get to a specific part of a page easily without having to scroll through the whole page to find that point.

The fragment identifier is separated from the filename by a pound or hash sign:

```
http://www.wrox.com/newTitles/index.html#HTML
```

You learn more about fragment identifiers in the section of that name later in the chapter.

*Path arguments* are used to pass extra information to a server program. They are separated from the URL by a question mark and come in name/value pairs separated by the equal sign (they are rather like attributes without the quotation marks). Path arguments are commonly used to collect information from visitors and often to pass information to programs on the server that will tailor a page to you. Such arguments are often referred to as a *Query String*.

When you use a form on a web page, such as a search form or an online order form, the browser can append the information you supply to the URL to pass information from you to the server — you do not type path arguments into a URL.

Here, the path arguments `searchTerm=HTML` are added to the URL to indicate that the user is searching on the term `HTML`:

```
http://www.wrox.com/search.aspx?searchTerm=HTML
```

## Absolute and Relative URLs

As you have already seen, a URL is used to locate a resource on the Internet. Each web page and image — in fact every file on the Internet — has a unique URL, the address that can be used to find that particular file. No two files on the Internet share the same URL.

If you want to access a particular page of a web site, you type the URL for that page into the address bar in your browser. For example, to get the page about film on the fictional news site you met earlier in the chapter, you might type in the URL:

```
http://www.exampleNewsSite.com/Entertainment/Film/index.html
```

An *absolute URL* like this one contains everything you need to uniquely identify a particular file on the Internet.

As you can see, absolute URLs can quickly get quite long, and every page of a web site can contain many links. So it's about time you learned the shorthand for URLs that point to files within your web site: relative URLs.

## Chapter 2: Links and Navigation

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A *relative URL* indicates where the resource is in relation to the current page. For example, imagine you are looking at the index page for the entertainment section of the following fictional news site:

```
http://www.exampleNewsSite.com/Entertainment/index.html
```

Then you want to add a link to the index pages for each of the subsections: Film, TV, Arts, and Music. Rather than including the full URL for each page, you can use a relative URL. For example:

```
Film/index.html  
TV/index.html  
Arts/index.html  
Music/index.html
```

As I am sure you agree, this is a lot quicker than having to write out the following:

```
http://www.exampleNewsSite.com/Entertainment/Film/index.html  
http://www.exampleNewsSite.com/Entertainment/TV/index.html  
http://www.exampleNewsSite.com/Entertainment/Arts/index.html  
http://www.exampleNewsSite.com/Entertainment/Music/index.html
```

You might be interested to know that your web browser still requests the full URL, not the shortened relative URL, but it is the browser that is actually doing the work of turning the relative URLs into full absolute URLs.

Another key benefit to using relative URLs within your site is that it means you can change your domain name or copy a subsection of one site to a new site without having to change all of the links because each link is relative to other pages within the same site.

*Note that relative URLs work only on links within the same directory structure on the same web site; you cannot use them to link to pages on other servers.*

The subsections that follow provide a summary of the different types of relative URLs you can use.

### Same Directory

When you want to link to or include a resource from the same directory, you can just use the name of that file. For example, to link from the home page (`index.html`) to the “contact us” page (`contactUs.html`), you can use the following:

```
contactUs.html
```

Because the file lives in the same folder, you do not need to specify anything else.

### Subdirectory

The Film, TV, Arts, and Music directories from Figure 2-4 were all subdirectories of the Entertainment directory. If you are writing a page in the Entertainment directory, you can create a link to the index page of the subdirectories like so:

```
Film/index.html  
TV/index.html  
Arts/index.html  
Music/index.html
```

You include the name of the subdirectory, followed by a forward slash character, and the name of the page you want to link to.

For each additional subdirectory, you just add the name of the directory followed by a forward slash character. So, if you are creating a link from a page in the root folder of the site (such as the site's main home page), you use a relative URL like these to reach the same pages:

```
Entertainment/Film/index.html  
Entertainment/TV/index.html  
Entertainment/Arts/index.html  
Entertainment/Music/index.html
```

### **Parent Directory**

If you want to create a link from one directory to its parent directory (the directory that it is in), you use the `..` notation of two periods or dots followed by a forward slash character. For example, from a page in the Music directory to a page in the Entertainment directory, your relative URL looks like this:

```
../index.html
```

If you want to link from the Music directory to the root directory, you repeat the notation:

```
 ../../index.html
```

Each time you repeat the `..` notation, you go up another directory.

### **From the Root**

It is also possible to indicate a file relative to the root folder of the site. So, if you wanted to link to the `contactUs.html` page from any page within the site, you use its path preceded by a forward slash. For example, if the Contact Us page is in the root folder, you just need to enter:

```
/contactUs.html
```

Alternatively, you can link to the Music section's index page from anywhere within that site using the following:

```
/Entertainment/Music/index.html
```

The forward slash at the start indicates the root directory, and then the path from there is specified.

### **Default Files**

You may have noticed on many web sites that you do not need to actually specify the exact page that you want to view. For example, you might just enter the domain name or the domain name and a directory, such as:

```
http://www.exampleNewsSite.com/
```

or

```
http://www.exampleNewsSite.com/Entertainment/
```

## Chapter 2: Links and Navigation

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This is because many web servers allow their owners to send a default file to the visitor when they just specify a directory. So, `http://www.exampleNewsSite.com/Entertainment/` will return the default file for the Entertainment directory, and if you specify `http://www.exampleNewSite.com/`, the server returns the default file for the root folder of the web site. (Remember that the forward slash character can be used as an indicator of being relative to the root directory.)

Most servers use either `index.html` or `default.html` as the default HTML filename (although this may be different if you use a server-side language such as ASP.net or PHP).

You might have noticed that both of these URLs end in a forward slash character. If you do not include the trailing slash at the end of the URL you request, it might look like this:

`http://www.exampleNewsSite.com`

or

`http://www.exampleNewsSite.com/Entertainment`

In these cases, the server tends to look for a file by these names, not find one, and tell the browser to request the same page with a slash character at the end. For example, if you enter the following into your browser without the trailing slash character:

`http://www.wrox.com`

most browsers read the following when you get to see the home page:

`http://www.wrox.com/`

Therefore, when you create links to folders within web sites (rather than specific pages), it's a good idea to add a forward slash to the end of the URL.

### **The `<base>` Element**

As I mentioned earlier, when a browser comes across a relative URL, it actually transforms the relative URL into a full absolute URL. The `<base>` element allows you to specify a base URL for a page that all relative URLs will be added to when the browser comes across a relative URL.

You specify the base URL as the value of the `href` attribute. For example, you might indicate a base URL for `http://www.exampleSite2.com/` as follows:

```
<base href="http://www.exampleSite2.com/" />
```

In this case, a relative URL like this one:

```
Entertainment/Arts/index.html
```

ends up with the browser requesting this page:

```
http://www.exampleSite2.com/Entertainment/Arts/index.html
```

This might be helpful when a specific page has been moved to a new server but you still want all the links on that page to go back to the original site, or when there is no URL for the page itself (such as an HTML e-mail).

The only other attribute a `<base>` element can carry (apart from the `href` attribute) is the `id` attribute.

## Creating Links with the `<a>` Element

You have already seen a couple of examples of using the `<a>` element at the start of the chapter. However, that was just a taste of what you can do with the `<a>` element. Now that you understand a little more about directory structure, it is time to look at links in a little more depth.

All hypertext links on the Web take you from one part of the Web to another. You have already seen links that take you from one page to another (and this section covers them in more depth). You will also meet links that take you to a specific part of a page (either a specific part of the same page or specific part of a different page).

Like all journeys, these have a starting point known as the *source*, and a finishing point known as the *destination*, which are both called *anchors*.

Each link that you see on a page that you can click is actually a *source anchor*, and each source anchor is created using the `<a>` element.

### Creating a Source Anchor with the `href` Attribute

The source anchor is what most people think of when talking about links on the Web — whether the link contains text or an image. It is something you can click and then expect to be taken somewhere else.

As you have already seen, any text that forms part of the link that a user can click is contained between the opening `<a>` tag and closing `</a>` tag, and the URL to which the user should be taken is specified as the value of the `href` attribute.

For example, when you click the words Wrox Press website (which you can see are inside the `<a>` element) the link takes you to `http://www.wrox.com/`:

Why not visit the `<a href="http://www.wrox.com/">Wrox Press website</a>` to find out about some of our other books?

whereas the following link on the home page of the fictional news site would take you to the main Film page (note how this link uses a relative URL):

You can see more films in the `<a href="Entertainment/Film/index.html">film section</a>`.

By default, the link looks something like the one shown in Figure 2-6, underlined and in blue text.

You need to specify a destination anchor only if you want to link to a specific part of a page, as described in the next section.



Figure 2-6

### ***Creating a Destination Anchor Using the name and id Attributes (linking to a specific part of a page)***

If you have a long web page, you might want to link to a specific part of that page. You will usually want to do this when the page does not fit in the browser window, and the user might otherwise have to scroll to find the relevant part of the page.

The *destination anchor* allows the page author to mark specific points in a page that a source link can point to.

Common examples of linking to a specific part of a page that you might have seen used on web pages include:

- ❑ “Back to top” links at the bottom of long pages
- ❑ A list of contents for a page that takes the user to the relevant section
- ❑ Links to footnotes or definitions

You create a destination anchor using the `<a>` element again, but when it acts as a destination anchor it must carry an `id` attribute (and if you are creating pages that might be viewed by very early browsers, such as IE 3 and Netscape 3, a `name` attribute as well) because the `id` attribute was only introduced in HTML 4.

*You may remember from Chapter 1 that the name and id attributes were two of the universal attributes that most elements can carry.*

By way of an example, imagine that you have a long page with a main heading and several subheadings. The whole page does not fit on the screen at once, forcing the user to scroll, so you want to add links to each of the main headings at the start of the document.

Before you can create links to each section of the page (using the source anchors), you have to add the destination anchors. Here you can see the subheadings of the page, each containing an `<a>` element with the `id` attribute whose value uniquely identifies that section:

```
<h1>Linking and Navigation</h1>
<h2><a id="URL">URLs</a></h2>
<h2><a id="SourceAnchors">Source Anchors</a></h2>
<h2><a id="DestinationAnchors">Destination Anchors</a></h2>
<h2><a id="Examples">Examples</a></h2>
```

With destination anchors in place, it's now possible to add source anchors to link to these sections, like so:

```
<p>This page covers the following topics:<br>
<ul>
  <li><a href="#URL">URLs</a></li>
  <li><a href="#SourceAnchors">Source Anchors</a></li>
  <li><a href="#DestinationAnchors">Destination Anchors</a></li>
  <li><a href="#Examples">Examples</a></li>
</ul>
</p>
```

The value of the `href` attribute in the source anchors is the value of the `id` attribute preceded by a pound or hash sign (#).

If you take a look at Figure 2-7a you can see how the page has several links to the sections of the page; and in Figure 2-7b you can see what happens when the user clicks on the second link and is taken directly to that section of the page. You can see the full code for this example, and try it, with the download code for this chapter available from Wrox.com; the file is `ch02_eg06.html`.

Note that it is important for destination anchors to always have some content; otherwise some browsers will not find the destination. For example, you should not use the following to indicate the top of the page:

```
<a id="top"></a>
```

Rather, you should put this around the main heading or some other content, like so:

```
<h1><a id="top">Linking and Navigation</a></h1>
```

If someone wanted to link to a specific part of this page from a different web site, he or she would add the full URL for the page, followed by the pound or hash sign and then the value of the `id` attribute, like so:

```
http://www.example.com/HTML/links.html#SourceAnchors
```

**The value of a name or id attribute should be unique within the page, and source anchors should match the case of destination anchors.**

### **The `<a>` Element's Other Attributes**

The `<a>` element supports all of the universal attributes, the UI event attributes, and the following attributes:

```
accesskey charset cords href hreflang rel rev shape style tabindex target type
```

#### **The `accesskey` Attribute**

The `accesskey` attribute provides a keyboard shortcut that can be used to activate a link. For example, you can make the T key an access key so that when the user presses either the Alt or Ctrl key on his keyboard (depending on his operating system) along with the T key, the link gets activated. This may either mean the browser immediately follows the link, or it may mean the link is highlighted and that the user then has to press the Enter (or Return) key for it to be followed.

# Chapter 2: Links and Navigation

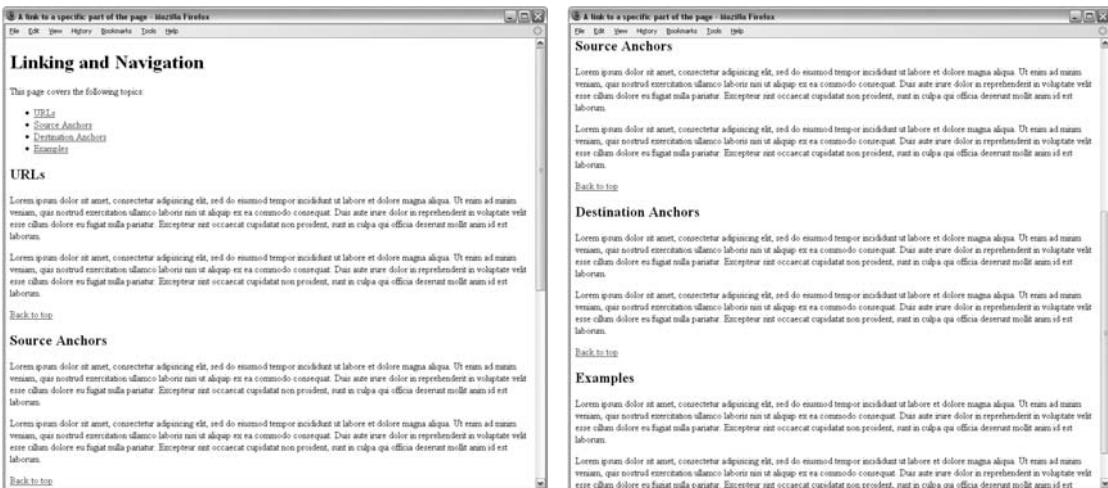


Figure 2-7

The `accesskey` attribute should be specified on the source anchor. For example, if you want to follow a link to the top of the page when the user presses the T key on his keyboard (with either Alt or Ctrl) you use the `accesskey` attribute like so:

```
<a id="bottom" accesskey="t">Back to top</a>
```

Note that the key is case-insensitive. You will see more about the `accesskey` attribute (and some examples) when you look at forms in Chapter 5.

## The `charset` Attribute

The `charset` attribute indicates the character encoding of the document the URL points to. The value must be a string that identifies the character set, such as UTF-8 or ISO-8859-1. (See Appendix F for the list of character sets.)

The `charset` attribute is usually used on the source anchor, and typically only when the language is different from that of the main document containing the link. For example:

```
<a href="http://www.wrox.com/" charset="UTF-8">Wrox Web Site</a>
```

This is particularly useful when linking to foreign language sites written in encodings that some users might not be able to understand (or might not even be able to view — for example, not all American computers have the characters installed that are required in order to view Chinese text).

## The `coords` Attribute

The `coords` attribute is designed for use on a source anchor when it contains an image. It is designed so you can create an image map, which is where different parts of the image link to different documents or different parts of the same document. The `coords` attribute's value will be *x* and *y* coordinates that indicate which part of the image should follow this link.

You will learn more about using images as links in Chapter 3.

### The hreflang Attribute

The `hreflang` attribute specifies the language of the document a source link points to and can be used only when a value for the `href` attribute is given. For example:

```
<a href="http://www.wrox.com/" hreflang="en-US">Wrox Web Site</a>
```

Appendix G lists the possible values.

### The rel Attribute

The `rel` attribute is used on the source anchor to indicate the relationship between the current document and the resource specified by the `href` attribute. The major browsers do not at present make any use of this attribute, although it is possible that automated applications could. For example, the following link uses the `rel` attribute to indicate that its destination is a glossary of terms used in the document:

```
For more information, please read the <a href="#glossary"  
rel="glossary">glossary</a>.
```

See the table that follows for possible values for `rel`.

Value	Description
toc (or contents)	A document that is a table of contents for the current document
index	A document that is an index for the current document
glossary	A document containing a glossary of terms that relate to the current document
copyright	A document containing the copyright statement for the current document
start	A document that is the first in a series of ordered documents, of which this is one document
next	A document that is the next in a series of ordered documents, of which this is one document
prev (or previous)	A document that is the previous in a series of ordered documents, of which this is one document
help	A document that helps users understand or navigate the page and/or site
chapter	A document that acts as a chapter within a collection of documents

*Continued*

## Chapter 2: Links and Navigation

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Value	Description
section	A document that acts as a section in a collection of documents
subsection	A document that acts as a subsection in a collection of documents
appendix	A document that acts as an appendix in a collection of documents

### The rev Attribute

The `rev` attribute provides the same role as the `rel` attribute but is used on the destination anchor to describe the relation between the destination and the source. It is currently not supported by major browsers.

### The shape Attribute

If you want to create an image map, the `shape` attribute can be used to indicate the shape of an area that becomes a clickable *hotspot*. The `shape` attribute is covered in detail in Chapter 3, where you learn how to create image maps.

### The tabindex Attribute

To understand the `tabindex` attribute, you need to know what it means for an element to gain *focus*; any element that a user can interact with can gain focus. If the user clicks the Tab key on his or her keyboard when a page has loaded, the browser moves focus between the parts of the page that the user can interact with. The parts of the page that can gain focus include links and some parts of forms (such as the boxes that allow you to enter text). When a link receives focus, and the user presses Enter on the keyboard, the link is activated. You can see focus working on the Google web site; if you repeatedly press the Tab key, you should see focus pass between links on the page. After it has passed across each link in turn, it goes onto the box where you enter search terms, across the site's buttons, and usually ends up back where you typed in the URL. Then it cycles around the same elements again as you keep pressing Tab.

The `tabindex` attribute allows you to specify the order in which, when the Tab key is pressed, the links (or form controls) obtain focus. So, when the user clicks the Tab key, the focus may skip to the key items on the page that the user might want to interact with.

The value of the `tabindex` attribute is a number between 0 and 32767. A link whose `tabindex` attribute has a value of 1 received focus before a link with a `tabindex` value of 20 (and if a value of 0 is used, they appear in the order in which they appear in the document). Chapter 5 covers the `tabindex` attribute in more detail.

### The target Attribute

The `target` attribute is used to indicate which window or frame the document contained in a link should open in. You learn more about frames in Chapter 6. The syntax is:

```
<a href="Page2.html" target="main">Page 2</a>
```

When the user clicks the Page 2 link, the document `Page2.html` loads in the window or frame called `main`. If you want the link to open in a new window, you can give the `target` attribute a value of `_blank`.

### The title Attribute

As mentioned at the start of the chapter, a `title` attribute is vital for any links that are images, and can also help provide additional information to visitors in the form of a visual text tooltip in most browsers or an auditory clue in voice browsers for the visually impaired. Figure 2-2 near the beginning of this chapter showed you what the `title` attribute looks like in Firefox when a user hovers over the link.

### The type Attribute

The `type` attribute specifies the MIME type of the link. Appendix H includes a list of MIME types. An HTML page would have the MIME type `text/html`, whereas a JPEG image would have the MIME type `img/jpeg`. The following is an example of the `type` attribute being used to indicate that the document the link points to is an HTML document:

```
<a href="index.html" type="text/html">Index</a>
```

Theoretically, the browser could use the information in the `type` attribute to either display it differently or indicate to the user what the format of the destination is, although none do use it at present.

### Try It Out Creating Links Within Pages

Now it's your turn to try making a long page with links between different parts of the page. In this example, you are going to create a page that is a restaurant menu. So open your text editor or authoring tool and follow these steps:

1. Start with the XML declaration, DOCTYPE declaration, and the elements for the skeleton of the document: `<html>`, `<head>`, `<title>`, and `<body>`. Remember to give the document a title and add in the namespace identifier on the root `<html>` element:

```
<?xml version="1.0" ?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">

  <head>
    <title>A menu example</title>
  </head>
  <body>

    </body>
  </html>
```

2. Inside the `<body>` element, add the headings for the page. Each of these should have a destination anchor so that you can link directly to that part of the page. The main heading will be used for "Back to top" links, whereas each course of the menu will have an `id` attribute that describes its sections:

```
<body>
  <h1><a id="top">Wrox Cafe Menu</a></h1>
  <h2><a id="starters">Starters</a></h2>
  <h2><a id="mains">Main Courses</a></h2>
  <h2><a id="desserts">Desserts</a></h2>
</body>
```

## Chapter 2: Links and Navigation

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3. Between the title and the starters, not only will there be an introductory paragraph, but also a menu linking to each of the courses. In order to be Strict XHTML, the links at the top will go in a block-level `<div>` element:

```
<h1><a id="top">Wrox Cafe Menu</a></h1>
<div id="nav"><a href="#starters">Starters</a> | <a href="#mains">Main
Courses</a> | <a href="#desserts">Desserts</a></div>

<p>Welcome to the Wrox Cafe, where we pride ourselves on good, honest home
cooked food at good, honest prices.</p>
<h2><a id="starters">Starters</a></h2>
```

4. At the bottom of the page, you will have a description of vegetarian dishes. Links next to vegetarian items will point to this description, so it needs to have a destination anchor.

```
<p><a id="vege">Items marked with a (v) are suitable for vegetarians.</a></p>
```

5. Finally, you can just add in the items on the menu in a bulleted list. Note how the vegetarian items have a link down to the description of vegetarian dishes. Don't forget to add the "Back to top" links.

```
<h2><a id="starters">Starters</a></h2>
<ul>
    <li>Chestnut and Mushroom Goujons (<a href="#vege">v</a>)</li>
    <li>Goat Cheese Salad (<a href="#vege">v</a>)</li>
    <li>Honey Soy Chicken Kebabs</li>
    <li>Seafood Salad</li>
</ul>
<p><small><a href="#top">Back to top</a></small></p>
<h2><a id="mains">Main courses</a></h2>
<ul>
    <li>Spinach and Ricotta Roulade (<a href="#vege">v</a>)</li>
    <li>Beef Tournados with Mustard and Dill Sauce</li>
    <li>Roast Chicken Salad</li>
    <li>Icelandic Cod with Parsley Sauce</li>
    <li>Mushroom Wellington (<a href="#vege">v</a>)</li>
</ul>
<p><small><a href="#top">Back to top</a></small></p>
<h2><a id="desserts">Desserts</a></h2>
<ul>
    <li>Lemon Sorbet (<a href="#vege">v</a>)</li>
    <li>Chocolate Mud Pie (<a href="#vege">v</a>)</li>
    <li>Pecan Pie (<a href="#vege">v</a>)</li>
    <li>Selection of Fine Cheeses from Around the World</li>
</ul>
<p><small><a href="#top">Back to top</a></small></p>
```

6. Save your example as `menu.html` and take a look at it in your browser. You should end up with something that looks like Figure 2-8.



Figure 2-8

### How It Works

You have already seen the skeleton parts for the page (along with the declarations that come before it), so let's focus on the links.

There are three source anchors just under the first heading that form a simple navigation bar. When clicked, these will take users to the appropriate section of the page. These items are kept inside a `<div>` element because `<a>` elements should appear inside a block-level element in Strict XHTML 1.0 — although any earlier versions would allow you to leave this off.

```
<div id="nav"><a href="#starters">Starters</a> | <a href="#mains">Main courses</a> | <a href="#desserts">Desserts</a></div>
```

The `id` attribute on the `<div>` element is there just to identify the purpose of this block-level grouping element. Because this element does not have a specific purpose like some of the other elements (such as `<p>` or `<h2>`), it helps to add this attribute as a reminder of what it is grouping.

Three additional source anchors are underneath each section of the menu to take you back to the top of the page.

```
<p><small><a href="#top">Back to top</a></small></p>
```

Finally, source anchors with the text `v` indicate items are vegetarian, and to take you to a key at the bottom of the page that explains what the `v` stands for.

```
<li>Mushroom wellington (<a href="#vege">v</a>)</li>
```

## Chapter 2: Links and Navigation

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The destination anchors are using the `id` attribute to indicate the potential targets of links. Each of the headings contains a destination anchor. The main menu heading requires an anchor so that the “Back to top” links will take the user to the top of the page, while the subheadings have anchors so that the navigation menu at the top can take them to that part of the page.

Remember that destination anchors must have some content — they cannot be empty or the browser might not recognize them, which is why they have been put inside the heading elements surrounding the actual heading name:

```
<h1><a id="top">Wrox Cafe Menu</a></h1>
<h2><a id="starters">Starters</a></h2>
<h2><a id="mains">Main courses</a></h2>
<h2><a id="desserts">Desserts</a></h2>
```

Similarly, the paragraph at the bottom that indicates what the (v) sign means contains a destination anchor, just like the heading.

```
<p><a id="vege">Items marked with a (v) are suitable for vegetarians.</a></p>
```

---

## Advanced E-mail Links

As you saw at the beginning of the chapter, you can make a link open up the user’s default e-mail editor, and address an e-mail to you — or any other e-mail address you give — automatically. This is done like so:

```
<a href="mailto:info@example.org">info@example.org</a>
```

You can also specify some other parts of the message, too, such as the subject, body, and people that it should be *cc*’d or *bcc*’d to.

To add a subject to an e-mail, you follow the e-mail address with a question mark to separate the extra values from the e-mail address. Then you use the name/value pairs to specify the additional properties of the mail you want to control. The name and the value are separated by an equal sign.

For example, to set the subject to be Enquiry, you would add the `subject` property name and what you wanted to be the subject, like so:

```
<a href="mailto:info@example.org?subject=Enquiry">
```

You can specify more than one property by separating the name/value pairs with an ampersand. Here you can see that the subject and a cc address have been added in:

```
<a href="mailto:info@example.org?subject=XHTML&cc=sales@example.org"></a>
```

The table that follows includes a full list of properties you can add.

Property	Purpose
subject	Adds a subject line to the e-mail; you can add this to encourage the user to use a subject line that makes it easier to recognize where the mail has come from.
body	Adds a message into the body of the e-mail, although you should be aware that users would be able to alter this message.
cc	Sends a carbon copy of the mail to the cc'd address; the value must be a valid e-mail address. If you want to provide multiple addresses you simply repeat the property, separating it from the previous one with an ampersand.
bcc	Secretly sends a carbon copy of the mail to the bcc'd address without any recipient seeing any other recipients; the value must be a valid e-mail address. If you want to provide multiple addresses, you simply repeat the property, separating it from the previous one with an ampersand.

If you want to add a space between any of the words in the subject line, you should add %20 between the words instead of the space. If you want to take the body part of the message onto a new line you should add %0D%0A (where 0 is a zero, not a capital O).

It is common practice to add only the e-mail address in e-mail links. If you want to add subject lines or message bodies you are better off creating an e-mail form, like the one you will see in Chapter 5.

## Summary

In this chapter you learned about links — the part of XHTML that puts the “hyper” in hypertext. Links enable visitors to your site to jump between pages and even between parts of pages (so that they don’t have to scroll to find the place they need).

You have seen that you can use the `<a>` element to create source anchors, which are what most people think of when you mention links on the Web. The content of the source anchor is what users can click — and this should usually be an informative, concise description of what the target is (rather than text such as “click here”), or it can be an image (as you will see in Chapter 3).

You can also use the `<a>` element to create destination anchors. Destination anchors are a little like index points or special markers because they allow you to create links that take you directly to that part of the page. Destination anchors should always have some content, and the old `name` attribute that HTML introduced for destination anchors has been replaced in Strict XHTML by the `id` attribute (although this works only in version 3+ browsers).

Along the way, you learned more about URLs, in particular the difference between an absolute URL, like those that appear in the address bar of your browser, and relative URLs, which describe where a resource is in relation to the document containing it. Learning the different ways in which relative URLs can be used will also be helpful as you head to the next chapter and learn about adding images and other objects into your documents.

# Exercises

You can find the answers to all of the exercises in Appendix A.

1. Look back at the Try It Out example where you created a menu, and create a new page that has links, like those at the top of the menu page, to each of the courses in the menu example. Then add a link to the main Wrox Press web site ([www.wrox.com](http://www.wrox.com)). The page should look something like Figure 2-9.

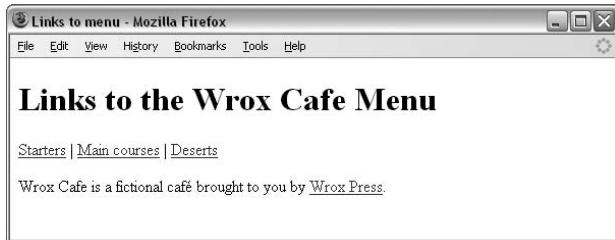


Figure 2-9

2. Take the following sentence and place `<a>` elements around the parts that should have the link.

```
<p>To find out why advertising on our site works, visit the testimonials  
page.</p>
```

3. What is wrong with the positioning of the `<a>` element here?

```
<p>You can read the full article <a>here</a>.</p>
```

# 3

## Images and Objects

In this chapter, you begin learning some aspects of web design that will really breathe life into your web pages. You start by learning how to add images into your documents using the `<img>` element. You will see the difference between some of the main formats used for images on the Web and learn how to prepare your images for use on the Web. You will also learn how to make an image a link, and even how to divide an image up into sections so that different parts of the image link to different pages — this is known as an *image map*.

Then you will go on to meet the `<object>` element that you can use to insert all manner of objects into pages, from MP3s and Flash movies to Active X controls and even images.

### Adding Images to Your Site

Images and graphics can really bring your site to life. In this section you will not only learn how to insert images and graphics into your pages, but also the different image formats you can use on the Web (such as GIFs, JPEGs, and PNGs). You will also learn when you should choose which format.

You will see how careful you have to be when using images on the Web because if you don't prepare images correctly, they can really slow down the speed it takes for a page to load — and slow sites frustrate users. Furthermore, because you will probably be writing your first sites on your desktop/laptop computer, you might not realize how long a page will take to load until it is actually on the Web. So choosing the right format for your images and saving them correctly will help make your site faster and result in happier visitors.

*For practice purposes, you can download images from other sites by right-clicking the image (or Ctrl-clicking) and selecting either the download image to disk or save image as options. Remember, however, that images are subject to copyright, and you could land yourself in legal trouble if you use other people's images on your site.*

Once you've learned how to insert the right kind of images into your pages, you will then see how to turn them into links and even how to write code that divides them up, so that when users click different parts of the image they get taken to different web pages.

### Types of Image Formats

To start off, it would help to look at how computers store and render pictures. Graphics are created for computers in two main ways:

- ❑ **Bitmapped graphics** divide a picture into a grid of pixels and specify the color of each pixel, much as a computer tells a screen the color of each pixel. Broadly speaking, bitmaps are ideal for photographs and complicated gradations of shade and color. There are several different Bitmap formats; common ones include JPEG, GIF, TIFF, PNG, and the rather confusingly named bitmap or BMP. You will be learning more about JPEGs, GIFs, and PNGs later in the chapter.
- ❑ **Vector graphics** break the image into lines and shapes (like a wireframe drawing), and store the lines as coordinates. They then fill the spaces between the lines with color. Vector graphics are commonly used for line art, illustration, and animation. They often feature large areas of flat color (as opposed to textures, shades of colors, and photographic styles).

In the early days, bitmaps were the main image format for the Web, although more recently some formats such as Flash and SVG are making use of vector graphics.

### Bitmap Images

Most static images on the Web are bitmapped images. As mentioned, the image is divided into a grid of pixels. If you look very closely at your computer screen you may be able to make out the pixels that make up the screen. If you look at Figure 3-1, you can see an example of a bitmap image with one section that has been modified so that you can see how pixels make up the image.

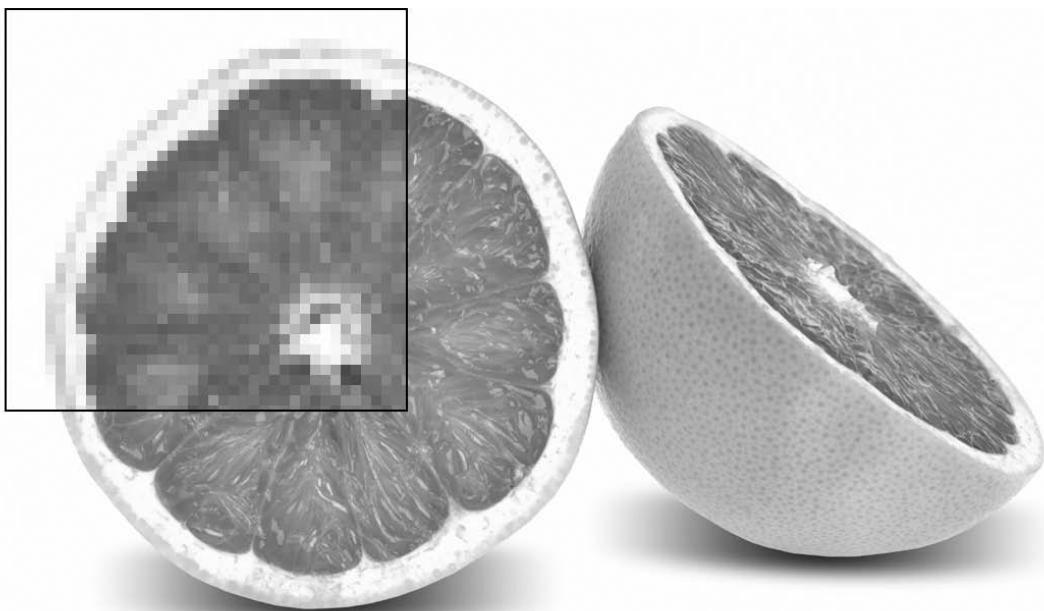


Figure 3-1

The number of pixels in every square inch of the screen is known as the *resolution* of the image. Images on the Web can show a maximum of 72 pixels per inch; images used in print are usually higher resolution and are often supplied to printers at 300 dots per inch (note how onscreen we refer to pixels per inch, while in print we call them dots per inch). The more pixels or dots per inch an image contains, the larger the size of the file will be. As a result, any images that you use on the Web, you save at a resolution of 72 dots per inch. If you saved it any larger, this would create unnecessarily large files that would take longer to download.

*Note that while you can easily save an image that is 300 dots per inch at 72 pixels per inch for the Web, you cannot simply increase an image from 72 pixels per inch to 300 dots per inch because you do not know what color the 228 pixels that are missing from every square inch should be. If you just try to increase the resolution of the image, it will often look grainy. Therefore, if you have a high-resolution 300-dots-per-inch picture, it is often helpful to keep a copy of it at that size just in case you ever wish to show it larger or at a higher resolution.*

Browsers tend to support three common bitmap graphics formats, and most graphics programs will save images in these formats:

- GIF:** Graphics Interchange Format (pronounced either “gif” or “jif”)
- JPEG:** Joint Photographic Experts Group Format (pronounced “jay peg”)
- PNG:** Portable Network Graphics (pronounced “ping” or “pee en gee”)

Let's take a quick look at each of these because understanding how the format works helps you choose how to save an image.

### **GIF Images**

In the early days of the Web, the GIF (or Graphics Interchange Format) was the standard for all web graphics. GIF images are created using a palette of up to 256 colors and each pixel of the image is one of these 256 colors. Every different GIF image can have a different palette of 256 colors selected from a range of over 16 million colors. The program that saves the image also selects the palette that will best represent the images.

The GIF file stores the palette of colors in what is called a lookup table, and each pixel references the color information in the lookup table rather than each pixel having to specify its own color information. So, if many pixels use the same colors, the image does not have to repeat the same color information and the result is a smaller file size. This way of storing images is known as an *indexed color format*. Figure 3-2 shows a GIF file being created in Adobe Photoshop. You can see the color palette that is being used for this image represented in the set of squares halfway down the image on the right.

Because of the way GIF images save color information in a lookup table, they are particularly suited to images where there are large flat areas of color. A flat area of color is a section that is just one shade; for example, a rectangle that uses just one green is a flat color, whereas a picture of grass contains lots of different greens. The fewer colors the image uses, the smaller the GIF file is.

If a GIF contains less than 16 colors (in which case it can be referred to as a 4-bit GIF), the image will be less than half the file size of a GIF using 256 colors (known as an 8-bit GIF). Therefore, if you are creating an image that uses less than 16 colors, it is worth checking whether your program automatically saves your image as a 4-bit GIF because this will result in a smaller file that's quicker to download than an 8-bit GIF.

## Chapter 3: Images and Objects

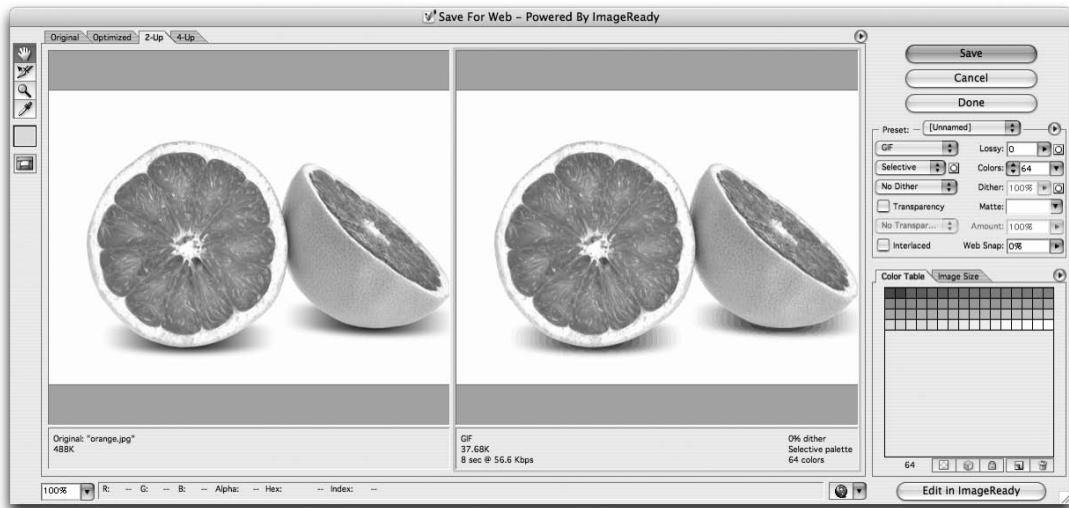


Figure 3-2

If your text or lines are two colors (say black and white) and you have used anti-aliased edges to make them look smoother, your image will contain more than two colors because the edges use a variety of other colors to make them look smooth.

If the GIF needs to use more than 256 colors, then most graphics programs, when saving GIFs, will use a technique called *dithering* to better represent the extra colors. Therefore, they use two or more colors in adjacent pixels to create an effect of a third color. Dithering has the following two drawbacks:

- ❑ It can result in some *banding* in colors. This usually occurs when patches of the image look flat to the eye in the original, but are actually very slightly different shades. For example, when there is a smooth transition between one color and another color (referred to as a gradient), dithering uses a lot of different colors to create the smooth effect. In this case, the changes between colors can become more visible.
- ❑ If you place a flat color next to a dithered color you will be able to see where the change occurs (because the dithered color is really made up of more than one color).

Figure 3-3 illustrates how even a simple gradient, when saved as a GIF, can result in banding because the image contains more than 256 colors — if you look closely you can see that the gradient had vertical lines rather than a smooth transition from black to white.

Because GIFs support only 256 colors and have to use dithering to achieve any further colors, they are not really suitable for detailed photographs, which tend to contain more than 256 colors. If you have a photograph, gradient, or any image with similar shades of the same color next to each other, you are often better off using a JPEG, which can support unlimited colors, or sometimes a PNG — both of which you will learn about shortly.



Figure 3-3

GIFs do have another handy feature: you can specify one or more colors in a GIF to represent a *transparent background* — in parts of the image that are the specified colors, the background will be allowed to show through. You should be aware, however, that each pixel is either on or off, opaque or transparent — there are not degrees of transparency, as there are in alpha-color transparency formats. As a result, if you try to use it with curved corners, the corners may appear pixelated. To help overcome this problem you should try to make the transparency color as close to the background color as possible (or if you are using Photoshop you can use the matte feature).

Figure 3-4 shows how a pixelated effect is created when a GIF is not created on a suitable background (notice the corners in particular).



Figure 3-4

To make the GIF files smaller, they are compressed using a technique called *LZW compression*, which scans rows of the image looking for consecutive pixels that share the same color. When it comes across them, it indicates that  $x$  number of pixels should be written from this point onwards using the same color.

LZW compression is known as a *lossless compression* technique because no data is lost and therefore there is no loss of quality (this is contrasted with *lossy compression* techniques where some of the data is discarded during compression and cannot therefore be recovered from the compressed file). However, when there are not many consecutive pixels of the same color, there is little saving in file size. Thus, the format does not compress photographic images well because, while the adjacent pixels may look the same in photographs,

## Chapter 3: Images and Objects

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they tend to be very slightly different. Furthermore, if the picture uses complex dithering to achieve subtle coloring effects, there is less chance of finding pixels of the same consecutive color, and therefore file size cannot be compressed.

Some programs will give you an option of saving the file as an *interlaced image*. *Interlacing* means that lines of the image are stored in a different order than they would appear in the image, allowing a browser to display every eighth row in turn and then fill in the lines between. The idea behind interlaced images was that, if you had a large file on a slow connection, the user would see something appearing early on, and the image would get progressively clearer. However, as connection speeds on the Web have improved, interlaced GIFs are not commonly seen anymore.

### **Animated GIFs**

GIF images can store more than one frame (or copy of the image) within a file, allowing the GIF to rotate between the versions/frames and create a simple animation. It works in a similar way to a flip-book animation, where the drawing on each page of the book changes slightly from the previous one, so that when a user flips the pages it looks as if the images are moving.

This works especially well if your animated image contains large areas of flat color. Compression for this technique is quite effective because only the changed pixels need storing with each frame, along with their positions. It is not suitable, however, for photographic images because you end up with a very large image.

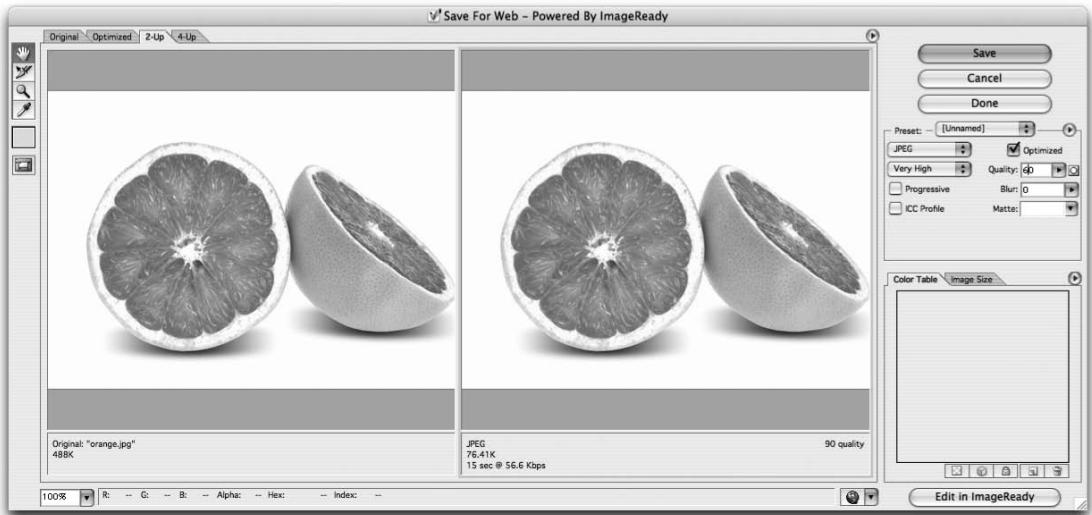
*You should be very careful about the use of animated GIFs. A lot of sites offer animated GIFs, from cartoon characters doing something amusing to bouncing or flaming bullet points. Although they might be impressive or fun the first time you see a page, they soon become tiresome, slow down the site, and distract users from the real content. So while animated GIFs can be fun on a personal home page, you will very rarely find such animations on the sites of large companies. If you are trying to create a professional looking site, you should use animated GIFs only if the animation gives additional information to the user.*

### **JPEG Images**

The JPEG image format was developed as a standard for storing and *compressing* images such as photographs with wide ranges of colors. When you save a JPEG, you can usually specify by how much, if at all, you want to compress the image — which depends upon the image quality you want. The process of compressing a JPEG involves discarding color data that people would not normally perceive, such as small color changes. However, because the image format discards this data when the image is compressed, some of the data is lost and the original cannot be recreated from a compressed version — hence it is known as *lossy compression*.

The amount of compression you apply will change from image to image, and you can only judge how much to compress a JPEG by looking at it. Hence the size of the file varies depending upon how much you compress the image. When you are saving the image, you will often be asked for a percentage of quality to be used; 100 percent does not compress the picture at all, and for a photo you can usually get down to around 60 percent (but not usually much lower). Some programs use words such as excellent, very good, good, and so on to describe the image quality instead of percentages.

A good image-editing program enables you to compare the original image side by side with the compressed version as you choose how much compression to add. Figure 3-5 shows you how Adobe Photoshop lets you compare two versions of the image next to each other as you prepare to save the JPEG for the Web. On the left, you have the original image, and on the right is the version that it is saving for use on the Web.



**Figure 3-5**

Because the JPEG format was designed to work with photo-realistic images, they do not work so well with images that have large amounts of flat color, or high-contrast hard edges (such as lettering and line drawings). As you increase compression in a JPEG you may also see banding start to show in colors that are very similar.

JPEG does support interlacing using the *Progressive JPEG*, allowing an initially blocky view of the image to download first, with greater detail being filled in as the rest of the image loads. The most helpful aspect of this is that it gives the user an idea of the size of the image that is being downloaded, and a rough idea of how complete it is. However, they are not commonly used on the Web any more, and because JPEGs tend to have a lot of detail, you often need a lot of the image to come through before you really get to see the intended picture.

### PNG Images

The Portable Network Graphics format is the most recent format on the block. It was developed in the late 1990s because the company that owns the patent for GIFs (Unisys) decided to charge companies that developed software for creating and viewing GIFs a license fee to use the technology. While web designers and web surfers are not affected by this charge, the companies that make the software they use are.

The PNG format was designed for the same uses as GIF images, but while it was being created the designers decided to solve what they thought were some of the disadvantages with the GIF format. The result is two types of PNG. The 8-bit PNG has the same limitations as an 8-bit GIF — only 256 colors, and when transparency is used each pixel is either on or off. Then there is the enhanced PNG-24, a 24-bit version, which has the following advantages:

- ❑ The number of colors available for use in an image is not restricted, and so any color can be included without losing any data.
- ❑ A map (like the lookup table that indicates the color of each pixel in GIFs) is used to provide different levels of transparency for every pixel, which allows for softer, anti-aliased edges.

## Chapter 3: Images and Objects

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- The approach of sampling one in eight lines was replaced with a two-dimensional sample which can display an image eight times faster than a GIF.
- PNG 24-bit files can contain gamma correction information to allow for slight differences in color between different monitors and platforms.

Furthermore, all PNGs tend to compress better than a GIF equivalent. The real drawback with the PNG format, however, is that not all browsers support it. While basic support was offered in early versions of browsers some of the more advanced features took longer to be implemented. For example, Internet Explorer was unable to deal with transparency correctly until version 6.

### Keeping File Sizes Small

You will usually want to save the images for your site in the format that best compresses the image and therefore results in a smaller file size. This will not only make your pages quicker to load, but can also save you on the charges made for hosting your site.

Usually one or another format will be the obvious choice for you. The rule of thumb is:

- Use JPEGs for photo-realistic pictures with a lot of detail, or subtle shade differences you want to preserve.
- Use GIFs for images with flat color (rather than textured colors), and hard edges, such as diagrams, text, or logos.

*You can also consider using PNGs if you do not need the advanced features such as transparency, or if you know the majority of your visitors will be using more recently released browsers.*

If you look at the following images (see Figure 3-6) — one a photograph of Autumn leaves, and the second, the logo of a fictional company called Wheels that uses only two colors — you can see the file size of each saved as a GIF and as a JPEG (where the JPEG is saved at 60 percent quality).

Image	JPEG	GIF
Leaves	54.81k	116.3
Wheels	8.26	6.063k

As you can see, the Wheels logo has areas of flat, plain color, whereas the photo of the forest uses lots of different shades. Therefore, the logo is better suited to the GIF or PNG formats, while the photo of the forest with all its shadows is suited better to the JPEG format.

*Good image editing software is very helpful if you use a lot of images on your site. Adobe Photoshop is the most popular software used by professionals, although it is very expensive. There is, however, a limited functionality version called Photoshop Elements that includes many of the common features — including the Save for Web options. Two other popular image editing programs are Paint Shop Pro made by JASC software and a free image editing program called Gimp which you can download from [www.GIMP.org](http://www.GIMP.org).*



Figure 3-6

If you have to include many large, complex photographic images on your site, it's good practice to offer users smaller versions of the images when the pages first load and then add a link to the larger version. These smaller images are often referred to as *thumbnails*, and you will usually see them in image galleries or on pages that contain summaries of information (such as the home pages of news sites and pages that list several products, from which you link to a page with more detail and larger images).

*When creating the smaller version, scale the image down in an image-editing program. Do not simply alter the width and height attributes of the <img /> or <object> elements because users still have to download the full-sized image even though they are getting to see only a smaller version of it. (The full-sized image takes much longer to download.) By creating a special thumbnail of any smaller images you use, your pages will load a lot quicker.*

## Vector Images

Illustration and animation software tends to use vector formats to save images, and the most popular vector graphics format on the Web is Flash (which you will see on a lot of sites).

Vector formats store information in terms of coordinates between which lines are drawn, and then inside the lines a colored fill can be specified. Because vector formats are based on the coordinates that mark points on lines, it is very easy for vector formats to scale to different sizes simply by increasing or decreasing the gap between each point the coordinates are plotted against.

Browsers and XHTML do not, by default, support any vector graphics formats, although the main browsers now ship with the Flash Player that is required to view Flash files. As a result, Flash is currently the most popular way of deploying vector graphics and animations on the Web. While the Flash Player is free for download, and the browsers feature it, you should be aware that Adobe charges for the software to create Flash files and that learning to use the software is an entirely new skill (which is outside the scope of this book).

As an alternative vector graphics format, the W3C developed Scalable Vector Graphics (SVG), which (like XHTML) is written in XML, and would thus be easily integrated with XHTML. (Furthermore, it is an open standard, not the creation of an individual company as Flash is.) A number of tools support SVG, although at the time of this writing it is not used very widely.

## Chapter 3: Images and Objects

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Microsoft has also come up with a technology called Silverlight that uses vector graphics and competes with Flash. It has been gaining interest from developers, although the player required for Silverlight does not have widespread support at the time of this writing.

Flash, Silverlight, and SVG files tend to be included in pages using the more recent `<object>` element (or written into the page using JavaScript). Indeed, the W3C would prefer to see all images included using this element in the long run, but for the moment images are added using the `<img>` element.

### **Adding Images Using the `<img>` Element**

Images are usually added to a site using the `<img>` element. It must carry the `src` attribute indicating the source of the image and an `alt` attribute whose value is an alternate description for the image in case it does not load or the user has a visual impairment.

For example, the following line would add the image called `wrox_logo.gif` into the page (in this case, the image lives in a directory called `images`, and this `images` directory resides inside the same directory that holds the XHTML file). You can find this code at `ch03_eg01.html`.

```

```

Figure 3-7 shows you what this image looks like in a browser.



Figure 3-7

In addition to carrying all of the universal attributes and the UI event attributes, the `<img>` element can carry the following attributes:

```
src alt align border height width hspace vspace ismap usemap longdesc name
```

#### **The `src` Attribute**

The `src` attribute is required to specify the URL of the image to load.

```
src="url"
```

The URL can be an absolute URL or a relative, just like the URLs when linking between pages, which is discussed in Chapter 2. The URL can also use the same shorthand notations that links between XHTML pages to indicate which folder an image is in.

It's a good idea to create a separate directory (or folder) in your web site for images. If you have a very large site, you might even create separate folders for different types of images. (For example, one folder for images that are used in the interface, and one for each subsection of the site.)

*Generally speaking, images for your site should always reside on your server. It is not good practice to link to images on other sites because if the owner of the other site decides to move that image your users will no longer be able to see the image on your site.*

### **The alt Attribute**

The `alt` attribute is required to specify a text alternative for the image in case the user cannot see the image (for any of a number of reasons). For example:

```
alt="Wrox logo"
```

Often referred to as *alt text*, it is important that the value of this attribute really describes the image. Two common reasons why images are not visible to users are:

- Because the browser did not download the file correctly; the file cannot be found
- Because the user has visual impairment that prevents him or her from seeing the image

Sometimes images do not convey any information, and are only used to enhance the layout of the page. (For example, you might have an image that is just a design element but does not add any information to the page.) Then the `alt` attribute should still be used but given no value, as follows:

```
alt=""
```

### **The align Attribute (deprecated)**

The `align` attribute is used to align the image within the page or the element that contains the image (such as a table cell).

```
align="right"
```

It can take one of the values in the table that follows.

You may come across the `absbottom`, `texttop`, `absmiddle`, and `baseline` values, but these are non-standard extensions that can produce inconsistent results.

## Chapter 3: Images and Objects

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Value	Purpose
top	The top of the image is aligned with top of the current line of text.
middle	The middle of the image is aligned with the current text baseline.
bottom	The bottom of the image is aligned with the baseline of the current line of text (the default), which usually results in images rising above the text.
left	The image is aligned to the left side of the containing window or element and any text flows around it.
right	The image is aligned to the right side of the containing window or element and any text flows around it.

### ***The border Attribute (deprecated)***

The `border` attribute specifies the width of the border around the image in pixels:

```
border="2"
```

If the attribute is not used, there will not be a border unless the image is used as a link, in which case you could specify `border="0"` (see the “Using Images as Links” section later in this chapter). This attribute has been replaced by the CSS `border` property.

### ***The height and width Attributes***

The `height` and `width` attributes specify the height and width of the image:

```
height="120" width="180"
```

The values for these attributes are almost always shown in pixels.

Technically, the values of these attributes can be a percentage of the page or containing element (in which case the number will be followed by the percent sign) but this is very rare, and showing an image at any size other than the size it was created can result in a distorted or fuzzy image.

Specifying the size of the image can help browsers lay out pages faster and more smoothly because they can allocate the correct amount of space to the image and continue to render the rest of the page before the image has finished loading.

If you really want to show an image smaller than it is stored on your web server, you can just provide the value for either the `height` or `width` attributes and leave out the other attribute, in which case the browser maintains the correct *aspect ratio* for the image (its width compared to the height). Your image, however, might not be as sharp. You can even distort images by providing a different width in relation to height.

Figure 3-8 shows an image at its actual size (top: 130 pixels by 130 pixels), the image magnified (middle: the width attribute is given a value of 160 pixels), and the image distorted (bottom: the width attribute is given a value of 80 pixels and the height attribute a value of 150 pixels).

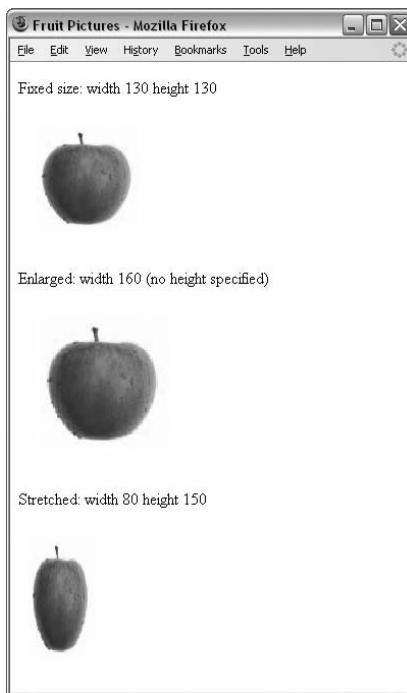


Figure 3-8

Here is the code for this example (ch03\_eg02.html):

```
<p>Fixed size: width 130 height 130</p>

<p>Enlarged: width 160 (no height specified)</p>

<p>Stretched: width 80 height 150</p>

```

If you want to display the image a lot smaller than the original version, rather than just specifying the smaller dimensions for the same image, you should resize the image in an image manipulation program to create the smaller version for use on the web site. If you reduce the size of the image using the height and width attributes, the user will still have to download the full-sized image, which takes longer than a special small version and uses up more bandwidth.

## Chapter 3: Images and Objects

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### **The hspace and vspace Attributes (deprecated)**

The hspace and vspace attributes can be used to control the amount of whitespace around an image.

```
hspace="10"  
vspace="14"
```

The value is the amount in pixels of whitespace that should be left around the image, and is similar to a white border. Before CSS, the hspace and vspace attributes were particularly helpful because text can flow around an image and, unless there is a gap between the text and the image, the text becomes hard to read and doesn't look as professional. Figure 3-9 illustrates this idea (ch03\_eg03.html).



Figure 3-9

These attributes have been deprecated, and you can achieve the same result by using the border or margin properties in CSS.

### **The ismap and usemap Attributes**

The ismap and usemap attributes are used with image maps. Image maps are covered in the “Image Maps” section later in the chapter.

### **The longdesc Attribute**

The longdesc attribute is used to indicate the URL of a document (or part of a document) containing a description for the image in more detail.

```
longdesc=".../accessibility/profit_graphs.txt"
```

It is designed for users who cannot see the image, and to provide extra information that cannot be seen in the image. A good example of where it might be used is in providing a text explanation for a graph or chart.

Unfortunately, the `longdesc` attribute is not widely supported. However, a commonly used alternative is to place a link next to the image that takes you to a long description of the image (usually a link to the bottom of that page). Between the opening `<a>` tag and closing `</a>` tag is the letter `D` (which stands for description). You can see an example of this in Figure 3-10 (`ch03_eg04.html`).

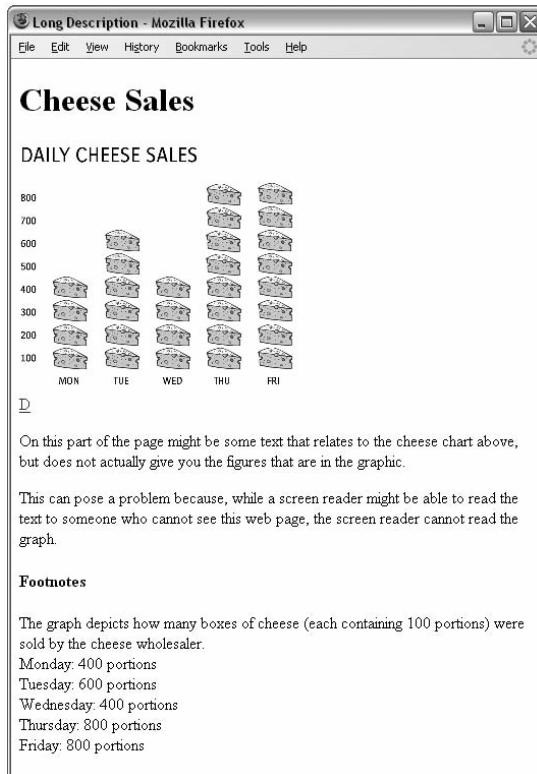


Figure 3-10

### ***The name Attribute (deprecated)***

The `name` attribute allows you to specify a name for the image so that it can then be referenced from script code. It is the predecessor to, and has been replaced by, the `id` attribute.

```
name="image_name"
```

## Chapter 3: Images and Objects

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### Try It Out Adding Images to a Document

In this example, you're going to add some images to a document; they will be some brightly colored images of food accompanied by a description of each. So, open up your text editor or web page authoring tool and follow these steps:

1. Start with the XML and DOCTYPE declarations and add the skeleton of the XHTML document, like so:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
    <title>Fruit Pictures</title>
</head>
<body>
</body>
</html>
```

2. Add the following to the body of the page. Pay particular attention to the `<img>` elements:

```
<h1>The Fruit Pictures Page</h1>
<p>The first image is an image of an apple.</p>

<p>The second image is an image of an orange cut in half.</p>

<p>The third image shows a group of bananas.</p>

```

3. Save the file as `fruit.html` and open it in your browser. You should end up with something that resembles Figure 3-11.

### How It Works

You have met most of this code enough times already. But the parts to concentrate on are the `<img />` elements. Each `<img />` element adds a new image. There are three in the example.

```

```

The `src` attribute indicates the URL for the image. The URLs in this example are all relative URLs pointing to an `images` directory that is contained in the same directory as the example page. You might remember from Chapter 2 that I said organizing your file structure was very important — you can see here why this is the case (it makes it clear where the images should be within the site structure).

The `alt` attribute should be used on every `<img />` element you write. It will be shown if the browser cannot load the image and tells what the image is to those who have vision impairments.

The `width` and `height` attributes tell the browser how big the image should be displayed. By including these attributes, the browser can lay out the page quicker because it can continue to display other items on the page without waiting for the image to download. While you can use these attributes to stretch or scale up an image, it is best to have the image the size you want to use it, and if you want to make the image smaller, you should save a new version of it rather than just using these attributes to save your viewers' time and bandwidth.

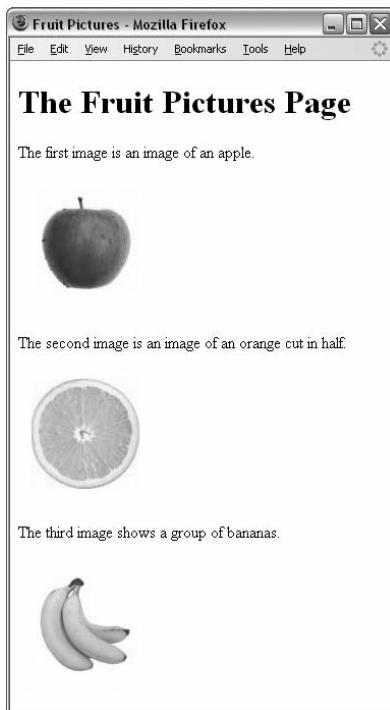


Figure 3-11

---

## Adding Other Objects with the <object> Element

The W3C introduced the `<object>` element into HTML 4 with the intention that it be used to embed all media types into documents, not just graphics but also MP3 files, Flash movies, QuickTime movies, JavaScript objects, Java applets, and so on. It is even intended that in the long run the `<object>` element be used to include images in documents.

While we are used to browsers supporting GIFs, JPEGs, and, more recently, PNGs, the same cannot be said of including MP3 audio files, Flash movies, QuickTime movies, or Java applications. Rather, in these cases, the `<object>` element is used to include some other kind of software that is used to play or load these files. For example:

- Flash movies are played with the Flash Player;
- Windows Media Files require Windows Media Player;
- MP3s can be played in various players including Flash Player, Windows Media Player, and QuickTime Player.

## Chapter 3: Images and Objects

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So when it comes to embedding audio, video, or Java/JavaScript programs on your web page, you not only need to have the file, but you also have to choose an application to embed into your page that will play/run the file.

Including the right tool in the page can be complicated because not every computer will have the application that you want to use installed. In addition, each player has lots of different versions. At the time of writing, the most common way of embedding moving graphics and video into web pages, without asking the user first, is by using Flash (Flash was being used to serve most of the video and audio files on sites such as YouTube and MySpace). However, while Flash is often quoted as being installed on over 95 percent of computers worldwide, support for playing audio and video was only included in later versions of the Flash player.

Before the `<object>` element was introduced, a range of elements was used to insert multimedia objects into pages, such as the `<applet>`, `<embed>` and `<bgsound>` elements, but these elements have been deprecated (they are covered in Appendix I).

The `<object>` element was initially introduced by Microsoft to support its Active X technology; however, it was soon used to embed all kinds of object in web pages. To embed an object into a page, you need to specify:

- The location of the code used to display or play the object (sometimes referred to as the *implementation* of the object)
- The actual data to be rendered (for example a movie, an audio file, a program)
- Any additional values the object needs at runtime

The first two are added using the `<object>` element, while additional values are provided in the `<param>` element, which can be a child of the `<object>` element.

While the `<object>` element can contain a child `<param>` element, any other content of the `<object>` element should be displayed only if the browser cannot render the object:

```
<object>
Your browser does not appear to support the format used in this film clip,
for more details please look <a href="../help/video.htm">here</a>
</object>
```

You can nest `<object>` elements in order of preference for viewing, so you can put an alternative format of object inside your preferred one. If neither is supported, the browser then displays the text content. To support older or different versions of browsers you might add older code, such as the deprecated `<embed>` and `<applet>` elements inside the `<object>` element.

It is worth noting that, when any video or audio is added into a page, it is widely considered good practice to offer a button to turn the music off.

### **The `<object>` Element's Attributes**

The `<object>` element can carry all of the universal attributes, the UI event attributes, and the following attributes:

```
archive border classid codebase codetype data declare height width hspace
vspace name standby tabindex usemap
```

We'll take a look at each of these here, although the ones you will most commonly use to start are the `classid` attribute (covered below), the `type` attribute, and the `id` attributes (discussed in Chapter 1).

### **The `archive` Attribute**

The `archive` attribute is particularly of use with Java-based applications. It allows you to preload classes or collections of objects in an archive — for example, when one class relies on others — and it tends to be used to improve speed. The value should be one or more URLs to the resources in a space-separated list.

### **The `border` Attribute (deprecated)**

The `border` attribute specifies the width of the border to appear around the object; the value is specified in pixels. However, it is deprecated and you should use the `border` property in CSS instead.

### **The `classid` Attribute**

The `classid` attribute is designed to specify the implementation of the object. When you are trying to include Flash or QuickTime files and a plug-in needs to be loaded, this value would indicate the application required to play or run the file. When you are working with Java, the value of this attribute is likely to be the Java class you want to include.

Here is an example of a `classid` to embed a player to show a QuickTime movie:

```
classid="clsid:02BF25D5-8C17-4B23-BC80-D3488ABDDC6B"
```

### **The `codebase` Attribute**

The `codebase` attribute is supposed to give an alternative base URL for any relative URLs in the `<object>` element. If this attribute is not specified, then the folder the page is in will be used. For example, if you were working with Java, it might look like this:

```
codebase="http://www.example.org/javaclasses/"
```

However, when it comes to files such as QuickTime movies and Flash, IE uses it to specify where the program required to play or run the file can be found. For example, the QuickTime ActiveX control (required to play QuickTime movies) can be downloaded from here:

```
codebase="http://www.apple.com/qtactivex/qtplugin.cab"
```

It can also identify the version of the file that should be downloaded. If the object isn't installed on the machine loading the page, the browser should go to the URL specified to get it (although it should show users an alert first before starting to download).

### **The `codetype` Attribute**

The `codetype` attribute specifies the MIME type expected by the browser. It is relevant only if a `classid` attribute has already been specified. For example, if you are working with Java, it might be:

```
codetype="application/java"
```

If you wanted to embed a QuickTime movie, you would use a value like this:

```
codetype="video/quicktime"
```

## Chapter 3: Images and Objects

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Browsers can use the `codetype` attribute to skip over unsupported media types without having to download unnecessary objects. Appendix H covers MIME types.

### **The `declare` Attribute**

The `declare` attribute is used to declare an object without instantiating it. It can be used for forward references to objects, so they get loaded only if used, to create cross-references to other objects, or when you are using the object as a parameter within another object.

It is a Boolean attribute, and while it does not need a value in HTML, all attributes in XHTML require a value, so you would use:

```
declare="declare"
```

### **The `data` Attribute**

If the object has a file to process or play, then the `data` attribute specifies the URL for that file. For example, here is a URL to an MP3:

```
data="http://www.example.com/mp3s/newsong.mp3"
```

The value can be a relative URL, which would be relative to the value provided in the `codebase` attribute if specified; otherwise it would be relative to the page itself.

### **The `height` and `width` Attributes**

The `height` and `width` attributes specify the height and width of an object. The values should be in pixels or a percentage of the containing element. It is treated just like `height` and `width` attributes of the `<img>` element. The use of these attributes should make the page load faster because the browser can lay out the rest of the page without completely loading the object.

### **The `hspace` and `vspace` attributes (deprecated)**

The `hspace` and `vspace` attributes specify the amount of white space that should appear around an object, just as when they are used with the `<img>` element. They have been replaced by the `margin` and `border` properties of CSS.

### **The `name` Attribute (deprecated)**

The `name` attribute provides a name that can be used to refer to the object, in particular for use in scripts. It has been replaced by the `id` attribute in XHTML.

### **The `standby` Attribute**

The `standby` attribute specifies a text string that will be used when the object is loading:

```
standby="Trailer for Harry Potter 27 is loading"
```

The value should be a meaningful description of the object that is loading.

### The **tabindex** Attribute

The `tabindex` attribute indicates the tab index of the object within a page. Tabbing order is discussed in Chapter 5.

### The **usemap** Attribute

The `usemap` attribute indicates that the object is an image map containing defined areas that are hyperlinks. Its value is the map file used with the object. It can be a complete URL to an external file or a reference to the value of an inline `<mapElement>`'s `mapName` attribute. See the "Image Maps" section later in this chapter.

### The **<param>** Element

The `<param>` element is used to pass parameters to an object. The kinds of parameters an object requires depend upon what the object does; for example, if an object has to load an MP3 player into the page, you will probably need to specify where the MP3 file can be found. Alternatively, if you are adding a video to a page, your object might allow you to tell it whether to automatically play the video when the page loads, or whether to wait for the user to press a play button in order for it to start.

As well as the universal attributes and basic events, the `<param>` element can carry the following attributes:

`name` `type` `value` `valuetype`

### The **name** and **value** Attributes

The `name` and `value` attributes act as a name/value pair (rather like attributes themselves). The `name` attribute provides a name for the parameter you are passing to the application, while the `value` gives the value of the parameter.

Here are a couple of examples, taken from a QuickTime movie. The first parameter indicates the source of the file being loaded to play, while the second indicates that the movie should start playing automatically as it is loading (without the user having to start it):

```
<param name="src" value="movieTrailer.mov" />
<param name="autoplay" value="true" />
```

If you were working with a Java applet, you could use the `name` and `value` attribute to pass values into a method.

### The **valuetype** Attribute

If your object accepts parameters, then the `valuetype` attribute indicates whether the parameter will be a file, URL, or indeed another object. The table that follows shows the possible values.

## Chapter 3: Images and Objects

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Value	Purpose
data	The parameter value is a simple string — this is the default value.
ref	The parameter value is a URL.
object	The parameter value is another object.

### **The type Attribute**

You do not need to specify a `type` attribute if you are just passing a string to an object as a parameter. However, if you are passing a URL or object, then you should use the `type` attribute. Its purpose is to tell the object the MIME type of the parameter it is being passed.

For example, you might want to specify that you were passing a Java object as a parameter, in which case you would use the `value` attribute like so:

```
value="application/java"
```

### **Adding a Flash Movie To A Page**

Let's look at an example of using the `<object>` element to add a Flash movie into a page. One of the really helpful things about working with Adobe's Flash software (which can be used to create Flash animations) is that it can create the `<object>` code that is required to add the movie into the page for you. When you go through a process of "publishing" the file (which basically means preparing the file for the Web), the software creates an example file that can be used to display the file in your browser.

In the following example, you can see the `<object>` element being used to include the Flash player — the `classid` attribute specifies that the Flash Player should be included, while the `width` and `height` attributes specify the dimensions of the Flash file. Then, inside the `<object>` element are the `<param>` elements, which give further information to the flash Player (`ch03_eg05.html`).

```
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000" width="300"
height="200"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab">
<param name="movie" value="motion/flash_sample.swf">
<param name="play" value="true">
<param name="loop" value="false">
<embed src="motion/flash_sample.swf" width="300" height="200" play="true"
loop="false" QUALITY="best" menu="false" type="application/x-shockwave-flash"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod_Version
=ShockwaveFlash">
</embed>
</object>
```

The `<param>` elements affect the way in which the object (which in this case is the Flash Player) behaves because the `<object>` element is used to include different types of objects; the `<param>` elements, as you might imagine, are specific to each object.

In this example, the parameters with the specified values have the following meanings:

- ❑ `movie` specifies where the Flash Movie that should be loaded into the Flash Player can be found.
- ❑ `play` specifies whether the movie should play by default when the page loads.
- ❑ `loop` indicates whether, once the movie has finished playing, it should loop and play again.

You can also see the `<embed>` element, which you will learn more about in Appendix I where we look at deprecated and nonstandard code. The `<embed>` element was introduced in early versions of browsers to insert plug-ins (small programs that not part of the browser), but most recent browsers understand the `<object>` element and ignore the `<embed>` element. It is included in Figure 3-12 only because you quite often still see both elements used.

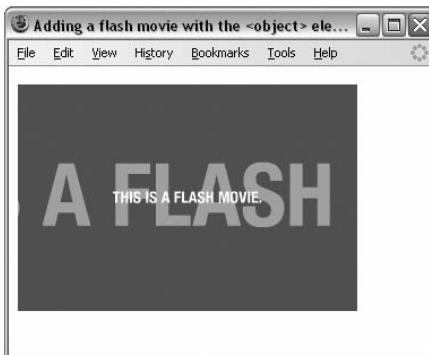


Figure 3-12

While the `<object>` element is commonly used to add Flash to a page, you will also see a lot of sites use something called SWFObject to write the Flash movie into the page using JavaScript — this handy technique not only checks that the browser has the required version of Flash installed but also allows you to display an alternative if the user does not have the required version of Flash. You can read more about SWFObject and download the JavaScript file at <http://blog.deconcept.com/swfobject/>.

## Using Images as Links

It's easy to turn an image into a link; rather than putting text between the opening `<a>` tag and the closing `</a>` tag, as you saw in the last chapter, you can place an image inside these tags. Images are often used to create graphical buttons or links to other pages, as follows (ch03\_eg06.html):

```
<a href="../index.html" title="Click here to return to the home page">
</a>
```

Note the use of the deprecated `border` attribute. When you use an image inside an `<a>` element, the image will gain a border in IE for Windows, as shown in Figure 3-13.

## Chapter 3: Images and Objects

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This border can be quite unsightly, so you either specify that the border should be 0 pixels wide, or preferably set the border property of CSS for `<img />` elements to be 0 (which you will learn how to do in Chapter 7).

Note also that the image in this example is not a very good example of a link, as it does not tell you where the link is going to take you. If you use images as links, you should make it clear what will happen if the user clicks the link.

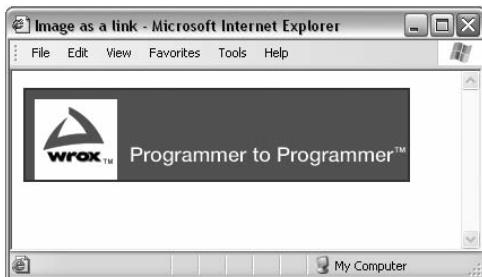


Figure 3-13

*This technique of putting an image inside an `<a>` element will also work when you want to include images using the `<object>` element, but not necessarily when you use the `<object>` element to include other objects, such as a Flash movie, QuickTime player, or Windows Media player.*

## Image Maps

Image maps allow you to specify several links that correspond to different areas of one single image, so that when users click different parts of the image they get taken to different pages. There are two types of image maps:

- Server-side image maps
- Client-side image maps

The difference between the two lies in where the code that decides which link you should be taken to is executed. With client-side image maps, the browser indicates which page you should be taken to based upon where the user clicks, whereas with server-side image maps the browser sends the server the coordinates of where the user clicked, and these are processed by a script file on the server that determines which page the user should be sent to.

Figure 3-14 shows a GIF that you will see turned into an image map. When users click the circle, they see what is in the gallery; when they click the garden, they see the pages about the sculpture garden, and when they click the studios, they see a page about the studios. Each of these sections is known as a clickable *hotspot*.

Image maps are particularly helpful when the image needs to be divided up in irregular shapes, such as maps. However, if the image can be divided up in a grid, you might be better off chopping up an image manually and putting it together in a table (you will learn about tables in the next chapter).

These hotspots should not be too small; otherwise, users might have difficulty in selecting the correct area they want. If this happens, they will soon get frustrated and leave your site. Image maps can also be difficult for people with motor control difficulties to navigate. Thus, if for any reason you use image maps as the main method of navigation for your site you should offer text links at the bottom of the page (and indicate this in the alt text).

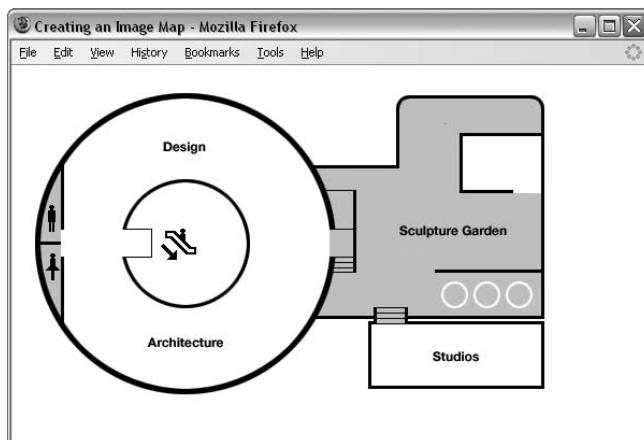


Figure 3-14

### Server-Side Image Maps

With server-side images, the `<img>` element (inside an `<a>` element) carries a special `ismap` attribute, which tells the browser to send the server *x*, *y* coordinates representing where the user's mouse was when he or she clicked the image map. Then a script on the server is used to determine which page the user should be sent to based on the coordinates fed to it.

For example, look at the following link, where the `<img>` element carries the `ismap` attribute with a value of `ismap` (this is an attribute that did not require a value in HTML; however, in XHTML all attributes must have a value, and therefore its own name is used as a value in XHTML to make the attribute valid):

```
<a href="../location/map.aspx"></a>
```

Now, if the user clicks the image 50 pixels to the right of the top-left corner of the image and 75 pixels down from the that same corner, the browser will send this information with the URL like so:

<http://www.example.org/location/map.aspx?50,75>

You can see the coordinates appended at the end of the URL that is specified in the `<a>` element.

The thing about a server-side image map is that there needs to be a script, map file, or application on the server that can process the coordinates and know which page the user should then be sent to. The implementation of image maps will vary depending on what kind of server you are running on.

## Chapter 3: Images and Objects

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Because server-side image maps are processed on the server, the implementation of them is not covered by HTML or XHTML recommendations, and unfortunately there is not space to cover different possible implementations for each different platform here. If you want to learn about server-side image maps you should pick up a book that covers server-side scripting, such as a book on ASP.Net, PHP, CGI, or JSP. See the book list at [Wrox.com](http://Wrox.com) for a list of books on topics such as these.

## Client-Side Image Maps

Because server-side image maps rely on server technology, an alternative that worked on browsers was introduced and client-side image maps were born. Client-side image maps use code within the XHTML page to indicate which parts of the image should link to which pages. Because the code that divides up the sections of the image is on the browser, it is possible for the browser to offer extra information to users, either by showing them a URL in the status bar or as a tooltip when the mouse is hovered over the image.

There are two methods of creating a client-side image map: using the `<map>` and `<area>` elements inside an `<img>` element, and, more recently, using the `<map>` element inside the `<object>` element.

### Client-Side Image Maps Using `<map>` and `<area>`

This earlier method of creating image maps has been supported for longer in browsers, going back to Netscape 4 and IE 4.

The image that is going to form the map is inserted into the page using the `<img />` element as normal, except it carries an extra attribute called `usemap`. The value of the `usemap` attribute is the value of the `name` attribute on the `<map>` element, which you are about to meet, preceded by a pound or hash sign.

The `<map>` element actually creates the map for the image and usually follows directly after the `<img />` element. It acts as a container for the `<area>` elements that actually define the clickable hotspots. The `<map>` element carries only one attribute, the `name` attribute, which is the name that identifies the map. This is how the `<img />` element knows which `<map>` element to use.

The `<area>` element specifies the shape and the coordinates that define the boundaries of each clickable hotspot. Here's an example from the image map that was used for the image in Figure 3-14 (ch03\_eg06.html).

```

<map name="gallery">
  <area shape="circle" coords="154,150,59" href="foyer.html" target="_self"
    alt="Foyer" />
  <area shape="poly" coords="272,79,351,79,351,15,486,15,486,218,272,218,292,
    166,292,136,270,76" href="sculpture_garden.html" target="_self"
    alt="Sculpture garden" />
  <area shape="rect" coords="325,224,488,286" href="workshop.html"
    target="_self" alt="Artists workshops" />
</map>
```

As you can see, the value of the `usemap` attribute on the `<img />` element is `#gallery`, and this is used on the `<map>` element. Then the `<area>` elements actually define the sections of the image that are clickable.

If you have two areas that overlap each other, the first one in the code will take precedence.

The attributes that the `<area>` element can carry may look familiar from the `<a>` element. The ones that are relevant to image maps are covered here; otherwise see the “Adding Images Using the `<img />` Element” section earlier in this chapter.

```
accesskey alt shape coords href nohref target tabindex taborder notab
```

### The shape Attribute

The value of the `shape` attribute actually affects how the browser will use the coordinates specified in the `coords` attribute, and is therefore required. If you do not specify a `shape` attribute, IE usually assumes the area is a rectangle.

The table that follows shows the possible values of the `shape` attribute.

Value	Shape Created
<code>default</code>	The whole of the image not defined in an area (should be specified last)
<code>rectangle</code> or <code>rect</code>	Rectangle
<code>polygon</code> or <code>poly</code>	Polygon
<code>circle</code> or <code>circ</code>	Circle

You are better off using the abbreviated versions of the values, as they are better supported in older browsers. The value `default` should be used last if you want to indicate any sections of the image not otherwise indicated by an `<area>` element — it’s like a catch-all for the rest of the image.

### The coords Attribute

The `coords` attribute specifies the area that is the clickable hotspot. The number of coordinates you specify depends on the shape you are creating (and have specified in the `shape` attribute).

- A rectangle contains four coordinates. The first two coordinates represent the top left of the rectangle, and the second two the bottom right.
- A circle contains three coordinates; the first two are the center of the circle, while the third is the radius in pixels.
- A polygon contains two coordinates for each point of the polygon. So a triangle would contain six coordinates, a pentagon would contain ten, and so on. You do not need to specify the first coordinate at the end again because the shape is automatically closed.

Some web authoring and image editing programs will help work out the coordinates of an image map for you; they provide a tool that allows you to select the areas you want to turn into a map and use those shapes to create the coordinates for you. Figure 3-15 shows you Dreamweaver’s Image Map tool — because each program is different, you should look in the help files for that program to see how yours creates an image map.

## Chapter 3: Images and Objects

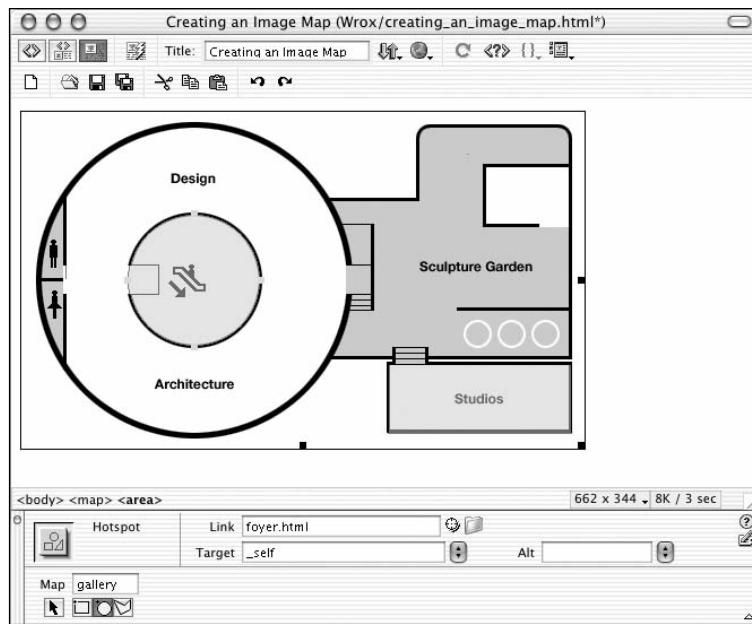


Figure 3-15

### The href and nohref Attributes

The `href` attribute works just like the `href` attribute for an `<a>` element; its value is the URL of the page you want to load when the user clicks that part of the image.

If you do not have an `href` attribute, you must use a `noreferrer` attribute indicating that the area will not take you anywhere, it takes a value of `noreferrer`.

### The alt Attribute

The `alt` attribute specifies a text alternative for that section of the image and works just like the `alt` attribute on the `<img />` element. It will actually override the `alt` text specified for the image when the user rolls over the area.

### The target Attribute

The `target` attribute specifies which frame or window the page should be loaded into. Possible values are the same as for the `target` attribute of the `<a>` element.

### The tabindex Attribute

The `tabindex` attribute allows you to specify the order in which users can tab through items on a page. The value is a number between 1 and 32767. It is discussed in full in Chapter 5.

## Client-Side Image Maps Using the `<object>` Element

HTML 4 started to promote the use of the `<object>` element rather than the `<map>` element for adding image maps to your documents (although you can still use the `<map>` element in Strict XHTML 1.0). The `<object>` element takes a different approach to creating image maps.

It is the `<object>` element that carries the `usemap` attribute (whose value is the value of the `name` attribute on the `<map>` element preceded by the pound or hash sign). Inside the `<object>` element you use the familiar `<map>` element with the `name` attribute. But inside the `<map>` element are standard `<a>` elements.

The presence of the `<a>` element in this context helps explain why it can carry attributes such as `shape` and `coords`.

```
<object data="gallery_map.gif" type="image/gif" alt="Gallery Map" width="500"
        height="300" border="0" usemap="#gallery" />
<map name="gallery">
    <a shape="circle" coords="154,150,59" href="foyer.html" target="_self">Foyer</a>
    <a shape="poly" coords="272,79,351,79,351,15,486,15,486,218,272,218,292,166,
       292,136,270,76" href="sculpture_garden.html" target="_self">Sculpture garden</a>
    <a shape="rect" coords="325,224,488,286" href="workshop.html"
       target="_self">
        Artists workshops</a>
</map>
```

Rather than using `alt` attributes, you should put alt text (or a description of the link) inside the `<a>` element.

Unfortunately, the support for this way of creating image maps is rather poor, so you are better off sticking to the old method for the moment.

## Summary

In this chapter you have learned how to make your pages look a lot more exciting by adding images and other multimedia objects.

You learned all about the different types of images used on the Web. While images add life to a page, you have to be careful with their sizes. If you have too many images or your images are too large they will slow down your site significantly. Therefore, you have to choose the format that will compress your image the best while retaining its quality. The GIF format is the format of choice for images with flat colors, while JPEGs are better for photographic images and graphics with gradients of the same color. Investing in good image-editing software that allows you to save images in these formats is a good idea if you use a lot of images on your pages.

While the `<img />` element is the most common way of including an image in your document today, you also saw the `<object>` element which is going to be used more in the future. The `<object>` element is already widely used for embedding other types of files and code into your pages, from Flash or QuickTime movies to Java applets and JavaScript objects.

## Chapter 3: Images and Objects

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Finally, you saw how to divide up an image into clickable hotspots that turn different parts of the image into separate links. Another way of creating separate links in the one image is by chopping it up and putting the separate sections into different cells of a table; you'll learn about tables in Chapter 5.

## Exercises

The answers to all the exercises are given in Appendix A.

1. Add the images of icons that represent a diary, a camera and a newspaper to the following example. All of the images are provided in the `images` folder in the download code for Chapter 3.

```
<h1>Icons</h1>
<p>Here is an icon used to represent a diary.</p>
<br />

<p>Here is an icon used to represent a picture.</p>
Camera image goes here<br />

<p>Here is an icon used to represent a news item.</p>
Newspaper image goes here<br />
```

Your finished page should resemble Figure 3-16.

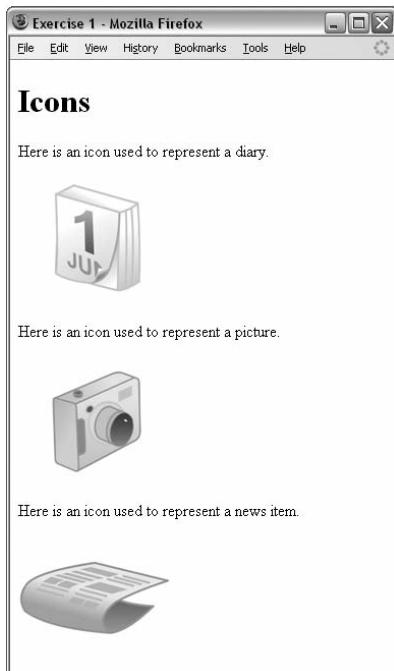


Figure 3-16

2. Look at the images shown in Figures 3-17 and 3-18 and decide whether you are more likely to get smaller file sizes and better quality images if you save them as JPEGs or GIFs.



Figure 3-17



Figure 3-18



# 4

# Tables

Tables are commonly used to display all manner of data, such as timetables, financial reports, and sports results. So when you want to display information in rows and columns, you need to use the markup that you will learn about in this chapter to create a table.

This chapter begins with a discussion of the basic elements that are used to create all tables. Then I introduce some of the more advanced features of tables such as captions, headings, and more complicated table layouts. You will also learn about some deprecated markup that was designed to control the appearance of tables. Even though it is preferable to use CSS to control the way a page looks, you will sometimes need to use the older markup so that viewers with older browsers can see your pages as you intend them to be. The chapter ends with a discussion of accessibility issues that relate to tables because they can have a serious effect, particularly for users with visual impairments.

## Introducing Tables

In order to work with tables, you need to start thinking in *grids*. Tables, just like spreadsheets, are made up of rows and columns, as shown in Figure 4-1.

Here you can see a grid of rectangles. Each rectangle is known as a *cell*. A *row* is made up of a set of cells on the same line from left to right, while a *column* is made up of a line of cells going from top to bottom.

By now you have understood that the names of elements in XHTML tend to refer to the type of markup they contain. So you will hardly be surprised to know that you create a table in XHTML using the `<table>` element.

Inside the `<table>` element, the table is written out row by row. A row is contained inside a `<tr>` element — which stands for *table row*. And each cell is then written inside the row element using a `<td>` element — which stands for *table data*.

## Chapter 4: Tables

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The diagram illustrates a 5x4 table structure. It features a grid of 20 cells arranged in 5 rows and 4 columns. The columns are labeled "COLUMNS" vertically along the left side, and the rows are labeled "ROWS" horizontally across the top. Each cell contains a label indicating its column and row, such as "Column 1 Row 1" through "Column 4 Row 5".

Column 1 Row 1	Column 2 Row 1	Column 3 Row 1	Column 4 Row 1
Column 1 Row 2	Column 2 Row 2	Column 3 Row 2	Column 4 Row 2
Column 1 Row 3	Column 2 Row 3	Column 3 Row 3	Column 4 Row 3
Column 1 Row 4	Column 2 Row 4	Column 3 Row 4	Column 4 Row 4
Column 1 Row 5	Column 2 Row 5	Column 3 Row 5	Column 4 Row 5

**Figure 4-1**

The following is an example of a very basic table (`ch04_eg01.html`):

```
<table border="1">
  <tr>
    <td>Row 1, Column 1</td>
    <td>Row 1, Column 2</td>
  </tr>
  <tr>
    <td>Row 2, Column 1</td>
    <td>Row 2, Column 2</td>
  </tr>
</table>
```

I always carefully indent table code so that it is easier to see the structure of the table, and start each row and cell on a new line. While this is just personal preference, leaving off just one ending tag or angle bracket in a table can prevent an entire table from being displayed properly, and indenting helps you keep track of where you are when you come to look at the code (especially when you come to look at complicated nested tables later in the chapter).

This will look very basic in a web browser, but will give you the idea of how a table is formed. You can see the result in Figure 4-2.

All tables will follow this basic structure, although there are additional elements and attributes that allow you to control the presentation of tables. If a row or column should contain a heading, a `<th>` element is used in place of the table data or `<td>` element. By default, most browsers render the content of a `<th>` element in bold text.

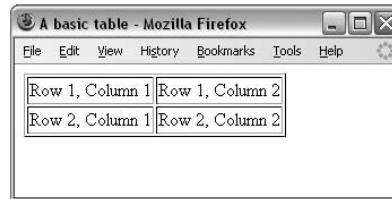


Figure 4-2

**Each cell must be represented by either a `<td>` or a `<th>` element in order for the table to display correctly even if that element is empty.**

Here you can see a slightly more complex example of a table, which includes headings (ch04\_eg02.html):

```
<table border="1">
  <tr>
    <th></th>
    <th>Outgoings ({$})</th>
    <th>Receipts ({$})</th>
    <th>Profit ({$})</th>
  </tr>
  <tr>
    <th>Quarter 1 (Jan–Mar)</th>
    <td>11200.00</td>
    <td>21800.00</td>
    <td><b>10600.00</b></td>
  </tr>
  <tr>
    <th>Quarter 2 (Apr–Jun)</th>
    <td>11700.00</td>
    <td>22500.00</td>
    <td><b>10800.00</b></td>
  </tr>
  <tr>
    <th>Quarter 3 (Jul – Sep)</th>
    <td>11650.00</td>
    <td>22100.00</td>
    <td><b>10450.00</b></td>
  </tr>
  <tr>
    <th>Quarter 4 (Oct – Dec)</th>
    <td>11850.00</td>
    <td>22900.00</td>
    <td><b>11050.00</b></td>
  </tr>
</table>
```

## Chapter 4: Tables

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*As you can see, tables can take up a lot of space and make a document longer, but clear formatting of tables makes it much easier to see what is going on in your code. No matter how familiar the code looks when you write it, you will be glad that you made good use of structure if you have to come back to it a year later.*

In this example, the table shows a financial summary for a small company. Along the top in the first row you can see that there are headings for incomings, outgoings, and profit. The first cell is actually empty, but you must still add either a `<td>` or `<th>` element for it in the code; otherwise the first row would have fewer cells than all the others and the alignment of the columns would not match up as intended.

In each row, the first table cell is also a table heading cell (`<th>`) that indicates which quarter the results are for. Then the remaining three cells of each row contain table data, and are therefore contained inside the `<td>` elements.

The figures showing the profit are also contained within a `<b>` element to display the profit figures in a bold typeface. This shows how any cell can, in fact, contain all manner of markup. The only constraint on placing markup inside a table is that it must nest within the table cell element (be that a `<td>` or a `<th>` element). You cannot have an opening tag for an element inside a table cell and a closing tag outside that cell — or vice versa.

Figure 4-3 shows what this table looks like in a web browser.

	Outgoings (\$)	Receipts (\$)	Profit (\$)
Quarter 1 (Jan-Mar)	11200.00	21800.00	<b>10600.00</b>
Quarter 2 (Apr-Jun)	11700.00	22500.00	<b>10800.00</b>
Quarter 3 (Jul - Sep)	11650.00	22100.00	<b>10450.00</b>
Quarter 4 (Oct - Dec)	11850.00	22900.00	<b>11050.00</b>

Figure 4-3

*It is worth noting that a lot of people, when creating tables, do not actually bother with the `<th>` element, and instead use the `<td>` element for every cell — including headers. However, it can help make the table more accessible as you will see at the end of the chapter, and given that the element is there for a purpose, it is a good idea to use it. It can also help you present those cells differently when you style the table using CSS.*

## Basic Table Elements and Attributes

Now that you've seen how basic tables work, this section describes the elements in a little more detail, introducing the attributes they can carry. With these attributes, you can create more sophisticated table layouts.

## The <table> Element Creates a Table

The <table> element is the containing element for all tables. It can carry the following attributes:

- All of the universal attributes
- Basic event attributes for scripting

The <table> element can carry the following deprecated attributes. Even though they are deprecated, you will still see many of them in use today:

### The **align** Attribute (deprecated)

Although it is deprecated, the `align` attribute is still frequently used with tables. When used with the `<table>` element, it indicates whether the table should be aligned to the `left` (the default), `right`, or `center` of the page. (When used with cells, as you will see shortly, it aligns the content of that cell.) The syntax is:

If the table is contained within another element, then the `align` attribute will indicate whether the table should be aligned to the left, right, or center of that element.

If the table is aligned, text should flow around it. For example, here is a left-aligned table that is followed by some text (`ch04_eg03.html`):

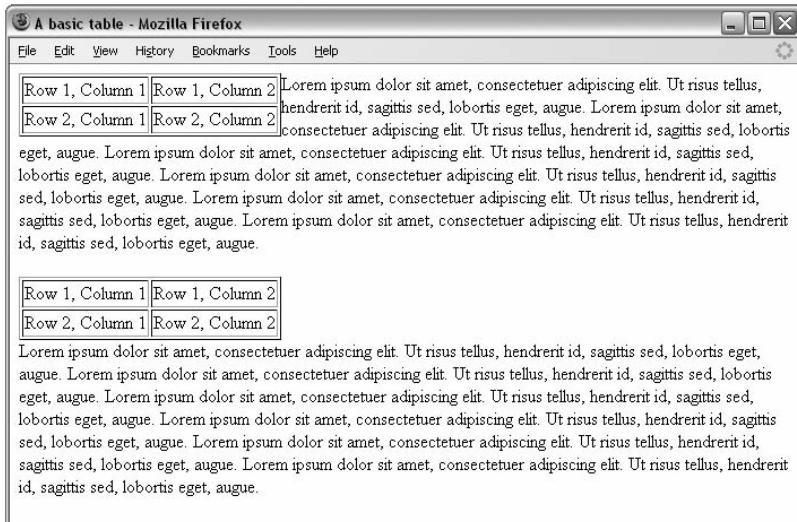
```
<table border="1" align="left">
  <tr>
    <td>Row 1, Column 1</td>
    <td>Row 1, Column 2</td>
  </tr>
  <tr>
    <td>Row 2, Column 1</td>
    <td>Row 2, Column 2</td>
  </tr>
</table>
Lorem ipsum dolor sit amet, consectetur adipiscing elit...
```

The text should flow around the table, as shown with the first table in Figure 4-4.

To prevent this flow you *could* place a line break after the table and add the `clear` attribute (`<br clear="left" />`), which you can see in the second table of Figure 4-4.

```
</table>
<br clear="left" />
Lorem ipsum dolor sit amet, consectetur adipiscing elit...
```

## Chapter 4: Tables



**Figure 4-4**

The `clear` attribute indicates how the browser should display the next line after the line break. With the value of `left`, the text can begin only when there is nothing positioned on the left margin of the browser window (or if it is in a containing element, when nothing is positioned on the left margin of that element). The values the `clear` attribute can take are `all`, `left`, `right`, or `none`; `clear` is covered in more detail in Appendix I, although the `clear` attribute has been replaced by a `clear` property in CSS, which does the equivalent job and is the preferred option.

## ***The bgcolor Attribute (deprecated)***

The `bgcolor` attribute sets the background color for the table. The value of this attribute should be either a six-digit code known as a hex code or a color name. The way in which colors are specified in XHTML and CSS is covered in Appendix D. The syntax is:

bqcolor="#rrqqbb"

## ***The border Attribute (deprecated)***

If you use the `border` attribute, a border will be created around both the table and each individual cell. The value for this attribute is the width you want the outside border of the table to be in pixels. If you give this attribute a value of 0, or if you do not use this attribute, then you should not get any borders on either the table or any cells.

border="0"

While this attribute is deprecated, it has been used in several of the examples in this chapter so that you can clearly see where the edge of each table cell is.

### **The cellpadding Attribute (deprecated)**

The `cellpadding` attribute is used to create a gap between the edges of a cell and its contents. The value for this attribute can either be the amount of space or padding you want inside each wall of the cell in pixels or a percentage value (as a percentage of the width of the table).

As you can imagine, if two cells both contain writing, and there is no gap between the edge of the cells and the writing, the contents can become hard to read.

```
cellpadding="5" or cellpadding="2%"
```

### **The cellspacing Attribute (deprecated)**

The `cellspacing` attribute is used to create a space between the borders of each cell. The value for this attribute can be either the amount of space you want to create between the cells in pixels or a percentage value (as a percentage of the width of the table).

```
cellspacing="6" or cellspacing="2%"
```

### **The dir Attribute**

The `dir` attribute is supposed to indicate the direction of text that is used in the table. Possible values are `ltr` for left to right text and `rtl` for right to left (for languages such as Hebrew and Arabic):

```
dir="rtl"
```

If you use the `dir` attribute with a value of `rtl` on the `<table>` element, then the cells appear from the right first and each consecutive cell is placed to the left of that one.

### **The frame Attribute (deprecated)**

The `frame` attribute is supposed to control the appearance of the outermost border of the whole table, referred to here as its *frame*, with greater control than the `border` attribute. If both the `frame` and `border` attributes are used, the `frame` attribute takes precedence. The syntax is:

```
frame="frameType"
```

The following table shows the possible values for `frameType`.

## Chapter 4: Tables

---

Value	Purpose
void	No outer border (the default)
above	A border on the top only
below	A border on the bottom only
hsides	A border on the top and bottom
lhs	A border on the left side of table
rhs	A border on the right side of table
vsides	A border on the left and right sides of table
box	A border on all sides
border	A border on all sides

Support for the `frame` attribute is not perfect in common browsers, and better results can be achieved using CSS.

### **The `rules` Attribute (deprecated)**

The `rules` attribute is used to indicate which inner borders of the table should be displayed, such as rows and columns. Here is the syntax; the default value is `none`.

```
rules="ruleType"
```

The following table shows the possible values for `ruleType`.

Value	Purpose
none	No inner borders (the default)
groups	Displays inner borders between all table groups (groups are created by the <code>&lt;thead&gt;</code> , <code>&lt;tbody&gt;</code> , <code>&lt;tfoot&gt;</code> , and <code>&lt;colgroup&gt;</code> elements)
rows	Displays horizontal borders between each row
cols	Displays vertical borders between each column
all	Displays horizontal and vertical borders between each row and column

Again, support in common browsers is not perfect, and better results can be achieved using CSS.

## **The *summary* Attribute**

The *summary* attribute is supposed to provide a summary of the table's purpose and structure for non-visual browsers such as speech browsers or Braille browsers. The value of this attribute is not rendered in IE or Firefox, but you should include it in your pages for accessibility purposes:

```
summary="Table shows the operating profit for the last four quarters. The first column indicates the quarter, the second indicates outgoings, the third indicates receipts, and the fourth indicates profit."
```

## **The *width* Attribute (deprecated)**

The *width* attribute is used to specify the width of the table in pixels, or as a percentage of the available space. When the table is not nested inside another element, the available space is the width of the screen; otherwise the available space is the width of the containing element.

```
width="500" or width="90%"
```

## **The *<tr>* Element Contains Table Rows**

The *<tr>* element is used to contain each row in a table. Anything appearing within a *<tr>* element should appear on the same row. It can carry five attributes, four of which have been deprecated in favor of using CSS.

## **The *align* Attribute (deprecated)**

The *align* attribute specifies the position of the content of all of the cells in the row.

```
align="alignment"
```

The table that follows lists the possible values for the *align* attribute.

Value	Purpose
<i>left</i>	Content is left-aligned.
<i>right</i>	Content is right-aligned.
<i>center</i>	Content is centered horizontally within the cell.
<i>justify</i>	Text within the cell is justified to fill the cell.
<i>char</i>	Cell contents are aligned horizontally around the first instance of a specific character (for example, numbers could be aligned around the first instance of a decimal point).

## Chapter 4: Tables

---

By default, any `<td>` cells are usually left-aligned, whereas any `<th>` cells are usually centered. Unfortunately, only Firefox 2 and Netscape 6+ support justified text. IE does not, and neither IE nor Firefox supports the value `char`.

### **The `bcolor` Attribute (deprecated)**

The `bcolor` attribute sets the background color for the row. The value of this attribute should be either a hex code or color value as discussed in Appendix D.

```
bcolor="#rrggbb"
```

The `bcolor` attribute is commonly used on the `<tr>` element to shade alternate rows of a table different colors, thus making it easier to read across each row.

### **The `char` Attribute**

The `char` attribute is used to specify that the contents of each cell within the row will be aligned around the first instance of a particular character known as an *axis character*. The default character for this attribute in HTML was the decimal place, and the idea is that decimal figures would be aligned by the decimal point like so:

```
13412.22  
232.147  
2449.6331  
2.12
```

The syntax is as follows:

```
char=". "
```

Unfortunately, this potentially very helpful attribute is not supported at the time of this writing, and there is no requirement for browsers to support it.

### **The `charoff` Attribute**

The `charoff` attribute's name is an abbreviation of its purpose, to indicate a character offset. It is designed to indicate where characters that are aligned using the `char` attribute should be positioned in terms of either the number of characters used as the offset or a percentage of the length of the text. If this attribute is omitted, the default behavior is to make the offset the equivalent of the longest amount of text content that appeared before the character specified in the `char` attribute.

```
charoff="5"
```

Unfortunately, this attribute is not supported at the time of this writing, and there is no requirement for browsers to support it.

### **The `valign` Attribute (deprecated)**

The `valign` attribute specifies the vertical alignment of the contents of each cell in the row. The syntax is as follows:

```
valign="verticalPosition"
```

The table that follows shows the possible values of *verticalPosition*:

Value	Purpose
top	Aligns content with the top of the cell
middle	(Vertically) aligns content in the center of a cell
bottom	Aligns content with the bottom of the cell
baseline	Aligns content so that the first line of text in each cell starts on the same horizontal line

## ***The <td> and <th> Elements Represent Table Cells***

Every cell in a table will be represented by either a `<td>` element for cells containing table data or a `<th>` element for cells containing table headings.

By default the contents of a `<th>` element are usually displayed in a bold font, horizontally aligned in the center of the cell. The content of a `<td>` element, meanwhile, will usually be displayed left-aligned and not in bold (unless otherwise indicated by CSS or another element).

The `<td>` and `<th>` elements can both carry the same set of attributes, each of which applies just to that cell. Any effect these attributes have will override settings for the table as a whole or any containing element (such as a row).

In addition to the universal attributes and the basic event attributes, the `<td>` and `<th>` elements can also carry the following attributes:

abbr	align	axis	bgcolor	char	charoff	colspan	headers
height	nowrap	rowspan	scope	valign	width	The abbr	Attribute

### ***The abbr Attribute***

The `abbr` attribute is used to provide an abbreviated version of the cell's content. If a browser with a small screen is being used to view the page, the content of this attribute could be displayed instead of the full content of the cell.

```
abbr="description of services"
```

While the major browsers do not currently support this attribute, it's likely to become more widely used by the increasing number of devices with small screens accessing the Internet.

### ***The align Attribute (deprecated)***

The `align` attribute sets the horizontal alignment for the content of the cell.

```
align="alignment"
```

## Chapter 4: Tables

---

The possible values for the `align` attribute are `left`, `right`, `center`, `justify`, and `char`, each of which was described earlier in the chapter in the section “The `align` Attribute.”

### **The `axis` Attribute**

The `axis` attribute allows you to add conceptual categories to cells, and therefore represent  $n$ -dimensional data. The value of this attribute would be a comma-separated list of names for each category the cell belonged to.

```
axis="heavy, old, valuable"
```

Rather than having a visual formatting effect, this attribute allows you to preserve data, which then may be used programmatically, such as querying for all cells belonging to a certain category.

### **The `bgcolor` Attribute (deprecated)**

The `bgcolor` attribute sets the background color for the cell. The value of this attribute should be either a hex code or a color name — both are covered in Appendix D.

```
bgcolor="#rrggbb"
```

### **The `char` Attribute**

The `char` attribute specifies a character, the first instance of which should be used to horizontally align the contents of a cell. (See the full description in the “The `char` Attribute” subsection within the “The `<tr>` Element Contains Table Rows” section earlier in the chapter.)

### **The `charoff` Attribute**

The `charoff` attribute specifies the number of offset characters that can be displayed before the character specified as the value of the `char` attribute. (See the full description in the “The `charoff` Attribute” subsection within the “The `<tr>` Element Contains Table Rows” section earlier in the chapter.)

### **The `colspan` Attribute**

The `colspan` attribute is used to specify how many columns of the table a cell will span across. The value of the `colspan` attribute is the number of columns the cell stretches across. (See the section “Spanning Columns Using the `colspan` Attribute” later in this chapter.)

```
colspan="2"
```

### **The `headers` Attribute**

The `headers` attribute is used to indicate which headers correspond to that cell. The value of the attribute is a space-separated list of the header cells’ `id` attribute values:

```
headers="income q1"
```

The main purpose of this attribute is to support voice browsers. When a table is being read to you it can be hard to keep track of which row and column you are on; therefore the `header` attribute is used to remind users which row and column the current cell’s data belongs to.

## **The `height` Attribute (deprecated)**

The `height` attribute allows you to specify the height of a cell in pixels or as a percentage of the available space:

```
height="20" or height="10%"
```

## **The `nowrap` Attribute (deprecated)**

The `nowrap` attribute is used to stop text from wrapping onto a new line within a cell. You would use `nowrap` only when the text really would not make sense if it were allowed to wrap onto the next line (for example a line of code that would not work if it were spread across two lines). In HTML it was used without an attribute value, but that would not be allowed in Transitional XHTML. Rather, you would use the following:

```
nowrap="nowrap"
```

## **The `rowspan` Attribute**

The `rowspan` attribute specifies the number of rows of the table a cell will span across, the value of the attribute being the number of rows the cell stretches across. (See the example in the section “Spanning Rows Using the `rowspan` Attribute” later in this chapter.)

```
rowspan="2"
```

## **The `scope` Attribute**

The `scope` attribute can be used to indicate which cells the current header provides a label or header information for. It can be used instead of the `headers` attribute in basic tables, but does not have much support:

```
scope="range"
```

The table that follows shows the possible values of the attribute.

Value	Purpose
<code>row</code>	Cell contains header information for that row.
<code>col</code>	Cell contains header information for that column.
<code>rowgroup</code>	Cell contains header information for that rowgroup (a group of cells in a row created using the <code>&lt;thead&gt;</code> , <code>&lt;tbody&gt;</code> , or <code>&lt;tfoot&gt;</code> elements).
<code>colgroup</code>	Cell contains header information for that colgroup (a group of columns created using the <code>&lt;col&gt;</code> or <code>&lt;colgroup&gt;</code> element, both of which are discussed later in the chapter).

### The **valign** Attribute (deprecated)

The `valign` attribute allows you to specify the vertical alignment for the content of the cell. Possible values are `top`, `middle`, `bottom`, and `baseline`, each of which is discussed more in the “The `valign` Attribute” section within the “The `<tr>` Element Contains Table Rows” section earlier in the chapter.

### The **width** Attribute (deprecated)

The `width` attribute allows you to specify the width of a cell in pixels or as a percentage of the available space:

```
width="150" or width="30%"
```

You need to specify only the `width` attribute for the cells in the first row of a table, and the rest of the rows will follow the first row’s cell widths.

If you specify a `width` attribute for the `<table>` element, and the widths of individual cells add up to more than that width, most browsers will squash those cells to fit them into the width of the table.

You can also add a special value of `*`, which means that this cell will take up the remaining space available in the table. So if you have a table that is 300 pixels wide, and the first two cells in a row are specified as being 50 pixels wide, if the third cell has a value of `*` it will take up 200 pixels — the remaining width of the table. If the width of the table had not been specified, then the third column would take up the remaining width of the browser window.

It is worth noting that you cannot specify different widths for `<td>` elements in corresponding columns of different rows of a table. So, if the first row of a table had three `<td>` elements whose widths are 100 pixels, the second row could not have one `<td>` element whose width was 200 pixels and two that are 50 pixels.

---

### Try It Out      An Accessible Timetable

In this example you create a timetable that is specifically designed to be accessible for those with visual impairments. Because you are likely to come across them in the real world, the example will contain some deprecated attributes.

1. Because this example contains deprecated attributes, you need to set up the skeleton ready to handle a Transitional XHTML 1.0 document:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
  <head>
    <title>An accessible timetable</title>
  </head>
  <body>
  </body>
</html>
```

2. Next you can add in the main elements required to create a table with three rows and three columns. The left-most column and the top row will contain headings. While you are doing this, you'll add in some content for the table, too. The timetable will show a fictional weekend course on XHTML, with morning and afternoon sessions for Saturday and Sunday:

```
<body>
<table>
  <tr>
    <th></th>
    <th>Saturday</th>
    <th>Sunday</th>
  </tr>
  <tr>
    <th>Morning</th>
    <td>The structure of a document and how to mark up text.</td>
    <td>Adding tables and forms to pages. Splitting pages up into windows
        called frames.</td>
  </tr>
  <tr>
    <th>Afternoon</th>
    <td>Linking between pages and adding color images and objects to
        your pages.</td>
    <td>Using CSS to style your documents and make them look attractive.</td>
  </tr>
</table>
</body>
```

3. The next stage is to add `id` attributes to the `<th>` elements that have content, and `header` attributes to the `<td>` elements. The value of the `header` attributes should correspond to the values of the `id` attributes, indicating which headings correspond to each cell:

```
<table>
  <tr>
    <th></th>
    <th id="Saturday">Saturday</th>
    <th id="Sunday">Sunday</th>
  </tr>
  <tr>
    <th id="Morning">Morning</th>
    <td headers="Saturday Morning" abbr="Structure and markup">The
        structure of a document and how to markup text.</td>
    <td headers="Sunday Morning" abbr="Tables, forms and frames">Adding
        tables
        and forms to pages. Splitting pages up into windows called
        frames</td>
  </tr>
  <tr>
    <th id="Afternoon">Afternoon</th>
    <td headers="Saturday Afternoon" abbr="Links, color, images,
        objects">Linking between pages, and adding color images and
        objects to your pages.</td>
```

## Chapter 4: Tables

---

```
<td headers="Sunday Afternoon" abbr="CSS">Using CSS to style your  
documents  
and make them look attractive.</td>  
</tr>  
</table>
```

4. Save your file as `table.html`. The example in Figure 4-5 contains some CSS style rules that you learn more about in Chapter 8.

	Saturday	Sunday
Morning	The structure of a document and how to mark up text. Linking between pages and adding color images and objects to your pages.	Adding tables and forms to pages. Splitting pages up into windows called frames. Using CSS to style your documents and make them look attractive.
Afternoon		

Figure 4-5

### How It Works

The table is contained within the `<table>` element and its content is then written out a row at a time. Starting with the top row, you have three table heading elements. The first is empty because the top-left corner cell of the table is empty. The next two elements contain the headings for days. Remember that the `id` attributes will be used by individual table cells so they can indicate which headings correspond to them.

```
<table>  
  <tr>  
    <th></th>  
    <th id="Saturday">Saturday</th>  
    <th id="Sunday">Sunday</th>  
  </tr>  
  ...  
</table>
```

In the next row of the table, the first cell is a heading for that row, indicating that this row shows times for morning sessions. The second two cells show table data. The `headers` attributes contain the values of the `id` attributes on their corresponding header elements, and the `abbr` attributes contain an abbreviation of the table cell content:

```
<tr>  
  <th id="Morning">Morning</th>  
  <td headers="Saturday Morning" abbr="Structure and markup">The structure of  
  a document and how to markup text.</td>  
  <td headers="Sunday Morning" abbr="Tables, forms and frames">Adding tables  
  and forms to pages. Splitting pages up into windows called frames</td>  
</tr>
```

The final row uses the same structure as the second row:

```
<tr>
  <th id="Afternoon">Afternoon</th>
  <td headers="Saturday Afternoon" abbr="Links, color, images,
    objects">Linking between pages, and adding color images and
    objects to your pages.</td>
  <td headers="Sunday Afternoon" abbr="CSS">Using CSS to style your documents
    and make them look attractive.</td>
</tr>
```

As long as you accept that each row is written out in turn, you will have no problem creating quite complex tables.

To be honest, this example is quite a bit more complex than most tables you will come across. Not many people have gotten into the practice of using the `id` and `header` attributes on `<table>` elements, but it makes tables a lot easier to use for those with visual impairments, in particular when those tables have a lot of columns and rows. Nor will you often see the `abbr` attribute used on table cells. In fact, if you look at other people's code around on the Web at the moment, you are more likely to come across the use of lots of deprecated attributes rather than these attributes.

*Including attributes like these will set you apart from other coders who have not yet learned to make their tables more accessible. Furthermore, awareness of accessibility issues is being required in an increasing number of job positions, so you should learn how to use such attributes.*

---

## Advanced Tables

Now that you've seen the basics behind creating tables, it's time to look at some more advanced issues, such as the following:

- Splitting a table into three sections: a head, body, and foot
- Captioning tables
- Using the `rowspan` and `colspan` attributes to make cells stretch over more than one row or column
- Grouping columns using the `<colgroup>` element
- Sharing attributes between unrelated columns using the `<col>` element

### ***Splitting Up Tables Using a Head, Body, and Foot***

Tables can be divided into three portions: a header, a body, and a foot. The head and foot are rather similar to headers and footers in a word-processed document, which remain the same for every page, while the body is the main content of the table.

## Chapter 4: Tables

---

The separation of the parts of the table allows for the richer formatting of tables by browsers. For example, when printing a table, browsers could print the head and foot of a table on each page if the table spreads to more than one page. Aural browsers, which read pages to users, could allow users to navigate between content and headers or footers with additional information easily.

It was also intended that if the table was too large for a single page then the header and footer would remain in view, while the body of the table would gain a scroll bar. However, this is not supported in the majority of browsers.

The three elements for separating the head, body, and foot of a table are:

- ❑ <thead> to create a separate table header
- ❑ <tbody> to indicate the main body of the table
- ❑ <tfoot> to create a separate table footer

A table may contain several <tbody> elements to indicate different “pages” or groups of data.

**Note that the <tfoot> element must appear before the <tbody> element in the source document.**

Here you can see an example of a table that makes use of these elements (ch04\_eg04.html):

```
<table>
  <thead>
    <tr>
      <td colspan="4">This is the head of the table</td>
    </tr>
  </thead>
  <tfoot>
    <tr>
      <td colspan="4">This is the foot of the table</td>
    </tr>
  </tfoot>
  <tbody>
    <tr>
      <td>Cell 1</td>
      <td>Cell 2</td>
      <td>Cell 3</td>
      <td>Cell 4</td>
    </tr>
    <tr>
      ...more rows here containing four cells...
    </tr>
  </tbody>
  <tbody>
    <tr>
      <td>Cell 1</td>
      <td>Cell 2</td>
```

```
<td>Cell 3</td>
<td>Cell 4</td>
</tr>
<tr>
    ...more rows here containing four cells...
</tr>
</tbody>
</table>
```

Figure 4-6 shows what this example looks like in Firefox, which supports the `thead`, `tbody`, and `tfoot` elements. Note that this example uses CSS to give the header and footer of the table a background shade, and that the font used in these elements is larger; also, the height of each `<td>` element has been set to 100 pixels to make the table larger.

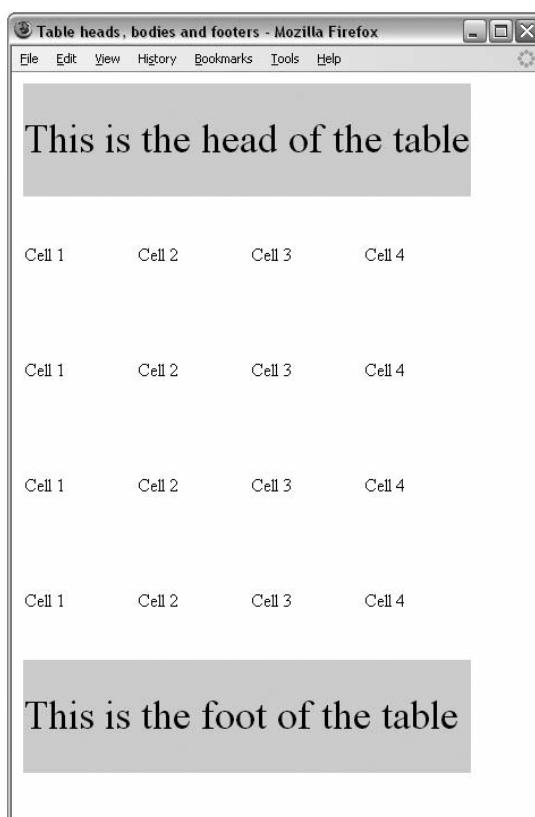


Figure 4-6

All three elements carry the same attributes. In addition to the universal attributes, they can carry the following attributes:

```
align char charoff valign
```

## Chapter 4: Tables

---

### **The `align` Attribute (deprecated)**

The `align` attribute is used to specify the horizontal positioning of the text and contained elements. The possible values for the `align` attribute are `left`, `right`, `center`, `justify`, and `char`, each of which was described in the “The `align` Attribute” subsection within the “The `<tr>` Element Contains Table Rows” section earlier in the chapter.

### **The `char` Attribute**

The `char` attribute specifies a character, the first instance of which should be used to horizontally align the contents of each cell in the column group. (See the full description in the subsection “The `char` Attribute” within the “The `<tr>` Element Contains Table Rows” section earlier in the chapter.)

### **The `charoff` Attribute**

The `charoff` attribute specifies the number of offset characters that can be displayed before the character specified as the value of the `char` attribute. (See the full description in the “The `char` Attribute” subsection within the section “The `<tr>` Element Contains Table Rows” earlier in the chapter.)

### **The `valign` Attribute (deprecated)**

The `valign` attribute allows you to specify the vertical alignment for the content of the cells in each element. Possible values are `top`, `middle`, `bottom`, and `baseline` each of which is discussed more in the subsection “The `valign` Attribute” within the “The `<tr>` Element Contains Table Rows” section earlier in the chapter.

## **Adding a `<caption>` to a Table**

To add a caption to a table, you just use the `<caption>` element after the opening `<table>` tag and before the first row or header:

```
<table>
<caption>Spanning columns using the colspan attribute</caption>
<tr>
```

By default, most browsers will display the contents of this attribute centered above the table, as shown in Figure 4-7 in the next section.

## **Spanning Columns Using the `colspan` Attribute**

As you saw when looking at the `<td>` and `<th>` elements, both can carry an attribute that allows the table cell to span more than one column.

Remember that whenever you work with tables, you need to think in terms of grids. The `colspan` attribute allows a cell to stretch across more than one column, which means it can stretch across more than one rectangle horizontally in the grid. Take a look at the following example, which uses the deprecated `border`, `width`, `height`, and `bgcolor` attributes to illustrate a point visually (`ch04_eg05.html`):

```
<table border="1">
<caption>Spanning columns using the colspan attribute</caption>
<tr>
  <td bgcolor="#efefef" width="100" height="100">&nbsp;</td>
```

```

<td bgcolor="#999999" width="100" height="100">&nbsp;</td>
<td bgcolor="#000000" width="100" height="100">&nbsp;</td>
</tr>
<tr>
    <td bgcolor="#efefef" width="100" height="100">&nbsp;</td>
    <td colspan="2" bgcolor="#999999">&nbsp;</td>
</tr>
<tr>
    <td colspan="3" bgcolor="#efefef" height="100">&nbsp;</td>
</tr>
</table>

```

You can see here that, for each extra column that a cell spans, you do not add in a cell for that row. So, if a table has three columns and one of the cells spans two columns, you have only two `<td>` elements in that row.

You might also have noticed the use of the non-breaking space character (`&nbsp;`) in the cells, which is included so that the cell has some content; without content for a table cell, some browsers will not display the background color (whether that color is specified using CSS or the deprecated `bgcolor` attribute).

Figure 4-7 shows what this example would look like in a browser.

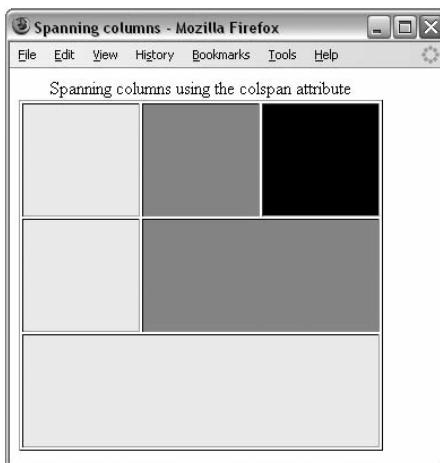


Figure 4-7

## **Spanning Rows Using the `rowspan` Attribute**

The `rowspan` attribute does much the same thing as the `colspan` attribute, but it works in the opposite direction; it allows cells to stretch vertically across cells.

When you use a `rowspan` attribute, the corresponding cell in the row beneath it must be left out:

```

<table border="1">
    <caption>Spanning rows using the colspan attribute</caption>
    <tr>
        <td bgcolor="#efefef" width="100" height="100">&nbsp;</td>

```

## Chapter 4: Tables

---

```
<td bgcolor="#999999" width="100" height="100">&nbsp;</td>
<td rowspan="3" bgcolor="#000000" width="100" height="100">&nbsp;</td>
</tr>
<tr>
  <td bgcolor="#efefef" height="100">&nbsp;</td>
  <td rowspan="2" bgcolor="#999999">&nbsp;</td>
</tr>
<tr>
  <td bgcolor="#efefef" height="100">&nbsp;</td>
</tr>
</table>
```

You can see the effect of the `rowspan` attribute in Figure 4-8.

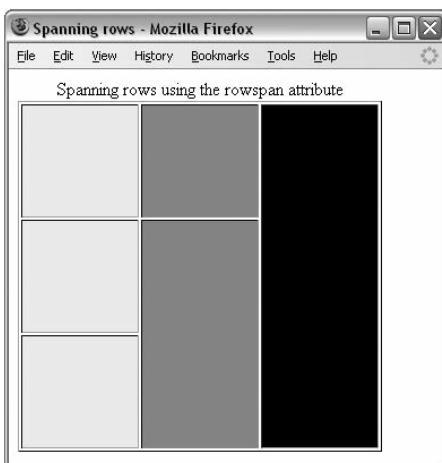


Figure 4-8

The `rowspan` and `colspan` attributes were particularly popular with designers who used tables to control the layout pages; but this technique has largely been replaced by the use of CSS to control layouts.

## Grouping Columns Using the `<colgroup>` Element

If you are creating complex tables, you can group one or more adjacent columns together using the `<colgroup>` element. It is particularly helpful when two or more adjacent columns contain similar types of information. This allows you to apply formatting to the group of columns rather than having to style each column separately. When you look at CSS in Chapter 7, you will see how the `class` attribute is used to associate this column group with a particular style.

For example, in the following table, there are 12 columns. The first eight columns are in the first column group, the next two columns are in the second column group, and the final two columns are in the third column group:

```
<table>
<colgroup span="8" width="75" class="mainColumns" />
```

```
<colgroup span="2" width="50" class="subTotalColumns" />
<colgroup span="2" width="80" class="totalColumns" />
<tr>
    <td></td>
    ...
    <td></td>
</tr>
</table>
```

As you can see, when the `<colgroup>` element is used, it comes directly after the opening `<table>` tag. The `span` attribute is being used to indicate how many columns the group contains, the `width` attribute sets the width of each column in the group (although in XHTML you should use CSS instead), and the `class` attribute can be used to attach further styles using CSS.

In addition to the universal attributes, the `<colgroup>` element can carry the following attributes:

While this will allow basic formatting, such as background color changes, support in browsers is limited.

### **The align Attribute (deprecated)**

The `align` attribute is used to specify the horizontal positioning of the text in cells within a `<colgroup>` element. The possible values for the `align` attribute are `left`, `right`, `center`, `justify`, and `char`, each of which was described in the “The align Attribute” subsection within the section “The `<tr>` Element Contains Table Rows” earlier in the chapter.

### **The char Attribute**

The `char` attribute specifies a character, the first instance of which should be used to horizontally align the contents of each cell in the column group. (See the full description in the “The `char` Attribute” subsection within the section “The `<tr>` Element Contains Table Rows” earlier in the chapter.)

### **The charoff Attribute**

The `charoff` attribute specifies the number of offset characters that can be displayed before the character specified as the value of the `char` attribute. (See the full description in the “The `charoff` Attribute” subsection within the “The `<tr>` Element Contains Table Rows” section earlier in the chapter.)

### **The span Attribute**

The `span` attribute specifies how many columns a `<colgroup>` is supposed to stretch across.

`span="5"`

### **The valign Attribute (deprecated)**

The `valign` attribute allows you to specify the vertical alignment for the content of the cell. Possible values are `top`, `middle`, `bottom`, and `baseline`, each of which is discussed more in the “The `valign` Attribute” subsection within the “The `<tr>` Element Contains Table Rows” section earlier in the chapter.

## Chapter 4: Tables

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### The **width** Attribute

The `width` attribute specifies the width of each cell in the column either in pixels or as a percentage of the available space. The `width` attribute can also take the special value `0*`, which specifies that the column width should be the minimum width required to display all of the content of that column.

### Columns Sharing Styles Using the `<col>` Element

The `<col>` element can be used to perform a similar role as the `<colgroup>` element, but without actually implying a structural group of columns. It can also be used to indicate that just one column needs formatting different from the rest of the group.

The `<col>` elements are always empty elements, and are therefore used only to carry attributes, not content.

For example, the following table would have ten columns, and the first nine, while not a group, could be formatted differently than the last column because it belongs to a separate set.

```
<table>
  <colgroup span="10">
    <col span="9" width="100" id="mainColumns" />
    <col span="1" width="200" id="totalColumn" />
  </colgroup>
  <tr>
    <td></td>
    ...
    <td></td>
  </tr>
</table>
```

The attributes that the `<col>` element can carry are the same as for the `<colgroup>` element.

Unfortunately, browser support for grouping columns is currently limited.

## Accessibility Issues with Tables

Because tables can create a grid, a lot of designers used to use them to control the layout of whole documents, and entire web pages would be built inside a table. Before you even consider using tables to control the layout of a document, it is important to understand how they are dealt with by non-visual user agents, such as voice browsers; otherwise, those with visual impairments might not be able to access your pages. In order to understand how to make tables accessible, you first need to learn how tables *linearize* your page.

### How Tables Linearize

To understand how a screen reader reads a table, consider the following simple table:

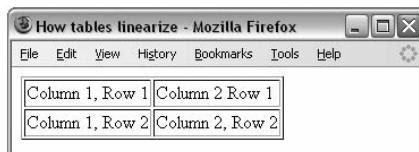
```
<table border="1">
  <tr>
```

```

<td>Column 1, Row 1</td>
<td>Column 2 Row 1</td>
</tr>
<tr>
    <td>Column 1, Row 2</td>
    <td>Column 2, Row 2</td>
</tr>
</table>

```

Figure 4-9 shows what this simple table would look like in a browser.



**Figure 4-9**

Screen readers tend to perform linearization on a table when they read it to a visitor. This means that they start at the first row and read the cells in that row from left to right, one by one, before moving on to the next row, and so on until they have read each row in the table. The order in which the cells in Figure 4-9 would be read is therefore:

- Column 1 Row 1
- Column 2 Row 1
- Column 1 Row 2
- Column 2 Row 2

## **Linearization of Tables Used for Layout**

Because tables *can* be used to control where elements appear on a page, web designers often used to use tables as a means for positioning text and images where they wanted them to appear. Because the designer can control properties of the table, such as width of each individual cell, it's possible to create layouts that feature more than one column of text and to determine how wide each column should appear. Often the body of entire web pages is contained within a table.

*While it is the W3C's intention that tables should be used solely for tabular data and that CSS is the preferred mechanism for positioning elements on the page, until the support for CSS positioning in browsers improves (something you learn about in Chapter 9) and until more designers learn how to make best use of CSS positioning, it is likely that tables will still be used to control the layout of web pages.*

You learn more about using both tables and CSS to control positioning of elements on a page in Chapters 9 and 10, but for now you should consider how pages that are written inside tables linearize for users of screen readers and that you should use a table for layout only if you can make sure that it will linearize correctly.

## Chapter 4: Tables

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As mentioned earlier in the chapter, you can include markup inside a table cell, as long as the whole element is contained within that cell. This means you can even place another whole table inside a table cell, creating what's called a *nested table*.

If you use nested tables, when a screen reader comes across a cell containing another table, the whole of the nested table must be linearized before the reader can move onto the next cell. For example, Figure 4-10 shows a common page layout.



Figure 4-10

The layout in Figure 4-10 is created using a table with two columns and three rows:

- In the first row, the header and logo are in a cell that spans both columns.
- In the second row, the first cell contains the navigation bar, while the second cell contains a nested table with three rows and just one column.
- In the third row, the cell spans both columns like the first one.

Here is the code for this page (note that there are also some CSS rules in the source document used to style this table, ch04\_eg10.html):

```
<table>
  <tr>
    <td colspan="2" id="heading">Page heading and logo</td>
  </tr>
  <tr>
    <td id="navigation">Navigation item 1 <br />
      Navigation item 2 <br />
      Navigation item 3 <br />
      Navigation item 4 <br />
    </td>
    <td>
      <table>
        <tr>
          <td>Article 1</td>
        </tr>
        <tr>
          <td>Article 2</td>
        </tr>
      </table>
    </td>
  </tr>
```

```
<tr>
  <td>Article 3</td>
</tr>
</table>
</td>
</tr>
<tr>
  <td colspan="2" class="footer">Footer</td>
</tr>
</table>
```

*This example could have used the <thead> element for the first row and the <tfoot> element for the last row, but because the content of the table isn't really tabular data, it is not the intended use of the <table> element in the first place; I will rely only on the basic elements.*

In this example, the order in which pages are read is as follows:

- Page heading and logo
- Navigation item 1
- Navigation item 2
- Navigation item 3
- Navigation item 4
- Article 1
- Article 2
- Article 3
- Footer

Ideally you would be testing your tables in a voice browser such as one of the ones listed at [www.w3.org/WAI/References/Browsing#2](http://www.w3.org/WAI/References/Browsing#2).

Remember that if you are using tables to control layout, you should use style sheets rather than markup to control how you want the text to appear in a table. (For example, do not use a <th> element just to get text centered and in a bold font; use it for headings only, and do not use the <em> element to get italicized text, as a screen reader may add inflection to the voice to show emphasis.)

## **Linearization of Tables Used for Data**

If you use tables to represent data, you should try to keep your tables simple, without cells spanning rows or columns, because they can make listening to a table very complicated. Here are some general guidelines for creating tables to hold data:

- Always try to use the <th> element to indicate a table heading. If you do not like their visual representation you can override this using CSS.
- If you cannot use the <th> element to indicate table headings, use the scope attribute with a value of `row` or `col` on all cells that are headings.

## Chapter 4: Tables

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- Always put headings in the first row and the first column.
- If your table is complex and contains cells that span more than one cell, then use the headers attribute on those cells, and the next cell in the linearization process to clearly indicate which heading applies to that cell.

## Summary

In this chapter you have seen how tables can be a powerful tool for web developers. Tables are not only used to lay out tabular data, but are often used to control layout of pages.

You have seen how all tables are based on a grid pattern and use the four basic elements: `<table>`, which contains each table; `<tr>`, which contains the rows of a table; `<td>`, which contains a cell of table data; and `<th>`, which represents a cell that contains a heading.

You have also seen how you can add headers, footers, and captions to tables. It is particularly helpful to add a `<thead>` and `<tfoot>` element to any table that may be longer than a browser window or sheet of printed paper, as they help a reader relate between the content and the information in headers or footers.

You can make cells span both columns and rows, although you should avoid doing this in tables that contain data, as it makes them harder for aural browsers to read to a user, and you can group columns together so that you can preserve structure and so they can share styles and attributes.

Finally, you saw some of the accessibility issues regarding use of tables. It is important to be aware of the process of linearization, which a screen reader performs before reading a table to a user, so that your sites are accessible to users with visual impairments. The chapter ended with some guidelines for making tables more accessible to all visitors.

In the next chapter, you learn about using forms to collect information from visitors.

## Exercises

The answers to all of the exercises are in Appendix A.

1. Where should the `<caption>` element for a table be placed in the document, and by default where is it displayed?
2. In what order would the cells in Figure 4-11 be read out by a screen reader?

Emily	Jack	Frank
Mary	Dominic	Amy
Thomas	Angela	David

Figure 4-11

3. Create a table to hold the data shown in Figure 4-12. To give you a couple of clues, the document must be Transitional XHTML 1.0 because the width attribute is used on the cells of the first row of the table. You should also have seen examples of how the border is generated in this chapter, using another deprecated attribute, but on the `<table>` element rather than the cells.

The screenshot shows a Mozilla Firefox window with the title bar "Classic Movies Times - Mozilla Firefox". The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. Below the menu is a table titled "Classic Movie Day". The table has four columns labeled "5 pm", "7 pm", "9 pm", and "11 pm". It has three rows labeled "Screen one", "Screen two", and "Screen three". The data in the table is as follows:

	5 pm	7 pm	9 pm	11 pm
Screen one	Star Wars	Empire Strikes Back	Return of the Jedi	The Exorcist
Screen two	Dances with Wolves	Gone With the Wind		
Screen three	2001: A Space Odyssey		The Conversation	5 Easy Pieces

Figure 4-12



# 5

## Forms

Almost every time you want to collect information from a visitor to your site, you need to use a *form*. You have probably used several different kinds of forms on different web sites, from simple search boxes, which allow you to enter keywords in order to find what you are looking for, to complex forms that allow you to order groceries or book a holiday online.

Forms on the Web bear a strong resemblance to paper forms you have to fill out. On paper, there are areas to enter text, boxes to check (or tick), options to choose from, and so on. On the Web, you can create a form by combining what are known as *form controls*, such as text boxes (to enter text into), checkboxes (to place a tick in), select boxes and radio buttons (to choose from different options), and so on. In this chapter you learn how each of these different types of controls can be combined into a form.

In this chapter, then, you learn:

- How to create a form using the `<form>` element
- The different types of form control you can use to make a form — such as text input boxes, radio buttons, select boxes, and submit buttons
- What happens to the data a user enters
- How to make your forms accessible
- How to structure the content of your forms

By the end of the chapter you will be able to create all kinds of forms to collect information from visitors to your site.

*What you do with the data that you collect depends upon the server your web site is hosted on. XHTML is used only to present the form to the user; it does not allow you to say what happens with that data once it has been collected. To get a better idea of what happens to the data once it has been collected from a form, you will need to look at a book on a server-side language (such as ASP.net, PHP, or JSP). See the book list at Wrox.com for books on at least some of these topics.*

# Introducing Forms

Any form that you create will live inside an element called `<form>`. Between the opening `<form>` and closing `</form>` tags, you will find the form controls (the text input boxes, drop-down boxes, checkboxes, a submit button, and so on). A `<form>` element can also contain other XHTML markup just like the rest of a page.

Once users have entered information into a form, they usually have to click what is known as a *submit button* (although the actual text on the button may say something different such as Search, Send, or Proceed — and often pressing the return key on the keyboard has the same effect as clicking this button). This indicates that the user has filled out the form, and this usually sends the form data to a web server.

Once the data that you have entered arrives at the server, a script or other program usually processes the data and sends a new web page back to you. The returned page will usually respond to a request you have made or acknowledge an action you have taken.

As an example, you might want to add the search form shown in Figure 5-1 to your page.

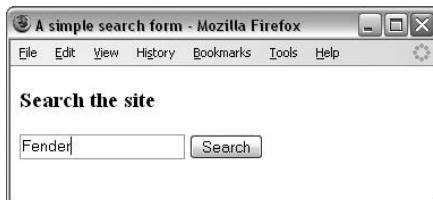
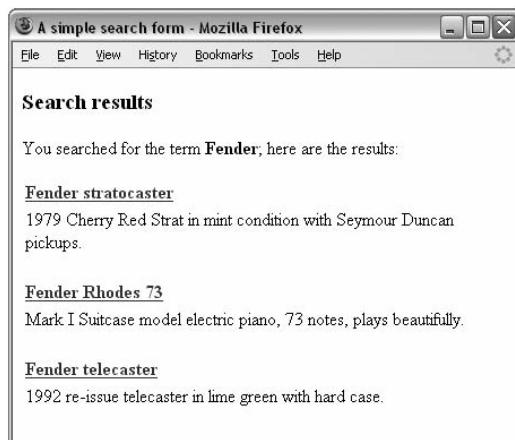


Figure 5-1

You can see that this form contains a text box for the user to enter the keywords of what he or she is searching for, and a submit button which has been set to have the word “Search” on it. When the user clicks the Search button, the information is sent to the server. The server then processes the data and generates a new page for that user telling what pages meet the search criteria (see Figure 5-2).



The page content is as follows:

**Search results**

You searched for the term Fender, here are the results:

[Fender stratocaster](#)  
1979 Cherry Red Strat in mint condition with Seymour Duncan pickups.

[Fender Rhodes 73](#)  
Mark I Suitcase model electric piano, 73 notes, plays beautifully.

[Fender telecaster](#)  
1992 re-issue telecaster in lime green with hard case.

Figure 5-2

When a user fills in a form, the data is sent to the server in *name/value* pairs. The *name* corresponds to the name of the form control, and the *value* is what the user has entered (if the user can type an answer) or the value of the option selected (if there is a list of options to choose from).

Each item needs both a name and a value because, if you have five text boxes on a form, you need to know which data corresponds to which text box. The processing application can then process the information from each form control individually.

Here is the code for the simple search form shown in Figure 5-1:

```
<form action="http://www.example.org/search.aspx" method="get">
    <h3>Search the site</h3>
    <input type="text" name="txtSearchItem" />
    <input type="submit" value="Search" />
</form>
```

The `<form>` element carries an attribute called `action` whose value is the URL of the page on the web server that handles search requests. The `method` attribute meanwhile indicates which HTTP method will be used in getting the form data to the server. (You will learn that there are two methods you can use, `get` and `post`, later in the chapter.)

You will see some more advanced forms later in the chapter, but for now let's look in more detail at what makes up the form.

## Creating a Form with the `<form>` Element

As you have already seen, forms live inside an element called `<form>`. The `<form>` element can also contain other markup, such as paragraphs, headings, and so on. A `<form>` element must not, however, contain another `<form>` element.

Providing you keep your `<form>` elements separate from each other (and no one `<form>` element contains another `<form>` element), your page may contain as many forms as you like. For example, you might have a login form, a search form, and a form to subscribe to a newsletter all on the same page. If you do have more than one form on a page, users will be able to send the data from only one form at a time to the server.

Every `<form>` element should carry at least two attributes:

action method

A `<form>` element may also carry all of the universal attributes, the UI event attributes, and the following attributes:

enctype accept accept-charset onsubmit onreset

### The **action** Attribute

The `action` attribute indicates what happens to the data when the form is submitted. Usually the value of the `action` attribute is a page or program on a web server that will receive the information from this form when a user presses the submit button.

For example, if you had a login form consisting of a username and password, the details the user enters may get passed to a page written in ASP.net on the web server called `login.aspx`, in which case the `action` attribute would read as follows:

```
<form action="http://www.example.org/membership/login.aspx">
```

Most browsers will accept only a URL beginning with `http://` as the value of the `action` attribute.

### The **method** Attribute

Form data can be sent to the server in two ways, each corresponding to an *HTTP method*:

- The `get` method, which sends data as part of the URL
- The `post` method, which hides data in the HTTP headers

You learn more about these two methods later in the chapter, where you will learn what they mean and when you should use each method.

### The **id** Attribute

The `id` attribute allows you to uniquely identify the `<form>` element within a page, just as you can use it to uniquely identify any element on a page.

It is good practice to give every `<form>` element an `id` attribute, because many forms make use of style sheets and scripts, which may require the use of the `id` attribute to identify the form.

*As you will see in Chapter 12, it can sometimes help users if you automatically put the browser's cursor in the first text box on a form. To do this you need to add an id or name attribute to identify the form.*

The value of the `id` attribute should be unique within the document, and it should also follow the other rules mentioned in Chapter 1. Some people start the value of `id` and `name` attributes for forms with the characters `frm` and then use the rest of the value to describe the kind of data the form collects, for example, `frmLogin` or `frmSearch`.

### The **name** Attribute (*deprecated*)

As you have already seen, from its use on other elements, the `name` attribute is the predecessor to the `id` attribute.

As with the `id` attribute, the value should be unique to the document. In addition, you will often see the value of this attribute begin with the characters `frm` followed by the purpose of the form.

## The `onsubmit` Attribute

At some point, you have probably filled in a form on a web site, and then, as soon as you have clicked the button to send the form data (even before the page is sent to the server), been shown a message telling you that you have missed entering some data, or entered the wrong data. When this happens, the chances are you have come across a form that uses the `onsubmit` attribute to run a script in the browser that checks the data you entered before the form is sent to the server.

When a user clicks a submit button, something called an *event* fires. It is rather like the browser raising its hand and saying "Hey, I am sending this form data to the server." The idea behind these events is that a script (such as a JavaScript script) can be run before the data is sent to the server to ensure the quality and accuracy of the submitted data. The value of the `onsubmit` attribute should be a script function that would be used when this event fires.

So, an `onsubmit` attribute on the `<form>` element might look like this:

```
onsubmit="validateFormDetails();"
```

In this case, the `validateFormDetails()` function should have been defined in the document already (probably in the `<head>` element). So when the user clicks the submit button, this function will be called and run.

There are two key advantages to making some checks on the form before it is sent to the server:

- ❑ The user does not have to wait the extra time it would take for the page to be sent to the server and then returned if there are any errors.
- ❑ The server does not have to deal with as much error checking as it would if the checks by the browser had not been performed.

In both cases it saves work on the server, which is especially important on very busy sites.

## The `onreset` Attribute

Some forms contain a reset button that empties the form of all details, although the button might say something like `clear form` instead; when this button is pressed, an `onreset` event fires and a script can be run.

When the `onreset` attribute is used, its value is a script (as with the `onsubmit` attribute) that is executed when the user clicks the button that calls it.

*The onreset event and attribute are used a lot less than onsubmit. If you offer a Clear Form button, however, it is good to confirm with users that they did intend to clear the form before performing the action (in case they pressed it by accident).*

### The `enctype` Attribute

If you use the HTTP post method to send data to the server, you can use the `enctype` attribute to specify how the browser encodes the data before it sends it to the server (to ensure that it arrives safely). Browsers tend to support two types of encoding:

- ❑ `application/x-www-form-urlencoded`, which is the standard method most forms use. It is used because some characters, such as spaces, the plus sign, and some other non-alphanumeric characters cannot be sent to the web server. Instead, they are replaced by other characters used to represent them.
- ❑ `multipart/form-data`, which allows the data to be sent in parts, where each consecutive part corresponds to a form control, in the order they appear in the form. Each part can have an optional content-type header of its own indicating the type of data for that form control.

If this attribute is not used, browsers use the first value. As a result, you are only likely to use this attribute if your form allows users to upload a file (such as an image) to the server, or they are going to use non-ASCII characters, in which case the `enctype` attribute should be given the second value:

```
enctype="multipart/form-data"
```

### The `accept-charset` Attribute

The idea behind the `accept-charset` attribute is that it specifies a list of character encodings that a user may enter and that the server can then process. However, IE 7 and Firefox 2 do not support this attribute. Values should be a space-separated or comma-delimited list of character sets (as shown in Appendix E).

For example, the following indicates that a server accepts UTF-8 encodings:

```
accept-charset="utf-8"
```

The main browsers will currently allow any character set to be entered.

### The `accept` Attribute

The `accept` attribute is similar to the `accept-charset` attribute except it takes a comma-separated list of content types (or file types) that the server processing the form can handle. Again, neither Firefox 2, nor IE 7 supports this feature.

The idea is that a user would not be able to upload a file of a different content type other than those listed. Here, you can see that the only types intended to be uploaded are images that are GIFs or JPEGs:

```
accept="image/gif, image/jpg"
```

The main browsers, however, currently still allow you to upload any file. A list of MIME types appears in Appendix H.

## The target Attribute

The `target` attribute is usually used with the `<a>` element to indicate which frame or browser window a new page should be loaded into. It also works with a form that generates a new page, allowing you to indicate which frame or window the page generated ends up in when the user submits the form.

## White Space and the `<form>` Element

You should also be aware that, when a browser comes across a `<form>` element it often creates extra white space around that element. This can particularly affect your design if you want a form to fit in a small area, such as putting a search form in a menu bar. If CSS will not cure this problem in the browsers you are targeting, the only way to avoid the problem is through careful placement of the `<form>` element.

To avoid the extra space created, you can try either placing the `<form>` element near the start or end of the document, or, if you are using tables for layout purposes in a Transitional XHTML 1.0 document, between the `<table>` and `<tr>` elements. (You should be aware that this latter approach is a cheat, and therefore it might cause an error if you tried to validate the page. However, most browsers will still display the table and form as you intended.)

# Form Controls

This section covers the different types of form controls that you can use to collect data from a visitor to your site. You will see:

- Text input controls
- Buttons
- Checkboxes and radio buttons
- Select boxes (sometimes referred to as drop-down menus) and list boxes
- File select boxes
- Hidden controls

## Text Inputs

You undoubtedly have come across text input boxes on many web pages. Possibly the most famous text input box is the one right in the middle of the Google home page that allows you to enter what you are searching for.

On a printed form, the equivalent of a text input is a box or line that you are allowed to write a response in or on.

## Chapter 5: Forms

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There are actually three types of text input used on forms:

- ❑ **Single-line text input controls:** Used for items that require only one line of user input, such as search boxes or e-mail addresses. They are created using the `<input>` element.
- ❑ **Password input controls:** These are just like the single-line text input, except they mask the characters a user enters so that the characters cannot be seen on the screen. They tend to either show an asterisk or a dot instead of each character the user types, so that someone cannot simply look at the screen to see what a user types in. Password input controls are mainly used for entering passwords on login forms or sensitive details such as credit card numbers. They are also created using the `<input>` element.
- ❑ **Multi-line text input controls:** Used when the user is required to give details that may be longer than a single sentence. Multi-line input controls are created with the `<textarea>` element.

### Single-Line Text Input Controls

Single-line text input controls are created using an `<input>` element whose `type` attribute has a value of `text`. Here is a basic example of a single-line text input used for a search box (`ch05_eg02.html`):

```
<form action="http://www.example.com/search.aspx" method="get" name="frmSearch">
    Search:
    <input type="text" name="txtSearch" value="Search for" size="20"
           maxlength="64" />
    <input type="submit" value="Submit" />
</form>
```

Figure 5-3 shows what this form looks like in a browser.

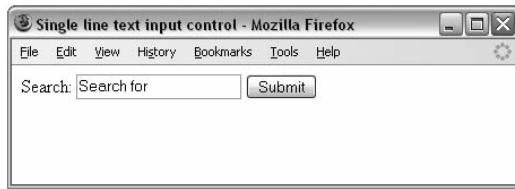


Figure 5-3

*Just as some people try to start form names with the characters frm, it is also common to start text input names with the characters txt to indicate that the form controls a text box. This is especially handy when working with the data on the server to remind you what sort of form control sent that data.*

The table that follows lists the attributes the `<input>` element can carry when creating a text input control. Note how the purpose of the `name` attribute is quite specific on this element, and different from other elements you have met already.

Attribute	Purpose
type	Indicates the type of input control you want to create. The value for this attribute should be <code>text</code> when you want to create a single-line text input control. This is required because the <code>&lt;input&gt;</code> element is also used to create other form controls such as radio buttons and checkboxes.
name	Used to give the name part of the name/value pair that is sent to the server, representing each form control and the value the user entered. Each control needs to have a name so that the associated value (supplied or chosen by the user) can be retrieved individually at the other end.
value	Provides an initial value for the text input control that the user will see when the form loads. You need to use this attribute only if you want something to be written in the text input when the page loads (such as a cue for what the user should be entering); more often you are likely to leave it blank.
size	Allows you to specify the width of the text-input control in terms of characters; the search box in the earlier example is 20 characters wide. The <code>size</code> property does not affect how many characters users can enter (they could enter 40 characters); it just indicates how many characters wide the input will be. If users enter more characters than the size of the input, they can scroll right and left using the arrow keys.
maxlength	Allows you to specify the maximum number of characters a user can enter into the text box. Usually after the maximum number of characters has been entered, even if the user keeps pressing more keys, no new characters will be added.

When an `<input>` element's `type` attribute has a value of `text`, it can also carry the following attributes:

- All of the universal attributes
- `disabled`, `readonly`, `tabindex`, and `accesskey`, which are covered later in the chapter

## Password Input Controls

If you want to collect sensitive data such as passwords and credit card information, you should use the password input. The password input masks the characters the user types on the screen by replacing them with either a dot or asterisk.

Password input controls are created almost identically to the single-line text input controls, except that the `type` attribute on the `<input>` element is given a value of `password`.

## Chapter 5: Forms

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Here you can see an example of a login form that combines a single-line text input control and a password input control (ch05\_eg03.html):

```
<form action="http://www.example.com/login.aspx" method="post">
    Username:
    <input type="text" name="txtUsername" value="" size="20" maxlength="20" />
    <br />
    Password:
    <input type="password" name="pwdPassword" value="" size="20" maxlength="20" />
    <input type="submit" value="Submit" />
</form>
```

*As you can see, it is common to start the name of any password with the characters pwd so that when you come to deal with the data on the server, you know the associated value came from a password input box.*

Figure 5-4 shows you how this login form might look in a browser when the user starts entering details.



**Figure 5-4**

*While passwords are hidden on the screen, they are still sent across the Internet as clear text. In order to make them secure you should use an SSL connection between the client and server.*

### **Multiple-Line Text Input Controls**

If you want to allow a visitor to your site to enter more than one line of text, you should create a multiple-line text input control using the `<textarea>` element.

Here is an example of a multiple-line text input used to collect feedback from visitors to a site (ch05\_eg04.html):

```
<form action="http://www.example.org/feedback.asp" method="post">
    Please tell us what you think of the site and then click submit:<br />
    <textarea name="txtFeedback" rows="20" cols="50">
        Enter your feedback here.
    </textarea>
    <br />
    <input type="submit" value="Submit" />
</form>
```

Note that the text inside the `<textarea>` element is not indented. Anything written between the opening and closing `<textarea>` tags is treated as if it were written inside a `<pre>` element, and formatting

of the source document is preserved. If the words “Enter your feedback here” were indented in the code, they would also be indented in the resulting multi-line text input on the browser.

Figure 5-5 shows what this form might look like.

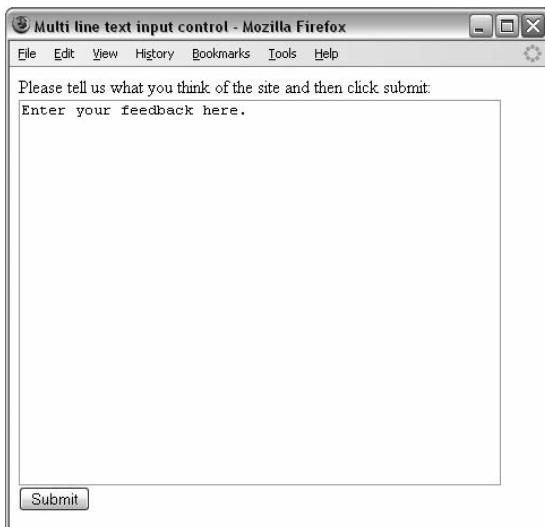


Figure 5-5

In the figure, you can see the writing between the opening `<textarea>` and closing `</textarea>` tags, which is shown in the text area when the page loads. Users can delete this text before adding their own text, and if they do not delete the text from the text box it will be sent to the server when the form is submitted. Users often just type after any text written in a `<textarea>` element, so you may choose to avoid adding anything in between the elements, but you should still have opening and closing `<textarea>` tags, or earlier browsers may not render the element correctly.

The `<textarea>` element can take the attributes shown in the table that follows.

Attribute	Purpose
<code>name</code>	The name of the control. This is used in the name/value pair that is sent to the server.
<code>rows</code>	Used to specify the size of a <code>&lt;textarea&gt;</code> , it indicates the number of rows of text a <code>&lt;textarea&gt;</code> element should have and therefore corresponds to its height.
<code>cols</code>	Used to specify the size of a <code>&lt;textarea&gt;</code> ; here it specifies the width of the box and refers to the number of columns. One column is the average width of a character.

## Chapter 5: Forms

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The `<textarea>` element can also take the following attributes:

- ❑ All of the universal attributes
- ❑ `disabled`, `readonly`, `tabindex`, and `accesskey`, which are covered later in the chapter
- ❑ The UI event attributes

By default, when a user runs out of columns in a `<textarea>`, the text is wrapped onto the next line (which means it just flows onto the next line as text in a word processor does), but the server will receive it as if it were all on one line. Because some users expect the sentences to break where they see them break on the screen, the major browsers also support an extra attribute called `wrap` that allows you to indicate how the text should be wrapped. Possible values are as follows:

- ❑ `off` (the default), which means scrollbars are added to the box if the user's words take up more space than the allowed width, and users have to scroll to see what they have entered
- ❑ `virtual`, which means that wherever the text wraps, users see it on the new line but it is transmitted to the server as if it were all on the same line unless the user has pressed the Enter key, in which case it is treated as a line break
- ❑ `physical`, which means that wherever the user sees the text start on a new line, so will the server

The `wrap` attribute is not, however, part of the XHTML specification.

## Buttons

Buttons are most commonly used to submit a form, although they are sometimes used to clear or reset a form and even to trigger client-side scripts. (For example, on a basic loan calculator form within the page, a button might be used to trigger the script that calculates repayments without sending the data to the server.) You can create a button in three ways:

- ❑ Using an `<input>` element with a `type` attribute whose value is `submit`, `reset`, or `button`
- ❑ Using an `<input>` element with a `type` attribute whose value is `image`
- ❑ Using a `<button>` element

With each different method, the button will appear slightly different.

### ***Creating Buttons Using the `<input>` Element***

When you use the `<input>` element to create a button, the type of button you create is specified using the `type` attribute. The `type` attribute can take the following values:

- ❑ `submit`, which creates a button that automatically submits a form
- ❑ `reset`, which creates a button that automatically resets form controls to their initial values
- ❑ `button`, which creates a button that is used to trigger a client-side script when the user clicks that button

Here you can see examples of all three types of button (`ch05_eg05.html`):

```
<input type="submit" name="btnVoteRed" value="Vote for reds" />
<input type="submit" name="btnVoteBlue" value="Vote for blues" />
<br /><br />
<input type="reset" value="Clear form" /> <br /><br />
<input type="button" value="calculate" onclick="calculate()" />
```

Figure 5-6 shows what these buttons might look like in Firefox on a PC (a Mac displays them in the standard Mac-style for buttons).



**Figure 5-6**

The table that follows shows the attributes used by the buttons.

Attribute	Purpose
<code>type</code>	Specifies the type of button you want and takes one of the following values: <code>submit</code> , <code>reset</code> , or <code>button</code> .
<code>name</code>	Provides a name for the button. You need to add only a <code>name</code> attribute to a button if there is more than one button on the same form (in which case it helps indicate which button was clicked). It is considered good practice, however, to use it anyway to provide an indication of what the button does.
<code>value</code>	Enables you to specify what the text on the button should read. If a <code>name</code> attribute is given, then the value of the <code>value</code> attribute is sent to the server as part of the name/value pair for this form control. If no value is given, then no name/value pair is sent for this button.
<code>size</code>	Enables you to specify the width of the button in pixels, although Firefox 2 and IE7 do not support this attribute.
<code>onclick</code>	Used to trigger a script when the user clicks the button; the value of this attribute is the script that should be run.

In the same way that you can trigger a script when the user clicks a button, you can also trigger a script when the button gains or loses focus with the `onfocus` and `onblur` event attributes.

## Chapter 5: Forms

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When an `<input>` element has a `type` attribute whose value is `submit`, `reset`, or `button`, it can also take the following attributes:

- ❑ All of the universal attributes
- ❑ `disabled`, `readonly`, `tabindex`, and `accesskey`, which are discussed later in the chapter
- ❑ The UI event attributes

If you do not use the `value` attribute on the submit button, you may find that a browser displays text that is inappropriate to the purpose of the form — for example IE displays the text `Send Query`, which is not ideal for a login button form.

### Using Images for Buttons

You can use an image for a button rather than using the standard button that a browser renders for you. Creating an image button is very similar to creating any other button, but the `type` attribute has a value of `image`:

```
<input type="image" src="submit.jpg" alt="Submit" name="btnImageMap" />
```

*Note how you can start the value of a name attribute for a button with the characters btn, in keeping with the naming convention that I mentioned earlier. (When you come to refer to the name of the form control in other code, the use of this prefix will help remind you what type of form control the information came from.)*

Because you are creating a button that has an image, you need to have two additional attributes, which are listed in the table that follows.

Attribute	Purpose
<code>src</code>	Specifies the source of the image file.
<code>alt</code>	Provides alternative text for the image. This will be displayed when the image cannot be found and also helps speech browsers. (It was first supported only in IE 5 and Netscape 6.)

If the image button has a `name` attribute, when you click it, the browser sends a `name/value` pair to the server. The name will be what you provide for the `name` attribute and the value will be a pair of *x* and *y* coordinates for where on the button the user clicked (just as you saw when dealing with server-side image maps in Chapter 3).

In Figure 5-7, you can see a graphical submit button. Both Firefox and IE change the cursor as a cue for usability when a user hovers over such a button.

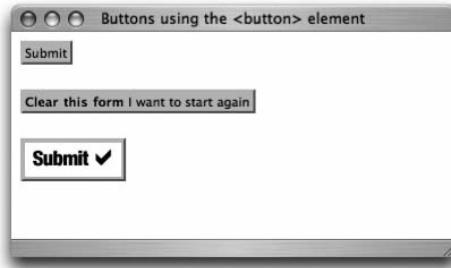


Figure 5-7

### ***Creating Buttons Using the <button> Element***

The `<button>` element is a more recent introduction that allows you to specify what appears on a button between an opening `<button>` tag and a closing `</button>` tag. So you can include textual markup or image elements between these tags.

This element was first supported in IE 4 and Netscape 6, but the browsers that do support this element also offer a relief (or 3D) effect on the button, which resembles an up or down motion when the button is clicked.

Here are some examples of using the `<button>` element (`ch06_eg06.html`):

```
<button type="submit">Submit</button>
<br /><br />
<button type="reset"><b>Clear this form</b> I want to start again</button>
<br /><br />
<button type="button"></button>
```

As you can see, the first submit button just contains text, the second reset button contains text and other markup (in the form of the `<b>` element), and the third submit button contains an `<img>` element.

Figure 5-8 shows what these buttons would look like.



Figure 5-8

## Chapter 5: Forms

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### Checkboxes

Checkboxes are just like the little boxes that you have to check on paper forms. As with light switches, they can be either on or off. When they are checked they are on and the user can simply toggle between on and off positions by clicking the checkbox.

Checkboxes can appear individually, with each having its own name, or they can appear as a group of checkboxes that share a control name and allow users to select several values for the same property.

Checkboxes are ideal form controls when you need to allow a user to:

- ❑ Provide a simple yes or no response with one control (such as accepting terms and conditions or subscribing to an e-mail list)
- ❑ Select several items from a list of possible options (such as when you want a user to indicate all of the skills they have from a given list)

A checkbox is created using the `<input>` element whose `type` attribute has a value of `checkbox`. Following is an example of some checkboxes that use the same control name (`ch05_eg07.html`):

```
<form action="http://www.example.com/cv.aspx" method="get" name="frmCV">  
Which of the following skills do you possess? Select all that apply.  
    <input type="checkbox" name="chkSkills" value="html" />HTML <br />  
    <input type="checkbox" name="chkSkills" value="xhtml" />XHTML <br />  
    <input type="checkbox" name="chkSkills" value="CSS" />CSS<br />  
    <input type="checkbox" name="chkSkills" value="JavaScript" />JavaScript<br />  
    <input type="checkbox" name="chkSkills" value="aspnet" />ASP.Net<br />  
    <input type="checkbox" name="chkSkills" value="php" />PHP  
</form>
```

To keep consistent with the naming convention we have used for form elements throughout the chapter, you can start the name of checkboxes with the letters `chk`. Figure 5-9 shows how this form might look in a browser. Note how there is a line break after each checkbox, so that it clearly appears on each line (if you have checkboxes side by side, users are likely to get confused between which label applies to which checkbox).

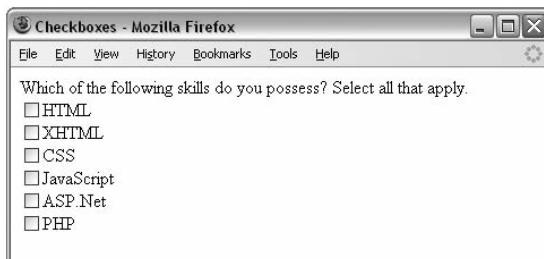


Figure 5-9

Because all of the selected skills will be sent to the processing application in the form of name/value pairs, if someone selects more than one skill there will be several name/value pairs sent to the server that all share the same name.

*How you process multiple checkboxes with the same name depends on how you send the data to the server. If you use HTTP get to send the data, then the selected checkbox will be sent as part of the URL in the query string. If you use the HTTP post method, however, then you'll get an array that you can loop through representing the checked options.*

As a contrast, here is a single checkbox, acting like a simple yes or no option:

```
<form action="http://www.example.org/accept.aspx" name="frmTandC" method="get">
    <input type="checkbox" name="chkAcceptTerms" checked="checked" />
    I accept the <a href="terms.htm">terms and conditions</a>.<br />
    <input type="submit" />
</form>
```

Note how the `<input>` element that creates this checkbox does not carry a `value` attribute. In the absence of a `value` attribute, the value is `on`. In this example, you can also see an attribute called `checked`, with a value of `checked`, which indicates that when the page loads the checkbox is selected.

*Before HTML 4.1, you could just provide the `checked` attribute without a value. This process is known as attribute minimization, and elements that carried the `checked` attribute without a value were considered to be on. In XHTML, all attributes must have a value, so the name of these attributes is repeated as their value. Older browsers might ignore the value, but they still acknowledge the presence of the attribute.*

The table that follows shows the attributes that an `<input>` element whose `type` attribute has a value of `checkbox` can carry.

Attribute	Purpose
<code>type</code>	Indicates that you want to create a checkbox.
<code>name</code>	Gives the name of the control. Several checkboxes may share the same name, but this should only happen if you want users to have the option of selecting several items from the same list — in which case, they should be placed next to each other on the form.
<code>value</code>	The value that will be sent to the server if the checkbox is selected.
<code>checked</code>	Indicates that when the page loads, the checkbox should be selected.
<code>size</code>	Indicates the size of the checkbox in pixels (this does not work in IE 7 or Firefox 2).

Checkboxes can also carry the following attributes:

- ❑ All universal attributes
- ❑ `disabled`, `readonly`, `tabindex`, and `accesskey` which are discussed later in the chapter
- ❑ UI event attributes

### Radio Buttons

Radio buttons are similar to checkboxes in that they can be either on or off, but there are two key differences:

- ❑ When you have a group of radio buttons that share the same name, only one of them can be selected. Once one radio button has been selected, if the user clicks another option, the new option is selected and the old one deselected.
- ❑ You should not use radio buttons for a single form control where the control indicates on or off because once a lone radio button has been selected it cannot be deselected again (without writing a script to do that).

Therefore, radio buttons are ideal if you want to provide users with a number of options from which they can pick only one. In such situations, an alternative is to use a drop-down select box that allows users to select only one option from several. Your decision between whether to use a select box or a group of radio buttons depends on three things:

- ❑ **Users expectations:** If your form models a paper form where users would be presented with several checkboxes, from which they can pick only one, then you should use a group of radio buttons.
- ❑ **Seeing all the options:** If users would benefit from having all the options in front of them before they pick one, you should use a group of radio buttons.
- ❑ **Space:** If you are concerned about space, a drop-down select box will take up far less space than a set of radio buttons.

*The term “radio buttons” comes from old radios. On some old radios, you could press only one button at a time to select the radio station you wanted to listen to from the ones that had been set. You could not press two of these buttons at the same time on your radio, and pressing one would pop the other out.*

The `<input>` element is again called upon to create radio buttons, and this time the `type` attribute should be given a value of `radio`. For example, here radio buttons are used to allow users to select which class of travel they want to take (`ch05_eg08.html`):

```
<form action="http://www.example.com/flights.aspx" name="frmFlightBooking"
      method="get">
    Please select which class of travel you wish to fly: <br />
    <input type="radio" name="radClass" value="First" />First class <br />
    <input type="radio" name="radClass" value="Business" />Business class <br />
    <input type="radio" name="radClass" value="Economy" />Economy class <br />
</form>
```

As you can see, the user should be allowed to select only one of the three options, so radio buttons are ideal. I start the name of a radio button with the letters `rad`. Figure 5-10 shows you what this might look like in a browser.

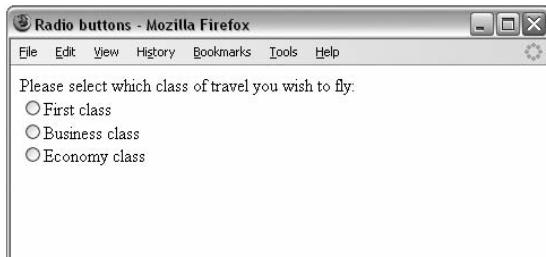


Figure 5-10

The table that follows lists the attributes for an `<input>` element whose `type` attribute has a value of `radio`.

Attribute	Purpose
<code>type</code>	To indicate that you want a radio button form control.
<code>name</code>	The name of the form control.
<code>value</code>	Used to indicate the value that will be sent to the server if this option is selected.
<code>checked</code>	Indicates that this option should be selected by default when the page loads. Remember that there is no point using this with a single radio button as a user can't deselect the option. If you use this attribute, the value should also be checked in order for the attribute to be XHTML-compliant.
<code>size</code>	This attribute indicates the size of the radio button in pixels, but this attribute does not work in IE 7 or Firefox 2.

Radio buttons can also take the following attributes:

- All of the universal attributes
- All of the UI event attributes
- `disabled`, `tabindex`, and `accesskey`, which are covered later in the chapter

*When you have a group of radio buttons that share the same name, some browsers will automatically select the first option as the page loads — even though they are not required to do so in the HTML specification. Therefore, if your radio buttons represent a set of values — say for a voting application — you might like to set a medium option to be selected by default so that, should some users forget to select one of the options, the results are not too biased by the browser's selection. To do this you should use the `checked` attribute.*

### Select Boxes

A drop-down select box allows users to select one item from a drop-down menu. Drop-down select boxes can take up far less space than a group of radio buttons.

Drop-down select boxes can also provide an alternative to single-line text input controls where you want to limit the options that a user can enter. For example, you can use a select box to allow users to indicate which country or state they live in (the advantage being that all users from the USA would have the same value, rather than potentially having people write U.S.A., U.S., United States, America, or North America — and then having to deal with different answers for the same country).

A drop-down select box is contained by a `<select>` element, while each individual option within that list is contained within an `<option>` element. For example, the following form creates a drop-down select box for the user to select a color (ch05\_eg09.html):

```
<select name="selColor">
    <option selected="selected" value="">Select color</option>
    <option value="red">Red</option>
    <option value="green">Green</option>
    <option value="blue">Blue</option>
</select>
```

As you can see here, the text between the opening `<option>` element and the closing `</option>` tags is used to display options to the user, while the value that would be sent to the server if that option is selected is given in the `value` attribute. You can also see that the first `<option>` element does not have a value and that its content is `Select color`; this is to indicate to the user that he or she must pick one of the color choices. Finally, notice again the use of the letters `sel` at the start of the name of a select box.

Figure 5-11 shows what this would look like in a browser.

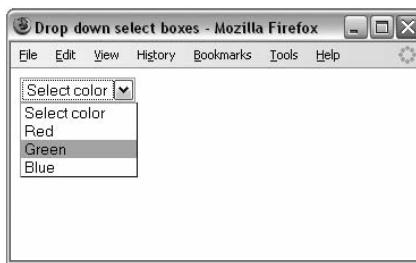


Figure 5-11

Note that the width of the select box will be the width of the longest option displayed to the user; in this case, it will be the width of the text `Select color`.

### The `<select>` Element

The `<select>` element is the containing element for a drop-down list box; it can take the following attributes.

Attribute	Purpose
name	The name for the control.
size	Can be used to present a scrolling list box, as you will see shortly. Its value would be the number of rows in the list that should be visible at the same time.
multiple	Allows a user to select multiple items from the menu. If the attribute is not present, the user may select only one item. In earlier versions of HTML, this attribute did not have a value. However, to be valid XHTML it should be given the value of <code>multiple</code> (i.e., <code>&lt;select multiple="multiple"&gt;</code> ). Note that the use of this attribute will change the presentation of the select box, as you will see in the section "Selecting Multiple Options with the multiple Attribute" later in this chapter.

The HTML and XHTML recommendations indicate that a `<select>` element *must* contain at least one `<option>` element, although in practice it should contain more than one `<option>` element. After all, a drop-down list box with just one option might confuse a user.

### **The `<option>` Element**

Inside any `<select>` element you will find at least one `<option>` element. The text between the opening `<option>` and closing `</option>` tags is displayed to the user as the label for that option. The `<option>` element can take the attributes shown in the table that follows.

Attribute	Purpose
value	The value that is sent to the server if this option is selected.
selected	Specifies that this option should be the initially selected value when the page loads. This attribute may be used on several <code>&lt;option&gt;</code> elements even if the <code>&lt;select&gt;</code> element does not carry the <code>multiple</code> attribute. Although earlier versions of XHTML did not require a value for this attribute, in order to be valid XHTML you should give this attribute a value of <code>selected</code> .
label	An alternative way of labeling options, using an attribute rather than element content. This attribute is particularly useful when using the <code>&lt;optgroup&gt;</code> element, which is covered a bit later in this chapter.

### **Creating Scrolling Select Boxes**

As I mentioned earlier, it's possible to create scrolling menus where users can see a few of the options in a select box at a time. In order to do this, you just add the `size` attribute to the `<select>` element. The value of the `size` attribute is the number of options you want to be visible at any one time.

## Chapter 5: Forms

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While scrolling select box menus are rarely used, they can give users an indication that there are several possible options open to them and allow them to see a few of the options at the same time. For example, here is a scrolling select box that allows the user to select a day of the week (ch05\_eg10.html):

```
<form action="http://www.example.org/days.aspx" name="frmDays" method="get">
    <select size="4" name="selDay">
        <option value="Mon">Monday</option>
        <option value="Tue">Tuesday</option>
        <option value="Wed">Wednesday</option>
        <option value="Thu">Thursday</option>
        <option value="Fri">Friday</option>
        <option value="Sat">Saturday</option>
        <option value="Sun">Sunday</option>
    </select>
    <br /><br /><input type="submit" value="Submit" />
</form>
```

As you can see from Figure 5-12, this clearly shows the user that he or she has several options while limiting the space taken up by showing only a few of the options.

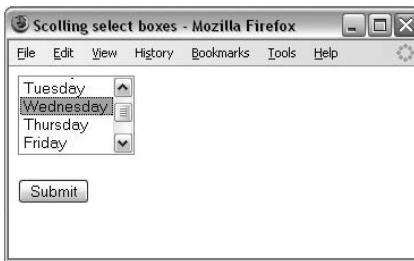


Figure 5-12

Note that the `multiple` attribute discussed in the subsection that follows is not used on this element.

### Selecting Multiple Options with the `multiple` Attribute

The `multiple` attribute allows users to select more than one item from a select box. The value of the `multiple` attribute should be the word `multiple` in order for it to be valid XHTML (although earlier versions of HTML left it without a value).

The addition of this attribute automatically makes the select box look like a scrolling select box. Here you can see an example of a multiple-item select box that allows users to select more than one day of the week (ch05\_eg11.html):

```
<form action="http://www.example.org/days.aspx" method="get" name="frmDays">
    Please select more than one day of the week:<br />
    <select name="selDays" multiple="multiple">
        <option value="Mon">Monday</option>
        <option value="Tue">Tuesday</option>
        <option value="Wed">Wednesday</option>
        <option value="Thu">Thursday</option>
```

```

<option value="Fri">Friday</option>
<option value="Sat">Saturday</option>
<option value="Sun">Sunday</option>
</select>
<br /><br /><input type="submit" value="Submit" >
</form>

```

The result is shown in Figure 5-13, where you can see that without the addition of the `size` attribute the select box is still a scrolling one.

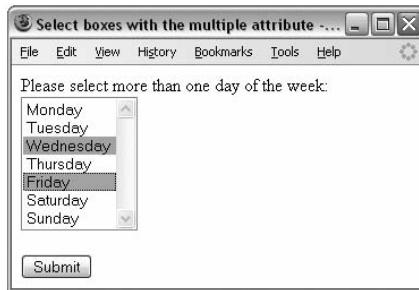


Figure 5-13

### ***Grouping Options with the <optgroup> Element***

If you have a very long list of items in a select box, you can group them together using the `<optgroup>` element, which acts just like a container element for all the elements you want within a group.

The `<optgroup>` element can carry a `label` attribute whose value is a label for that group of options. In the following example, you can see how the options are grouped in terms of type of equipment (`ch05_eg12.html`):

```

<form action="http://www.example.org/info.aspx" method="get" name="frmInfo">
    Please select the product you are interested in:<br />
    <select name="selInformation">
        <optgroup label="Hardware">
            <option value="Desktop">Desktop computers</option>
            <option value="Laptop">Laptop computers</option>
        </optgroup>
        <optgroup label="Software">
            <option value="OfficeSoftware">Office software</option>
            <option value="Games">Games</option>
        </optgroup>
        <optgroup label="Peripherals">
            <option value="Monitors">Monitors</option>
            <option value="InputDevices">Input Devices</option>
            <option value="Storage">Storage</option>
        </optgroup>
    </select>
    <br /><br /><input type="submit" value="Submit" />
</form>

```

## Chapter 5: Forms

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You will find that different browsers display `<optgroup>` elements in different ways. Figure 5-14 shows you how Safari on a Mac displays options held by `<optgroup>` elements, whereas Figure 5-15 shows you the result in Firefox on a PC.

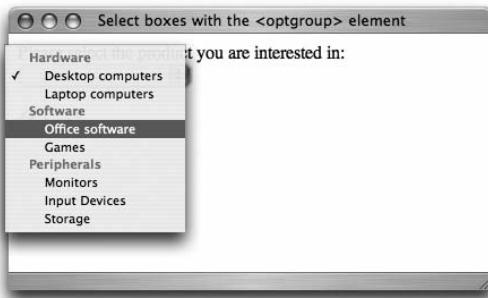


Figure 5-14

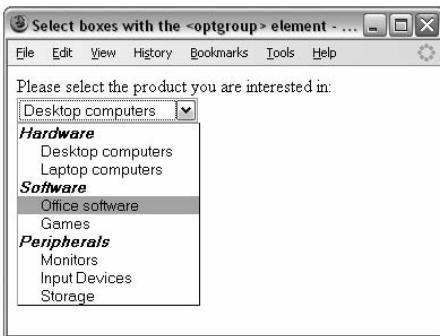


Figure 5-15

An alternative option for grouping elements is to add an `<option>` element that carries the `disabled` attribute, which you learn about shortly (ch05\_eg13.html):

```
<form action="http://www.example.org/info.aspx" method="get" name="frmInfo">
    Please select the product you are interested in:<br />
    <select name="selInformation">
        <option disabled="disabled" value=""> -- Hardware -- </option>
        <option value="Desktop">Desktop computers</option>
        <option value="Laptop">Laptop computers</option>
        <option disabled="disabled" value=""> -- Software -- </option>
        <option value="OfficeSoftware">Office software</option>
        <option value="Games">Games</option>
        <option disabled="disabled" value=""> -- Peripherals -- </option>
        <option value="Monitors">Monitors</option>
        <option value="InputDevices">Input Devices</option>
        <option value="Storage">Storage</option>
    </select>
```

```
<br /><br /><input type="submit" value="Submit" />  
</form>
```

As you will see later in the chapter, the use of the `disabled` attribute prevents a user from selecting the option that carries it. With the careful use of a couple of dashes, the option groups become more clearly defined, as you can see in Figure 5-16.

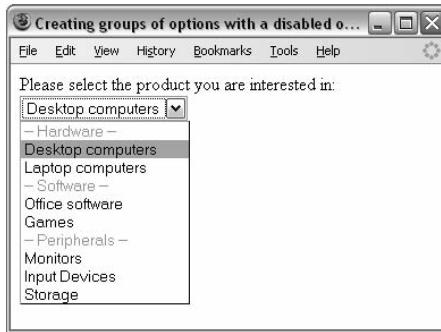


Figure 5-16

If you decide to use a select box as part of your navigation, for example, to allow users to quickly jump to a particular section of a site, you should also include a submit button or go button. Avoid the temptation to use JavaScript to automatically take the user to the relevant page once he or she has selected an option. Using JavaScript to submit the form in this case is generally seen as an example of bad usability. One of the main reasons for this is that users can select the wrong section by accident; for example, if a user tries to select options using his or her up and down arrow keys, the script will fire as soon as he or she comes across the first option. Also, some browsers might not support the script, and it would need to be thoroughly checked on different platforms and for different browsers.

## Attributes for Select Boxes

For completeness, the following is the full list of attributes that the `<select>` element can carry:

- ❑ `name`, `size`, and `multiple`, all of which you have met
- ❑ `disabled` and `tabindex`, which are covered later in the chapter
- ❑ All universal attributes
- ❑ UI event attributes

Meanwhile the `<option>` element can carry the following attributes:

- ❑ `label`, which you have already seen
- ❑ `disabled`, which you learn about later in the chapter
- ❑ All universal attributes
- ❑ UI event attributes

### File Select Boxes

If you want to allow a user to upload a file to your web site from his or her computer, you will need to use a *file upload box*, also known as a *file select box*. This is created using the `<input>` element (again), but this time you give the `type` attribute a value of `file` (`ch05_eg14`):

```
<form action="http://www.example.com/imageUpload.aspx" method="post">
    name="fromImageUpload" enctype="multipart/form-data">
    <input type="file" name="fileUpload" accept="image/*" />
    <br /><br /><input type="submit" value="Submit" />
</form>
```

When you are using a file upload box, the `method` attribute of the `<form>` element must be `post`.

There are some attributes in this example that you learned about at the beginning of the chapter.

- ❑ The `enctype` attribute has been added to the `<form>` element with a value of `multipart/form-data` so that each form control is sent separately to the server. This is required on a form that uses a file upload box.
- ❑ The `accept` attribute has been added to the `<input>` element to indicate the MIME types of the files that can be selected for upload. In this example, any image format can be uploaded, as the wildcard character (the asterisk) has been used after the `image/` portion of the MIME type. Unfortunately, this is not supported by Firefox 2 or IE 7.

In Figure 5-17 you can see that when you click the Browse button a file dialog box opens up enabling you to browse to a file and select which one you want to upload.

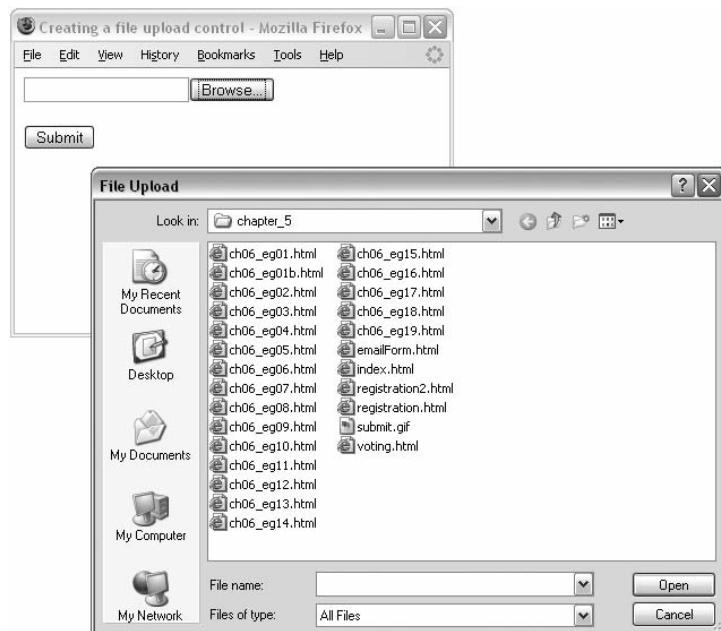


Figure 5-17

An `<input>` element whose `type` attribute has a value of `file` can take the following attributes:

- name, value, and accept, which you have already seen
- tabindex, accesskey, disabled, and readonly, which are covered later in the chapter
- All universal attributes
- UI event attributes

## Hidden Controls

Sometimes you will want to pass information between pages without the user seeing it; to do this you can use hidden form controls. It is important to note, however, that while users cannot see them in the web page displayed in the browser, if they were to look at the source code for the page they would be able to see the values in the code. Therefore, hidden controls should not be used for any sensitive information that you do not want the user to see.

*You may have come across forms on the Web that span more than one page. Long forms can be confusing; splitting them up can help a user, which means more forms will be filled out. In such cases, a web site programmer often wants to pass values that a user has entered into the first form (on one page) onto the form in the second page, and then onto a further page. Hidden elements are one way in which programmers can pass values between pages.*

You create a hidden control using the `<input>` element whose `type` attribute has a value of `hidden`. For example, the following form contains a hidden form control indicating which section of the site the user filled the form in from (`ch05_eg15.html`):

```
<form action="http://www.example.com/vote.aspx" method="get" name="fromVote">
    <input type="hidden" name="hidPageSentFrom" value="home page" />
    <input type="submit" value="Click if this is your favorite page of our
        site." />
</form>
```

For a name and value can still be sent to the server for a hidden form control, the hidden control must carry `name` and `value` attributes.

Figure 5-18 shows that the hidden form control is not shown on the page, but it is available in the source for the page.



Figure 5-18

## Chapter 5: Forms

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*As you will see in Chapter 8, you can also hide form controls using the CSS display and visibility properties.*

### Object Controls

The HTML 4.0 specification introduced the capability to use objects — embedded in an `<object>` element — as part of a form. To become successful form controls, they must appear inside the `<form>` element. For example, you may want to use an object that enables some kind of graphical interaction, and then store its value with the name of the object. However, this feature is not implemented in the main browsers at the time of writing.

#### Try It Out      Creating a Registration Form

In this example you are going to combine several of the form controls to make up a site registration form.

1. Create a new Transitional XHTML 1.0 document, with the skeleton in place. Then add a heading and introduction to what the user should be doing:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
  <title>Registration</title>
</head>
<body>
  <h2>User Registration</h2>
  <p>Please complete the following form to register with our site:</p>
</body>
</html>
```

2. The form is going to be placed in a table with two columns so that the instructions are in the left column, and the form controls are aligned in the right column. (Without this, the form controls would look uneven across the page.) This is quite a common technique in writing forms.

In the first two rows you can add text inputs for username and password, and then leave a row blank for spacing out the page:

```
<table>
  <tr>
    <td>User Name:</td>
    <td><input type="text" name="txtUserName" size="20" /></td>
  </tr>
  <tr>
    <td>Password:</td>
    <td><input type="password" name="pwdPassword" size="20" /></td>
  </tr>
  <tr>
    <td>&nbsp;</td>
```

```

<td>&nbsp;</td>
</tr>
</table>
```

- 3.** After the username and the password, add two radio buttons for the user to indicate his or her gender:

```

<tr>
    <td>Gender:</td>
    <td><input type="radio" name="radSex" value="male" />Male</td>
</tr>
<tr>
    <td></td>
    <td><input type="radio" name="radSex" value="female" />Female</td>
</tr>
<tr><td>&nbsp;</td><td>&nbsp;</td></tr>
```

- 4.** Next you want to add a select box to indicate how the user heard about the web site:

```

<tr>
    <td>How did you hear about us?:</td>
    <td>
        <select name="selReferrer">
            <option selected="selected" value="">Select answer</option>
            <option value="website">Another website</option>
            <option value="printAd">Magazine ad</option>
            <option value="friend">From a friend</option>
            <option value="other">Other</option>
        </select>
    </td>
</tr>
<tr><td>&nbsp;</td><td>&nbsp;</td></tr>
```

- 5.** The last option for the user is whether they will subscribe to the newsletter on the site, which you accomplish with a checkbox. There is also the submit button for the form:

```

<tr>
    <td>Please select this box if you wish<br /> to be added to our mailing list
        <br /><small>We will not pass on your details to any third
        party.</small></td>
    <td><input type="checkbox" name="chkMailingList" /></td>
</tr>
<tr>
    <td></td>
    <td><input type="submit" value="Register now" /></td>
</tr>
</table>
```

- 6.** Save the file as `registration.html` and open it up in your browser; it should look something like Figure 5-19.

The screenshot shows a "User Registration" form within a Mozilla Firefox window. The title bar reads "Registration - Mozilla Firefox". The main content area has a heading "User Registration" and a sub-instruction "Please complete the following form to register with our site:". There are two text input fields: "User Name:" and "Password:", both with a size of 20. A gender section follows, with "Gender:" and two radio buttons: "Male" (selected) and "Female". Below this is a dropdown menu labeled "How did you hear about us?". A checkbox section asks "Please select this box if you wish to be added to our mailing list" with the note "We will not pass on your details to any third party." A "Register now" button is at the bottom.

Figure 5-19

### How It Works

This is an example of a form that makes use of several of the form controls, and you will just concentrate on those controls here.

First, there were two text input boxes for the username and password. Because the password is sensitive information, it uses a password-type text input, which prevents anyone looking over the user's shoulder from seeing what the user is entering. Remember that the `size` attribute controls the width of the input box.

```
<tr>
  <td>User Name:</td>
  <td><input type="text" name="txtUserName" size="20" /></td>
</tr>
<tr>
  <td>Password:</td>
  <td><input type="password" name="pwdPassword" size="20" /></td>
</tr>
<tr>
```

Next, the user has two radio buttons to indicate whether the user is male or female. Both radio buttons have the same names, making the selection mutually exclusive — you can pick only one of the two radio buttons. When the user selects one option, the value of the `value` attribute on that element is sent to the server.

```
<tr>
  <td>Gender:</td>
  <td><input type="radio" name="radSex" value="male" />Male</td>
</tr>
<tr>
  <td></td>
```

```
<td><input type="radio" name="radSex" value="female" />Female</td>
</tr>
```

In the select box, the user has to choose how they heard about the site. The first option is automatically selected because it carries the `selected` attribute, which also acts as another hint to users that they must select one of the options. The value of the item selected will be sent to the server with the name `selReferrer`.

```
<select name="selReferrer">
    <option selected="selected" value="">Select answer</option>
    <option value="website">Another website</option>
    <option value="printAd">Magazine ad</option>
    <option value="friend">From a friend</option>
    <option value="other">Other</option>
</select>
```

The user is finally presented with the option to subscribe to the newsletter, using a checkbox.

```
<tr>
    <td>Please select this box if you wish<br /> to be added to our mailing list
        <br /><small>We will not pass on your details to any third
        party.</small></td>
    <td><input type="checkbox" name="chkMailingList" /></td>
</tr>
```

In order to send the form, the user must click the Register now button. The words Register now appear because they have been given as the value of the `value` attribute:

```
<tr>
    <td></td>
    <td><input type="submit" value="Register now" /></td>
</tr>
```

Now that you've seen the basics of forms, it is time to look at more advanced features that you can use to enhance your forms.

---

## Creating Labels for Controls and the `<label>` Element

When you are creating a form it is absolutely vital that you provide good labeling so that the user knows what data he or she should be entering where.

Forms can be confusing enough at the best of times; I'm sure an insurance company or tax form has left you scratching your head at some point. So unless your visitors are completely sure what information they should be providing and where that information should be, they will not be as inclined to fill in your forms.

## Chapter 5: Forms

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Some form controls, such as buttons, already have labels. For the majority of form controls, however, you will have to provide the label yourself.

For controls that do not have a label, you should use the `<label>` element. This element does not affect the form in any way other than telling users what information they should be entering (ch05\_eg16.html).

*You can see that this form has been placed inside a table; this ensures that even if the labels are of different lengths the text inputs are aligned in their own column. If a list of text inputs has different indentations, it is very hard to use.*

```
<form action="http://www.example.org/login.aspx" method="post" name="frmLogin">
  <table>
    <tr>
      <td><label for="Uname">User name</label></td>
      <td><input type="text" id="Uname" name="txtUserName" /></td>
    </tr>
    <tr>
      <td><label for="Pwd">Password</label></td>
      <td><input type="password" id="Pwd" name="pwdPassword" /></td>
    </tr>
  </table>
</form>
```

As you can see here the `<label>` element carries an attribute called `for`, which indicates the form control associated with the label. The value of the `for` attribute should be the same as the value of the `id` attribute on the corresponding form control. For example, the text box form control, where a user enters his or her username, has an `id` attribute whose value is `Uname`, and the label for this text box has a `for` attribute whose value is also `Uname`.

Figure 5-20 shows you what this login screen looks like.

The label may be positioned before or after the control. For text boxes, it is generally good practice to have the label on the left, whereas for checkboxes and radio buttons it is often easier to associate the label with the correct form control if they are on the right.

*You should have a new `<label>` element for each form control.*

Another way of using the `<label>` element is as a containing element. This kind of label is sometimes known as an *implicit label*. For example:

```
<form action="http://www.example.org/login.asp" method="post" name="frmLogin">
  <label for="Uname"><input type="text" id="Uname" name="txtUserName" /></label>
  <label for="Pwd"><input type="password" id="Pwd" name="pwdPassword" /></label>
</form>
```

The drawback with this approach is that you cannot control where the label appears in relation to the form control, and you certainly cannot have the label in a different table cell from the form control, as the markup would not nest correctly.

*In the section “Focus” later in this chapter, you’ll learn about giving form elements focus. When a label gains focus, the focus should be passed onto the associated control.*



Figure 5-20

## Structuring Your Forms with <fieldset> and <legend> Elements

Large forms can be confusing for users, so it's good practice to group together related form controls. The `<fieldset>` and `<legend>` elements do exactly this — help you group controls.

Both elements were introduced in IE 4 and Netscape 6; however, older browsers will just ignore these elements, so you are safe to include them in all your forms.

- ❑ The `<fieldset>` element creates a border around the group of form controls to show that they are related.
- ❑ The `<legend>` element allows you to specify a caption for the `<fieldset>` element, which acts as a title for the group of form controls. When used, the `<legend>` element should always be the first child of the `<fieldset>` element.

In the following example, you can see how a form has been divided into four sections: contact information, competition question, tiebreaker question, and enter the competition (`ch05_eg17.html`).

```
<form action="http://www.example.org/competition.asp" method="post" name="frmComp">
  <fieldset>
    <legend><em>Contact Information</em></legend>
    <label>First name: <input type="text" name="txtFName" size="20" /></label><br />
    <label>Last name: <input type="text" name="txtLName" size="20" /></label><br />
    <label>E-mail: <input type="text" name="txtEmail" size="20" /></label><br />
  </fieldset>
  <fieldset>
    <legend><em>Competition Question</em></legend>
    How tall is the Eiffel Tower in Paris, France? <br />
    <label><input type="radio" name="radAnswer" value="584" />
      584ft</label><br />
    <label><input type="radio" name="radAnswer" value="784" />
      784ft</label><br />
    <label><input type="radio" name="radAnswer" value="984" />
      984ft</label><br />
    <label><input type="radio" name="radAnswer" value="1184" />
      1184ft</label><br />
  </fieldset>
  <fieldset>
    <legend><em>Tiebreaker Question</em></legend>
```

## Chapter 5: Forms

```
<label>In 25 words or less, say why you would like to win $10,000:  
    <textarea name="txtTiebreaker" rows="10" cols="40"></textarea>  
</label>  
</fieldset>  
<fieldset>  
    <legend><em>Enter competition</em></legend>  
        <input type="submit" value="Enter Competition" />  
</fieldset>  
</form>
```

You can see how the `<fieldset>` elements create borders around the groups of form controls, and how the `<legend>` elements are used to title the groups of controls. Remember that the `<legend>` element must be the first child of the `<fieldset>` element when it is used. See Figure 5-21.

The screenshot shows a web browser window with the title "Organizing Elements With <fieldset> and <legend>Elements ...". The window contains a form with three distinct sections, each enclosed in a `<fieldset>` element:

- Contact Information**: This section contains three text input fields: "First name:", "Last name:", and "E-mail:".
- Competition Question**: This section contains a legend "Competition Question" followed by a question "How tall is the Eiffel Tower in Paris, France?" and four radio button options: 584 ft, 784 ft, 984 ft, and 1184 ft.
- Tiebreaker Question**: This section contains a legend "Tiebreaker Question" followed by a text area with the placeholder "In 25 words or less, say why you would like to win \$10,000:" and a submit button labeled "Enter Competition".

Figure 5-21

The `<fieldset>` element can take the following attributes:

- All the universal attributes
- The basic event attributes

*Note that if you use a table to format your form, the `<table>` element must appear inside the `<fieldset>` element. If a `<fieldset>` resides within a table that is used to format the page, then the entire fieldset must reside within the same cell.*

The `<legend>` element can take the following attributes:

- `accesskey`, which you will learn about in the next section
- `align` (which is deprecated — you should use CSS positioning instead)
- All of the universal attributes
- UI event attributes

## Focus

When a web page featuring several links or several form controls loads, you might have noticed that you are able to use your Tab key to move between those elements (or Shift+Tab to move backward through elements). As you move between them, the web browser tends to add some form of border or highlighting to that element (be it a link or a form control). This is known as *focus*.

From what you have learned already about XHTML, you know that not every element in the document receives this focus. In fact, it is only the elements that a user can interact with, such as links and form controls, that can receive focus. Indeed, if a user is expected to interact with an element, that element *must* be able to receive focus.

An element can gain focus in three ways:

- An element can be selected using a pointing device such as a mouse or trackball.
- The elements can be navigated between using the keyboard — often using the Tab key (or Shift+Tab to move backward through elements). The elements in some documents can be given a fixed *tabbing order*, indicating the order in which elements gain focus.
- You can use a system such as a keyboard shortcut known as an *access key* to select a particular element. For example, on a PC you would likely press the Alt key plus an access key (such as Alt+E), whereas on a Mac you would press the Control key with an access key (such as Control+E).

## Tabbing Order

If you want to control the order in which elements can gain focus, you can use the `tabindex` attribute to give that element a number between 0 and 32767, which forms part of the tabbing order. Every time the user presses the Tab key, the focus moves to the element with the next highest tabbing order (and again, Shift+Tab moves focus in reverse order).

The following elements can carry a `tabindex` attribute:

```
<a> <area> <button> <input> <object> <select> <textarea>
```

The `tabindex` attribute was first supported in Netscape 6 and IE 4, but older browsers just ignore this attribute, so it is safe to use it in all documents.

After a user has tabbed through all elements in a document that can gain focus, then focus may be given to browser features (most commonly the address bar).

## Chapter 5: Forms

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To demonstrate how tabbing order works, the following example gives focus to the checkboxes in a different order than you might expect (ch05\_eg18.html):

```
<form action="http://www.example.com/tapping.asp" method="get"
      name="frmTabExample">
  <input type="checkbox" name="chkNumber" value="1" tabindex="3" /> One<br />
  <input type="checkbox" name="chkNumber" value="2" tabindex="7" /> Two<br />
  <input type="checkbox" name="chkNumber" value="3" tabindex="4" /> Three<br />
  <input type="checkbox" name="chkNumber" value="4" tabindex="1" /> Four<br />
  <input type="checkbox" name="chkNumber" value="5" tabindex="9" /> Five<br />
  <input type="checkbox" name="chkNumber" value="6" tabindex="6" /> Six<br />
  <input type="checkbox" name="chkNumber" value="7" tabindex="10" /> Seven <br />
  <input type="checkbox" name="chkNumber" value="8" tabindex="2" /> Eight<br />
  <input type="checkbox" name="chkNumber" value="9" tabindex="8" /> Nine<br />
  <input type="checkbox" name="chkNumber" value="10" tabindex="5" /> Ten<br />
  <input type="submit" value="Submit" />
</form>
```

In this example, the checkboxes receive focus in the following order:

4, 8, 1, 3, 10, 6, 2, 9, 5, 7

Figure 5-22 shows how Firefox 2 for PC will, by default, give a yellow outline to form elements as they gain focus (other browsers give different outlines — Internet Explorer uses blue lines). I have zoomed in on the item in focus so you can see it in closer detail.

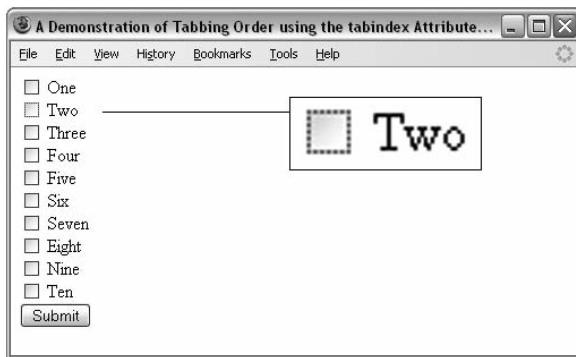


Figure 5-22

You should always start your tabindex values with 1 or higher, rather than 0, because elements that could gain focus but do not have a tabindex attribute are given a value of 0 and are navigated in the order in which they appear after those with a tabindex have been cycled through. If two elements have the same value for a tabindex attribute, they will be navigated in the order in which they appear in the document.

*Note that if an element is disabled, it cannot gain focus and does not participate in the tabbing order.*

## Access Keys

*Access keys* act just like keyboard shortcuts. The access key is a single character from the document's character set that is expected to appear on the user's keyboard. When this key is used in conjunction with another key (such as Alt on Windows and Control on an Apple), the browser automatically goes to that section (exactly which key must be used in conjunction with the access key depends upon the operating system and browser).

The access key is defined using the `accesskey` attribute. The value of this attribute is the character (and key on the keyboard) you want the user to be able to press (in conjunction with the other key that is dependent upon the operating system and browser).

The following elements can carry an access key attribute:

```
<a> <area> <button> <input> <label> <legend> <textarea>
```

The `accesskey` attribute was first supported in Netscape 6 and IE 4, but older browsers just ignore these attributes, so it is safe to use them in all documents.

To see how access keys work, you can revisit the example of a competition form (`ch05_eg17.html`), which was covered in the section "Structuring Your Forms with `<fieldset>` and `<legend>` Elements" earlier in this chapter. Now the `accesskey` attributes can be added to the `<legend>` elements:

```
<legend accesskey="c"><u>C</u>ontact Information (ALT + C)</legend>
<legend>Competition Question</legend>
<legend accesskey="t"><u>T</u>iebreaker Question (ALT + T)</legend>
<legend>Enter competition</legend>
```

The new version of this file is `ch05_eg19.html` in the download code. (Extra `<br />` elements have been added to show how the screen scrolls to the appropriate section when an access key is used.) As a hint to users that they can use the access keys as shortcuts, information has also been added to the information in the `<legend>` element in two ways:

- In brackets after the title
- By underlining the access key itself

Figure 5-23 shows how this updated example looks in a browser.

The effect of an access key being used depends upon the element that it is used with. With `<legend>` elements, such as those shown previously, the browser scrolls to that part of the page automatically and gives focus to the first form control in the section. When used with form controls, those elements gain focus. As soon as the element gains focus, the user should be able to interact with it (either by typing in text controls or pressing the Enter or Return key with other form controls).

When using letters a–z, it does not matter whether you specify an uppercase or lowercase access key, although strictly speaking it should be lowercase.

The screenshot shows a web browser window with the title "Organizing Elements With <fieldset> and <legend> Elements". The page displays a form with the following structure:

- Contact Information (ALT + C)**:
  - First name: [Text input field]
  - Last name: [Text input field]
  - Email: [Text input field]
- Competition Question**:

How tall is the Eiffel Tower in Paris, France?

  - 584 ft
  - 784 ft
  - 984 ft
  - 1184 ft
- Tiebreaker Question (ALT + T)**:

In 25 words or less, say why you would like to win \$10,000:
- Enter competition**:

Figure 5-23

## Disabled and Read-Only Controls

Throughout the chapter you have seen that several of the elements can carry attributes called `disabled` and `readonly`:

- ❑ The `readonly` attribute prevents users from changing the value of the form control themselves, although it may be modified by a script. A name/value pair of a `readonly` control *will* be sent to the server. Its value should be `readonly`.
- ❑ The `disabled` attribute disables the form control so that users cannot alter it. A script can be used to re-enable the control, but unless a control is re-enabled, the name/value pair will not be sent to the server. Its value should be `disabled`.

The `readonly` and `disabled` attributes were implemented in Netscape 6 and IE 5, although older browsers ignore them, so you can add these attributes to all documents. You should be aware, however, that because older browsers ignore these attributes, users with older browsers would still be able to interact with form controls that have `readonly` or `disabled` attributes.

A `readonly` control is particularly helpful when you want to stop visitors from changing a part of the form, perhaps because it cannot change (such as in the case of terms and conditions) or because you want to indicate to a user something that they have already said, or when. You often see `readonly` controls for user agreements and in the body of e-mail forms that allow you to e-mail a web page to a friend.

The `disabled` attribute is particularly helpful when preventing users from interacting with a control until they have done something else. For example, you might use a script to disable a submit button until all of the form fields contain a value.

The following table indicates which form controls work with the `readonly` and `disabled` attributes.

Element	<code>readonly</code>	<code>disabled</code>
<code>&lt;textarea&gt;</code>	Yes	Yes
<code>&lt;input type="text" /&gt;</code>	Yes	Yes
<code>&lt;input type="checkbox" /&gt;</code>	No	Yes
<code>&lt;input type="radio" /&gt;</code>	No	Yes
<code>&lt;input type="submit" /&gt;</code>	No	Yes
<code>&lt;input type="reset" /&gt;</code>	No	Yes
<code>&lt;input type="button" /&gt;</code>	No	Yes
<code>&lt;select&gt;</code>	No	Yes
<code>&lt;option&gt;</code>	No	Yes
<code>&lt;button&gt;</code>	No	Yes

The following table indicates the main differences between the `readonly` and `disabled` attributes.

Attribute	<code>readonly</code>	<code>disabled</code>
Can be modified	Yes by script, not by user	Not while disabled
Will be sent to server	Yes	Not while disabled
Will receive focus	Yes	No
Included in tabbing order	Yes	No

# Sending Form Data to the Server

You've already learned about the submit button, which the user presses to initiate the sending of form data to the server, but this book has not yet covered the difference between the HTTP get and HTTP post methods. You might remember that you can specify which of these two methods is used by adding the `method` attribute to the `<form>` element — just as all of the examples in this chapter have done.

The `method` attribute can take one of two values, either `get` or `post`, corresponding to the HTTP methods used to send the form data. If the `<form>` element does not carry a `method` attribute, then by default the `get` method will be used. If you are using a file upload form control, you must choose the `post` method (and you must set the `enctype` attribute to have a value of `multipart/form-data`).

## HTTP get

When you send form data to the server using the HTTP `get` method, the form data is appended to the URL specified in the `action` attribute of the `<form>` element.

The form data is separated from the URL using a question mark. Following the question mark you get the name/value pairs for each form control. Each name/value pair is separated by an ampersand (`&`).

For example, take the following login form, which you saw when the password form control was introduced:

```
<form action="http://www.example.com/login.aspx" method="get">
    Username:
    <input type="text" name="txtUsername" value="" size="20" maxlength="20"><br />
    Password:
    <input type="password" name="pwdPassword" value="" size="20" maxlength="20">
    <input type="submit" />
</form>
```

When you click the submit button, your username and password are appended to the URL `http://www.example.com/login.aspx` like so in what is known as the *query string*:

`http://www.example.com/login.aspx?txtUsername=Bob&pwdPassword=LetMeIn`

Note that, when a browser requests a URL with any spaces or unsafe characters (such as `/`, `\`, `=`, `&`, and `+`, which have special meanings in URL), they are replaced with a hex code to represent that character. This is done automatically by the browser, and is known as *URL encoding*. When the data reaches the server, the server will usually un-encode the special characters automatically.

One of the great advantages of passing form data in a URL is that it can be bookmarked. If you look at searches performed on major search engines such as Google, they tend to use the `get` method so that the page can be bookmarked.

The `get` method, however, has some disadvantages. Indeed, when sending sensitive data such as the password shown here, or credit card details, you should not use the `get` method because the sensitive data becomes part of the URL and is in full view to everyone (and could be bookmarked).

You should not use the HTTP `get` method when:

- You are updating a data source such as a database or spreadsheet (because someone could make up URLs that would alter your data source).
- You are dealing with sensitive information, such as passwords or credit card details (because the sensitive form data would be visible as part of a URL).
- You have large amounts of data (because older browsers do not allow URLs to exceed more than 1,024 characters — although the recent versions of the main browsers do not have limits).
- Your form contains a file upload control (because uploaded files cannot be passed in the URL).
- Your users might enter non-ASCII characters such as Hebrew or Cyrillic characters.

In these circumstances, you should use the HTTP `post` method.

## **HTTP post**

When you send data from a form to the server using the HTTP `post` method, the form data is sent transparently in what is known as the *HTTP headers*. While you do not see these headers, they are sent in clear text and cannot be relied upon to be secure (unless you are sending data under a *Secure Sockets Layer*, or *SSL*).

If the login form you just saw was sent using the `post` method, it could look something like this in the HTTP headers:

```
User-agent: MSIE 5.5
Content-Type: application/x-www-form-urlencoded
Content-length: 35
...other headers go here...
txtUserName=Bob&pwdPassword=LetMeIn
```

Note that the last line is the form data, and that it is in exactly the same format as the data after the question mark in the `get` method — it would also be URL — encoded if it contained spaces or any characters reserved for use in URLs.

There is nothing to stop you using the `post` method to send form data to a page that also contains a query string. For example, you might have one page to handle users that want to subscribe to or unsubscribe from a newsletter, and you might choose to indicate whether a user wanted to subscribe or unsubscribe in the query string. Meanwhile, you might want to send their actual contact details in a form that uses the `post` method because you are updating a data source. In this case, you could use the following `<form>` element:

```
<form action="http://www.example.com/newsletter.asp?action=subscribe"
      method="post">
```

The only issue with using the HTTP `post` method is that the information the user entered on the form cannot be bookmarked in the same way it can when it is contained in the URL. So you cannot use it to retrieve a page that was generated using specific form data as you can when you bookmark a page generated by most search engines, but it is good for security reasons.

## Chapter 5: Forms

### Try It Out    The Registration Form Revisited

It is time to revisit the registration form from the earlier Try It Out section in this chapter. This time you add some more fields into it, and make it more usable.

1. Open the file `registration.html` that you made earlier in the chapter and save it as `registration2.html` so that you have a different copy to work with.
2. You should create `<label>` elements for all of the form controls. This involves putting the instructions for that control inside a `<label>` element. This element should carry the `for` attribute, whose value is the value of the `id` attribute on the corresponding form control, like this one:

```
<tr>
    <td><label for="userName">User name:</label></td>
    <td><input type="text" name="txtUserName" size="20" id="username" /></td>
</tr>
```

3. You have to label the two radio buttons individually:

```
<tr>
    <td>Gender:</td>
    <td><input type="radio" name="radSex" value="male" id="male" />
        <label for="male">Male</label></td>
    </td>
<tr>
    <td></td>
    <td><input type="radio" name="radSex" value="female" id="female" />
        <label for="female">Female</label></td>
    </td>
</tr>
```

If you remember the last chapter's discussion of table linearization for screen readers, then this should work fine for most users. If, however, another column were to the right with unrelated information (such as ads) this could confuse readers, so the table for the form controls should hold only the controls and their labels.

4. Next you are going to add four new text boxes after the username and password. The first text input will be to confirm the password and then there will be an empty row. This will be followed by two text inputs: one for the user's first name and one for the user's last name. Then there will be another empty row, followed by an input for the user's e-mail address:

```
<tr>
    <td><label for="confPwd">Confirm Password:</label></td>
    <td><input type="password" name="pwdPasswordConf" size="20"
        id="confPassword" /></td>
</tr>
<tr><td>&nbsp;</td><td>&nbsp;</td></tr>
<tr>
```

```

<td><label for="firstName">First name:</label></td>
<td><input type="text" name="txtFirstName" size="20" id="firstName" /></td>
</tr>
<tr>
    <td><label for="lastName">Last name:</label></td>
    <td><input type="text" name="txtLastName" size="20" id="lastName" /></td>
</tr>
<tr><td>&nbsp;</td><td>&nbsp;</td></tr>
<tr>
    <td><label for="email">Email address:</label></td>
    <td><input type="text" name="txtEmail" size="20" id="email" /></td>
</tr>

```

5. Now it is time to split the form into two sections using the `<fieldset>` element. The first section will indicate that it is for information about the user (containing username, password, name, e-mail, and gender details). The second section is for information about the company (how the user found the site and if they want to be on the mailing list).

Both `<fieldset>` elements will carry access keys. Here is the `<fieldset>` element for the second section of the form:

```

<fieldset>
    <legend accesskey="u">About <u>U</u>s (ALT + U)</legend>
    <table>
        <tr>
            <td><label for="referrer">How did you hear about us?</label></td>
            <td>
                <select name="selReferrer" id="referrer">
                    <option selected="selected" value="">Select answer</option>
                    <option value="website">Another website</option>
                    <option value="printAd">Magazine ad</option>
                    <option value="friend">From a friend</option>
                    <option value="other">Other</option>
                </select>
            </td>
        </tr>
        <tr><td>&nbsp;</td><td>&nbsp;</td></tr>
        <tr>
            <td><label for="mailList">Please select this box if you wish<br /> to be
                added to our mailing list
                <br /><small>We will not pass on your details to any third
                party.</small></label></td>
            <td><input type="checkbox" name="chkMailingList" id="mailList" /></td>
        </tr>
    </table>
</fieldset>

```

This extended registration form is now a lot more usable. If you save the file again and open it in your browser, you should find something that resembles Figure 5-24.

## Chapter 5: Forms

---

Please complete the following form to register with our site:

About You (ALT + Y)

User name:

Password:

Confirm Password:

First name:

Last name:

Email address:

Gender:  Male  
 Female

About Us (ALT + U)

How did you hear about us?:

Please select this box if you wish  
to be added to our mailing list   
We will not pass on your details to any third party.

Figure 5-24

### How It Works

You should be familiar with most of what is going on here, but let's just address a few key points.

- ❑ The form has been divided up into sections using the `<fieldset>` element. This added structure makes it easier to use the form, as the user knows what section he or she is in.
- ❑ The `accesskey` attributes, which provide keyboard shortcuts, are particularly helpful if you are creating long forms, so that users can immediately go to the relevant section. In reality, the `accesskey` attributes are more likely to be of use when creating a site that people will use frequently, rather than a form that users will use only a few times. Users tend to use the shortcuts only if they are familiar with the form already and want to skip between the sections.
- ❑ As you will see in Chapter 10, if you are creating a particularly long form, it may be a good idea to split the form up into several pages.
- ❑ The `<label>` elements are of particular help to those who use screen readers. It ensures that the users know what they are supposed to be entering into which form control.
- ❑ When splitting up your page using the `<fieldset>` element, make sure that your elements nest correctly. You cannot just place `<fieldset>` elements between rows of a table.

## Summary

This chapter has introduced you to the world of creating online forms, which are a vital part of many sites. In most cases when you want or need to directly collect information from a visitor to your site you will use a form, and you have seen several different examples of forms in this chapter.

From simple search boxes and login pages to complex online order forms and registration processes, forms are a vital part of web design.

You have learned how a form lives inside a `<form>` element and that inside a form there are one or more form controls. You have seen how the `<input>` element can be used to create several kinds of form controls, namely single-line text input controls, checkboxes, radio buttons, file upload boxes, buttons, and hidden form controls. There are also the `<textarea>` elements for creating multiple line text inputs and the `<select>` and `<option>` elements for creating select boxes.

Once you have created a form with its form controls, you need to ensure that each element is labeled properly so that users know what information they should enter or which selection they will be making. You can also organize larger forms using the `<fieldset>` and `<label>` elements and aid navigation with `tabindex` and `accesskey` attributes.

Finally, you learned when you should use the HTTP `get` or `post` methods to send form data to the server.

Next, it is time to look at the last of our core XHTML chapters, which covers framesets. You will see more about form design in Chapter 12, which covers some design issues that will make your forms easier to understand.

## Exercises

The answers to all of the exercises are in Appendix A.

1. Create an e-mail feedback form that looks like the one shown in Figure 5-25.

The screenshot shows a Mozilla Firefox window with the title bar "Reply to ad - Mozilla Firefox". The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The main content area has a heading "Reply to ad" and the sub-instruction "Use the following form to respond to the ad:". Below this, there are three text input fields: "To" containing "Star seller", "Your email" (empty), and "Subject" (empty). Below these is a large text area labeled "Body". At the bottom is a "Send email" button.

Figure 5-25

## Chapter 5: Forms

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Note that the first text box is a `readonly` text box so that the user cannot alter the name of the person the mail is being sent to.

2. Create a voting or ranking form that looks like the one shown in Figure 5-26.

The screenshot shows a Mozilla Firefox browser window with the title bar "Voting - Mozilla Firefox". The menu bar includes "File", "Edit", "View", "History", "Bookmarks", "Tools", and "Help". The main content area has a heading "Register your opinion". Below it is a question: "How well do you rate the information on this site (where 1 is very poor, and 5 is very good)?". Underneath the question is a horizontal row of five radio buttons labeled 1 through 5. Below each number is a descriptive word: "Very Poor", "Poor", "Average", "Good", and "Very Good". At the bottom of the form is a "Vote now" button.

Figure 5-26

```
<head>
```

Note that the following `<style>` element was added to the `<head>` of the document to make each column of the table the same fixed width, with text aligned in the center (you'll see more about this in Chapter 7).

```
<title>Voting</title>
<style type="text/css">td {width:100; text-align:center;}</style>
</head>
```

# 6

## Frames

*Frames* divide a browser window into several separate pieces or panes, each pane containing a separate XHTML page. One of the key advantages that frames offer is that you can then load and reload single panes without having to reload the entire contents of the browser window. A collection of frames in the browser window is known as a *frameset*.

The window is divided into frames much as tables are organized: into rows and columns (although they are usually relatively basic in structure). The simplest of framesets might just divide the screen into two rows, whereas a complex frameset could use several rows and columns.

In this chapter you learn the following:

- How to create a frameset document with multiple frames
- How to create inline frames (or iframes), which are single windows that sit within another page
- How to deal with users whose browsers cannot use frames

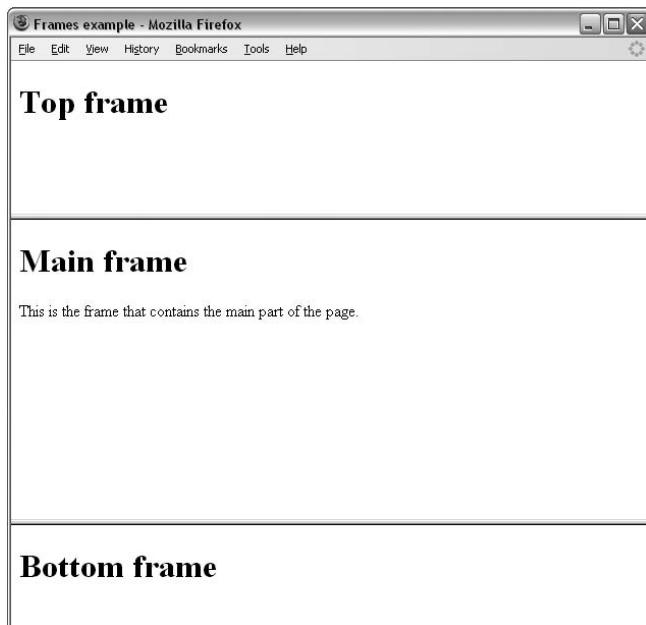
I should warn you early on that there are actually very few cases in which I would consider using frames, although this is a matter of preference and I explain my reasons why in the second section of this chapter — after a simple example that helps you understand what frames really are.

## Introducing the Frameset

To help you understand frames, Figure 6-1 shows you a frameset document in a browser. This frameset divides the page into three parts, and each separate part of the page is a separate XHTML document.

## Chapter 6: Frames

---



**Figure 6-1**

You may remember from Chapter 1 that, when writing a frameset document, you use a different DOCTYPE declaration. This is because frameset documents use a few elements in different ways than other XHTML documents.

To create a frameset document, first you need the `<frameset>` element, which is used instead of the `<body>` element. The frameset defines the rows and columns your page is divided into. Each frame is then represented by a `<frame>` element.

You also need to learn the `<noframes>` element, which provides a message for users whose browsers do not support frames.

To get a better idea of how frames work, here is the code for the frameset shown previously in Figure 6-1 (`ch06_eg01.html`):

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Frameset//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-frameset.dtd">
<html>
<head>
  <title>Frames example</title>
</head>
<frameset rows="150, *, 100">
  <frame src="top_frame.html" />
```

```
<frame src="main_frame.html" />
<frame src="bottom_frame.html" />
<noframes><body>
    This site uses a technology called frames. Unfortunately, your
    browser does not support this technology. Please Please upgrade
    your browser and visit us again!
</body></noframes>
</frameset>
</html>
```

In practical terms, the new DOCTYPE declaration does little more than allow you to use these frame-related elements.

You already know that there is no `<body>` element as it has been replaced with the `<frameset>` element; also, there should be no markup between the closing `</head>` tag and the opening `<frameset>` tag, other than a comment if you want to include one.

As you will see shortly, the `<frameset>` element must carry the two attributes `rows` and `cols`, which specify the number of rows and columns that make up the frameset. In our example there are just three rows, the first being 150 pixels high, the third just 100 pixels high, and the second taking up the rest of the page (the asterisk is used to indicate that the remaining part of the page should be used in this place).

```
<frameset rows="150, *, 100">
```

Inside the `<frameset>` element are the empty `<frames />` elements. The `<frames />` elements indicate a URL of the document that will be loaded into that frame; the URL is specified using the `src` attribute (this is very similar to the way an image file is specified in an `<img />` element). There is also a `<noframes>` element whose contents will be displayed if the user's browser does not support frames.

Three separate documents are displayed in the one browser window in this example:

- `top_frame.html`
- `main_frame.html`
- `bottom_frame.html`

You should be able to see which part of the window each of these pages corresponds to fairly easily in Figure 6-1, shown previously.

To see you another idea of how frames can work, look at Figure 6-2, which shows a page that uses horizontal and vertical frames. (This shows the similarity between the way in which simple tables are sometimes used to divide up pages and how frames can be used.)

*Even though Netscape has supported frames since version 2, and IE introduced them in version 3, frames didn't make it into HTML until version 4.0.*

Now that you have a good idea of how a frameset document appears, before you take a closer look at the syntax, let's just have a look at when you might want to use frames.

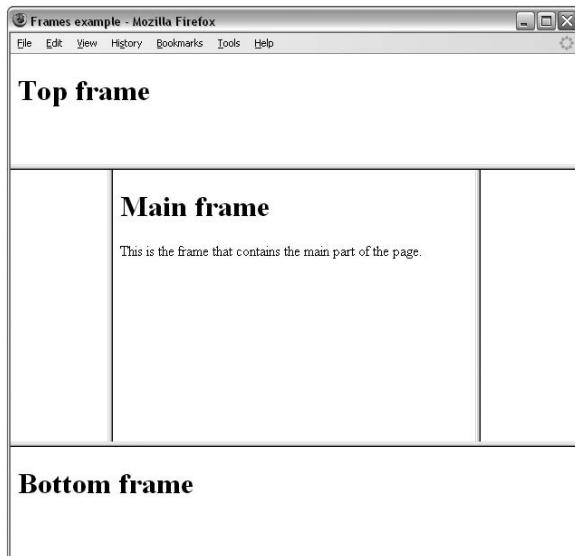


Figure 6-2

## When to Use Frames

It is quite rare to see frames in use these days. Personally, there are very few circumstances in which I would suggest that you use frames in a page. The cases in which I think frames are useful include:

- ❑ When you want to display a lot of content in one single page and you cannot split the document into separate pages, then a frame might be of use to create a navigation bar that links to the subsections of the long document.
- ❑ When you have a lot of data in one part of the page that you do not want the user to have to reload while another part of the page changes. Examples might include a photography site where you have lots of thumbnails in one frame, and the main picture in another. Rather than reloading the thumbnails each time if a visitor wants to look at a new main picture, you can just reload the main picture.

As you have seen in the first example, for each frame you have in a layout, you need to have a file that acts as its content (each frame is essentially its own web page), so the number of files in your site quickly grows. You therefore need to be particularly careful with your file structure so that you do not get lost in a sea of extra files.

A couple of other drawbacks you should be aware of with frames are as follows:

- ❑ Search engines often link to the content of individual frames rather than the frameset (or group of frames) that the user sees (and you have to use JavaScript in each frame to reload the frameset if a visitor lands on an individual frame).
- ❑ Some browsers do not print well from framesets (and will just print one frame at a time).
- ❑ The browser's Back button might not work as the user expects.

- ❑ Some smaller devices cannot cope with frames, often because their screen is not big enough to be divided up.
- ❑ It can be hard to achieve a nice layout because users with a lower resolution monitor than the designer can end up seeing only a portion of what you intend them to see, while users with a higher resolution monitor than the designer may end up with large gaps around the edges of the frames.
- ❑ If you have a navigation frame loading different pages into a “main frame,” it is hard to create a navigation bar that tells users which page they are on (because the other frame loads the new page without telling the navigation bar).

I should also mention that when a web developer wants to create a page where only part of the page is refreshed (rather than the whole page), it is becoming increasingly common to use a technique referred to as AJAX (Asynchronous JavaScript and XML).

While you know my opinion on frames, if you think their advantages outweigh the disadvantages, then you should use them. So let’s take a look at the syntax for using frames in a little more detail.

## The <frameset> Element

The <frameset> element replaces the <body> element in frameset documents. It is the attributes of the <frameset> element that specify how the browser window will be divided up into rows and columns. These attributes are as follows:

- ❑ `cols` specifies how many columns are in the frameset.
- ❑ `rows` specifies how many rows are in the frameset.

The <frameset> element contains a <frame> element for each frame of the document (or each cell of the grid constructed by the <frameset> element) and a <noframes> element to indicate what should be displayed if the user’s browser does not load frames.

In addition to the `rows` and `cols` attributes, the frameset element can also take the following attributes:

```
class id onload onunload rows style title
```

Most browsers also support the following well-used attributes (some of which are covered here because of their popularity). They are not, however, part of the W3C recommendation.

```
onblur onfocus border bordercolor frameborder framespacing
```

## The `cols` Attribute

The `cols` attribute specifies how many columns are contained in the frameset and the size of each column. You have to provide a value to indicate the width for each of the columns in your frameset, and the number of values you provide (each separated by a comma) indicates how many columns there are in the document. For example, here there are three columns: the first takes up 20 percent of the width of the browser window, the second takes up 60 percent, and the third takes the last 20 percent:

```
cols="20%, 60%, 20%"
```

## Chapter 6: Frames

---

Because there are three values, the browser knows that there should be three columns.

You can specify the width of each column in one of four ways:

- Absolute values in pixels
- A percentage of the browser window (or parent frame if you have one frameset sit inside another — which is known as a nested frame)
- Using a wildcard symbol
- As relative widths of the browser window (or parent frame)

You can mix and match these different ways of specifying column widths, but note the precedence they take (discussed after the four methods).

If you do not specify a `cols` attribute, then the default value is 100 percent, so if you do not specify a `cols` attribute, then there will be one column that takes up 100 percent of the width of the browser.

### **Absolute Values in Pixels**

To specify the width of a column in pixels, you just use a number. (You do not need to use `px` or any other characters after the number.) For example, here are three columns: the first is 100 pixels, the second is 500 pixels, and the third takes up the remainder of the page (using the wildcard symbol `*`).

```
cols="100, 500, *"
```

If you use absolute values only, and the width of the window is less or more than the specified values, then the browser will adjust the width of each column in proportion to the width of the browser window. So, if you want three columns of 100 pixels, you might specify it like this:

```
cols="100, 100, 100"
```

However, if the browser window were 600 pixels wide, you would end up with three columns of 200 pixels. Therefore if you really want to specify fixed absolute widths that won't grow, use a wildcard character after the third column and either make the content of the fourth frame blank or do not include a `<frame />` element for it:

```
cols="100, 100, 100, *"
```

Interestingly, if you have four columns 200 pixels wide, and the browser window is only 600 pixels wide, your columns would all be squashed proportionately to 150 pixels wide; the window will not use scroll-bars to make the page 800 pixels wide.

### **A Percentage of the Browser Window or Parent Frame**

To specify the width of a column as a percentage of a window (or, if you use nested frames, which you will meet later in the chapter, a percentage of the parent frame) you use a number followed by the percent sign. For example, the following attribute value specifies two columns, one of 40 percent and another of 60 percent of the browser window:

```
cols="40%, 60%"
```

If you specify widths as percentages, but they are more or less than 100 percent, the browser will adjust widths proportionately.

### **The Wildcard Symbol**

The asterisk, or wildcard symbol, indicates the “rest of the window” when used with an absolute value or percentage. Here, the first column is 400 pixels wide and the second frame takes up the remainder of the browser window:

```
cols="400, *"
```

If two rows or columns are given the wildcard symbol, then the remaining width is divided by these two columns.

### **Relative Widths Between Columns**

As an alternative to percentages, you can use relative widths of the browser window, which are best illustrated with an example. Here, the window is divided into sixths: the first column takes up half of the window, the second takes one third, and the third takes one sixth:

```
cols="3*, 2*, 1*"
```

You can tell that the window is divided up into sixths by adding up the values of the relative widths.

### **Value Priorities and Resizing Windows**

Absolute widths always take priority over relative widths. Consider the following example with three columns:

```
cols="250, *, 250"
```

If the window is only 510 pixels wide, then the center frame will be only 10 pixels wide. This demonstrates why you have to be careful when designing frames so that your users will be able to see what you intend them to see.

Furthermore, if the user resizes his or her window to less than 500 pixels wide, the browser will try to show as much of the columns defined using absolute widths as possible, ignoring any columns defined using relative widths.

Whenever a user resizes his or her window, relative widths and percentages are recalculated, but absolute widths remain the same.

If you specify too many columns for the number of frames you want, the rightmost column ends up being a blank space; if you specify too many `<frame>` elements the extra ones will be ignored.

### **The rows Attribute**

The `rows` attribute works just like the `cols` attribute and can take the same values, but it is used to specify the rows in the frameset. For example, the following `rows` attribute will specify three rows: the top row

## Chapter 6: Frames

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should be 100 pixels tall, the second should be 80 percent of the screen, and the bottom row should take up the screen that is left (if anything):

```
rows="100, 80%, *"
```

The default value for the `rows` attribute is 100 percent so, if you do not specify a `rows` attribute, one row will take up 100 percent of the height of the browser.

## **Browser-Specific Extensions to the <frameset> Element**

Most common browsers (such as IE, Firefox, and Safari) support some very important extensions to the `<frameset>` element that really deserve mention here. As you might have noticed in the first example, by default a frame creates a border and you will likely want to control the appearance of this border. While you can now use CSS to control these properties, you are likely to come across some of these attributes if you look at older code.

### **The border Attribute**

The `border` attribute specifies the width of the border of each frame in pixels. It was introduced in Netscape 3 and IE 4.

```
border="10"
```

Figure 6-3 shows you what the first example looks like with a border of 10 pixels. If you compare this with Figure 6-2, you will be able to see a taller gray line between each of the frames (`ch06_eg02.html`):

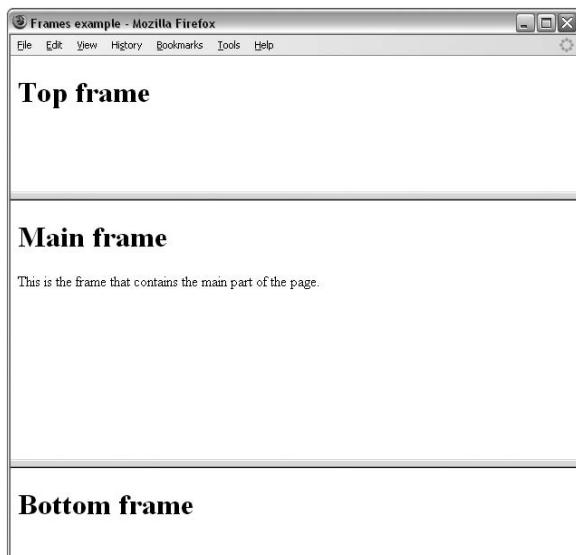


Figure 6-3

If you do not want a border, you can give this attribute a value of 0.

When you are first creating a frameset document, it can be a good idea to set this attribute to have a value of 1, even if you do not want borders, as it makes the frames clear when you are building the site; you can easily remove them by altering this one attribute on the <frameset> element.

## The **frameborder** Attribute

The `frameborder` attribute specifies whether a three-dimensional border should be displayed between frames. The following indicates that there should not be any borders (which is the same as if the `border` attribute is given a value of 0):

```
frameborder="0"
```

The table that follows shows possible values for the `frameborder` attribute.

Value	Purpose
1 or yes	Indicates borders should be shown, the default value (yes is not part of HTML 4 but is still supported by common browsers)
0 or no	Indicates borders should not be shown (no is not part of HTML 4 but is still supported by common browsers)

Figure 6-4 shows what the frames would look like without a border — you cannot see where one frame ends and another begins — unless you have different images or background colors for the pages in the frames (ch06\_eg04.html).

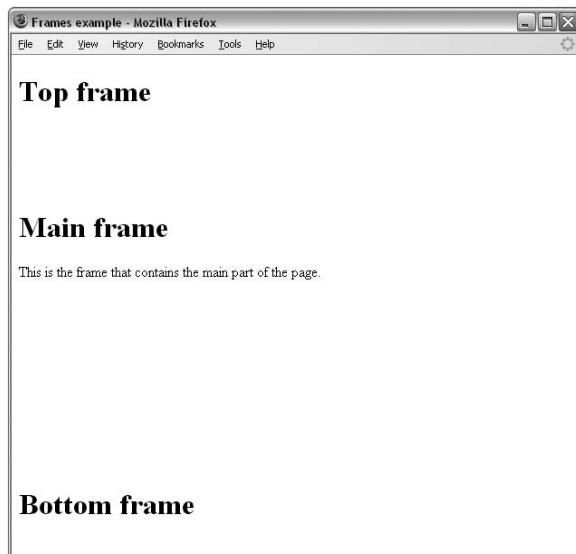


Figure 6-4

## Chapter 6: Frames

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### The **framespacing** Attribute

The `framespacing` attribute specifies the amount of space between frames in a frameset. The value should be given in pixels and the default value is 2 if not otherwise specified.

```
framespacing="25"
```

Figure 6-5 shows what the first example from this chapter (shown in Figure 6-1) would look like with a `framespacing` attribute indicating a 25-pixel gap between frames (`ch06_eg05.html`).

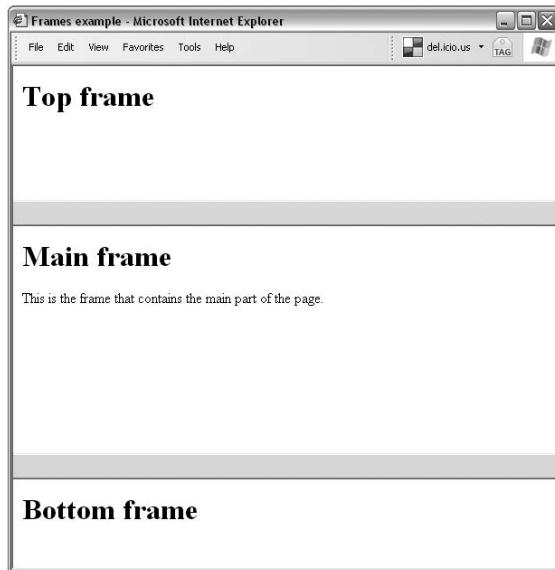


Figure 6-5

If you need to make sure that older browsers do not have a border, you should use the `border`, `frameborder`, and `framespacing` attributes together, each with a value of 0. (This will ensure that you do not get a border in browsers released after Netscape 3 and IE 3.)

```
border="0" frameborder="0" framespacing="0"
```

Several other browser-specific attributes are covered in Appendix I.

## The **<frame>** Element

The `<frame>` element indicates what goes in each frame of the frameset. The `<frame>` element is always an empty element, and therefore should not have any content, although each `<frame>` element should always carry one attribute, `src`, to indicate the page that should represent that frame.

The `<frame>` element can carry any of the universal attributes, and the following attributes:

```
frameborder marginwidth marginheight noresize scrolling longdesc src name
```

Note that there are no CSS styles related to the `<frame>` element.

### **The `src` Attribute**

The `src` attribute indicates the file that should be used in the frame.

```
src="main_page.html"
```

The value for the `src` attribute is a normal XHTML page, so you must have a corresponding page for each `<frame />` element.

While the value of this attribute will generally be a file on your server, its value can be any URL, so you can use the `src` attribute to specify another site.

You might find that some search engines on the Internet (such as the image search on Google) will create a frameset whereby the top of the page remains the search site and the bottom of the page is the page you requested.

If you use a frame like this, it is good practice to offer a link that will close the top frame and allow the viewer to view just the content of the main frame (as Google does).

### **The `name` Attribute**

The `name` attribute allows you to give a name to a frame; it is used to indicate which frame a document should be loaded into. This is especially important when you want to create links in one frame that load pages into a second frame, in which case the second frame needs a name to identify itself as the *target* of the link. You will see more about making links between frames later in the chapter.

```
name="main_frame"
```

You should note that the `name` attribute has not been replaced by the `id` attribute (in the same way that the `name` attribute on some other HTML elements was replaced by the `id` attribute when XHTML was introduced as the successor to HTML).

### **The `frameborder` Attribute**

The `frameborder` attribute specifies whether or not the borders of that frame are shown; it overrides the value given in the `frameborder` attribute on the `<frameset>` element if one is given, and the possible values are the same. The table that follows shows the possible values of the `frameborder` attribute.

Value	Purpose
1 or yes	Indicates borders should be shown, the default value. (yes is not part of HTML 4 but is still supported by IE and Netscape.)
0 or no	Indicates borders should not be shown. (no is not part of HTML 4 but is still supported by IE and Netscape.)

## The marginwidth and marginheight Attributes

The margin is the space between the three-dimensional border of a frame and its contents.

The `marginwidth` attribute enables you to specify the width of the space between the left and right of the frame's borders and the frame's content. The value is given in pixels.

The `marginheight` attribute enables you to specify the height of the space between the top and bottom of the frame's borders and its contents. The value is given in pixels.

```
marginheight="10" marginwidth="10"
```

## The noresize Attribute

By clicking and dragging on the borders of a frame, you are usually able to resize that frame. This is helpful if users cannot read everything in a frame, but it does make it harder for the designer to control the layout of the page.

The `noresize` attribute prevents a user from resizing the frame. It used to be a minimized attribute without a value in HTML 4, but now it should take a value of `noresize`:

```
noresize="noresize"
```

*Bear in mind that users with lower-resolution monitors than yours might have trouble seeing the content of a frame you see on a high-resolution monitor. If you use the `noresize` attribute, users who couldn't see the entire content of a frame would have no way of resizing the frames to view the missing material.*

## The scrolling Attribute

If the content of a frame is too big for the space it has been allocated, the browser will likely provide users with scrollbars so they can read the rest of the content for that frame.

You can control the appearance of the scrollbars that appear on the frame using the `scrollbar` attribute:

```
scrolling="yes"
```

This attribute can take one of three possible values, as listed in the table that follows.

Value	Purpose
yes	Indicates that the frame must always contain a set of scrollbars whether or not they are required, although IE just shows a vertical scrollbar and Firefox acts as if it were just set to auto.
no	Indicates that the frame must not contain a set of scrollbars even if the content does not fit into the frame.
auto	Indicates that the browser should include scrollbars when the content does not fit in the frame but otherwise should not show them.

## The `longdesc` Attribute

The `longdesc` attribute enables you to provide a link to another page containing a long description of the contents of the frame. The value of this attribute should be the URL pointing to where that description will be found.

```
longdesc="framedescription.html"
```

*The W3C indicates that the value of this URL must not be an anchor within the same page.*

## The `<noframes>` Element

If a user's browser does not support frames (which is very rare these days), the contents of the `<noframes>` element should be displayed to the user.

In XHTML, you must place a `<body>` element inside the `<noframes>` element because the `<frameset>` element is supposed to replace the `<body>` element. But if a browser does not understand the `<frameset>` element, it should ignore these elements and the `<noframes>` element and understand what is inside the `<body>` element contained in the `<noframes>` element.

You should think very carefully about how you phrase the contents of this element. You should *not* just write something like this element:

```
<noframes><body>This site requires frames.</body></noframes>
```

This will make little sense to average users — after all, their browsers are likely pretty old by now, and they are unlikely to have studied HTML or XHTML and know what frames are. Rather, you should offer a more descriptive example content, along these lines:

```
<noframes><body>This site makes uses of a technology called frames.  
Unfortunately the browser you are using does not support this technology. We  
recommend that you update your browser. We apologize for any inconvenience this  
causes.</body></noframes>
```

## Chapter 6: Frames

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You can use other XHTML markup within the `<noframes>` element if you want to present your message nicely.

*Although ideally you would have a non-frames version of the site for those users who have browsers that do not support frames, this can require a lot of work. So a helpful alternative is to provide links to the pages that make up the frames so that the user can still see the content of the site.*

## Creating Links Between Frames

One of the most popular uses of frames is to place navigation bars in one frame and then load the pages with the content into a separate frame. This is particularly helpful in three situations:

- ❑ When your navigation bar is rather large in size (such as thumbnails of photographs in a gallery). By using frames, the user does not need to reload the navigation bar each time he or she views a new page.
- ❑ When your main document is very long and the navigation bar provides shortcuts to parts of the main document (acting like a table of contents that is always in view).
- ❑ When you do not want to reload the whole page.

As you have already seen, each `<frame>` element can carry the `name` attribute to give each frame a name. This name is used in the links to indicate which frame the new page should load into. Consider this very simple example:

```
<frameset cols="200, *"
  <frame src="frames/linksNav.html" />
  <frame src="frames/linksMain.html" name="main_page" />
</frameset>
```

There are two columns in this example, and only one row. The first column is 200 pixels wide and will contain the navigation bar. The second column or frame will contain the main part of the page. The links on the left-side navigation bar will load pages into the right-side main page.

The links in the `linksNav.html` file look like this:

```
<a href="http://www.wrox.com" target="main_page">Wrox Press</a><br /><br />
<a href="http://www.google.com" target="main_page">Google</a><br /><br />
<a href="http://www.microsoft.com" target="main_page">Microsoft</a><br /><br />
<a href="http://news.bbc.co.uk/" target="main_page">BBC News</a><br /><br />
```

*This technique for creating navigation bars makes it very hard to indicate which page the user is on, as you would need to either use JavaScript or pass information to the navigation bar from the main page each time a new page was loaded.*

Figure 6-6 shows what this example might look like in a browser.

As you can see, you will need to use the `name` attribute for any frame you might want to load a new page into — it is the key to getting new content into that frame.

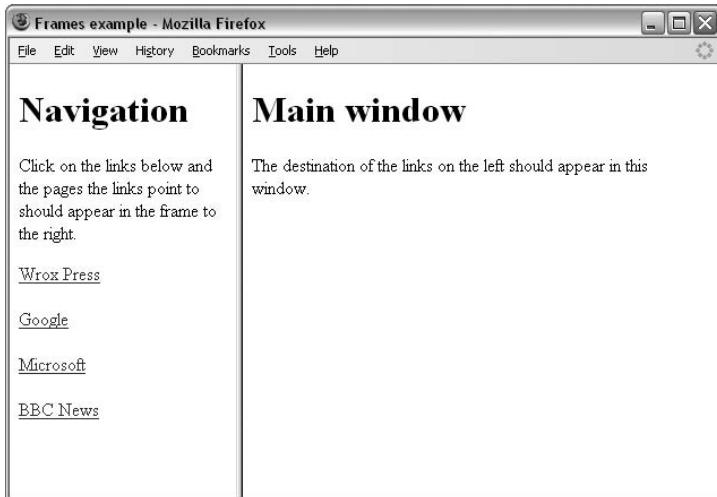


Figure 6-6

The `target` attribute can also take the attribute values listed in the table that follows.

Value	Purpose
<code>_self</code>	Loads the page into the current frame.
<code>_blank</code>	Loads a page into a new browser window — opening a new window (same as using a target that doesn't exist).
<code>_parent</code>	Loads the page into the parent window, which in the case of a single frameset is the main browser window (and the page will replace all the frames), or in nested frames it replaces the frame that frameset lives inside.
<code>_top</code>	Loads the page into the browser window, replacing any current frames.

If you are creating links to external pages, you should usually use the `_top` value for the `target` attribute so that the external site replaces your whole site; after all, your users probably don't want to view external pages just in frames of your site. The other option is to open external sites in new windows.

**Forgetting to add the `name` attribute to the `<frame>` element and the `target` attribute to the `<a>` element are the most common reasons why beginners have problems creating web sites that use frames. If either is missing, the browser just loads the link in that frame.**

### Setting a Default Target Frame Using the `<base>` Element

You can set a default target frame using the `<base>` element in any page that contains links that should open in another frame. The `<base>` element should carry an attribute called `target`, whose value is the name for the frame you want the content to be loaded into. So, you could add the following to `linksNav.html` to specify a default frame target:

```
<head>
  <base target="main_page" />
</head>
```

## Nested Framesets

You have seen that a single frameset gives you a fixed grid-like structure of rows and columns just like a table. If you want to create a more complex design, you might choose to use a nested frameset.

You create a nested frameset by using a new `<frameset>` element in the place of one of the `<frame>` elements. Take a look at the following example (`ch06_eg07.html`):

```
<frameset rows="*, 300, *">
  <frame src="frames/top_frame.html" />
  <frameset cols="*, 400, *">
    <frame src="frames/blank.html" />
    <frame src="frames/main_frame.html" />
    <frame src="frames/blank.html" />
  </frameset>
  <frame src="frames/bottom_frame.html" />
</frameset>
```

This example creates a set of three rows. In the middle row is a nested frameset with three columns. You can see that the two side columns actually share the same file. Figure 6-7 shows what this example looks like in a browser.

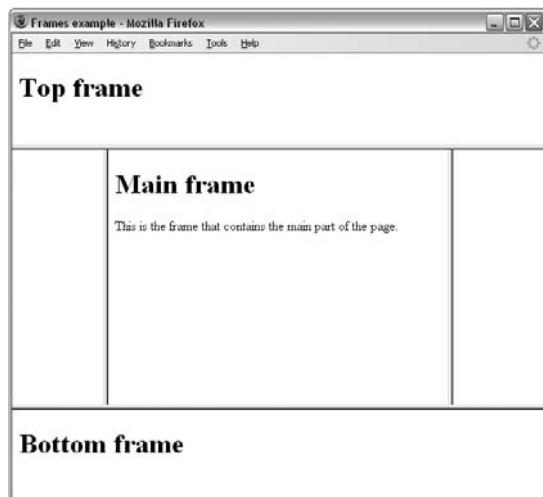


Figure 6-7

## Try It Out A Frame-Based Book Viewer

In this example you are going to create a frame-based viewer for previewing details about books.

The idea behind the viewer is that you have one page that contains all of the details about new book releases. Then there is a frame at the top of the page that forms the navigation; this frame does not resize or scroll. There is also a third frame that just contains a copyright and privacy policy notice like those you see at the bottom of a lot of web sites.

Before you start to build the example, it would help to have a look at what you are going to create. You can see the page in Figure 6-8.

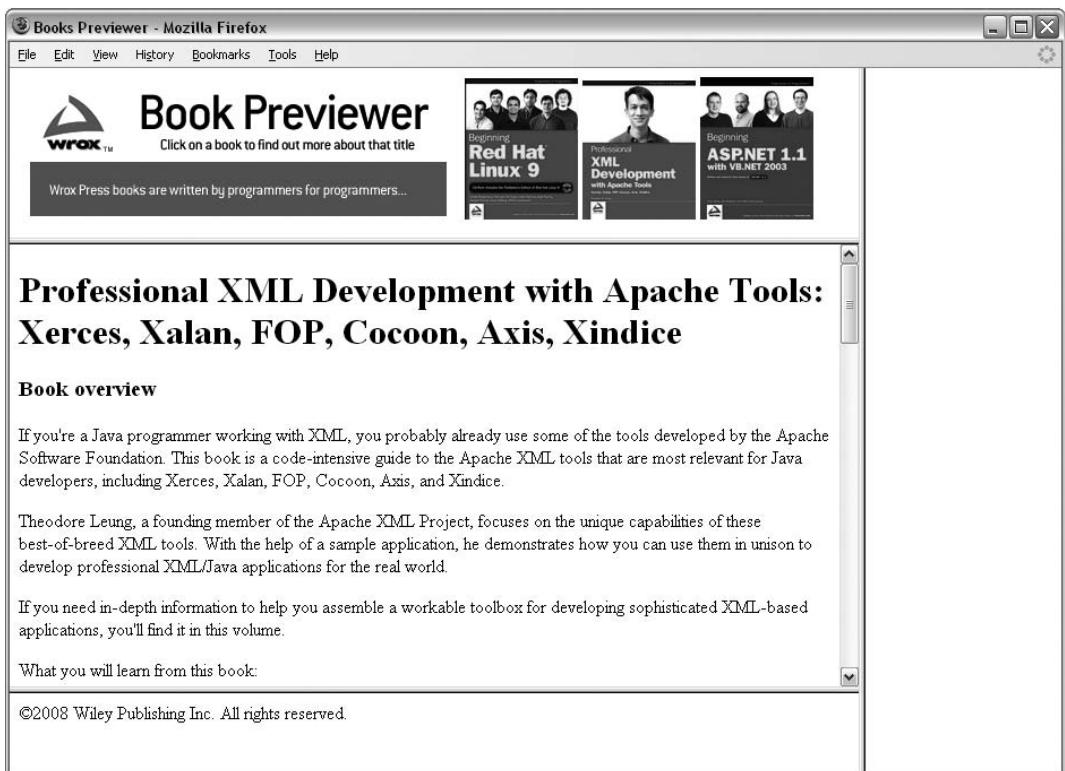


Figure 6-8

Four files actually make up this example:

- ❑ books.html, which contains the frameset for the whole document
- ❑ nav.html, which is the top frame
- ❑ newBooks.html, which is the page with all the book details
- ❑ footer.html, which is the page containing the footer image

## Chapter 6: Frames

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You will work through these pages in this order:

1. Start your text editor or web page editor and create a skeleton of a frameset document, remembering that this will be slightly different from the documents you have been creating so far. The following code is for books.html:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Frameset//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-frameset.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>Books Previewer</title>
</head>
</html>
```

2. Divide the page up into the relevant frames. While it might have looked like there were just three frames in the screenshot, if you look carefully, the edge of the middle frame does not touch the right side of the browser window. I wanted to make the page a fixed width.

As you can see, this example contains two `<frameset>` elements. The first divides the page into two columns: the first is 750 pixels wide and the second takes up the remaining page (if the window is set to wider than 750 pixels).

Within the first column you can see the second `<frameset>` element, which holds the real content of the page. Three `<frame>` elements are within this nested frameset, which you can see clearly in Figure 6-7.

```
<frameset cols="750, *">
    <frameset rows="150, *, 70" frameborder="1" noresize="noresize" >
        <frame src="frames/nav.html" scrolling="no" />
        <frame src="frames/newBooks.html" name="main_page" />
        <frame src="frames/footer.html" scrolling="no" />
    </frameset>
</frameset>
<noframes><body>
    This site uses a technology called frames. Unfortunately, your
    browser does not support this technology. Please upgrade your
    browser and visit us again!
<body></noframes>
```

You can now see the three `<frame>` elements, each of which points to its own file.

3. Create a new file called nav.html to form the content of the navigation frame at the top of the window. This is just a normal XHTML document, so start the skeleton as you usually would. You also need to add a `<style>` element into the `<head>` element to prevent the images that are links from having a border around them. (You learn more about this in Chapter 9, but for now just copy it down.)

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>Navigation</title>
```

```
<style type="text/css">img {border-style:none; border-width:0px;}</style>
</head>
<body>
</body>
</html>
```

4. In the nav.html page, there is one image on the left of the navigation bar that is the title of the page, and then there are three images that are links to the different parts of the page in the main frame:

```

<a href="../frames/newBooks.html#linux" target="main_page">
    </a>
<a href="../frames/newBooks.html+xml" target="main_page">
    </a>
<a href="../frames/newBooks.html#asp" target="main_page">
    </a>
```

You can see that the `<a>` elements have both the `href` and `target` attributes. Remember that the `target` attribute is the one that indicates which frame the page should appear in. Meanwhile the `href` attribute points not only to the page that should be loaded but also, in this case, the specific part of that page.

5. Next you have the newBooks.html file. The skeleton of the page, and indeed the basic text markup, are quite straightforward; you can see them in the code download for the chapter if you want to. In this otherwise normal XHTML page, it's important to note the `<a>` elements acting as target anchors so that the links in the navigation pane show the user the appropriate part of the page.

The `<a>` elements sit inside the `<h1>` elements and contain the heading. (Remember that if the target anchor element is empty, some browsers will not recognize them.) Here you can see the heading elements:

```
<h1><a name="xml">Professional XML Development with Apache Tools: Xerces,
Xalan, FOP, Cocoon, Axis, Xindice</a></h1>
<h1><a name="linux">Beginning Red Hat Linux 9</a></h1>
<h1><a name="asp">Beginning ASP.NET 1.1 with VB .NET 2003</a></h1>
```

6. Finally you come to footer.html, which is a rather simple plain XHTML page with an image inside it:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>Footer</title>
</head>
<body>
    
</body>
</html>
```

## Chapter 6: Frames

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You have already seen what this frameset looks like in Figure 6-8, so you should just look at some of the key points again.

### How It Works

At first this example looked as though it just contained three frames. On closer inspection, in order to get a fixed width, the three frames that hold the content were contained within another frameset. The containing frameset has one column fixed to 750 pixels wide, and rather than having a corresponding `<frame>` element, it has the `<frameset>` element. Because the second column is blank, it does not need a `<frame>` element either.

```
<frameset cols="750, *">
    <frameset rows="150, *, 70" frameborder="1" noresize="noresize" >
        <frame src="frames/nav.html" scrolling="no" />
        <frame src="frames/newBooks.html" name="main_page" />
        <frame src="frames/footer.html" scrolling="no" />
    </frameset>
</frameset>
```

You can see that the nested frameset then divides the page into the three obvious rows, each with its corresponding `<frame>` element. The nested `<frameset>` element carries the `noresize` attribute to prevent users from resizing the different frames that make up each of the rows.

Also note how the first and last `<frame>` elements carry the `scrolling` attribute with a value of `no` to prevent these frames from being given scrollbars.

This example shows how frames can be used to allow users to navigate between what could otherwise be very long single documents (as you can imagine, there could be many more books in the main page). It also illustrates how you end up with quite a few files for a single web page, and how you have to be careful to keep track of those pages and remember which one appears in which frame. You can see that the `<a>` elements in the navigation frame got more complicated, indicating which element frame is the target frame as well as having to provide the source of the document.

```
<a href="../frames/newBooks.html#linux" target="main_page">
    </a>
<a href="../frames/newBooks.html+xml" target="main_page">
    </a>
<a href="../frames/newBooks.html#asp" target="main_page">
    </a>
```

While these links are not too complicated, you can imagine that, if there were three frames each with links to one another, it could get rather tricky. This example does, however, illustrate how the frameset works.

---

### Floating or Inline Frames with `<iframe>`

Another special kind of frame is commonly known as an *iframe* (although it is sometimes referred to as an *inline frame* or *floating frame* because it can appear anywhere within an HTML or XHTML page); it

does not need to appear either in a `<frameset>` element or even in a document that uses the frameset document type declaration.

The floating frame is created using the `<iframe>` element, and, rather like an image, the inline frame can have text flowing around it and you can set borders and margins around the floating frame.

The following is a simple example of a floating frame (`ch06_eg08.html`):

```
<body>
<h1>Floating frame</h1>
<p>Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut risus
tellus, hendrerit id, sagittis sed, lobortis eget, augue.
<iframe src="frames/iframe.html">
    Error! You should be seeing our news in this window.
    This site uses a technology called frames which is not supported by older
    browsers. If you are using a version of Internet Explorer older than
    version 3 or a version of Netscape older than version 6 you might need
    to upgrade your browser.
</iframe>
<p>Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut risus tellus,
hendrerit id, sagittis sed, lobortis eget, augue.</p>
</body>
```

Note that between the opening `<iframe>` tag and the closing `</iframe>` tag is a message for those whose browsers do not support `<iframes>`.

Even if you do not add a message between the opening `<iframe>` and closing `</iframe>`, you should not make it an empty element; otherwise it might not display correctly in some browsers. Rather, you should still have both the opening and closing tags but no content.

You can see what this page looks like in Figure 6-9.

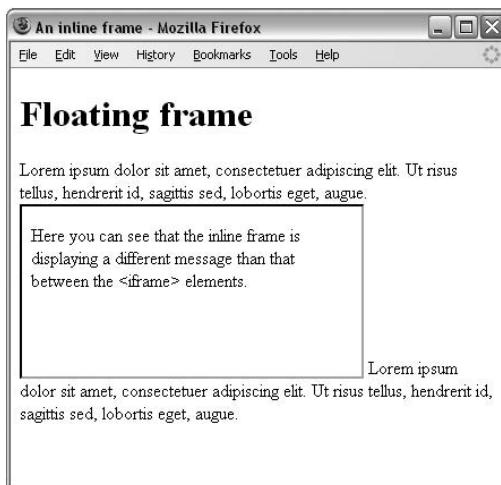


Figure 6-9

## Chapter 6: Frames

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*While the <iframe> element wasn't introduced until HTML 4.0, it first appeared in version 3 of IE, and Netscape 6.*

### The <iframe> Element

The <iframe> element sits in the middle of a normal XHTML page to create an inline frame. The only attribute it has to carry is the `src` attribute, whose value is the URL of the page to be included (wherever the <iframe> element is in the document), although it is also good to add the `height` and `width` attributes to control its size. Remember that this element does not have to be part of the frameset document type.

In addition to the universal attributes, the <iframe> element can carry these attributes:

```
align height width frameborder longdesc marginwidth marginheight name  
scrolling src
```

Note that there are no CSS styles or events particular to the <iframe> element.

### The `src` Attribute

The `src` attribute is required on the <iframe> element as it indicates where the browser can find the file with the content for that frame, just as it does on the <frame> element.

### The `align` Attribute (deprecated)

The `align` attribute indicates how the text that is outside of the floating frame will appear. It can take one of the values listed in the table that follows.

Value	Purpose
<code>left</code>	The frame will be aligned with the left margin of the page, allowing the text to flow around it to the right.
<code>right</code>	The frame will be aligned with the right margin of the page, allowing the text to flow around it to the left.
<code>top</code>	The top of the frame will be inline with the text around it.
<code>middle</code>	The middle of the frame will be inline with text around it.
<code>bottom</code>	The bottom of the frame will be inline with the text around it (the default setting as you can see from Figure 6-9).

### The `height` and `width` Attributes

The `height` and `width` attributes enable you to specify the height and width of a frame just as you would with an image.

```
height="250" width="500"
```

The value of the `height` and `width` attributes can be given in pixels (as in the preceding line of code) or in percentages of the browser (as in the line of code that follows) or parent element if it is contained by another element.

```
height="20%" width="40%"
```

Keep in mind, however, that users with different screen resolutions will see different amounts of the screen. If you do not specify a height or width, the browser works out a size based on the full size of the screen.

### ***The frameborder Attribute***

The `frameborder` attribute specifies whether the borders of the frame are shown; the value should be the number of pixels the border should be. A value of 0 means that there would be no border.

```
frameborder="0"
```

### ***The longdesc Attribute***

The `longdesc` attribute allows you to specify a link to another page where there is a description in text of what would otherwise be in the frame. This is particularly helpful if you are putting images, charts, or graphs in the frame, as they make your site accessible to those with visual impairments. It can also be used if the user is having trouble loading the frame.

```
longdesc=".../textDescriptions/iframe1.html"
```

### ***The marginheight and marginwidth Attributes***

The `marginheight` and `marginwidth` attributes allow you to specify the distance in pixels between the border of the frame and the content of the frame.

```
marginwidth="8" marginheight="8"
```

The `marginwidth` attribute allows you to specify the distance between left and right borders and the content, while the `marginheight` attribute specifies the distance between top and bottom borders and the content.

### ***The scrolling Attribute***

The `scrolling` attribute specifies whether a frame should have scrollbars (just as it does for the `<frame>` element).

---

#### **Try It Out      Using an Inline Frame**

In this example you create a simple page for children to learn about fruit. The page allows the child to click a link and load the corresponding image into the inline frame without the rest of the page changing.

1. Create the skeleton of a standard Transitional XHTML document, as follows:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
```

## Chapter 6: Frames

```
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>Iframe example</title>
</head>
<body>
</body>
</html>
```

2. Add a heading and then the `<iframe>` element, which must have a name attribute. In this case you should use the `scrolling` attribute to prevent the frame from having scrollbars. You should also set a size for the frame — let's make it 150 pixels square:

```
<h1>Learn your fruit</h1>
<iframe name="iframe" height="150" width="150" scrolling="no">Pictures of
fruit will appear here</iframe>
```

3. Add the links that will load the images into the inline frame. As with the other type of frames, if you want the links to load the page into another frame, the links must carry the `target` attribute whose value is the name of the iframe.

```
<p>Click on the name of the fruit to see an image of it appear.</p>
<p>The <a href="images/orange.jpg" target="iframe">orange</a> is an
orange colored fruit.</p>
<p>This <a href="images/apple.jpg" target="iframe">apple</a> is red
and crunchy.</p>
<p>The <a href="images/banana.jpg" target="iframe">banana</a> is
long and yellow.</p>
```

Your example should look something like Figure 6-10.

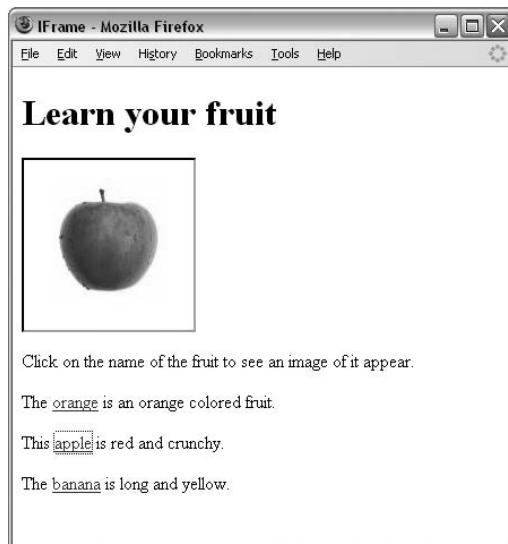


Figure 6-10

### How It Works

The `<iframe>` element can be very useful as it allows you to refresh just one portion of the page without reloading the whole page, and it can also be part of a normal XHTML document.

Once you have added the `<iframe>` element to the page, you just create links on the page that load new content into the inline frame. In this example there was no initial content in the iframe when the page loaded, although you could have used the `src` attribute to indicate a file that should go there by default when the page loaded.

Remember that the `<iframe>` element should not be an empty element, and between the opening and closing tags you should have what you want the user to see if the frame cannot be loaded.

---

### Summary

In this chapter, you learned about frames, which allow you to divide a browser window into separate panes. Each of these panes contains a discrete XHTML document that can be loaded and reloaded separately from the other frames.

Frames are particularly helpful if part of your page's content remains the same while the main body changes — for example, when either the main body is long (and you want the navigation to remain in view) or the navigation takes a long time to load (and you do not want to reload it for each page).

The chapter covered two types of frames:

- ❑ The more traditional frameset document, which uses the `<frameset>` element to divide the screen into rows and columns. The `<frameset>` element then contains a `<frame>` element corresponding to each part of the window. These frames belong to the frameset document type and require a different DOCTYPE declaration than other XHTML documents because the `<frameset>` element replaces the `<body>` element.
- ❑ The more recent inline or floating frame, which lives in a normal XHTML page, and allows only the content of the frame to be reloaded. Inline frames can appear anywhere within the document.

As I have already mentioned, frames are often replaced by the use of AJAX to reload parts of pages. As you will see later in the book you can use tables or CSS to control presentation, so the most common incarnation of frames you will see nowadays is the iframe.

### Exercises

The answers to all of the exercises are in Appendix A.

1. Re-create the frameset document shown in Figure 6-11, where clicking a fruit loads a new page in the main window. When the page loads it will carry the details for the appropriate fruit.

## Chapter 6: Frames

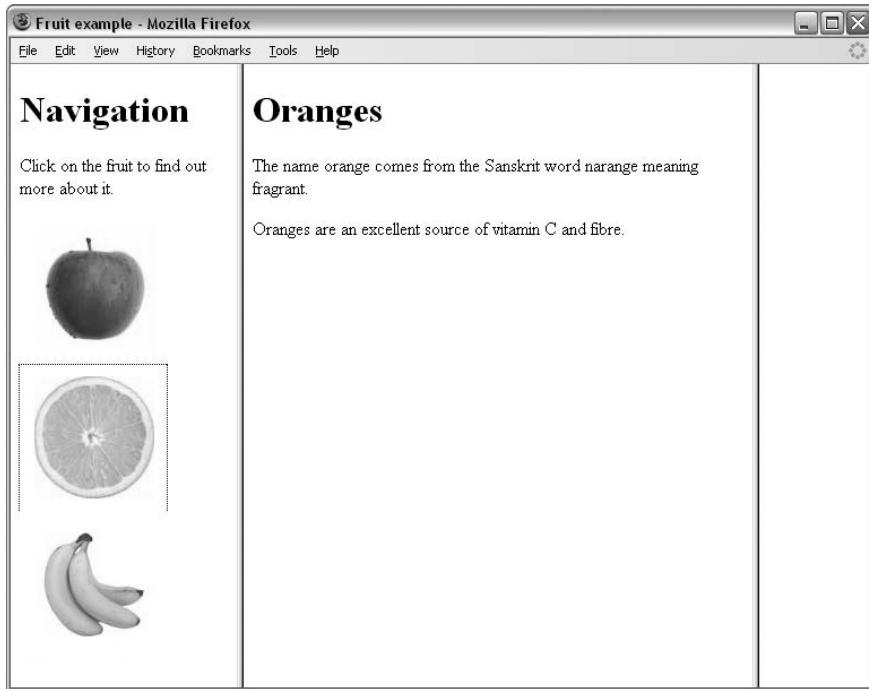


Figure 6-11

2. Re-create the <iframe> element shown in Figure 6-12.

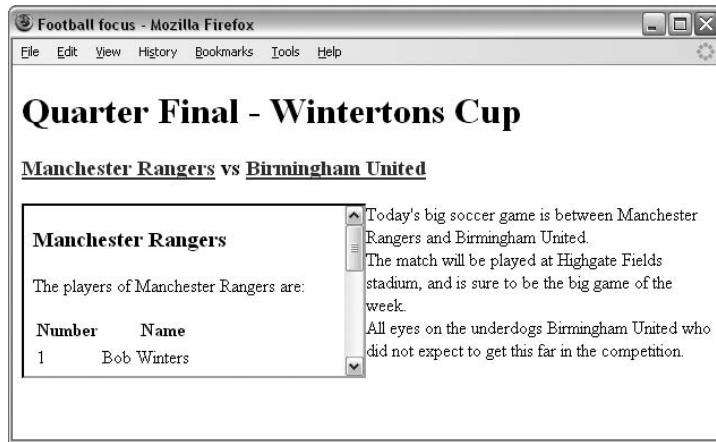


Figure 6-12

# 7

## Cascading Style Sheets

Having learned how to structure the content of your documents using XHTML's wide variety of elements and attributes, you're now going to start making your pages look a lot more exciting.

You're going to learn how to use cascading style sheets (or CSS for short) to take control of the style of your pages, including the colors and size of fonts, the width and colors of lines, and the amount of white space between items on the page. The cascading style sheets specification works by allowing you to specify *rules* that say how the content of elements within your document should appear. In fact, you can set different rules to control the appearance of every element in your page so that your pages start to look a lot more interesting.

As I have already mentioned, earlier versions of HTML used elements and attributes in the markup of the web page (just like the ones you have met already in the book) to control how a document should appear. However, the W3C (an organization that oversees the development of web technologies) decided quite a while back that the HTML and XHTML languages should no longer contain instructions that indicated how the document appears — rather that CSS should be used to control the appearance of web pages.

The W3C has actually released two versions of CSS. The properties and features you learn in this chapter are taken from CSS1 and CSS2 (as you probably guessed, CSS2 expanded upon CSS1). The W3C is also working on another update, which will be called CSS3; it's going to be a while before the work on CSS3 is completed; however I will make brief mention of it in a few places where you can see browsers that have already started to implement it. You will also see mention where more recent browsers still fail to support properties. One helpful thing about CSS is that users should still be able to read the document even if the CSS properties are not implemented by the browser — it just won't look quite as you intended.

In this chapter you learn the following:

- ❑ What makes up a CSS rule
- ❑ How to place CSS rules within your document, and how to link to an external CSS document
- ❑ How properties and values control presentation of different elements within your document
- ❑ How to control the presentation of text using CSS
- ❑ How CSS is based on a box model, and how you set different properties for these boxes (such as width and styles of borders)

## Chapter 7: Cascading Style Sheets

---

By the end of the chapter you should be confidently writing CSS style sheets, and should have learned many of the properties you can use to affect the presentation of any document using the style sheet.

In Chapter 8, you learn more advanced properties from CSS1 and CSS2, as well as how CSS can be used to position the content of elements within a page.

*Since the introduction of the Web, those building pages have desired the same control over their pages that print designers have over a printed page. There are, however, some inherent differences in the Internet as a medium when compared with print media. For example, a printed page in a book is always the same size in every copy of the book; viewers do not need to own a font in order to view the page as they generally do on the Web or have the option of printing the page themselves. These are issues that you learn more about in Chapters 9 and 10 when you look at page layout and design issues.*

## Introducing CSS

CSS works by allowing you to associate *rules* with the elements that appear in the document. These rules govern how the content of those elements should be rendered. Figure 7-1 shows you an example of a CSS rule, which as you can see is made up of two parts:

- ❑ The *selector*, which indicates which element or elements the declaration applies to (if it applies to more than one element, you can have a comma-separated list of several elements)
- ❑ The *declaration*, which sets out how the elements should be styled

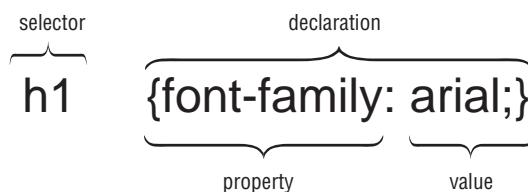


Figure 7-1

The rule in Figure 7-1 applies to all `<h1>` elements and indicates that they should appear in the Arial typeface.

The declaration is also split into two parts, separated by a colon:

- ❑ A *property*, which is the property of the selected element(s) that you want to affect, in this case the `font-family` property.
- ❑ A *value*, which is a specification for this property; in this case it is the Arial typeface.

This is very similar to the way elements can carry attributes in HTML, where the attribute controls a property of the element, and its value would be the setting for that property. With CSS, however, rather than your having to specify the attribute on each instance of the `<h1>` element, the selector indicates that this one rule applies to all `<h1>` elements in the document.

Here is an example of a CSS rule that applies to several different elements (in this example, the `<h1>`, `<h2>`, and `<h3>` elements). A comma separates the name of each element that this rule will apply to. The rule also specifies several properties for these elements with each property-value pair separated by a semicolon. Note how all the properties are kept inside the curly braces:

```
h1, h2, h3 {  
    font-weight:bold;  
    font-family:arial, verdana, sans-serif;  
    color:#000000;  
    background-color:#FFFFFF; }
```

Even if you have never seen a CSS rule before, you should now have a good idea of what this rule is doing. The content of each heading element named in the selector (`<h1>`, `<h2>`, and `<h3>`) will be written in a bold Arial font (unless the computer does not have Arial installed, in which case it will look for Verdana, failing which its default sans-serif font), and this will be written in black with a white background.

*If there is only one property-value pair in the declaration, you do not need to end it with a semicolon. However, because a declaration can consist of several property-value pairs, and each property-value pair within a rule must be separated by a semicolon, it is good practice to start adding semicolons every time you write a rule in case you want to add another rule later; if you forget to add the semicolon, any further property-value pairs will be ignored.*

## A Basic Example

The following example uses quite a number of CSS rules. The purpose of most of these rules should be clear by their name. After this example, you look at different aspects of CSS, and how to control text, tables, white space, and backgrounds.

Before starting, take a look at the XHTML document we will be working on without the CSS rules attached. Figure 7-2 shows you what the document looks like without styling.

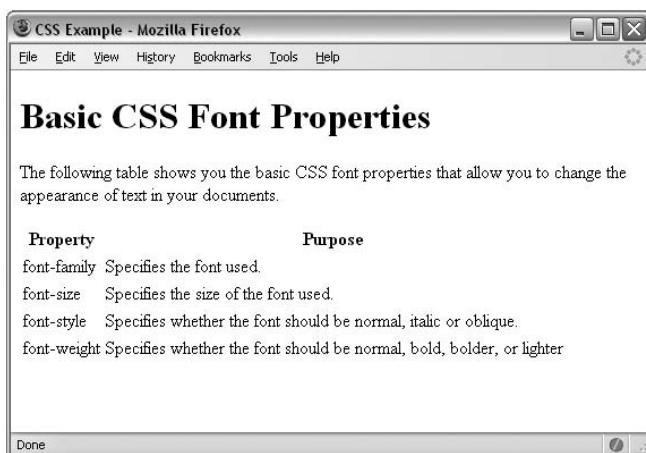


Figure 7-2

## Chapter 7: Cascading Style Sheets

---

Here is the code for the document you saw in Figure 7-2 (ch07\_eg01.html). It contains a heading, a paragraph, and a table. Notice the use of the `<link>` element inside the `<head>` element, which tells the browser that this document should be styled with the style sheet specified in the value of the `href` attribute that is carried on the `<link>` element. Also note how some of the `<td>` elements carry a `class` attribute whose value is `code`; you use this to distinguish the `<td>` elements that contain code from other text in the document.

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
  <title>CSS Example</title>
  <link rel="stylesheet" type="text/css" href="ch07_eg01.css" />
</head>
<body>
<h1>Basic CSS Font Properties</h1>
<p>The following table shows you the basic CSS font properties that allow you to change the appearance of text in your documents.</p>
<table>
  <tr>
    <th>Property</th>
    <th>Purpose</th>
  </tr>
  <tr>
    <td class="code">font-family</td>
    <td>Specifies the font used.</td>
  </tr>
  <tr>
    <td class="code">font-size</td>
    <td>Specifies the size of the font used.</td>
  </tr>
  <tr>
    <td class="code">font-style</td>
    <td>Specifies whether the font should be normal, italic or oblique.</td>
  </tr>
  <tr>
    <td class="code">font-weight</td>
    <td>Specifies whether the font should be normal, bold, bolder, or lighter</td>
  </tr>
</table>
</body>
</html>
```

Figure 7-3 shows what this document looks like with a style sheet attached.

Now, let's take a look at the style sheet used with this document. All CSS style sheets are saved with the file extension `.css`, and this one is called `ch07_eg01.css`.

You should be able to create a CSS style sheet in the same editor you are using to create your XHTML pages, and because CSS files are just simple text files (like XHTML files) you can also create them in Windows Notepad orTextEdit on the Mac.

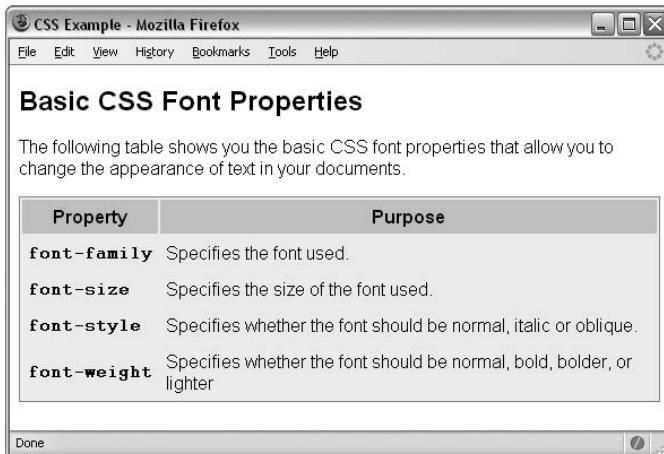


Figure 7-3

We will look through the style sheet rule by rule so that you can see what each one does. The document is mainly separate rules, the exception being the first line — which isn't really a rule; it is a comment. Anything between the opening `/*` and closing `*/` will be ignored by the browser and therefore will not be shown:

```
/* Style sheet for ch07_eg01.html */
```

The first rule applies to the `<body>` element. It specifies that the default color of any text and lines used on the page will be black, that the background of the page should be in white, and that the typeface used throughout the document should be Arial. If Arial is not available, Verdana will be used instead; failing that, any sans-serif font will be used.

```
body {
    color:#000000;
    background-color:#ffffff;
    font-family:arial, verdana, sans-serif; }
```

*I always specify a background-color property for the body of a document because some people change the default background color of their computers (so that it is not a glaring white); if you do not set this property, the background color of those users' browsers will be whatever color they have selected.*

The next two rules simply specify the size of the contents of the `<h1>` and `<p>` elements, respectively:

```
h1 {font-size:18pt;}
p {font-size:12pt;}
```

Next, it is time to add a few settings to control the appearance of the table — first to give it a light gray background, and then to draw a 1-pixel dark gray border around the edge:

```
table {
    background-color:#efefef;
    border-style:solid;
```

## Chapter 7: Cascading Style Sheets

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```
border-width:1px;  
border-color:#999999;}
```

Within the table, the headings should have a medium gray background color (slightly darker than the main body of the table), the text should appear in a bold font, and between the edge of the cell and the text there should be 5 pixels of padding. (As you will see in more detail later in the chapter, *padding* is the term used for space between the edge of a box and the content inside it.)

```
th {  
background-color:#cccccc;  
font-weight:bold;  
padding:5px;}
```

The individual table data cells have 5 pixels of padding. Adding this space makes the text much easier to read, and without it the text in one column might run up right next to the text in the neighboring column:

```
td {padding:5px;}
```

Finally, you may have noticed in Figure 7-3 that the cells of the table that mentioned CSS properties were in a Courier font. This is because the corresponding table cells in the XHTML document carried a *class* attribute whose value was `code`. On its own, the *class* attribute does not change the display of the document (as you can see from Figure 7-2). The *class* attribute does, however, allow you to associate CSS rules with elements whose *class* attribute has a specific value. Therefore, the following rule applies only to `<td>` elements that carry a *class* attribute whose value is `code`, not to all `<td>` elements:

```
td.code {  
font-family:courier, courier-new, serif;  
font-weight:bold;}
```

There you have the first example. You can find the code for this example with the download code for the rest of the book. If you want to view a style sheet like this from a web site, you can simply type the URL for the style sheet into the browser and you will see the text appear in the browser, or it will download to your computer. You can try it with the download code to see how it appears on your computer; to do so, when looking at the example in a browser, remove the filename `ch07_eg01.html` and replace it with the filename `ch07_eg01.css` and you will see the CSS rules appear in your browser.

## Inheritance

One of the powerful features of CSS is that many of the properties that have been applied to one element will be *inherited* by child elements (elements contained within the element that the rules were declared upon). For example, once the *font-family* property had been declared for the `<body>` element in the previous example, it applied to all of the elements inside the `<body>` element (all of the `<body>` element's child elements).

If a more specific rule comes along, the more specific rule will override any properties associated with the `<body>` element, or any other containing element. In the preceding example, most of the text was in an Arial typeface, as specified in the rule associated with the `<body>` element. There were a few table cells that used a Courier typeface. The table cells that were different had a *class* attribute whose value was `code`:

```
<td class="code">font-size</td>
```

Here you can see the rule associated with these elements:

```
td.code {  
    font-family:courier, courier-new, serif;  
    font-weight:bold;}
```

This rule takes precedence over the one associated with the `<body>` element because the selector is more specific about which element it applies to.

The way in which some properties inherit saves you from having to write out rules and all the property-value pairs for each element and makes for a more compact style sheet. Appendix C contains a handy reference to CSS properties and tells you which ones do and do not inherit if you need to check.

## Where You Can Add CSS Rules

The example that you saw at the beginning of the chapter used a separate style sheet, or *external style sheet*, to contain the CSS rules. This involved the use of the `<link />` element in the header of the XHTML document to indicate which style sheet should be used to control the appearance of the document.

CSS rules can also appear in two places inside the XHTML document:

- Inside the `<head>` element, contained with a `<style>` element
- As a value of a `style` attribute on any element that can carry the `style` attribute

When the style sheet rules are held inside a `<style>` element in the head of the document, they are referred to as an *internal style sheet*.

```
<head>  
    <title>Internal Style sheet</title>  
    <style type="text/css">  
        body {  
            color:#000000;  
            background-color:#ffffff;  
            font-family:arial, verdana, sans-serif; }  
        h1 {font-size:18pt;}  
        p {font-size:12pt;}  
    </style>  
</head>
```

When `style` attributes are used on XHTML elements, they are known as *inline style rules*. For example:

```
<td style="font-family:courier; padding:5px; border-style:solid;  
border-width:1px; border-color:#000000;">
```

Here you can see that the properties are added as the value of the `style` attribute. There is no need for a selector here (because the style is automatically applied to the element that carries the `style` attribute), and there are no curly braces. You still need to separate each property from its value with a colon and each of the property-value pairs from each other with a semicolon.

## Chapter 7: Cascading Style Sheets

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The `style` attribute was deprecated in Transitional XHTML and is not allowed in Strict XHTML 1.0 because it introduces stylistic markup, when documents should really contain only markup that explains semantics and structure of the document.

### **The `<link>` Element**

As you have already seen, the `<link />` element can be used to create a link to CSS style sheets. The `<link />` element is always an empty element that describes the relationship between two documents. It can be used in several ways, not just style sheets. For example, it can be used to describe a link to an RSS feed that corresponds with a page, but when used with style sheets the relationship indicates that the CSS document contains rules for the presentation of the document containing the `<link />` element.

When the `<link />` element is used to attach a style sheet to a document, it creates a very different kind of link than the kind of link created with an `<a>` element. Because the style sheet is automatically associated with the document, the user does not have to click anything to activate the link.

*The `<link />` element was also originally supposed to be able to be used to create navigation between an ordered sequence of pages. However, the major browsers ignore the `<link />` element when used in this context.*

When used with style sheets, the `<link />` element must carry three attributes: `type`, `rel`, and `href`. Here is an example of the `<link />` element finding a CSS file called `interface.css`, which lives in a folder called `stylesheets`:

```
<link rel="stylesheet" type="text/css" href="../stylesheets/interface.css" />
```

In addition to the core attributes, the `<link />` element can also take the following attributes:

```
charset dir href hreflang media rel rev style target type
```

You have met many of these already, so the more important ones are discussed in the following sections along with some of the less common ones.

### **The `rel` Attribute**

The `rel` attribute is required and specifies the relationship between the document containing the link and the document being linked to.

The key value for working with style sheets is `stylesheet`.

```
rel="stylesheet"
```

The other possible values for this element are discussed in Chapter 1.

### **The `type` Attribute**

The `type` attribute specifies the MIME type of the document being linked to; in this case, we are dealing with a CSS style sheet, so the MIME type is `text/css`:

```
type="text/css"
```

The other MIME types are listed in Appendix H.

## **The href Attribute**

The href attribute specifies the URL for the document being linked to.

```
href=".../stylesheets/interface.css"
```

The value of this attribute can be an absolute or relative URL.

## **The hreflang Attribute**

The hreflang attribute specifies the language that the resource specified is written in. Its value should be one of the language codes specified in Appendix G.

```
hreflang="en-US"
```

## **The media Attribute**

The media attribute specifies the output device that is intended for use with the document:

```
media="screen"
```

This attribute is becoming increasingly important as people access the Internet in different ways using different devices. See the table that follows for the possible values.

Value	Uses
screen	Non-paged computer screens
tty	Media with a fixed-pitch character grid, such as teletypes, terminals, or portable devices with limited display capabilities
tv	TV devices with low-resolution, color screens, and limited ability to scroll down pages
print	Printed documents, which are sometimes referred to as <i>paged media</i> (and documents shown onscreen in print preview mode)
projection	Projectors
handheld	Handheld devices, small screens, bitmapped graphics, and limited bandwidth
braille	Braille tactile feedback devices
embossed	Braille paged printers
aural	Speech synthesizers
all	Suitable for all devices

## Chapter 7: Cascading Style Sheets

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### The <style> Element

The `<style>` element is used inside the `<head>` element to contain style sheet rules within a document, rather than linking to an external document. It is also sometimes used when a document needs to contain just a few extra rules that do not apply to the other documents that share the same style sheet.

For example, here you can see a style sheet attached to the XHTML document using the `<link />` element you just learned about, as well as a `<style>` element containing an additional rule:

```
<head>
  <title>
    <link rel="stylesheet" type="text/css" href="../styles/mySite.css" />
    <style type="text/css">
      h1 {color:#FF0000;}
    </style>
  </head>
```

The `<style>` element takes the following attributes:

`dir lang media title type`

Some browsers also support the `id` and `src` attributes although they are not part of any W3C recommendation.

*Many document authors add comment marks inside the `<style>` elements so that all CSS rules appear between the `<!--` and the `-->` marks when they appear as an internal style sheet. The idea is that this will hide the code from older browsers that will not understand CSS. The drawback with this technique is that more modern browsers are allowed to strip out the content of an XHTML comment and not process their contents (although none of the popular ones do). Thus, some browsers in the future could ignore all of the style rules. Indeed, a server is also allowed to strip out comments and not send them to the client. In practice, the number of browsers that are likely to visit your site and have a problem viewing it because the style rules are included without a comment is so small that you are better off leaving them off altogether as shown previously.*

### Advantages of External CSS Style Sheets

If two or more documents are going to use a style sheet, you should always aim to use an external style sheet (although you may sometimes resort to an internal style sheet to override rules in the external style sheet).

There are several advantages to using external CSS style sheets rather than internal style sheets or inline style rules, including the following:

- ❑ The same style sheet can be *reused* by all of the web pages in your site. This saves you from including the stylistic markup in each individual document.
- ❑ Because the style rules are written only once, rather than appearing on every element or in every document, the source documents are smaller. This means that, once the CSS style sheet has been downloaded with the first document that uses it, subsequent documents will be quicker to download (because the browser retains a copy of the CSS style sheet and the rules do not have to be downloaded for every page). This also puts less strain on the server (the computer that sends the web pages to the people viewing the site) because the pages it sends out are smaller.

- ❑ You can change the appearance of several pages by altering just the style sheet rather than each individual page; this is particularly helpful if you want to change your company's colors, or the font used for a certain type of element wherever that element appears across the whole site.
- ❑ The style sheet can act as a style template to help different authors achieve the same style of document without learning all of the individual style settings.
- ❑ Because the source document does not contain the style rules, different style sheets can be attached to the same document. So you can use the same XHTML document with one style sheet when the viewer is on a desktop computer, another style sheet when the user has a handheld device, another style sheet when the page is being printed, another style sheet when the page is being viewed on a TV, and so on. You reuse the same document with different style sheets for different visitors' needs.
- ❑ A style sheet can import and use styles from other style sheets, making for modular development and good reuse.
- ❑ If you remove the style sheet, you make the site more accessible for those with visual impairments, because you are no longer controlling the fonts and color schemes.

It is fair to say, therefore, that whenever you are writing a whole site, you should be using an external style sheet to control the presentation, although as you will see in the next chapter you might use several external style sheets for different aspects of the site.

## CSS Properties

Now that you have learned the background of CSS, how to write CSS rules, and where you can place those rules, the rest of this chapter looks at the properties you can use to affect the presentation of your documents. In particular, you will learn the `font`, `text`, `border`, `padding`, and `margin` properties.

The following table shows the main properties available to you from CSS1 and CSS2, all of which you meet in this chapter or Chapter 8.

FONT	FONT ( <i>continued</i> )	TEXT ( <i>continued</i> )	TEXT ( <i>continued</i> )
font	font-variant	text-align	white-space
font-family	font-weight	text-decoration	word-spacing
font-size	<b>TEXT</b>	text-indent	<b>BACKGROUND</b>
font-size-adjust	color	text-shadow	background
font-stretch	direction	text-transform	background-attachment
font-style	letter-spacing	unicode-bidi	background-color

*Continued*

## Chapter 7: Cascading Style Sheets

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BACKGROUND (continued)	BORDER (continued)	DIMENSIONS (continued)	TABLE (continued)
background-image	border-top-style	min-width	table-layout
background-position	border-top-width	width	<b>LIST and MARKER</b>
background-repeat	border-width	<b>POSITIONING</b>	list-style
BORDER	MARGIN	bottom	list-style-image
border	margin	clip	list-style-position
border-bottom	margin-bottom	left	list-style-type
border-bottom-color	margin-left	overflow	marker-offset
border-bottom-style	margin-right	right	GENERATED CONTENT
border-bottom-width	margin-top	top	content
border-color	PADDING	vertical-align	counter-increment
border-left	padding	z-index	counter-reset
border-left-color	padding-bottom	OUTLINES	quotes
border-left-style	padding-left	outline	CLASSIFICATION
border-left-width	padding-right	outline-color	clear
border-right	padding-top	outline-style	cursor
border-right-color	DIMENSIONS	outline-width	display
border-right-style	height	TABLE	float
border-right-width	line-height	border-collapse	position
border-style	max-height	border-spacing	visibility
border-top	max-width	caption-side	
border-top-color	min-height	empty-cells	

I will not cover certain properties in this book, either because they are very rarely used or because there is little support for them. (For example, I avoid covering aural style sheets because there are not many aural browsers that support them.) You can find out more about these properties on the following web sites (or you can pick up a book dedicated to CSS):

- [www.w3.org/style/css/](http://www.w3.org/style/css/)
- [www.devguru.com/Technologies/css/quickref/css\\_index.html](http://www.devguru.com/Technologies/css/quickref/css_index.html)
- [www.w3schools.com/css/css\\_reference.asp](http://www.w3schools.com/css/css_reference.asp)

## Controlling Fonts

Several properties allow you to control the appearance of text in your documents. These can be split into two groups:

- Those that directly affect the font and its appearance
- Those that have other formatting effects upon the text

The table that follows lists the properties that directly affect the font.

Property	Purpose
font	Allows you to combine several of the following properties into one
font-family	Specifies the family of font to be used (the user must have this installed on his or her computer)
font-size	Specifies the size of a font
font-weight	Specifies whether the font should be normal, bold, or bolder than the containing element
font-style	Specifies whether the font should be normal, italic, or oblique (an oblique font is the normal font on a slant rather than a separate italic version of the font)
font-stretch	Allows you to control the width of the actual letters in a font (not spaces between them)
font-variant	Specifies whether the font should be normal or small caps
font-size-adjust	Allows you to alter the aspect ratio of the size of characters of the font

## Chapter 7: Cascading Style Sheets

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Before you start looking at fonts, it's important to understand a few issues. Perhaps most importantly, a font is not the same thing as a typeface:

- A *typeface* is a family of fonts, such as the Arial family.
- A *font* is a specific member of that family, such as Arial 12-point bold.

You will often see the terms used interchangeably, but it is helpful to be aware of the distinction.

Typefaces tend to belong to one of two groups: serif and sans-serif fonts. Serif fonts have extra curls on letters. For example, the following l contains a *serif* on the top of the letter leaning back and at the bottom of the letter, whereas sans-serif fonts have straight ends to the letters. The third common example of a typeface is of a monospaced serif font. Every letter in a monospaced font is the same width, whereas non-monospaced fonts have different widths for different letters. (In serif and sans-serif fonts, the *l* tends to be narrower than the *m*.) See Figure 7-4 for an example.



Figure 7-4

In general print theory, serif fonts are easier to read for long periods of text. However, on the Internet this does not hold true; many people find serif fonts harder to read on a screen, largely because the resolution of the screen is not as good as printed words. This makes sans-serif fonts easier to read onscreen because they are not so detailed.

To study the properties that affect fonts, most of the examples will follow a similar structure using paragraphs of text; each `<p>` element carries a `class` attribute with a different value:

```
<p class="one">Here is some text.</p>
<p class="two">Here is some text.</p>
<p class="three">Here is some text.</p>
```

The use of the `class` attribute allows you to add different styles to different elements that share the same name.

### ***The font-family Property***

The `font-family` property allows you to specify the typeface that should be used. The big drawback with this property is that those viewing the page must have this font on their computers; otherwise they will not see the page in that font. You can, however, specify more than one font so that, if the user does not have your first choice of font, the browser looks for the next font in the list (`ch07_eg02.css`).

```
p.one {font-family:arial, verdana, sans-serif;}
p.two {font-family:times, "times new roman", serif;}
p.three {font-family:courier, "courier new", serif;}
```

If a font name contains spaces, such as times new roman or courier new, you should place the name in double quotation marks.

Figure 7-5 shows what this example would look like in a browser; you can see the different types of font used for each paragraph (ch07\_eg02.html).



Figure 7-5

The comma-separated list of fonts you can use should end with one of five *generic font* names so that the computer can use its default generic font if it cannot find any of the typefaces you specify:

Generic font name	Type of font	Example
serif	Fonts with serifs	Times
sans-serif	Fonts without serifs	Arial
monospace	Fixed-width fonts	Courier
cursive	Fonts that emulate handwriting	Comic Sans
fantasy	Decorative fonts for titles, and so on	<b>Impact</b>

One thing to keep in mind when choosing fonts is that they can each be of different heights or widths, so you will probably want to choose a similar-sized font as an alternative to your first choice. For example, Courier New is a lot shorter and wider than Impact (which is quite tall and narrow). If you designed your page with one font in mind, the layout can be significantly different should a second-choice font be a different size.

When designers want to use a specific typeface that is not likely to be on the majority of users' computers, they tend to use a GIF image for that text. It is generally frowned upon to use images for large sections of text, but for logos or headings and other small amounts of text, this is a good solution. If you do this, remember that you must provide the text that would be seen in the image as the value of the alt attribute.

## Chapter 7: Cascading Style Sheets

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*There are several efforts to allow you to use fonts that others are not likely to have on their computers that involve downloading the font in question; however, most fonts are copyrighted and — like software — cannot simply be distributed by the purchaser. In addition, many users are wary of downloading files from web sites, so this cannot be relied upon as a technique for achieving the look you require. If you really want to use a non-standard font for small amounts of text, an alternative to images is a combination of Flash and JavaScript in SIFR, which allows you to create some interesting effects (<http://novemberborn.net/sifr>).*

### The **font-size** Property

The `font-size` property enables you to specify a size for the font. You can specify a value for this property in several ways:

- Absolute size
- Relative size
- Length
- Percentage (in relation to parent element)

The following values are absolute sizes:

`xx-small x-small small medium large x-large xx-large`

The following two values are relative sizes:

`smaller larger`

Length can be expressed in one of the following units of length:

`px em ex pt in cm pc mm`

You will see what each of these different units means later in the chapter in the section “Lengths” (as they are used in conjunction with several properties, not just fonts). Probably the most common is `px` for pixels.

A percentage is calculated as a proportion of the element that contains the text:

`2% 10% 25% 50% 100%`

For example:

```
p.one {font-size:xx-small;}  
p.twelve {font-size:12px;}  
p.thirteen {font-size:3pc;}  
p.fourteen {font-size:10%;}
```

Figure 7-6 shows you how some of these different font sizes work in the browser. (`ch07_eg03.html` and `ch07_eg03.css` contain several examples of different ways of specifying size and compare how they look.)

The screenshot shows a Mozilla Firefox window titled "CSS Example - Mozilla Firefox". The main content is a table titled "Font Sizes" comparing different font size units. The table has four columns: "Absolute", "Pixels", "Points", and "Picas". Below the table, the value "48 pt" is displayed in large font. The table data is as follows:

Absolute	Pixels	Points	Picas
x-small	9 px	9 pt	1 pc
small	12 px	12 pt	
medium	14 px	14 pt	2 pc
large	18 px	18 pt	
large	24 px	24 pt	3 pc
large	36 px		
	48 px	36 pt	4 pc
		48 pt	

Relative Sizes	Ems	Exs	Percents
smaller	1em	1ex	50%
no style	2em	2ex	75%
larger	3em	3ex	100%
	3em	4ex	150%
	4em	5ex	200%
		6ex	400%
		7ex	

Figure 7-6

## The `font-weight` Property

Most fonts have different variations, such as bold and italic. While many well-made fonts have completely different versions of each character for bold text, browsers tend to use an algorithm to calculate and add to the character's thickness when it is supposed to be bold. Because it uses an algorithm, it means you can also create a lighter version of fonts, too. This is what the `font-weight` property is for.

## Chapter 7: Cascading Style Sheets

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The possible values for `font-weight` are:

```
normal bold bolder lighter 100 200 300 400 500 600 700 800 900
```

So you assign a bold font like this (`ch07_eg04.css`):

```
p.one {font-weight:normal;}  
p.two {font-weight:bold;}  
p.three {font-weight:bolder;}  
p.four {font-weight:lighter;}  
p.five {font-weight:100;}  
p.six {font-weight:200;}
```

Figure 7-7 shows you how these values appear in the browser (`ch07_eg04.html`).

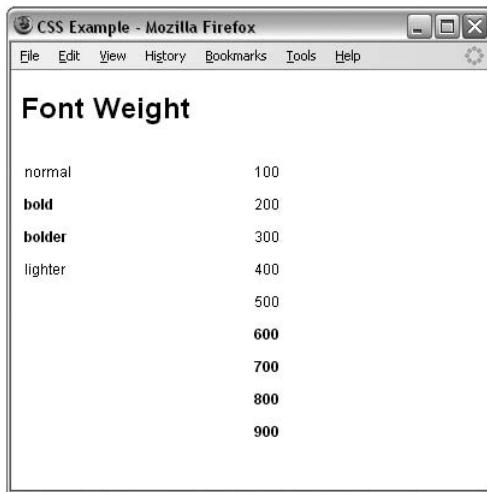


Figure 7-7

Of these values, `bold` is most commonly used, although you might also come across the use of `normal` (especially if a large body of text is already in bold and an exception has to be created).

## ***The font-style Property***

The `font-style` property allows you to specify that a font should be `normal`, `italic`, or `oblique`, and these are the values of the `font-style` property; for example:

```
p.one {font-style:normal;}  
p.two {font-style:italic;}  
p.three {font-style:oblique;}
```

Figure 7-8 shows you how these values appear in the browser (from ch07\_eg05.css).



Figure 7-8

### The **font-variant** Property

There are two possible values for the `font-variant` property: `normal` and `small-caps`. A small caps font looks like a smaller version of the uppercase letterset.

For example, look at the following paragraph, which contains a `<span>` with a `class` attribute (ch07\_eg06.html):

```
<p>This is a normal font, but then <span class="smallcaps">there  
are some small caps</span> in the middle.</p>
```

Now look at the style sheet (ch07\_eg06.css):

```
p {font-variant:normal;}  
span.smallcaps {font-variant:small-caps;}
```

As you can see from Figure 7-9, the rule associated with the `<span>` element indicates that its content should be shown in small caps.



Figure 7-9

## Chapter 7: Cascading Style Sheets

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### The **font-stretch** Property

The `font-stretch` property sets the width of the actual letters in a font (not the space between them). It can take either relative or fixed values. The relative values are as follows:

normal wider narrower

The fixed values are as follows:

ultra-condensed extra-condensed condensed semi-condensed semi-expanded  
expanded extra-expanded ultra-expanded

For example, you can make a condensed Arial font using the following syntax:

```
p {font-family:arial; font-stretch:condensed;}
```

Unfortunately, however, this property is not supported by either IE 7 or Firefox 2.

### The **font-size-adjust** Property

As I mentioned earlier in the chapter, fonts can be different heights and widths. A font's *aspect value* is the ratio between the height of a lowercase letter *x* in the font and the height of the font. The `font-size-adjust` property allows you to alter the aspect value of a font.

For example, Verdana has an aspect value of 0.58 (which means that when the font's size is 100 px, its x-height is 58 pixels). Times New Roman has an aspect value of 0.46 (which means that when the font's size is 100 px, its x-height is 46 pixels). This makes Verdana easier to read at smaller sizes than Times New Roman. By altering a font's aspect value you can, therefore, change its height.

Unfortunately, neither Firefox 2 nor IE 7 supports this property.

## Text Formatting

In addition to the font properties, you can use several properties to affect the appearance or formatting of your text. They are listed in the table that follows.

Property	Purpose
<code>color</code>	Specifies the color of the text
<code>text-align</code>	Specifies the alignment of the text within its containing element
<code>vertical-align</code>	Vertical alignment of text within containing element and in relation to containing element
<code>text-decoration</code>	Specifies whether the text should be underlined, overlined, strikethrough, or blinking text

Property	Purpose
text-indent	Specifies an indent from the left border for the text
text-transform	Specifies that the content of the element should all be uppercase, lowercase, or capitalized
text-shadow	Specifies that the text should have a drop shadow
letter-spacing	Controls the width between letters (known to print designers as <i>kerning</i> )
word-spacing	Controls the amount of space between each word
white-space	Specifies whether the white space should be collapsed, preserved, or prevented from wrapping
direction	Specifies the direction of text (similar to the <code>dir</code> attribute)
unicode-bidi	Allows you to create bidirectional text

## The `color` Property

The `color` property allows you to specify the color of the text. The value of this property can either be a hex code for a color or a color name. (The way in which colors are specified for the Web is discussed further in Appendix D.)

For example, the following rule would make the content of paragraph elements red (`ch07_eg07.html`):

```
p {color:#ff0000;}
```

## The `text-align` Property

The `text-align` property works like the deprecated `align` attribute would with text. It aligns the text within its containing element or the browser window. See the table that follows for possible values.

Value	Purpose
left	Aligns the text with the left border of the containing element
right	Aligns the text with the right border of the containing element
center	Centers the content in the middle of the containing element
justify	Spreads the width across the whole width of the containing element

## Chapter 7: Cascading Style Sheets

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For example, you can see how these work in a table that is 500 pixels wide. Here are the rules for each row (ch07\_eg08.css):

```
td.leftAlign {text-align:left;}  
td.rightAlign {text-align:right;}  
td.center {text-align:center;}  
td.justify {text-align:justify;}
```

Figure 7-10 shows you how these work.

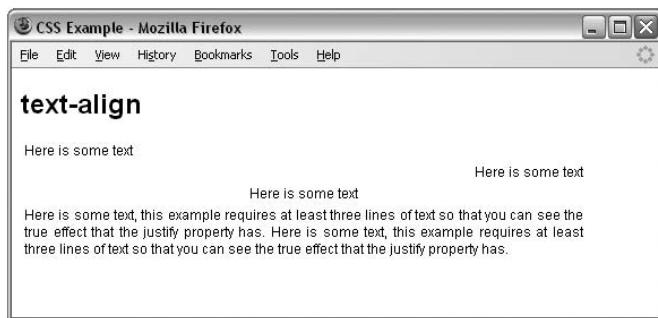


Figure 7-10

## The *vertical-align* Property

The *vertical-align* property is useful when working with inline elements, in particular images and portions of text. It allows you to control their vertical positioning within the containing element.

```
span.footnote {vertical-align:sub;}
```

It can take several values, as you can see in the table that follows.

Value	Purpose
baseline	Everything should be aligned on the baseline of the parent element (this is the default setting).
sub	Makes the element subscript. With images, the top of the image should be on the baseline. With text, the top of the font body should be on the baseline.
super	Makes the element superscript. With images, the bottom of the image should be level with the top of the font. With text, the bottom of the descender (the parts of letters such as g and p that go beneath the line of text) should align with the top of the font body.
top	The top of the text and the top of the image should align with the top of the tallest element on the line.

Value	Purpose
text-top	The top of the text and the top of the image should align with the top of the tallest text on the line.
middle	The vertical midpoint of the element should be aligned with the vertical midpoint of the parent.
bottom	The bottom of the text and the bottom of the image should align with the bottom of the lowest element on the line.
text-bottom	The bottom of the text and the bottom of the image should align with the bottom of the lowest text on the line.

This property may also accept a length and a percentage value.

You can try out all of these in your browser using ch07\_eg09.html.

Figure 7-11 shows you some of these values.

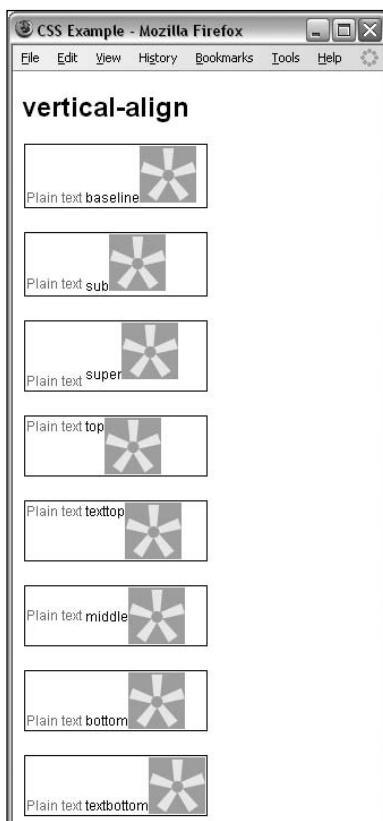


Figure 7-11

## Chapter 7: Cascading Style Sheets

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### The **text-decoration** Property

The `text-decoration` property allows you to specify the values shown in the table that follows.

Value	Purpose
<code>underline</code>	Adds a line under the content.
<code>overline</code>	Adds a line over the top of the content.
<code>line-through</code>	Like strikethrough text, with a line through the middle. In general, this should be used only to indicate text that is marked for deletion.
<code>blink</code>	Creates blinking text (which is generally frowned upon and considered annoying).

For example, here are these properties used on separate paragraphs:

```
p.underline {text-decoration:underline;}  
p.overline {text-decoration:overline;}  
p.line-through {text-decoration:line-through;}  
p.blink {text-decoration:blink;}
```

Figure 7-12 shows you the properties that are demonstrated in `ch07_eg10.html`. Note that the `blink` property works in Netscape and Firefox only.



Figure 7-12

### The **text-indent** Property

The `text-indent` property allows you to indent the first line of text within an element. For example, here you can see that the first line of the second paragraph has been indented. The following is the XHTML in `ch08_eg11.html`:

```
<p>This paragraph should be aligned with the left-hand side of the browser. </p>  
<p class="indent">The content of this paragraph should be indented by 3 em. </p>
```

Now, here is the rule that indents the second paragraph (`ch08_eg11.css`):

```
.indent {text-indent:3em;}
```

You can see what this looks like in Figure 7-13.



Figure 7-13

## The **text-shadow** Property

The `text-shadow` property is supposed to create a *drop shadow*, which is a dark version of the word just behind it and slightly offset. This has often been used in print media, and its popularity has meant that it has gained its own CSS property in CSS2. The value for this property is quite complicated because it can take three lengths, optionally followed by a color:

```
.dropShadow { text-shadow: 0.3em 0.3em 0.5em black}
```

The first two lengths specify X and Y coordinates for the offset of the drop shadow, while the third specifies a blur effect. This is then followed by a color, which can be a name or a hex value.

Unfortunately, this property does not work in IE 7 or Firefox 2, although an example has been provided with the download code in `ch07_eg12.html` and `ch07_eg12.css`.

## The **text-transform** Property

The `text-transform` property allows you to specify the case for the content of an element. The possible values are shown in the table that follows.

Value	Purpose
none	No change should take place.
capitalize	The first letter of every word should be capitalized.
uppercase	The entire content of the element should be uppercase.
lowercase	The entire content of the element should be lowercase.

## Chapter 7: Cascading Style Sheets

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Look at the following four paragraphs, all of which look like this (but with different values for the `class` attribute):

```
<p class="none"><i>The Catcher in the Rye</i> was written by J.D. Salinger</p>
```

Here you can see the four different values for the `text-transform` property in use (`ch07_eg13.css`):

```
p.none {text-transform:none;}  
p.Capitalize {text-transform:Capitalize;}  
p.UPPERCASE {text-transform:UPPERCASE;}  
p.lowercase {text-transform:lowercase;}
```

Figure 7-14 shows you how the paragraphs would appear in a browser with these styles applied.



Figure 7-14

## The **letter-spacing** Property

The `letter-spacing` property is supposed to control something that print designers refer to as *tracking*: the gap between letters. Loose tracking indicates that there is a lot of space between letters, whereas tight tracking refers to letters being squeezed together. No tracking refers to the normal gap between letters for that font.

The possible values are `normal` or a unit of length (which is the next topic). For example (`ch07_eg14.css` which is used with `ch07_eg14.html`):

```
span.wider {letter-spacing:10px;}
```

Figure 7-15 gives you an indication of what this looks like.



Figure 7-15

## The word-spacing Property

The `word-spacing` property is supposed to set the gap between words. Its value should be a unit of length. For example (`ch07_eg15.css` used with `ch07_eg15.html`):

```
span.wider {word-spacing:20px;}
```

Figure 7-16 gives you an indication of what this looks like.

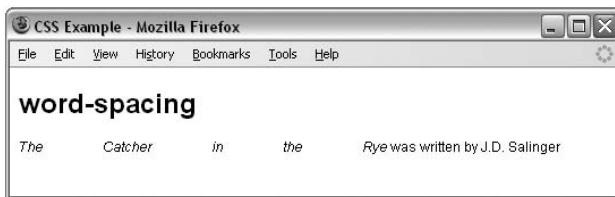


Figure 7-16

## The white-space Property

The `white-space` property controls whether or not white space is preserved within and between block level elements. By default, a browser changes any two or more spaces next to each other into a single space, and makes any carriage returns a single space, too. The `white-space` property offers the same results as the XHTML `<pre>` element and `nowrap` attribute. See the table that follows for the possible values for this property.

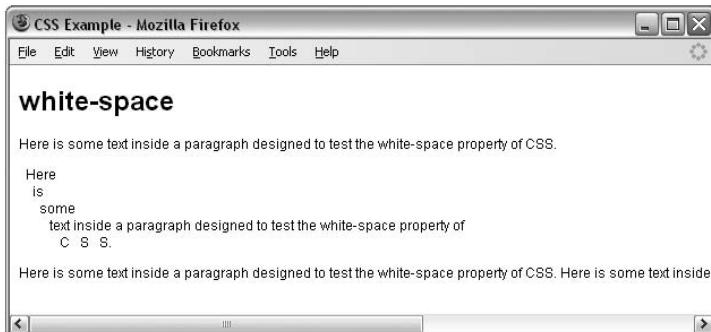
Value	Meaning
<code>normal</code>	Normal white space collapsing rules are followed.
<code>pre</code>	White space is preserved just as in the <code>&lt;pre&gt;</code> element of XHTML, but the formatting is whatever is indicated for that element, not just a monospaced font.
<code>nowrap</code>	Text is broken onto a new line only if explicitly told to with a <code>&lt;br /&gt;</code> element; otherwise text does not wrap.

For example, you can use the `white-space` property like so (`ch07_eg16.css`):

```
.pre {white-space:pre;}
.nowrap {white-space:nowrap;}
```

Unfortunately, the value of `pre` does not work in IE 7, although it does work in Netscape 4/Firefox 1 and later. The `nowrap` property works in IE 6 and Netscape 4/Firefox 1 and later. You can see both of these properties working in Figure 7-17.

## Chapter 7: Cascading Style Sheets



**Figure 7-17**

## ***The direction Property***

The `direction` property is rather like the `dir` attribute and specifies the direction in which the text should flow. The following table shows the possible values.

Value	Meaning
ltr	The text flows from left to right.
rtl	The text flows from right to left.
inherit	The text flows in the same direction as its parent element.

For example, here are rules for two paragraphs indicating different directions for the text (`ch07_eg17.css` used with `ch07_eg17.html`):

```
p.ltr {direction:ltr;}  
p.rtl {direction:rtl;}
```

In practice, both IE and Firefox use this property much as the align attribute is used. The value rtl will simply right-align text, as you can see in Figure 7-18. Note, however, that the period (or full stop) is to the left of the sentence in the paragraph that is supposed to be running right to left.



**Figure 7-18**

*Do not use this property instead of the `text-align` property, as it will break when new browsers fully support this property.*

### The `unicode-bidi` Property

The `unicode-bidi` property is designed for internationalization purposes; the `bidi` part in the name is short for *bi-directional*. It allows words to appear in the direction that would be inferred by the Unicode standard and for authors to specify a change in direction of the elements' content contrary to the Unicode standard. See the table that follows for possible values.

Value	Purpose
<code>normal</code>	No directional embedding will be enabled.
<code>embed</code>	The element opens an additional level of embedding, and the intending Unicode direction will be followed.
<code>bidi-override</code>	Overrides the default directional values of an inline element in order to allow the <code>direction</code> property to set the direction in the element (overrides the Unicode settings).

It is particularly helpful for inline elements that should be facing a different direction than the rest of the containing element — for example, if you were using a word that was written in a different direction because the `embed` value allows your text to flow in the opposite direction from the rest of the containing element. If you want to stop this from happening, you can use the `bidi-override` value.

## Text Pseudo-Classes

While you are learning about text, there are two very helpful pseudo-classes that can help you work with text. These pseudo-classes allow you to render either the first letter or the first line of an element in a different way than the rest of that element. Both of these are commonly used when laying out text.

### The `first-letter` Pseudo-Class

The `first-letter` pseudo-class allows you to specify a rule just for the first letter of an element. This is most commonly used on the first character of a new page, either in some magazine articles or in books.

Here is an example of the `first-letter` pseudo-class applied to a `<p>` element carrying a `class` attribute whose value is `pageOne` (`ch07_eg18.css` which is used with `ch07_eg18.html`):

```
p.pageOne:first-letter {font-size:42px;}
```

You can see the effect of this `first-letter` pseudo-class in Figure 7-19 (which also shows the next pseudo-class we will be looking at).

## Chapter 7: Cascading Style Sheets

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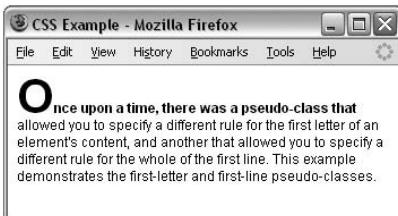


Figure 7-19

### The **first-line** Pseudo-Class

The `first-line` pseudo-class should allow you to render the first line of any paragraph differently from the rest of the paragraph. Commonly this might be in a bold font so that the reader can clearly see an introduction (for articles) or the first line (for poems).

The name of the pseudo-class is separated from the element it should appear on by a colon:

```
p:first-line {font-weight:bold;}
```

Note how, if you resize the window so that there is less text on the first line, only the first line of text in the browser will be given this new style. You can see the `first-line` pseudo-class in action in Figure 7-19, which also demonstrates the `first-letter` pseudo-class.

#### Try It Out A Font Test Page

Now that you've learned about using CSS to format text, it is time to try putting what you have learned into practice by creating a font test page. You will be able to use this page to test whether a browser supports a font or not.

1. Create a new XHTML document, with the skeleton you are used to creating by now:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
 "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
    <title>Font test</title>
</head>
<body>
</body>
</html>
```

2. Add a `<link />` element to an external style sheet. The name of the style sheet will be `font-test.css`.

```
<head>
    <title>Font text</title>
    <link rel="stylesheet" type="text/css" href="font-test.css" />
</head>
```

3. Add four `<div>` elements to the body of the document, each containing the line “The quick brown fox jumped over the lazy dog.”

For each element, give it a `class` attribute whose value is the name of a different typeface, and start each sentence with the name of the typeface, too, like this:

```
<div class="arial">Arial: The quick brown fox jumped over the lazy dog.</div>

<div class="helvetica">Helvetica: The quick brown fox jumped over the lazy dog.
</div>

<div class="TimesNewRoman">Times New Roman: The quick brown fox jumped over the
lazy dog.</div>

<div class="MrsEaves">Mrs Eaves: The quick brown fox jumped over the lazy dog.
</div>
```

4. Save this file as `font-test.html`.
5. Create a new document in the editor you are using and save the file as `font-test.css`.
6. Add the selectors for each of the `<div>` elements you added to your XHTML document:

```
div.arial
div.helvetica
div.TimesNewRoman
div.MrsEaves
```

7. Add `font-family` properties to each of these, and give the value of the typeface specified:

```
div.arial {font-family:arial;}
div.helvetica {font-family:Helvetica;}
div.TimesNewRoman {font-family:"Times New Roman";}
div.MrsEaves {font-family:"Mrs Eaves";}
```

8. Add another typeface after the one you want to view, and separate the two with a comma. Note that this second typeface should be very different from the ones you are hoping to see. I am using Courier, a monospaced font, as the second choice, so it will be clear whether or not the browser supports the font I have named.

```
div.arial {font-family:arial, courier;}
div.helvetica {font-family:Helvetica, courier;}
div.TimesNewRoman {font-family:"Times New Roman", courier;}
div.MrsEaves {font-family:"Mrs Eaves", courier;}
```

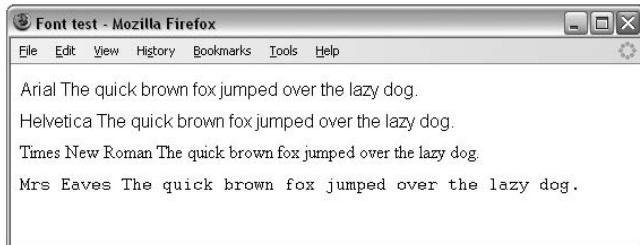
9. Add the following rule to make sure that there is adequate space between each line to look at the fonts:

```
div {line-height:28px;}
```

10. Save this CSS file and open the XHTML page in your browser. You should end up with something like Figure 7-20.

## Chapter 7: Cascading Style Sheets

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Finally, the `line-height` property added extra height between each line of text to make the examples more readable. This property was specified using one selector for every `<div>` element rather than repeating it for each `<div>` element.

---

## Selectors

You should be starting to get the hang of writing rules in style sheets that indicate how an element should appear, but before you look at more of the properties you can use to affect the layout of a document, you need to look at some more of the fundamentals, starting with a look at the different ways in which you can select which element or elements a rule applies to.

You can select elements in several ways, not just by using their names as you have seen in this chapter (which is, incidentally, known as a *simple selector*), or using the value of the `class` attribute in the document the sheet is styling. You can create selectors that are a lot more specific. In addition to providing the element name as a selector, you can use the following as selectors.

### ***Universal Selector***

The *universal selector* is an asterisk; it is like a wildcard and matches all element types in the document.

```
* { }
```

If you want a rule to apply to all elements, you can use this selector. Sometimes it is used for default values, such as a `font-family` and `font-size`, that will apply to the whole of the document (unless another more specific selector indicates an element should use different values for these same properties).

It is slightly different from applying default styles to the `<body>` element, as the universal selector applies to every element, and does not rely on the property being inherited from the rules that apply to the `<body>` element.

### ***The Type Selector***

The *type selector* matches all of the elements specified in the comma-delimited list. It allows you to apply the same rules to several elements. For example, the following would match all `h1`, `h2`, and `p` elements.

```
h1, h2, p { }
```

If you have the same rules that apply to several elements, this technique can lead to a smaller style sheet, saving bandwidth and load on your server (the computer sending your web pages to those that request them).

## Chapter 7: Cascading Style Sheets

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### The Class Selector

The *class selector* allows you to match a rule with an element carrying a `class` attribute whose value you specify in the class selector. For example, imagine you had a `<p>` element with a `class` attribute whose value was `BackgroundNote`, like so:

```
<p class="BackgroundNote">This paragraph contains an aside.</p>
```

You can use a class selector in one of two ways here: First you could simply assign a rule that applies to any element that has a `class` attribute whose value is `BackgroundNote`, like so, simply preceding the value of the `class` attribute with a period or full stop:

```
.BackgroundNote {}
```

Or you can create a selector that selects only the `<p>` elements that carry a `class` attribute with a value of `BackgroundNote` (not other elements) like so:

```
p.BackgroundNote {}
```

If you have several elements that can all carry a `class` attribute with the same value (for example a `<p>` element and a `<div>` element could both use the `class` attribute with the same value) *and* you want the content of these elements to be displayed in the same manner, you will want to use the former notation. If the class is specific to the `<p>` element, then you should use the latter notation.

### The ID Selector

The *id selector* works just like a class selector, but works on the value of `id` attributes. But rather than using a period or full stop before the value of the `id` attribute, you use a hash or pound sign (#). So, a `<p>` element with an `id` attribute whose value is `abstract` can be identified with this selector.

```
p#abstract
```

Because the value of an `id` attribute should be unique within a document, this selector should apply only to the content of one element.

### The Child Selector

The *child selector* matches an element that is a direct child of another. In this case it matches any `<b>` elements that are direct children of `<td>` elements:

```
td>b {}
```

This would enable you to specify a different style for `<b>` elements that are direct children of the `<td>` element rather than for `<b>` elements that appear elsewhere in the document.

Note, however, that this selector applies only to a `<b>` element that is a direct child of the parent element. The following selector does not really make sense because the `<b>` element should not be a direct child of a `<table>` element (instead, a `<tr>` element is more likely to be the direct child of a `<table>` element):

```
table>b {}
```

The less-than symbol (>) is referred to as a *combinator*.

Unfortunately, IE7 was the first version of Internet Explorer to support the child selector, so before using this selector on your site, you need to check how many of the visitors to your site use IE7 (you can see how to do this in Chapter 13). If you still have a lot of visitors using IE6, you should test your web site in IE6 to make sure it appears as you want it to.

## **The Descendent Selector**

The *descendent selector* matches an element type that is a descendent of another specified element, at any level of nesting, not just a direct child. While the less-than symbol was the combinator for the child selector, for the descendent selector the combinator is the space. Take a look at this example:

```
table b {}
```

In this case, the selector matches any `<b>` element that is a child of the `<table>` element, which means it would apply to `<b>` elements both in `<td>` and `<th>` elements.

This is a contrast to the child selector because it applies to all of the children of the `<table>` element, rather than just the direct children.

## **The Adjacent Sibling Selector**

An *adjacent sibling selector* matches an element type that is the next sibling of another. For example, if you want to make the first paragraph after any level 1 heading a different style you can use the adjacent sibling selector like so:

```
h1+p {}
```

Both elements must have the same element, and this will apply only to the `<p>` element directly after a heading.

Unfortunately, IE7 was the first version of Internet Explorer to support the adjacent sibling selector, so you need to check how many of the visitors to your site use IE7 (you learn how to do this in Chapter 13). If you still have a lot of visitors using IE6, you should test your web site in IE6 to make sure it appears as you want it to.

## **Using Child and Adjacent Sibling Selectors to Reduce Dependence on Classes in Markup**

The child and adjacent sibling selectors are both very important because they can reduce the number of `class` attributes you need to add into an XHTML document.

It is very easy to add classes for all kinds of eventualities. For example, you might want the first paragraph after an `<h1>` element to be shown in bold, and you might have been tempted to add a class to the first `<p>` element after every `<h1>` element. This will work, but before you know it your markup can be littered with all kinds of classes that are only there to make it easier to control the presentation of the pages.

## Chapter 7: Cascading Style Sheets

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Furthermore, if you then decided you wanted the first two `<p>` elements after every `<h1>` element to be bold, you might have to go back and add in new class attributes for the second `<p>` elements after every `<h1>` element. So the child and adjacent sibling selectors add a lot of flexibility to how you style documents and can make for much cleaner markup.

Take a look at the following XHTML content (`ch07_eg19.html`):

```
<p>Here is an example of some adjacent sibling and child selectors.</p>
<div>
  <p>One</p>
  <p>Two</p>
  <p>Three</p>
  <p>Four</p>
  <p>Five</p>
</div>
```

Using the adjacent and adjacent sibling and child selectors only, you are going to create a page that looks like the one shown in Figure 7-21.

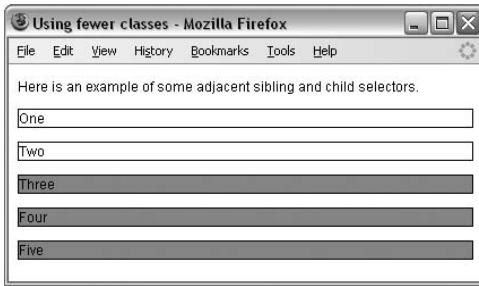


Figure 7-21

The three different paragraph styles are as follows:

- The first paragraph has no border or background color.
- The paragraphs inside the `<div>` element all have borders.
- The last three paragraphs have a gray background.

I have not used three different classes to specify different paragraph styles; rather, I have one rule that controls the font used for all paragraphs:

```
p {font-family:arial, verdana, sans-serif;}
```

The following is the second rule for any paragraph that is a child of a `<div>` element. (Because the first paragraph is not inside a `<div>` element, the rule does not apply to the first paragraph.)

```
div>p {border:1px solid #000000;}
```

The third rule matches any paragraph and is the third consecutive `<p>` element. (Because the fourth and fifth `<p>` elements have two previous `<p>` elements, this rule applies to them, too.)

```
p+p+p {background-color:#999999;}
```

Remember that this example will not work in IE6 or earlier versions of Internet Explorer, as these selectors were first introduced in IE7.

## Attribute Selectors

Attribute selectors enable you to use the attributes that an element carries in the selector. You can use attribute selectors in several ways, as shown in the following table, but they have only been supported in later browser versions.

Name	Example	Matches
Existence selector	<code>p[id]</code>	Any <code>&lt;p&gt;</code> element carrying an attribute called <code>id</code> .
Equality selector	<code>p[id="summary"]</code>	Any <code>&lt;p&gt;</code> element carrying an attribute called <code>id</code> whose value is <code>summary</code> .
Space selector	<code>p[class~="XHTML"]</code>	Any <code>&lt;p&gt;</code> element carrying an attribute called <code>class</code> , whose value is a list of space-separated words, one of which is exactly the same as <code>XHTML</code> .
Hyphen selector	<code>p[language = "en"]</code>	Any <code>&lt;p&gt;</code> element carrying an attribute called <code>language</code> whose value begins with <code>en</code> and is followed with a hyphen (it is designed for use with language attributes).
Prefix selector (CSS3)	<code>p[attr^="b"]</code>	Any <code>&lt;p&gt;</code> element carrying any attribute whose value begins with <code>b</code> . (CSS3)
Substring selector (CSS3)	<code>p[attr*="on"]</code>	Any <code>&lt;p&gt;</code> element carrying any attribute whose value contains the letters <code>on</code> . (CSS3)
Suffix selector (CSS3)	<code>p[attr\$="x"]</code>	Any <code>&lt;p&gt;</code> element carrying any attribute whose value contains the ends in the letter <code>x</code> . (CSS3)

Internet Explorer implemented these attribute selectors in IE7, and in order for them to work, the XHTML document must have the strict !DOCTYPE declaration.

## Chapter 7: Cascading Style Sheets

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Firefox 2 supports only the first four attribute selectors.

*Another feature is the ability to use regular expressions in selectors. However, the use of regular expressions in selectors is not yet supported in any of the major browsers. Furthermore, regular expressions are a complicated topic, and you are better off getting used to the selectors named here before you consider learning about regular expressions.*

Let's have a look at using these attribute selectors. Here are seven different paragraph elements, each carrying different attributes/attribute values (ch07\_eg20.html):

```
<p id="introduction">Here's paragraph one, each have different attributes.</p>
<p id="summary">Here's paragraph two, each have different attributes.</p>
<p class="important XHTML">Here's paragraph three, each have different
attributes.</p>
<p language="en-us">Here's paragraph four, each have different attributes.</p>
<p class="begins">Here's paragraph five, each have different attributes.</p>
<p class="contains">Here's paragraph six, each have different attributes.</p>
<p class="suffix">Here's paragraph seven, each have different attributes.</p>
```

Now let's look at a CSS style sheet that uses attribute selectors to associate different style rules with each of these elements (ch07\_eg20.css):

```
p[id] {border:1px solid #000000;}
p[id="summary"] {background-color:#999999;}
p[class~="XHTML"] {border:3px solid #000000;}
p[language|="en"] {color:#ffffff; background-color:#000000;}
p[attr^"b"] {border:3px solid #333333;}
p[attr*|"on"] {color:#ffffff; background-color:#333333;}
p[attr$|$x"] {border:1px solid #333333;}
```

You can see the result in Firefox 2.0 in Figure 7-22. As you can see, this version of Firefox understands only the first four attribute selectors, not the final three (which are new additions in CSS3).

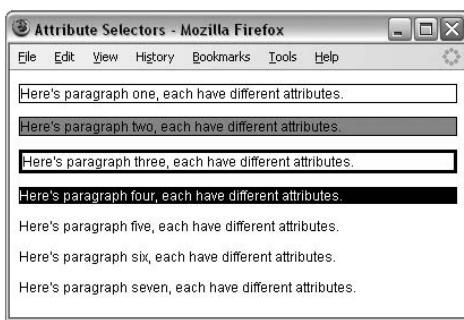


Figure 7-22

Because XHTML is case-sensitive, all selectors should match the case of the element name that they are supposed to match.

# Lengths

You have already seen that some of the properties' values are given as *lengths* (size of fonts, height of lines of text), and you will come across the need to specify lengths in several more CSS properties. Let's take a look at these now because the next section relies on lengths for several properties.

Lengths can be measured in one of three ways in CSS:

- Absolute units
- Relative units
- Percentages

## Absolute Units

The following table shows the *absolute units* that you can use in CSS.

Unit	Full Name
pt	A point
pc	A pica
in	An inch
cm	A centimeter
mm	A millimeter

I shouldn't really need to clarify inches, millimeters, or centimeters, but the other two are more interesting. A point is  $\frac{1}{72}$  of an inch (the same as a pixel in most computer screen resolutions), and a pica is  $\frac{1}{12}$  of an inch (12 points). Typographers tend to use points to measure font sizes and leading (the gaps between lines), while picas are used to measure line lengths.

## Relative Units

*Relative units* and percentages can be very useful, but they also bring their own issues that you need to be aware of for two reasons:

- They can adjust size with the kind of media that the document is being shown on.
- Users can increase and decrease the size of fonts on a web browser and the rest of the page will scale to fit.

## Chapter 7: Cascading Style Sheets

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### **px**

A *pixel* is the smallest unit of resolution on a screen and probably the most common way of specifying font sizes and lengths in CSS.

Technically, the size of a layout that uses pixels as a unit of measurement *can* depend upon the viewing medium (keep reading to see why I say “can”).

Most computer screens have a resolution of 72 dots per inch (dpi), but you will find that most modern laser and bubble jet printers are set with a higher resolution — my current printer runs at 300 dpi. In contrast, mobile phones and PDAs can have an even lower resolution than computer screens.

So, a table that is 500 pixels wide could be 9.9444 inches wide on a 72 dpi screen, 1.666 inches wide at 300 dpi, or 13.888 inches wide on a 32 dpi screen (and a screen with such low resolution is very unlikely to be that wide).

In reality, however, when you print a web page from IE or Firefox, the browser will adjust the pixels to present a readable version of the document. In fact, CSS recommends that user agents rescale pixel units so that reading at arm’s length 1 pixel would correspond to about 0.28 mm or  $\frac{1}{90}$  of an inch. But technically, this does stop a pixel from being a relative unit, and makes it an absolute unit.

*Most powerful programming languages have a function that allows programmers to adjust images to the screen resolution, but this is not possible in CSS.*

### **em**

An *em* unit corresponds directly to the font size of the *reference* element, the reference element being either that element or the containing element.

The term *em* is often thought to come from the width of a lowercase *m*, although now it is more often considered to be the height of the font. (Note that an *en* is half an *em*.)

### **ex**

The *ex* should be the height of a lowercase *x*. Because different fonts have different proportions, the *ex* is related to the font size and the type of font. In Figure 7-23, you can see the *x* in the Courier typeface is smaller than the *x* in the Impact typeface.



Figure 7-23

## Percentages

Percentages give a value in relation to another value (the value depends upon the property in question). Note that when a percentage value is inherited, it is the value that is set by the percentage that is inherited (not the percentage).

## Introducing the Box Model

Now that you've seen how to specify properties, learned more about selectors, and looked at some of the basic units of length, you will soon be ready to look at more sets of properties that you can use to control the presentation of element content. But before you do, you need to understand how CSS is based on a *box model*.

Every element gets treated as a *box* in CSS, and remembering this will really help you understand how to create attractive layouts with CSS.

As you can see in the table that follows, every box has three properties you must be aware of.

Property	Description
border	Even if you cannot see it, every box has a border. This separates the edge of the box from other boxes.
margin	The margin is the distance between the edge of a box and the box next to it.
padding	This padding is the space between the content of the box and its border.

You can get a better idea of these properties in Figure 7-24, which shows the various parts of the box (the black line is the border).

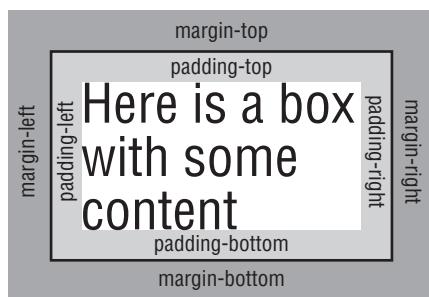


Figure 7-24

## Chapter 7: Cascading Style Sheets

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You can use CSS to individually control the top, bottom, left, and right border, margin, and padding of each box; and you can specify a different width and color for each side of the box.

The padding and margin properties are especially important in creating *white space*, which is the space between parts of the page, in your designs. For example, if you have text inside a box with a border, you would want to have some padding so that the edge of the text does not touch the border. (If text actually touches a border of the same color, it makes it much harder to read.)

Meanwhile, if you had two boxes with borders, then without a margin between them, the boxes would run into each other, and the line would look thicker where the boxes met.

There is, however, an interesting issue with margins: when a bottom margin of one element meets the top margin of another, only the larger of the two will show (if they are the same size, then the margin will be equivalent to the size of just one of the margins). Figure 7-25 shows the vertical margins of two adjacent boxes collapsing.

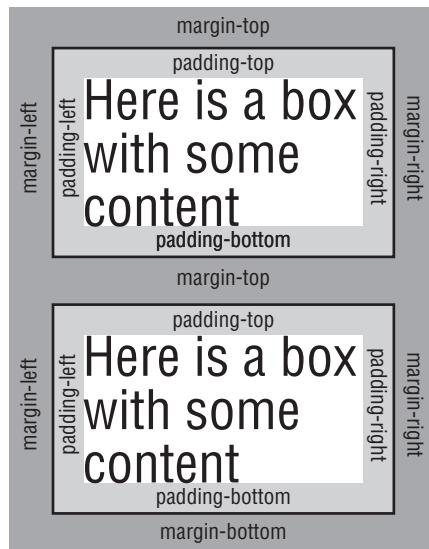


Figure 7-25

To really understand how the box model works with elements, take a look at the example in the next section.

### An Example Illustrating the Box Model

To illustrate the box model with a real page, it is as if the <body> element creates a box that contains the whole page, and then each heading, paragraph, image, or link creates another box within the page.

Each box can have different properties that affect the appearance of its contents. Take a look at the following XHTML (ch09\_eg21.html):

```
<?xml version="1.0" ?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
  <title>Understanding the Box Model</title>
  <link rel="stylesheet" type="text/css" href="ch07_eg19.css" />
</head>
<body>
  <h1>Thinking Inside the Box</h1>
  <p class="description">When you are styling a web page with CSS page you
    must start to think in terms of <b>boxes</b>.</p>
  <p>Each element is treated as if it generates a new box. Each box can have
    new rules associated with it.</p>
  
  <p>As you can see from the diagram above, each box has a <b>border</b>. Between
    the content and the border you can have <b>padding</b>, and outside of the border
    you can have a <b>margin</b> to separate this box from any neighboring boxes.</p>
</body>
</html>
```

Each element involved with the body of the document — `<body>`, `<h2>`, `<p>`, `<img>`, and `<b>` — gets treated as if it were in a separate box. You can see this by creating some CSS rules to add a border around each of these elements using some new properties here, which you will meet shortly (ch07\_eg21.css).

```
body {
  color:#000000;
  background-color:#ffffff;
  font-family:arial, verdana, sans-serif;
  font-size:12px;
  line-height:24px;}
body, h1, p, img, b {
  border-style:solid;
  border-width:2px;
  border-color:#000000;
  padding:2px;}
h1, b {background-color:#cccccc;}
```

This gives you an even better idea of how all styling with CSS involves selecting an element and then setting different properties with appropriate values.

Figure 7-26 shows you how this page looks in a browser. While it is not too attractive, it shows you how the boxes are created for each element. The line is actually the border of the box created for that element. In addition to each element having a border, the `<h1>` and `<b>` elements also have a gray background to help distinguish them.

## Chapter 7: Cascading Style Sheets

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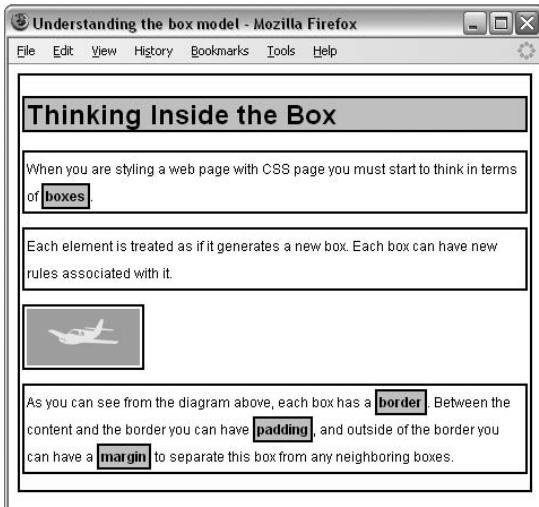


Figure 7-26

You may remember from Chapter 1 that there is a difference between *block level elements* and *inline elements*; the difference becomes quite important when working with CSS because it determines how each box is treated. This example illustrates the point well; if you look at the `<h1>` element, its box takes up the full width of the browser, whereas the boxes around the `<b>` elements sit in the middle of the rest of the paragraph rather than taking up a whole line.

The `<h1>` element is a block-level element, as are the `<body>` and `<p>` elements. It is treated as if it creates a separate block on its own and it appears on its own new line. The `<b>` element, meanwhile, is an inline element, flows within its containing element, and does not have to appear on a new line of its own. A block element will also, by default, take up the full width of the page (or the element it is contained within), whereas an inline element will take up only as much space as it needs.

The `<img />` element may look like it is a block-level element although it is actually an inline element. You can tell this because, while it looks as though it is on its own line, the border around it takes up only the width of the image. If it were a block-level element, the border would reach the full width of the browser. The image is on its own line only because the elements on either side of it are block-level elements (and therefore the surrounding elements appear on their own lines).

In Strict XHTML, this image element should be placed inside a block-level element, as you are supposed to have block-level elements only as children of the `<body>` element. While it does not matter in Transitional XHTML, you could simply fix this issue by putting the element inside a `<div>` element (which you might remember is a grouping element).

*If you are checking your site on Internet Explorer 6 or earlier versions of IE, you might find that boxes come up at a different size than you expected. In standards-compliant browsers the total width of a box is:*

```
width = margin-left + border-left + padding-left + width + padding-right  
+ border-right + margin-right
```

*In older versions of IE, padding and borders are not included in the calculation, so it thinks that*

```
width = margin-left + width + margin-right
```

*You can get around this in IE6 by making sure that it is running in standards-compliant mode, which you do by including one of the !DOCTYPE declarations that you met in Chapter 1 in your XHTML pages.*

## The Border Properties

The border properties allow you to specify how the border of the box representing an element should look. There are three properties of a border you can change:

- `border-color` to indicate the color a border should be
- `border-style` to indicate whether a border should be a solid, dashed, or double line, or one of the other possible values
- `border-width` to indicate the width a border should be

### The `border-color` Property

The `border-color` property allows you to change the color of the border surrounding a box. For example:

```
p {border-color:#ff0000;}
```

The value can be a hex code for the color or a color name (colors are discussed in greater detail in Appendix D). It can also be expressed as values for red, green, and blue; between 0 and 255; or percentages of red green and blue. See the table that follows for examples.

Color Name	hex	RGB Values	RGB Percentages
red	#ff0000	rgb(255, 0, 0)	rgb(100%, 0, 0)
green	#00ff00	rgb(0, 255, 0)	rgb(0, 100%, 0)
blue	#0000ff	rgb(0, 0, 255)	rgb(0, 0, 100%)

You can individually change the color of the bottom, left, top, and right sides of a box's border using the following properties:

- `border-bottom-color`
- `border-right-color`
- `border-top-color`
- `border-left-color`

## Chapter 7: Cascading Style Sheets

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### The **border-style** Property

The `border-style` property allows you to specify the style of the border:

```
p {border-style:solid;}
```

The default value for this property is `none`, so no border shows automatically. The table that follows shows the possible values.

Value	Description
<code>none</code>	No border. (Equivalent of <code>border-width:0;</code> )
<code>solid</code>	Border is a single solid line.
<code>dotted</code>	Border is a series of dots.
<code>dashed</code>	Border is a series of short lines.
<code>double</code>	Border is two solid lines; the value of the <code>border-width</code> property creates the sum of the two lines and the space between them.
<code>groove</code>	Border looks as though it is carved into the page.
<code>ridge</code>	Border looks the opposite of <code>groove</code> .
<code>inset</code>	Border makes the box look like it is embedded in the page.
<code>outset</code>	Border makes the box look like it is coming out of the canvas.
<code>hidden</code>	Same as <code>none</code> , except in terms of border-conflict resolution for table elements.

Figure 7-27 shows an example of what each of these would look like (taken from `ch07_eg22.html`). Note that even though the last four examples in Figure 7-27 look very similar, they are different, and you can try them for yourself with the download code for this example.

You can individually change the style of the bottom, left, top, and right borders of a box using the following properties:

- `border-bottom-style`
- `border-right-style`
- `border-top-style`
- `border-left-style`

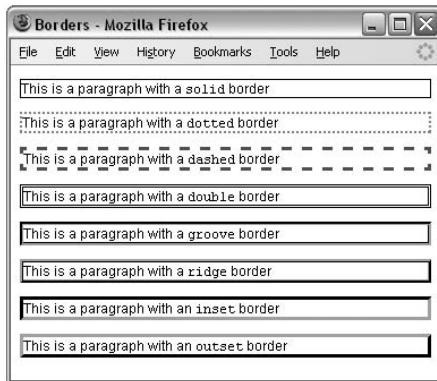


Figure 7-27

## The **border-width** Property

The `border-width` property allows you to set the width of your borders.

```
p {border-style:solid;}  
border-width:4px;}
```

The value of the `border-width` property cannot be a percentage; it must be a length (as discussed in the “Lengths” section earlier in the chapter) or one of the following values:

- thin
- medium
- thick

The width of the `thin`, `medium`, and `thick` values are not specified in the CSS recommendation in terms of pixels; so the actual width that corresponds to these keywords is dependent on the browser.

You can individually change the width of the bottom, top, left, and right borders of a box using the following properties:

- `border-bottom-width`
- `border-right-width`
- `border-top-width`
- `border-left-width`

## Expressing Border Properties Using Shorthand

The `border` property allows you to specify color, style, and width of lines in one property:

```
p {border: 4px solid red;}
```

## Chapter 7: Cascading Style Sheets

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If you use this shorthand, the values should not have anything (other than a space) between them. You can also specify the three color, style, and width of lines individually for each side of the box in the same way using these properties:

- border-bottom
- border-top
- border-left
- border-right

### **The padding Property**

The padding property allows you to specify how much space should appear between the content of an element and its border:

```
td {padding:5px;}
```

The value of this attribute should be either a length, a percentage, or the word `inherit`. If the value is `inherit` it will have the same padding as its parent element.

If a percentage is used, the percentage is of the containing box. So, if the rule indicates the padding on the `<body>` element should be 10 percent, 5 percent of the browser window's width will be inside the content of the `<body>` element on each side as padding. Alternatively, if the rule indicated that a `<td>` element should have a 10 percent padding in a cell that is 100 pixels square, there will be a 5-pixel padding around each side of the square inside the border.

The padding of an element will not inherit, so if the `<body>` element has a padding property with a value of 50 pixels, this will not automatically apply to all other elements inside it.

You can specify different amounts of padding inside each side of a box using the following properties:

- padding-bottom
- padding-top
- padding-left
- padding-right

The padding attribute is especially helpful in creating white space between the content of an element and any border it has. (Even if the border is not visible, padding prevents the content of two adjacent boxes from touching.) Take a look at the following two paragraphs in Figure 7-28.

If you look at the CSS rules for these two paragraph elements, you can see that by default the first paragraph has no padding; it must be specified if you want this gap (`ch07_eg23.css`).

```
.a, .b {border-style:solid;
  border-color:#000000;
  border-width:2px;
  width:100px;}
.b {padding:5px;}
```

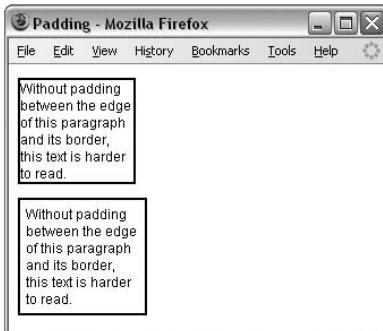


Figure 7-28

I'm sure you can imagine that when you have a table with lots of adjacent cells, this padding property becomes very valuable.

### The **margin** Property

The **margin** property is the gap between boxes, and its value is either a length, a percentage, or **inherit**, each of which has exactly the same meaning as it did for the **padding** property you just saw.

```
p {margin:20px;}
```

As with the **padding** property, the values of the **margin** property are not inherited by child elements. But remember that two boxes whose vertical margins touch each other will also collapse into each other so that the distance between the blocks is not the sum of the margins, but only the greater of the two margins (or the same size as one margin if both are equal).

You can also set different values for the margin on each side of the box using the following properties:

- margin-bottom**
- margin-top**
- margin-left**
- margin-right**

If you look at the following example (see Figure 7-29, which shows `ch07_eg24.html`), you can see three paragraphs, which look as if they are spaced equally. However, they have taller margins on the top than the bottom, and therefore where two boxes meet, the bottom margin is ignored (the margins are collapsed). The example also shows how to set the left and right margins on the side of inline elements — where you see the highlighted words. Again, this is not the most attractive example, but it illustrates both block and inline boxes using margins.

The words in the paragraphs that are emphasized using the `<em>` element have **margin-left** and **margin-right** properties set. Because these elements also have a background color set, you can really see how the margins to the left and the right separate the words from the surrounding words.

## Chapter 7: Cascading Style Sheets

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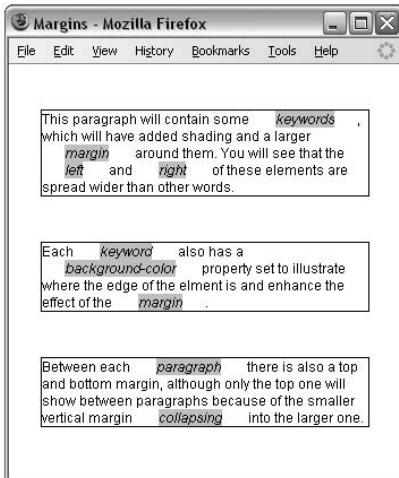


Figure 7-29

Here are the rules from ch07\_eg24.css:

```
body {  
    color:#000000;  
    background-color:#ffffff;  
    font-family:arial, verdana, sans-serif;  
    font-size:12px;}  
  
p {  
    margin-top:40px;  
    margin-bottom:30px;  
    margin-left:20px;  
    margin-right:20px;  
    border-style:solid;  
    border-width:1px;  
    border-color:#000000;}  
  
em {  
    background-color:#cccccc;  
    margin-left:20px;  
    margin-right:20px;}
```

## Dimensions

Now that you've seen the border that surrounds every box, the padding that can appear inside each box, and the margin that can go around them, it is time to look at how you can change the dimensions of boxes.

The table that follows shows the properties that allow you to control the dimensions of a box.

Property	Purpose
height	Sets the height of a box
width	Sets the width of a box
line-height	Sets the height of a line of text (like leading in a layout program)
max-height	Sets a maximum height for a box
min-height	Sets the minimum height for a box
max-width	Sets the maximum width for a box
min-width	Sets the minimum width for a box

## The **height** and **width** Properties

The `height` and `width` properties allow you to set the height and width for boxes. They can take values of a length, a percentage, or the keyword `auto` (the default value being `auto`).

Here you can see the CSS rules for two paragraph elements, the first with a `class` attribute whose value is `one` and the second whose `class` attribute has a value of `two` (`ch07_eg25.css`):

```
p.one {
    width:200px; height:100px;
    padding:5px; margin:10px;
    border-style:solid; border-color:#000000; border-width:2px; }
p.two {
    width:300px; height:100px;
    padding:5px; margin:10px;
    border-style:solid; border-color:#000000; border-width:2px; }
```

As you can see in Figure 7-30, the first paragraph will be 200 pixels wide and 100 pixels high, while the second paragraph will be 300 pixels wide and 100 pixels high.

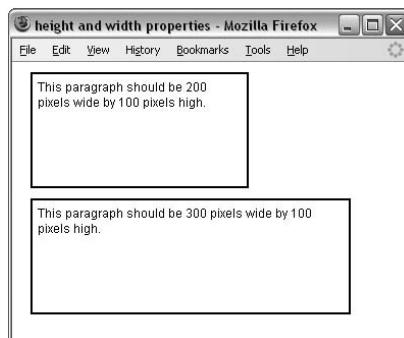


Figure 7-30

## Chapter 7: Cascading Style Sheets

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### The *line-height* Property

The *line-height* property is one of the most important properties when laying out text. It allows you to increase the space between lines of text (known to print designers as *leading*).

The value of the *line-height* property can be a number, a length, or a percentage. It is a good idea to specify this property in the same measurement in which you specify the size of your text.

Here you can see two rules setting different *line-height* properties (`ch07_eg26.css`):

```
p.one {  
    line-height:16px;  
}  
p.two {  
    line-height:28px;  
}
```

As you can see in Figure 7-31, the first paragraph does not have a *line-height* attribute, whereas the second and third paragraphs correspond to the preceding rules. Adding some extra height between each line of text can often make it more readable, especially in longer articles.

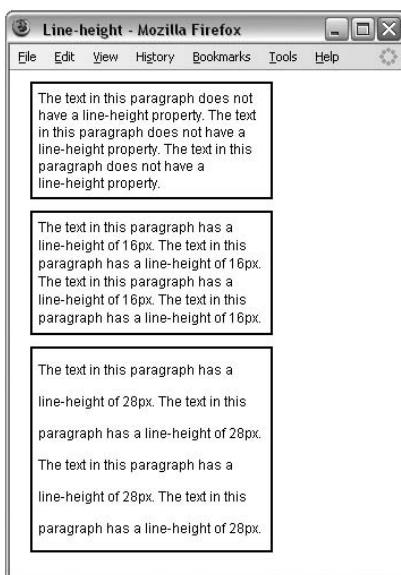


Figure 7-31

### The *max-width* and *min-width* Properties

The *max-width* and *min-width* properties allow you to specify a maximum and a minimum width for a box. This should be particularly useful if you want to create parts of pages that stretch and shrink to fit the size of users' screens. The *max-width* property will stop a box from being so wide that it is hard to read (lines that are too long are harder to read on screens), and *min-width* will help prevent boxes from being so narrow that they are unreadable. It is important to note, however, that IE7 was the first version of Internet Explorer to support these properties.

The value of these properties can be a number, a length, or a percentage, and negative values are not allowed. For example take a look at the following rule, which specifies that a `<div>` element may not be less than 200 pixels wide, and no wider than 500 pixels wide (`ch07_eg27.css`):

```
div {min-width:200px;  
     max-width:500px;  
     padding:5px;  
     border:1px solid #000000;}
```

You can see what this looks like in Figure 7-32, which shows two browser windows, and you can try it for yourself using `ch07_eg27.html` in the code download. The first window is opened to over 500 pixels wide, and the box does not stretch wider than 500 pixels; the second window is closed to less than 200 pixels, at which point the browser starts to show a horizontal scrollbar because you cannot see all of the box.

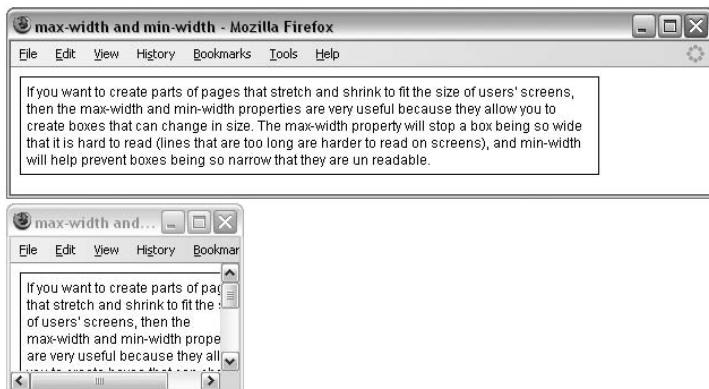


Figure 7-32

### ***The min-height and max-height Properties***

The `min-height` and `max-height` properties correspond with the `min-width` and `max-width` properties, but specify a minimum height and maximum height for the box. Again, it is important to note that IE7 was the first version of Internet Explorer to support these properties.

The value of these properties can be a number, a length, or a percentage, and negative values are not allowed. Take a look at the following example (`ch07_eg28.css`):

```
div {min-height:50px;  
     max-height:200px;  
     padding:5px;  
     border:1px solid #000000;}
```

Again, these properties are very useful in creating layouts that can be resized depending upon the size of the users' browser window. However, you can see an interesting phenomenon in Figure 7-33: if the content of the box takes up more space than the box is allowed because of these rules, the content can overflow out of the box (you learn how to deal with this in the next section).

## Chapter 7: Cascading Style Sheets

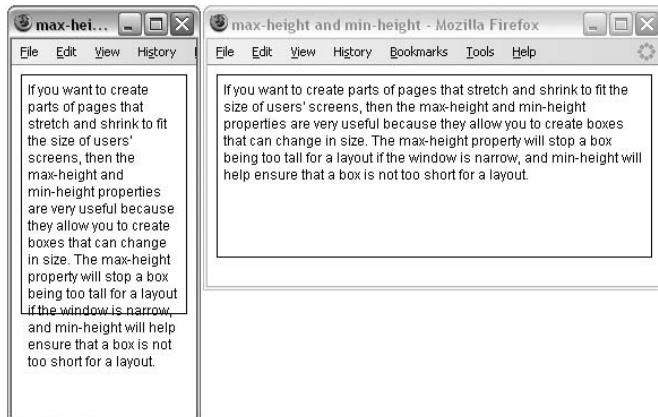


Figure 7-33

### The overflow Property

As you just saw in Figure 7-33, when you control the size of a box, the content you want to fit in the box might require more space than you have allowed for it. This not only happens with the `min-height` and `max-height` or `min-width` and `max-width` properties, but also for a number of other reasons such as when you have simply set a fixed width and height for a box, or given a box negative margins.

The `overflow` property was designed to deal with these situations and can take one of the values shown in the table that follows.

Value	Purpose
<code>hidden</code>	The overflowing content is hidden.
<code>scroll</code>	The box is given scrollbars to allow users to scroll to see the content.

Take a look at the following example, where the width of two `<div>` elements has been controlled by the `max-height` and `max-width` properties so that the content of the `<div>` elements does not fit in the box. For the first element, I have set the `overflow` property to have a value of `hidden`, and the second to have a value of `scroll` (`ch07_eg29.css`).

```
div {max-height:75px;  
     max-width:250px;  
     padding:5px;  
     margin:10px;  
     border:1px solid #000000;}  
  
div.one {overflow:hidden;}  
div.two {overflow:scroll;}
```

Now take a look at Figure 7-34, which shows ch07\_eg29.html. You can see the effect of these two properties — in the first box the text is simply cut off when it runs out of space, and in the second box a scrollbar is created allowing users to scroll to the appropriate content.

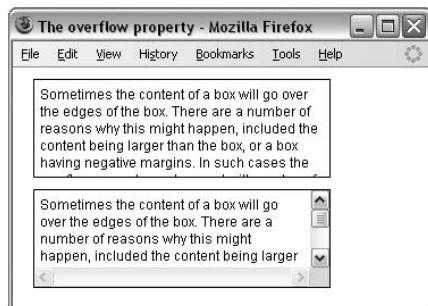


Figure 7-34

### Try It Out    A Style Sheet for Code

I often find the need to display code online. So I wrote the following style sheet to enable me to define styles very similar to those you see in this book, for showing code on the Web. As you will see in the next chapter, this code can then be included in other style sheets when needed, which means it is a reusable style sheet.

The style sheet features several styles for block and inline elements. The table that follows shows the styles you will be creating.

Style Name	Inline or Block	Use
codeInText	Inline	For a bit of code written in the middle of a sentence, shown in a monospace font.
codeForeground	Block	Highlighted code in a monospace font for showing examples.
codeBackground	Block	Like codeForeground, but not highlighted because it has been seen before, or is not the key point of the example.
keystroke	Inline	Keys a user should enter on the keyboard, distinguishable because it is italic.
importantWords	Inline	The first use of a key term; helps users scan the document because it appears in a bold font.

*Continued*

## Chapter 7: Cascading Style Sheets

Style Name	Inline or Block	Use
boxText	Block	Creates a block of important or key notes that is in a box and has background shading.
background	Block	Creates a block of italic text that has an aside or interesting note.

1. The first thing to do is create class selectors for each of these styles. Element names are not used for several of the styles here because the styles could apply to different elements (for example, box text could be in a `<p>` element or a `<div>` grouping other elements). The selectors that do use elements are the ones representing code.

```
code.codeInText{}  
code.codeForeground {}  
code.codeBackground {}  
.keystroke {}  
.importantWords {}  
.boxText {}  
.background {}
```

2. Now it's time to start adding declarations to each selector inside the curly brackets. First is the `codeInText` style for words that appear in the middle of a sentence or paragraph that represent code. In the same tradition as most written matter on programming, the code will be displayed in a monospaced font. The first choice of typeface — specified using the `font-family` property — is Courier, failing which the browser should try to find Courier New, and if it cannot find that typeface, it will use its default monospaced font (although most computers do have Courier or Courier New installed).

To make the code easier to read, this font will appear in bold text, as indicated using the `font-weight` property.

```
.codeInText {font-family:courier, "courier new", monospace;  
font-weight:bold;}
```

3. The second style is the `codeForeground` style. This style uses the same type of font as the `codeInText` style.

Here are a few things to take note of:

- ❑ The `codeForeground` style should always be displayed as a block-level element, but just in case the class is incorrectly used with an inline element, the `display` property is used with a value of `block` to ensure that it is displayed as a block (you will see more of this property in Chapter 8).
- ❑ You will also see that the `letter-spacing` property has been used with a negative value because monospace fonts tend to take up quite a bit of width on the page. So, to help get as many characters as possible on the same line, it is given a value of `-0.1` of an em (or 10 percent of a font's height).

- ❑ The background color of the `codeForeground` style is gray. This helps the code stand out and makes it more readable. A one and a half em-sized padding has been added inside the box so that the text does not go right to the edge of the background color — this also makes the code easier to read.
- ❑ The margin ensures that the box does not touch any other boxes or paragraphs. It has a smaller margin on the bottom than the top, as do all of the styles in this style sheet that use the margin property.

```
.codeForeground {  
    font-family:courier, "courier new", monospace; font-weight:bold;  
    letter-spacing:-0.1em;  
    display:block;  
    background-color:#cccccc;  
    padding:0.5em;  
    margin-bottom:1em; margin-top:1.5em;}
```

4. The `codeBackground` style is identical to the `codeForeground` style except that the `background-color` is white:

```
.codeBackground {  
    font-family:courier, "courier new", monospace; font-weight:bold;  
    letter-spacing:-0.1em;  
    display:block;  
    background-color:#ffffff;  
    padding:0.5em;  
    margin-bottom:1em; margin-top:1em;}
```

5. The `keystroke` style is in a Times typeface, or Times New Roman if Times is not available, failing which the default serif typeface for the browser is used. The `keystroke` style should be italicized as follows:

```
.keyStroke {  
    font-family:times, "Times New Roman", serif;  
    font-style:italic;}
```

6. The `importantWords` style is simply bold:

```
.importantWords {font-weight:bold; }
```

7. The `boxText` style has a bold font with a very light gray background; what really differentiates it is that it has a border. Like the `codeForeground` style, `boxText` has some padding so that the text does not reach the border — making it easier to read — and it has a margin to inset it from the left and right as well as vertically to separate it from other elements. Note that the bottom margin is slightly smaller than the top margin.

```
.boxText {  
    font-weight:bold;  
    background-color:#efefef;  
    width:90%;
```

## Chapter 7: Cascading Style Sheets

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```
padding:1em;  
margin-left:3em; margin-right:3em; margin-bottom:1em; margin-top:1.5em;  
border-style:solid; border-width:1px; border-color:#000000; }
```

8. The final style is the background style. This style is italic and has the same amount of padding and margins as the boxText style.

```
.background {  
    font-style:italic;  
    width:90%;  
    padding:1em;  
    margin-left:3em; margin-right:3em; margin-bottom:1em; margin-top:1em; }
```

9. For this example, I also included a rule for the `<p>` element and a rule for the `<body>` element (although they are not part of the standard CSS I use for code styles):

```
body {  
    color:#000000;  
    background-color:#ffffff;  
    font-family:arial, verdana, sans-serif;  
    font-size:12px;}  
p {margin-bottom:1em; margin-top:1.5em; }
```

10. Save this file as `codeStyles.css`. Then take a look at the following XHTML file, which makes use of this style sheet. As you can see, the `<link />` element indicates that this is the style sheet to be used for this example. You can then see the elements with the `class` attributes that relate to these styles:

```
<?xml version="1.0" ?>  
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">  
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">  
<head>  
    <title>CSS Example</title>  
    <link rel="stylesheet" type="text/css" href="codeStyles.css" />  
</head>  
<body>  
    <p>You are about to see some <code class="codeInText">codeInText</code>  
        followed by some <span class="importantWords">importantWords</span>, and the  
        font for a <span class="keystroke">keystroke</span>.</p>  
    <p>Next you will see some foreground code:</p>  
    <code class="codeForeground">p {font-family:arial, sans-serif;  
        font-weight:bold;}</code>  
    <p>Next you will see some background code:</p>  
    <code class="codeBackground">p {font-family:arial, sans-serif;  
        font-weight:bold;}</code>  
    <p class="boxText">This is some boxed text for important statements.</p>  
    <p class="background">Here is a background comment or aside.</p>  
</body>  
</html>
```

If you look at this example in the browser, it should look like the screenshot in Figure 7-35.

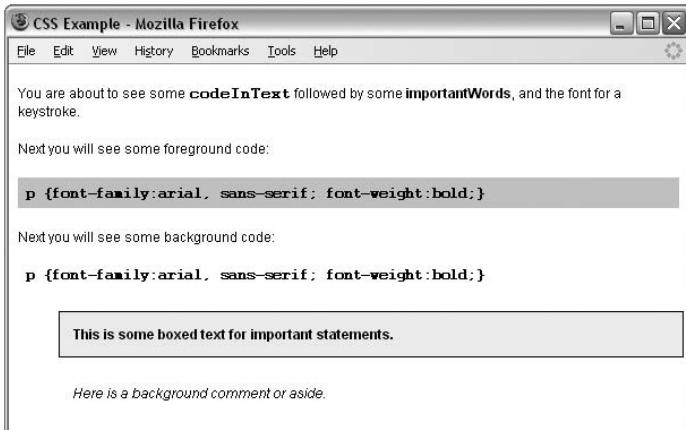


Figure 7-35

### How It Works

You've read through this chapter so you should have a good idea of how this example works. But let's review some of the key points here.

The style sheet is linked to the example XHTML document using the `<link />` element in the head of the XHTML document.

```
<link rel="stylesheet" type="text/css" href="codeStyles.css" />
```

The point behind the style sheet is that it can be used with several documents, which is why the style rules are not put inside a `<style>` element in the XHTML document.

Notice that several of the styles use `margin` properties, and when they do, the top margin is larger than the bottom margin. I tend to keep bottom margins a little bit smaller than top margins so that if adjacent vertical margins collapse I know which one it is more likely to be. This is especially helpful because you cannot actually see the edge of a margin in the same way you can use the `border` property to see the edge of a box.

```
.codeBackground {
    font-family:courier, "courier new", monospace; font-weight:bold;
    letter-spacing:-0.1em;
    display:block;
    background-color:#ffffff;
    padding:0.5em;
    margin-bottom:1em; margin-top:1em;}
```

## Chapter 7: Cascading Style Sheets

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The margins are greater to the left and the right in these examples, so that the boxes are indented. If the `text-indent` property had been used, only the first line would have been indented.

There are two properties in the block boxes of code that are not anywhere else on the style sheet. The `letter-spacing` property is used to make more letters fit on the same line than otherwise would. You cannot, however, set them too narrowly or the user will not be able to read the words (one-tenth of an `em` is the maximum here). There is also the `display` property with a value of `block` to ensure that `codeForeground` and `codeBackground` styles get treated as block-level elements.

The `boxText` and `background` styles are indented from the margins to the left and the right so that they are clearly separate from the text around them and to make them stand out more.

You might have noticed that all lengths in the style sheet are specified in `ems` so that they relate to the default size of the text in the document. If some of these elements were given in absolute sizes, they might have suddenly appeared a lot smaller or larger than the surrounding text if their lengths were not relative.

---

## Summary

In this chapter, you learned how to write a CSS style sheet. You have seen that a CSS style sheet is made up of rules that first select the element or elements to which the rules will apply, and then contain property-value pairs that specify how the element's content should appear.

You have learned how you can change the appearance of fonts and text.

You now know that CSS manages to render a document by treating each element as if it were a separate box and then using the properties to control how each box should appear, and you have learned how to set the dimensions and borders, padding, and margins for each box.

In the next chapter you not only learn some more properties, you also see how you can use CSS to position elements, which is used to create attractive layouts for pages. You even see how you can insert content from a style sheet into a document, deal with bulleted lists, create counters, and more.

## Exercises

1. Go back to the first Try It Out example in this chapter and add styles to show what bold and italic versions of each font would look like. You should end up with something looking like Figure 7-36.

You are allowed to use only `<span>` and `<br />` elements in the source document and class selectors in the style sheet. You also need to add a top margin to the content of the `<div>` elements to separate them from each other.

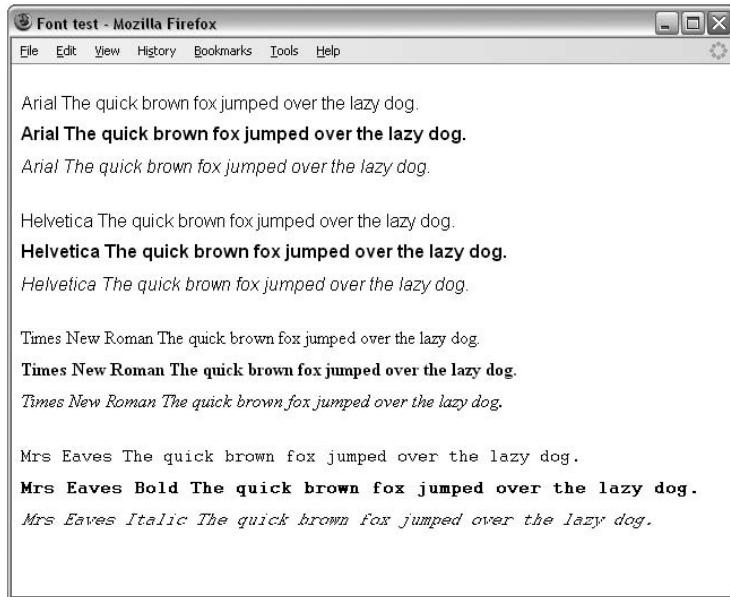


Figure 7-36

2. Take a look at the following XHTML page:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
  <title>Font test</title>
  <link rel="stylesheet" type="text/css" href="tableStyles.css" />
</head>
<body>
<table>
  <tr>
    <th>Quantity</th>
    <th>Ingredient</th>
  </tr>
  <tr class="odd">
    <td>3</td>
    <td>Eggs</td>
  </tr>
  <tr>
    <td>100ml</td>
    <td>Milk</td>
  </tr>
```

## Chapter 7: Cascading Style Sheets

---

```
<tr class="odd">
  <td>200g</td>
  <td>Spinach</td>
</tr>
<tr>
  <td>1 pinch</td>
  <td>Cinnamon</td>
</tr>
</table>
</body>
</html>
```

Now create the `tableStyles.css` style sheet that makes this example look like it does in Figure 7-37.

Quantity	Ingredient
3	Eggs
100ml	Milk
200g	Spinach
1 pinch	Cinnamon

Figure 7-37

Don't worry about getting the sizes exactly the same as the screenshot, but do make sure you have padding in the cells and a border around the outside. The white border is created by default in IE and you find out how to remove this in Chapter 8.

# 8

## More Cascading Style Sheets

In this chapter, you learn more about working with CSS. You will start by working through many of the remaining properties from the CSS specifications that allow you to control presentation of links, backgrounds, list styles, table styles, and outlines around boxes (the last of which are different from borders). You then learn about the `:before` and `:after` pseudo-classes that allow you to add content that was not in the source document that you are styling before or after a specified element. Finally, you will see how CSS can be used to position boxes on the page — and therefore how they can be used to create layouts instead of using tables.

By the end of the chapter, you will know more about how to use CSS to control the following:

- Presentation of links
- Backgrounds of document
- Styles of bullet points and numbered lists
- Appearance of tables
- Outlines around boxes
- Boxes that can gain focus or are active
- Addition of content to the XHTML document before or after an element
- The three positioning schemes that allow you to determine where on a page a box will appear — something that prepares you to use CSS to create layouts

*Some of the features you learn about in this chapter are not yet widely supported in browsers. They are, however, worth learning about so that you are aware of the direction in which CSS is going.*

# Links

You have already seen that the `color` property can change the color of the text inside any element, and web designers commonly use this property in rules that apply to `<a>` elements in order to change the colors of links. When you do this, however, the link will always be that one color — even the links that you have visited, are hovering over, or are clicking on.

The ability to change slightly the color of links you have visited can help users navigate your site, and changing the color when someone hovers over a link can encourage the user to click it. So, when you create a rule that changes the color of links, the *pseudo-classes* listed in the table that follows can help differentiate styles associated with links in different states.

Pseudo-class	Purpose
<code>link</code>	Styles for links in general
<code>visited</code>	Styles for links that have already been visited
<code>active</code>	Styles for links that are currently active (being clicked)
<code>hover</code>	Styles for when someone is hovering over a link

The following are properties you will likely use with these pseudo-classes:

- ❑ `color`: Often used to change the colors of the links. As mentioned, it is helpful to differentiate slightly between different links that have already been visited and those not yet visited, as this helps users see where they've been. Furthermore, changing the color slightly when a user hovers over a link can help encourage clicking on the link.
- ❑ `text-decoration`: Often used to control whether the link is underlined or not. Links always used to be underlined on the Web, although since the late 1990s it has been more popular not to underline links. Using the `text-decoration` property, you can specify that your links should not be underlined, and you can even set them to be underlined only when the user hovers over the link or selects it.
- ❑ `background-color`: Highlights the link, as if it had been highlighted with a highlighter pen. It is most commonly used when the user hovers over a link, just offering a slight change in color.

Here is an example that will change the styles of links as users interact with them (`ch08_eg01.css`):

```
body {background-color:#ffffff;}  
a {  
    font-family: arial, verdana, sans-serif;  
    font-size:12px;  
    font-weight:bold;}  
a:link {  
    color:#0000ff;  
    text-decoration:none;}  
a:visited {  
    color:#333399;
```

```
text-decoration:none;}  
a:active {  
    color:#0033ff;  
    text-decoration:underline;}  
a:link:hover {  
    background-color:#e9e9e9;  
    text-decoration:underline;}
```

Figure 8-1 gives you an idea of how this style sheet will look with (`ch08_eg01.html`), although it is rather hard to see the full effect of this in print, with the links changing as the user rolls the mouse over links and visits the sites, so try the example out with the downloaded code for this chapter.

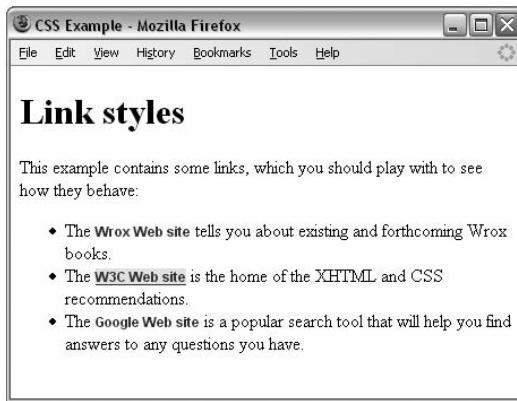


Figure 8-1

There are also two pseudo-classes called `:focus` and `:active` that alter the style of an element as it gains focus or becomes active. You learn about these pseudo-classes later in the chapter.

## Backgrounds

The table that follows lists the six properties in CSS that allow you to specify how the background of either the whole browser window or any individual box should appear.

Property	Purpose
<code>background-color</code>	Specifies a color that should be used for the background of the page or box
<code>background-image</code>	Sets an image to be in the background of a page or box
<code>background-repeat</code>	Indicates whether the background image should be repeated across the page or box

*Continued*

Property	Purpose
background-attachment	Indicates a background image should be fixed in one position on the page, and whether it should stay in that position when the user scrolls down the page or not
background-position	Indicates where an image should be positioned in either the window or the containing box
background	A shorthand form that allows you to specify all of these properties

You might be interested to note that the shorthand `background` property is better supported in older versions of some browsers than the individual properties, but you need to learn what values the properties can take before going on to use the shorthand.

### The `background-color` Property

The `background-color` property allows you to specify a single solid color for the background of your pages and the inside of any box created by CSS.

The value of this property can be a hex code, a color name, or an RGB value (colors are covered in greater depth in Appendix D). For example (`ch08_eg02.css`):

```
body {background-color:#cccccc; color:#000000;}  
b {background-color:#FF0000; color:#FFFFFF;}  
p {background-color: rgb(255,255,255);}
```

When the `background-color` property is set for the `<body>` element, it affects the whole document, and when it is used on any other element it will use the specified color inside the border of the box created for that element. Figure 8-2 shows the preceding styles used with (`ch08_eg02.html`):

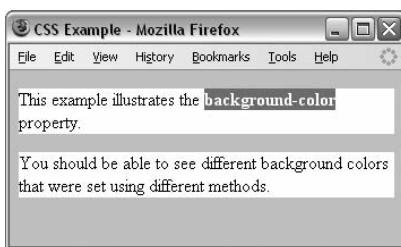


Figure 8-2

I add a rule for the `<body>` element to set the `background-color` property for nearly every style sheet I write, for the simple reason that some people set their computers to have a background other than plain white (often because it causes less strain on their eyes). When the background color of an operating system is changed, the background color of the web browser is usually that color (as are applications such as word processors). If you do not specify this property, you cannot guarantee that the visitor to the site has the same background color as you.

### The **background-image** Property

As its name suggests, the `background-image` property allows you to add an image to the background of any box in CSS, and its effect can be quite powerful. The value it takes is as follows, starting with the letters `url`, and then holding the URL for the image in brackets and quotes:

```
body {background-image: url("images/background.gif");}
```

The `background-image` property overrides the `background-color` property. It is good practice, however, to supply a `background-color` property with a value that is similar to the main color in the image even when you want to use a background image, because the page will use this color while the page is loading or if it cannot load the image for any reason.

Here is an example of using a single background image which is 200 pixels wide and 150 pixels high. By default, this image is repeated all across the page (`ch08_eg03.css`). The `background-color` property is set to be the same color as the background of the image (just in case the image cannot be loaded):

```
body {  
    background-image: url("images/background.gif");  
    background-color: #cccccc;}
```

Figure 8-3 shows what this looks like in a browser (`ch08_eg03.html`).



Figure 8-3

This is not a great example of a background image, but it makes an important point. The problem is that there is not enough contrast between the colors used in the background image and the text that appears on top of it, which makes the text harder to read.

You must make sure that there is sufficient contrast between any background image and the writing that appears on top of it; otherwise, users will have trouble reading the text. Furthermore, low-contrast images (images that are made up of similar colors) often make better backgrounds because it is harder to find a color that will be readable on top of a high-contrast image.

Figure 8-4 shows an improved example of the background image, where the text is on a solid color, which makes it easier to read. This time I have also used a larger image (`ch08_eg03b.html`).

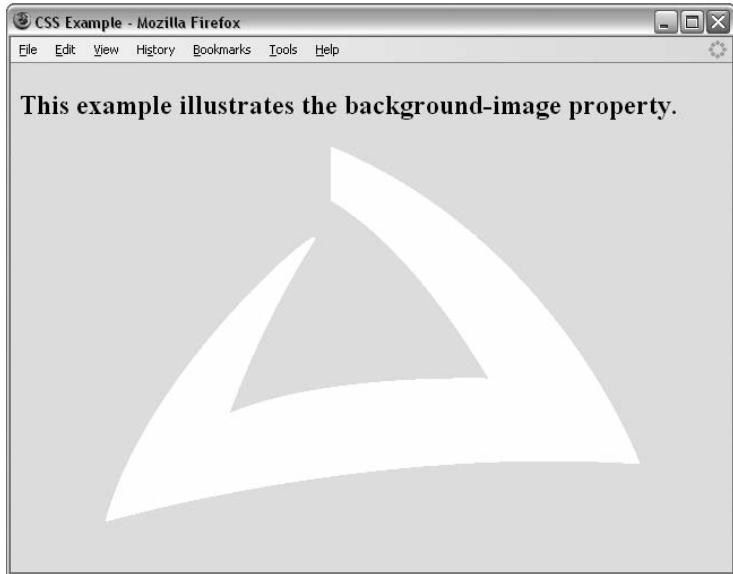


Figure 8-4

You should note that there is no way to express the intended width and height of a background image, and it is not able to have an `alt` attribute (alternate text for those not able to see the image for any reason); therefore, a background image should never be used to convey any important information because it is not accessible to those unable to see the image.

You should also be wary of using large files as background images because they can be slow to load. The larger the file size of the image, the longer it takes to load and render.

The `background-image` property works well with most block-level elements, although some older browsers can have problems showing background images in tables.

### ***The background-repeat Property***

By default, the `background-image` property repeats across the whole page, creating what is affectionately known as *wallpaper*. The wallpaper is made up of one image that is repeated over and over again, and which (if the image is designed well) you will not see the edges of. Therefore, it is important that any patterns should *tessellate*, or fit together, well. Wallpaper is often made up of textures such as paper, marble, or abstract surfaces, rather than photos or logos.

If you do not want your image to repeat all over the background of the page, you should use the `background-repeat` property, which has four helpful values, as you can see in the table that follows.

Value	Purpose
repeat	This causes the image to repeat to cover the whole page.
repeat-x	The image will be repeated horizontally across the page (not down the whole page vertically).
repeat-y	The image will be repeated vertically down the page (not across horizontally).
no-repeat	The image is displayed only once.

These different properties can have interesting effects. It is worth looking at each in turn. You have already seen the effect of the `repeat` value, so the next one to look at is `repeat-x`, which creates a horizontal bar following the browser's x-axis (`ch08_eg04.css`):

```
body {  
    background-image: url("images/background_small.gif");  
    background-repeat: repeat-x;  
    background-color: #ffffff;}
```

You can see the result of using this property in Figure 8-5.

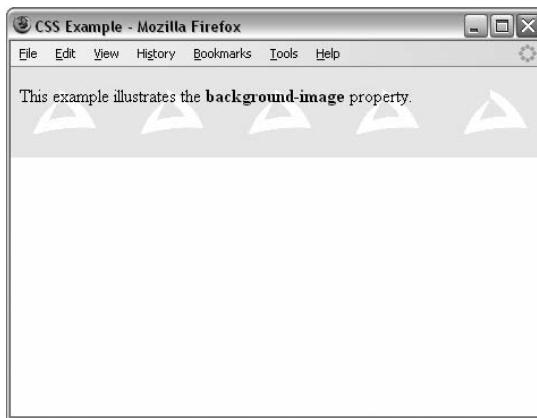


Figure 8-5

The `repeat-y` value works just like `repeat-x` but in the other direction: vertically following the browser's y-axis (`ch08_eg05.css`):

```
body {  
    background-image: url("images/background_small.gif");  
    background-repeat: repeat-y;  
    background-color: #ffffff;}
```

## Chapter 8: More Cascading Style Sheets

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In Figure 8-6, you can see the result with the sidebar coming down the left.

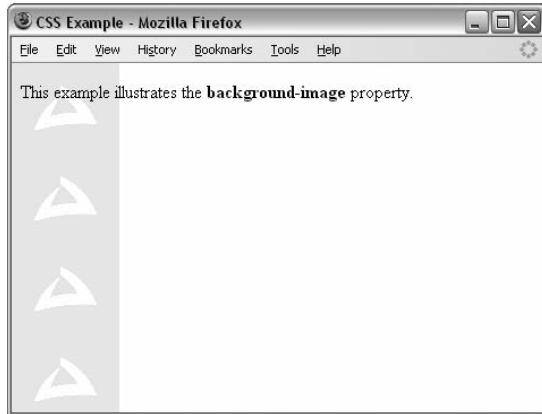


Figure 8-6

The final value was no-repeat, leaving one instance of the image that by default will be in the top-left corner of the browser window (ch08\_eg06.css):

```
body {  
    background-image: url("images/background_small.gif");  
    background-repeat: no-repeat;  
    background-color: #eaeaea;}
```

You can see the result in Figure 8-7; note how the background color of the page has been set to the same color as the image we have been using.

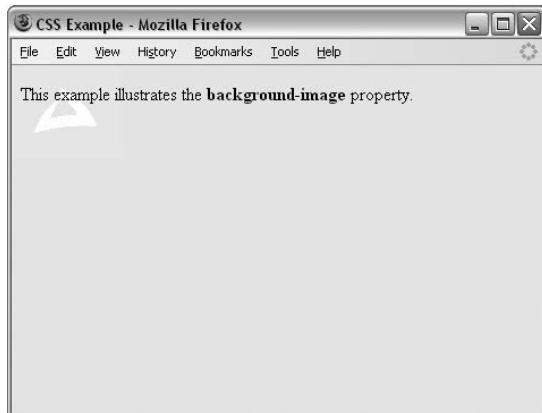


Figure 8-7

## **The *background-position* Property (for fixing position of backgrounds)**

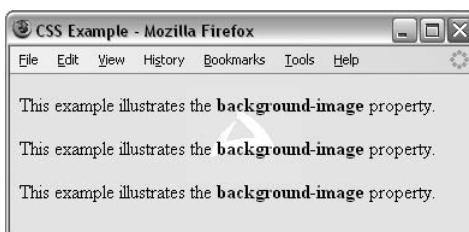
When the background-color property is the same as the background color of the image, you cannot see the edge of the image (as in Figure 8-7). However, you may want to alter the position of this image, and you can do so using the background-position property, which takes the values shown in the table that follows.

Value	Meaning
x% y%	Percentages along the x (horizontal) and y (vertical) axis
x y	Absolute lengths along the x (horizontal) and y (vertical) axis
left	Shown to the left of the page or containing element
center	Shown to the center of the page or containing element
right	Shown to the right of the page or containing element
top	Shown at the top of the page or containing element
center	Shown at the center of the page or containing element
bottom	Shown at the bottom of the page or containing element

Here is an example of fixing the position of the image as shown in Figure 8-8 (ch08\_eg07.css):

```
body {
    background-image: url("images/background_small.gif");
    background-position: 50% 20%;
    background-repeat: no-repeat;
    background-color: #eaeaea; }
```

This image will be centered (because it should be 50 percent of the screen's width from the left-hand side of the page) and a fifth of the way down from the top of the screen (because it is positioned 20 percent of the window height from the top of the screen).



**Figure 8-8**

### The **background-attachment** Property (for watermarks)

The `background-attachment` property allows you to specify an image known as a *watermark*. The key difference with this setting is that the background image can stay in the same position even when the user scrolls up and down a page or scrolls with all of the other elements of the page.

The `background-attachment` property can take two values, as you can see from the table that follows.

Value	Purpose
<code>fixed</code>	The image will not move if the user scrolls up and down the page.
<code>scroll</code>	The image stays in the same place on the background of the page. If the user scrolls up or down the page, the image moves too.

Here is an example where the image will stay in the middle of the page even when the user scrolls further down (`ch08_eg08.css`):

```
body {  
    background-image: url("images/background_small.gif");  
    background-attachment: fixed;  
    background-position: center;  
    background-repeat: no-repeat;  
    background-color: #eaeaea; }
```

Figure 8-9 shows that the user has scrolled halfway down the page and the image remains in the center.

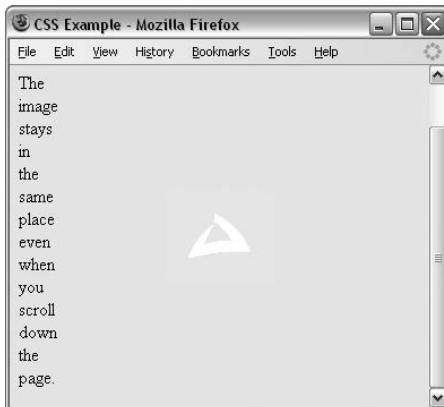


Figure 8-9

## The **background** Property (**the well-supported shorthand**)

The `background` property allows you to specify all five of the background properties at once. If you do not supply one of the values, the default value will be used. The values can be given in any order:

- `background-color`
- `background-image`
- `background-repeat`
- `background-attachment`
- `background-position`

For example, you can just write:

```
body {background: #cc66ff; url(images/background_small.gif) fixed  
no-repeat center;}
```

This creates exactly the same effect as the example shown in Figure 8-9.

## Lists

You learned about lists in Chapter 1. Lists are very helpful in conveying a set of either numbered or bulleted points, and it is simple enough to use the `<ul>` and `<li>` elements to create unordered lists, or the `<ol>` and `<li>` elements to create ordered lists, but CSS allows you great control over how they are presented.

Note that the bullet point, or number in the case of numbered lists, is referred to as the *marker*.

In this section you learn about the list properties shown in the table that follows.

Property	Purpose
<code>list-style-type</code>	Allows you to control the shape or appearance of the marker (bullet point or number)
<code>list-style-position</code>	Specifies whether a long item that takes up more than one line of text and therefore wraps to a second line should align with the first line or start underneath the start of the marker
<code>list-style-image</code>	Specifies an image for the marker rather than a bullet point or number
<code>list-style</code>	Serves as shorthand for the preceding properties
<code>marker-offset</code>	Specifies the distance between a marker and the text in the list

### The **list-style-type** Property

The `list-style-type` property allows you to control the shape or style of bullet point (also known as a *marker*) in the case of unordered lists, and the style of numbering characters in ordered lists. The table that follows shows the standard styles for an unordered list.

Value	Marker
<code>none</code>	None
<code>disc</code> (default)	A filled-in circle
<code>circle</code>	An empty circle
<code>square</code>	A filled-in square

The table that follows lists the popularly supported values for ordered lists.

Value	Meaning	Example
<code>decimal</code>	Number	1, 2, 3, 4, 5
<code>decimal-leading-zero</code>	0 before the number	01, 02, 03, 04, 05
<code>lower-alpha</code>	Lowercase alphanumeric characters	a, b, c, d, e
<code>upper-alpha</code>	Uppercase alphanumeric characters	A, B, C, D, E
<code>lower-roman</code>	Lowercase Roman numerals	i, ii, iii, iv, v
<code>upper-roman</code>	Uppercase Roman numerals	I, II, III, IV, V

The `list-style` property can either be used on the `<ul>` and `<ol>` elements or on the `<li>` element. The following example demonstrates all these styles (`ch08_eg09.html`):

```
li.a {list-style:none;}
li.b {list-style:disc;}
li.c {list-style:circle;}
li.d {list-style:square;}
li.e {list-style:decimal;}
li.f {list-style:lower-alpha;}
li.g {list-style:upper-alpha;}
li.h {list-style:lower-roman;}
li.i {list-style:upper-roman;}
```

You can see the result with examples of each kind of bullet in Figure 8-10.



Figure 8-10

### The **list-style-position** Property

The `list-style-position` property indicates whether the marker should appear inside or outside of the box containing the bullet points.

The real difference comes when the text for a bullet point wraps onto more than one line because this property sets whether the text on the new line wraps underneath the bullet point or in line with the position of the first line of text. There are two values for this property, as you can see in the table that follows.

Value	Purpose
<code>inside</code>	If the text goes onto a second line, the text will wrap underneath the marker. It will also appear indented to where the text would have started if the list had a value of <code>outside</code> .
<code>outside</code>	If the text goes onto a second line, the text will be aligned with the start of the first line (to the right of the bullet).

Here you can see how this property is written; in this case it is given on the `<ul>` or `<ol>` elements (`ch08_eg10.css`):

```
ul {list-style-position:outside; }
ol {list-style-position:inside; }
```

Figure 8-11 shows you what this would look like in a browser.

You can see here that the `list-style-position` property with the value `outside` creates bullet points to the left of the text, whereas the `inside` value starts the list item where the writing would have started if the value had been `outside` and adds the marker to the text rather than keeping it separate.

## Chapter 8: More Cascading Style Sheets

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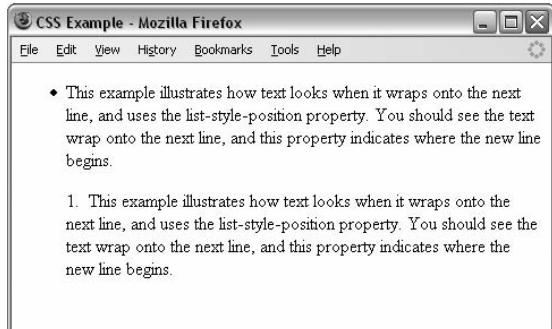


Figure 8-11

### **The *list-style-image* Property**

The *list-style-image* property allows you to specify an image so that you can use your own bullet style. The syntax is as follows, similar to the *background-image* property with the letters *url* starting the value of the property followed by the URL in brackets and quotation marks (*ch08\_eg11.css*):

```
li {list-style-image: url("images/bulletpoint.gif");}
```

You can see an example of some triangular bullet points in Figure 8-12.



Figure 8-12

If the image cannot be displayed, the browser should just display a dot rather than a broken image symbol.

*If you are using nested lists, this value will inherit from its parent element. To prevent this from happening, you can give the property a value of none.*

### **The *list-style* Property (the shorthand)**

The *list-style* property is a way of expressing the other three properties at once. They can appear in any order. For example:

```
ul {list-style: inside circle;}
```

Remember that you can also set the *border*, *padding*, and *margin* properties for *<ul>*, *<ol>*, *<li>*, *<dl>*, *<dt>*, and *<dd>* elements, as each element has its own box in CSS.

## The marker-offset Property

The `marker-offset` property allows you to specify the distance between the marker and the text relating to that marker. Its value should be a length, as follows:

```
li {marker-offset:2em;}
```

Unfortunately, this property is not supported in IE7 or Firefox 2.

## Tables

In the last chapter, you saw a couple of examples that use CSS with tables. Properties that are commonly used with the `<table>`, `<td>`, and `<th>` elements include the following:

- padding to set the amount of space between the border of a table cell and its content — this property is very important to make tables easier to read.
- border to set the properties of the border of a table.
- text and font properties to change the appearance of anything written in the cell.
- text-align to align writing to the left, right, or center of a cell.
- vertical-align to align writing to the top, middle, or bottom of a cell.
- width to set the width of a table or cell.
- height to set the height of a cell (often used on a row as well).
- background-color to change the background color of a table or cell.
- background-image to add an image to the background of a table or cell.

You should be aware that, apart from the `background-color` and `height` properties, it is best to avoid using these properties with `<tr>` elements, as browser support for these properties on rows is not as good as it is for individual cells.

Take a look at the table in Figure 8-13; it might look familiar because you saw it at the beginning of the last chapter, but this time it has an added `<caption>` element (`ch08_12.html`).

Font properties	
Property	Purpose
<code>font-family</code>	Specifies the font used.
<code>font-size</code>	Specifies the size of the font used.
<code>font-style</code>	Specifies whether the font should be normal, italic, or oblique.
<code>font-weight</code>	Specifies whether the font should be normal, bold, bolder, or lighter.

Figure 8-13

## Chapter 8: More Cascading Style Sheets

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Now take a look at the style sheet for this table (`ch08_eg12.css`):

```
body {color:#000000; background-color:#ffffff;}  
h1 {font-size:18pt;}  
p {font-size:12pt;}  
table {  
    background-color:#efefef;  
    width:350px;  
    border-style:solid;  
    border-width:1px;  
    border-color:#999999;  
    font-family:arial, verdana, sans-serif;}  
caption {  
    font-weight:bold;  
    text-align:left;  
    border-style:solid; border-width:1px; border-color:#666666;  
    color:#666666;}  
th {  
    height:50px;  
    font-weight:bold;  
    text-align:left;  
    background-color:#cccccc;}  
td, th {padding:5px;}  
td.code {  
    width:150px;  
    font-family:courier, courier-new, serif;  
    font-weight:bold;  
    text-align:right;  
    vertical-align:top;}
```

Here are some key points to note about this example, some of which you will be altering with new table properties you are about to meet:

- ❑ The `<table>` element has a `width` property to fix the width of the table to 350 pixels; otherwise it would take up as much of the screen as needed to show as much text as possible on one line.
- ❑ The `<table>` element also has a `border` property set, which creates a single pixel border all around the table. Note, however, that none of the other cells in the table inherit this property.
- ❑ The `<caption>` element has its `font-weight`, `border`, and `text-align` properties set. By default the text is normal (not bold), aligned in the center, and have no border.
- ❑ The `<th>` element has a `height` of 50 pixels specified, and the text is aligned left (rather than centered, which is the default).
- ❑ The `<th>` and `<td>` elements both have a `padding` property set to `5 px` (5 pixels) so that the content of the cells does not reach where the border of those cells would be. Creating space around the cells is very important and makes the table more readable.
- ❑ The `<td>` elements whose `class` attribute has a value of `code` are given a `width` property whose value is `150 px` (150 pixels). This ensures that the content of this whole column remains on one line. Unfortunately, there is no way to assign a style to a column, but in the case of the `width` property, once it has been set on one element it does not need to be set on all of the others in the column.

*Support for styling tables with CSS is still a bit patchy in different browsers; for example, while you can set border properties for a caption, you cannot set a height for it, so you should try out your examples in as many browsers as possible.*

You should make note of the gap between the two columns (which is apparent between the table header cells). By default, a border is created between each cell of the table to create a bit of space between each cell in case there are no rules specified to create this essential gap. You can, however, remove this gap using a property called `border-spacing`, which you learn about in the next section.

### Table-Specific Properties

Several properties relate to tables only; these are listed in the table that follows. There are also some special values the `border-style` property can carry, and when learning about borders it is particularly helpful to learn how borders are rendered through one of two models that are controlled using the `border-collapse` property.

Property	Purpose
<code>border-collapse</code>	Indicates whether the browser should control the appearance of adjacent borders that touch each other or whether each cell should maintain its style
<code>border-spacing</code>	Specifies the width that should appear between table cells
<code>caption-side</code>	Specifies which side of a table the caption should appear on
<code>empty-cells</code>	Specifies whether the border should be shown if a cell is empty
<code>table-layout</code>	Allows browsers to speed up layout of a table by using the first width properties it comes across for the rest of a column (rather than having to load the whole table before rendering it)

### The `border-collapse` Property

The `border-collapse` property specifies whether the browser should display every border — even if there are two cells with different border properties in adjacent cells — or whether the browser should automatically decide which border to display based upon a built-in complex set of rules. The table that follows shows the possible values for the `border-collapse` property.

Value	Purpose
<code>collapse</code>	Horizontal borders will be collapsed and vertical borders will abut one another. (There are complex rules about conflict resolution for different border rules in the recommendation, but you should try them out and see how they work.)
<code>separate</code>	Separate rules are observed and different properties are available to further control appearance.

## Chapter 8: More Cascading Style Sheets

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Here you can see two tables: the first has a `border-collapse` property with a value of `collapse`, the second has a value of `separate`, and both tables contain adjacent cells with dotted and solid lines:

```
table.one {border-collapse:collapse;}  
table.two {border-collapse:separate;}  
td.a {border-style:dotted; border-width:3px; border-color:#000000;  
      padding:  
      10px;}  
td.b {border-style:solid; border-width:3px; border-color:#333333;  
      padding:  
      10px;}
```

Figure 8-14 shows you how, with a value of `collapse`, the browser collapses borders into each other so that the solid border takes precedence over the dotted border. This, of course, wouldn't look as odd if the borders were both solid, but it does illustrate the point well. (Indeed, you probably would not want the internal lines to be thicker than the outer lines — so this may well be the effect that you want.)

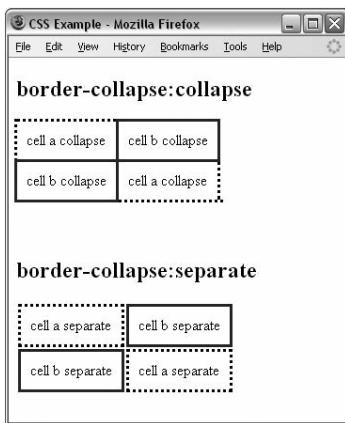


Figure 8-14

You may remember that at the beginning of this section you saw a table that had a light gray gap between the table heading cells. It would be this property that you would change to get rid of that gap. Figure 8-15 shows you the example from the beginning of the chapter with the borders collapsed.

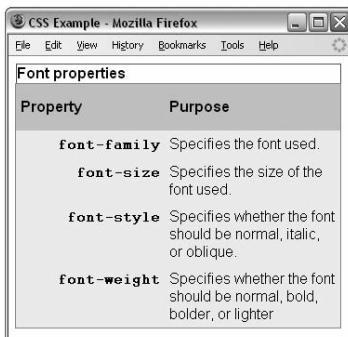


Figure 8-15

If you use the value of `separate` for this property, two further properties control border presentation:

- `border-spacing`
- `empty-cells`

The following sections discuss these properties.

### ***The border-spacing Property***

The `border-spacing` property specifies the distance that separates adjacent cells' borders. It can take either one or two values; these should be units of length.

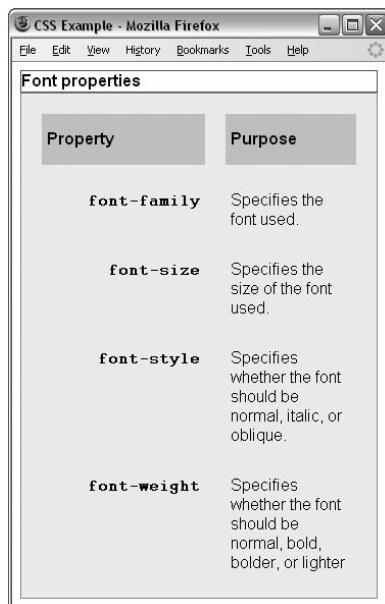
If you provide one value, it will apply to both vertical and horizontal borders:

```
td {border-spacing:15px;}
```

Or you can specify two values, in which case the first refers to the horizontal spacing and the second to the vertical spacing:

```
td {border-spacing:2px; 4px;}
```

You can see what this looks like in Figure 8-16 (ch08\_eg15.html styled with ch08\_eg15.css):



**Figure 8-16**

Note that Internet Explorer did not support this property until IE7.

### The **caption-side** Property

The `caption-side` property allows you to specify where the content of a `<caption>` element should be placed in relationship to the table. The table that follows lists the possible values.

Value	Purpose
<code>top</code>	The caption will appear above the table (the default).
<code>right</code>	The caption will appear to the right of the table.
<code>bottom</code>	The caption will appear below the table.
<code>left</code>	The caption will appear on the left side of the table.

For example, here you can see the caption being set to the bottom of the table (`ch08_eg16.css`):

```
caption {caption-side:bottom}
```

Unfortunately, IE did not start supporting this property until IE7. But Figure 8-17 shows you the `caption-side` property at work; you can see that the caption for this table has moved to the bottom of the table (rather than the top).

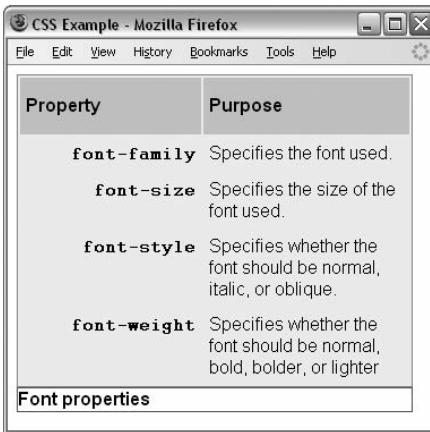


Figure 8-17

### The **empty-cells** Property

The `empty-cells` property indicates whether a cell without any content should have a border displayed. It can take one of three values, as you can see in the table that follows.

Value	Purpose
show	Borders will be shown even if the cell is empty (the default in Firefox).
hide	Borders will be hidden if cell is empty (the default in IE).
inherit	Borders will obey the rules of the containing table (only of use in nested tables).

*If you want to explicitly hide or show borders, you should use this attribute because IE and Netscape treat empty cells differently.*

Here you can see a table with two empty cells: an empty `<th>` element and an empty `<td>` element (ch08\_eg17.html):

```
<table>
  <tr>
    <th></th>
    <th>Title one</th>
    <th>Title two</th>
  </tr>
  <tr>
    <th>Row Title</th>
    <td>value</td>
    <td></td>
  </tr>
  <tr>
    <th>Row Title</th>
    <td>value</td>
    <td></td>
  </tr>
</table>
```

The following code shows the `empty-cells` property used to hide borders of empty cells in the `<table>` element (ch08\_eg17.css):

```
table {
  background-color:#efefef;
  width:350px;
  border-collapse:separate;
  empty-cells:hide;}
td {padding:5px;
  border-style:solid;
  border-width:1px;
  border-color:#999999;}
```

Figure 8-18 shows what the table looks like without borders for empty cells.

Whether or not you use this property is a matter of taste, and if you have specified no borders anyway, it will, of course, be irrelevant.

## Chapter 8: More Cascading Style Sheets

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Figure 8-18

### The **table-layout** Property

The `table-layout` property is supposed to help you control how a browser should render or lay out a table (although support in browsers is weak). See the table that follows for the three possible values this property can take.

Value	Purpose
<code>fixed</code>	The browser will calculate the layout by taking the first width specified for a column (if any are given) and use that to calculate the width of all other cells in that column. This speeds up rendering if you have a large table and you specify the widths on the first row.
<code>auto</code>	The browser looks at each cell before rendering the table and then calculates the size based upon the settings for all cells. This is slower at rendering, but more useful if you do not know the exact size of each column. This is the default value.
<code>inherit</code>	Will obey the rules of the containing table (only of use in nested tables).

Unless your tables are very large or contain a lot of images that will be slow to load, you can avoid using this property.

Several other properties, not discussed in this chapter, allow you to specify rules for groups of elements, although support for these is patchy. These properties are as follows:

- ❑ IE 5 and later supports `table-header-group` and `table-footer-group`.
- ❑ Netscape 6 and Firefox support `inline-table`, `table-row`, `table-column-group`, `table-column`, `table-row`, and `table-cell`.

## Outlines

Outlines are similar to the borders that you met in the last chapter, but there are two crucial differences:

- ❑ An outline does not take up space.
- ❑ Outlines do not have to be rectangular.

The idea behind the outline properties is that you might want to highlight some aspect of a page for the user; and this property will allow you to do that without affecting the flow of the page (where elements are positioned) in the way that a physical border would take up space. It is almost as if the outline style sits on top of the page after it has been rendered.

*Unfortunately, the outline properties are not supported by Internet Explorer 7, although they do work in Firefox.*

The table that follows lists the four outline properties.

Property	Purpose
outline-width	Specifies the width of the outline
outline-style	Specifies the line style for the outline
outline-color	Specifies the color of the outline
outline	Shorthand for above properties

Note that the outline is always the same on all sides; you cannot specify different values for different sides of the element.

### ***The outline-width Property***

The `outline-width` property specifies the width of the outline to be added to the box. Its value should be a length or one of the values `thin`, `medium`, or `thick` — just like the `border-width` attribute:

```
input {border-width:2px;}
```

### ***The outline-style Property***

The `outline-style` property specifies the style for the line (`solid`, `dotted`, or `dashed`) that goes around the box. Its value should be one of the values used with the `border-style` property you learned about in Chapter 7. For example:

```
input {outline-style:solid;}
```

### ***The outline-color Property***

The `outline-color` property allows you to specify the color of the outline. Its value should either be a color name, a hex color, or an RGB value, as with the `color` and `border-color` properties you learned about in Chapter 7. For example:

```
input {outline-color:#ffoooo;}
```

### The **outline** Property (**the shorthand**)

The `outline` property is the shorthand that allows you to specify values for any of the three properties discussed previously in any order you like. This example has been included in the download code (`ch08_eg18.css`):

```
input {outline: #ff0000 thick solid;}
```

You can see what this looks like in Figure 8-19.

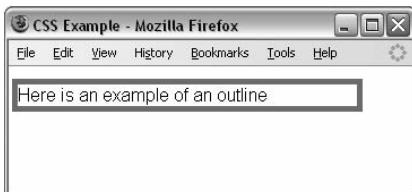


Figure 8-19

The outline properties discussed in the previous section will be of particular use with the `:focus` and `:active` pseudo-classes, which are covered next, to indicate which element is currently active or has focus.

## The **:focus** and **:active** Pseudo-Classes

You may remember that in Chapter 5, the topic of focus came up. An element needs to be able to gain focus if a user is going to interact with it; typically such elements are form controls and links.

When an element gains focus, it tends to have a slightly different appearance, and the `:focus` pseudo-class allows you to associate extra rules with an element when it gains focus. Meanwhile the `:active` pseudo-class allows you to associate further styles with elements when they are activated — such as when a user clicks a link.

Here is an example of a rule that will add a red border to any `<input>` element that gains focus (`ch08_eg19.css`):

```
input:focus {outline:#ff0000 thick solid;}
```

Unfortunately, the `:focus` pseudo-class does not work in IE7 (or Firefox 2 on a Mac), although Figure 8-20 shows you what a text input box would look like with this style when it gains focus in Firefox on a PC.

As you can probably imagine, this could offer users help in knowing which item they should currently be filling in as they work their way through a form.

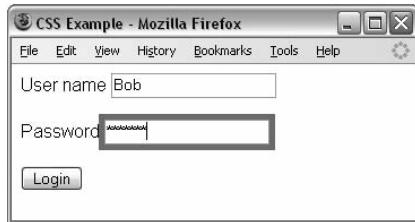


Figure 8-20

## Generated Content

CSS2 introduced a powerful way to add content into an XHTML document — one that was not part of the initial XHTML document that was being styled. This content could appear only before or after an element that is specified using a selector, and is with the `:before` and `:after` pseudo-elements. The `content` property is then used with these pseudo-elements to specify what should be inserted into the document.

The `:before` and `:after` pseudo-elements work to a limited degree in Netscape 6 and later, and in IE7, and have good support in Firefox.

### ***The `:before` and `:after` Pseudo-Elements***

The `:before` and `:after` pseudo-elements enable you to add text before or after each instance of an element or elements defined in a selector. For example, the following CSS rule adds the words “You need to register to read the full article” before each instance of a `<p>` element that carries the `class` attribute whose value is `abstract` (`ch08_eg20.css`):

```
p.abstract:after {content: "You need to register to read the full  
article.;"  
color:#ff0000;}
```

Here you can see the pseudo-element `:after` is used after the selector has identified which element it is to be applied to. Then, inside the declaration, you can see the `content` property; the text in quotes will be added to the end of the element. The `content` property can add a number of types of content to the document, not just text, and you will see these in the next section.

The default styles for the parent element will be adopted if no other declarations are added to the rule, although in this case the added content was written in red. You can see this pseudo-element in use in Figure 8-21.

It is worth noting that IE7 was the first version of Internet Explorer to support the `:before` and `:after` pseudo-elements.



Figure 8-21

*By default, the element created using these pseudo-classes will be inline unless you use the display property with a value of block, but if the element identified in the selector is an inline element you cannot use the display property with a value of block.*

## The content Property

The content property is used with the :before and :after pseudo-elements to indicate what content should be added to the document. The table that follows lists the values it can take; each value inserts different types of content into the XHTML document it is supposed to be styling.

Value	Purpose
A string	To insert plain text, this may not include quotes, and therefore cannot include XHTML markup that carries attributes (the term “string” refers to a set of alphanumeric characters, not a CSS property).
A URL	The URL can point to an image, text file, or HTML file to be included at this point.
A counter	A numbered counter for elements on the page (discussed in the next section).
attr(x)	The value of an attribute named <i>x</i> that is carried on that element (this is of more use to languages other than XHTML).
open-quote	Inserts the appropriate opening quote symbol (see the “Quotation Marks” section later in this chapter).
close-quote	Inserts the appropriate closing quote symbol (see the “Quotation Marks” section later in this chapter).
no-open-quote	Do not use any opening quotes.
no-close-quote	Do not use a closing quote (of particular use in prose where one person is speaking for a long while and style dictates the quote is closed only on the last paragraph).

### Counters

You have already seen how you can add numbered bullets to a page, so the concept of automatic numbering is not new. But the `counter()` function is designed to allow you to create a counter that increments each time a browser comes across any specified element — not just a `<li>` element.

The idea is particularly helpful if you want to create automatically numbered subsections of a document without the subsections appearing as part of an ordered list (which uses the `<ol>` and `<li>` elements).

To review the use of the `counter()` function, look at the following sample XHTML (`ch08_eg21.html`):

```
<body>
  <h1> Introducing Web Technologies</h1>
    <h2>Introducing HTML</h2>
    <h2>Introducing CSS</h2>
    <h2>Introducing XHTML</h2>
  <h1> Structure of Documents</h1>
    <h2>Text</h2>
    <h2>Lists</h2>
    <h2>Tables</h2>
    <h2>Forms</h2>
</body>
```

The example is going to contain two counters: one called `chapter` and the other called `section`. Each time an `<h1>` element comes up, the chapter counter will be incremented by 1, and each time the `<h2>` element comes up, the section counter will be incremented by 1.

Furthermore, each time the browser comes across an `<h1>` element, it will insert the word “Chapter” and the number in the counter before the content of the `<h1>` element. Meanwhile, each time the browser comes across an `<h2>` element, it will display the number of the chapter counter, then a period or full stop, and then the value of the section counter.

The result should look something like Figure 8-22.

Let's take a look at how this works. First, it is worth noting that you use the `counter-reset` property on the `<body>` element to set the Chapter and Section counters to zero before you start.

Then there are the CSS rules using the `:before` pseudo-class to insert the automatic numbering of sections.

Finally, you have the `counter-increment` properties to increase the counters every time that element is met (`ch08_eg21.css`).

```
body {counter-reset: chapter; counter-reset: section;}
h1:before {content: "Chapter " counter(chapter) ":";}
h1 {counter-increment: chapter; counter-reset: section;}
h2:before { content: counter(chapter) "." counter
  (section) " ";}
h2 {counter-increment: section;}
```

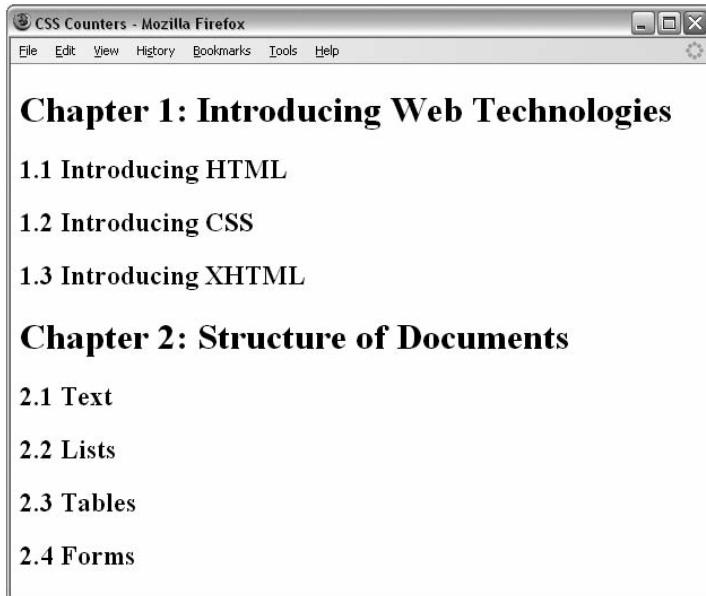


Figure 8-22

### Quotation Marks

The values `open-quote` and `close-quote` can be used with the `content` property to add quote marks before and after occurrences of specified elements.

Unfortunately, these features are not supported in IE7, but let's take a look at an example in Firefox. First, here is the XHTML (`ch08_eg22.html`):

```
<h1>Generated quotes</h1>
<p>Here are some quotes from Oscar Wilde:</p>
<blockquote>Consistency is the last refuge of the unimaginative.</blockquote>
<blockquote>If you want to tell people the truth, make them laugh, otherwise
they'll kill you.</blockquote>
<blockquote>It is a very sad thing that nowadays there is so little useless
information.</blockquote>
```

And now to add the quotes before and after the `<blockquote>` element, use the following CSS (`ch08_eg22.css`):

```
blockquote:before {content: open-quote;}
blockquote:after {content: close-quote;}
```

You can see the result in Figure 8-23.

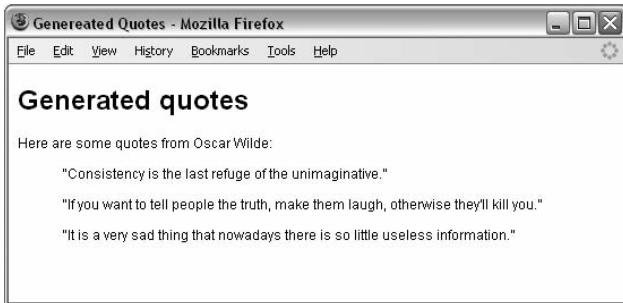


Figure 8-23

## Miscellaneous Properties

You should be aware of a few other properties, which will be addressed in the following sections:

- The cursor property
- The display property
- The visibility property

### ***The cursor Property***

The `cursor` property allows you to specify the type of mouse cursor that should be displayed to the user. This property is often implemented when using images for Submit buttons on forms. By default, when a user hovers over a link, the cursor changes from a pointer to a hand. For a Submit button on a form, however, this does not happen. Therefore, you can use the `cursor` property to change the cursor to a hand whenever someone hovers over an image that is a Submit button. This provides a visual clue to users that they can click it.

The table that follows shows possible values for the `cursor` property.

Value	Description
<code>auto</code>	Shape of the cursor depends on the context area it is over (an I over text, a hand over a link, and so on).
<code>crosshair</code>	A crosshair or plus sign.
<code>default</code>	Usually an arrow.
<code>pointer</code>	A pointing hand (in IE 4, this value is <code>hand</code> ).

*Continued*

## Chapter 8: More Cascading Style Sheets

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Value	Description
move	A grasping hand (ideal if you are doing drag-and-drop DHTML).
e-resize ne-resize nw-resize n-resize se-resize sw-resize s-resize w-resize	Indicate that an edge can be moved. For example, if you were stretching a box or image with the mouse, the se-resize cursor is used to indicate a movement starting from the southeast corner of the box.
text	The vertical bar I.
wait	An hourglass.
help	A question mark or balloon, ideal for use over help buttons.
<url>	The source of a cursor image file.

*You should try to use only these values to add helpful information for users, and to add this information in places they would expect to see that cursor. For example, using the crosshair when someone hovers over a link can confuse visitors.*

## The **display** Property

The `display` property forces an element (or box) to be a different type of box than you might expect it to be. You may have noticed that it was used in the last chapter to make an inline box appear like a block box.

```
display:block;
```

It may also take the value of `inline` to make a box that is traditionally a block-level box an inline box. Apart from this, the only other value you might want to use with this property is `none`, to indicate that the box should not be displayed (and it will have no effect on the layout of the page — as if it were not in the markup at all).

Apart from these uses you will have little reason to use this property. The other values this property can take are for use with languages other than XHTML.

## The **visibility** Property

A property called `visibility` allows you to hide a box from view, although it still affects the layout of the page (even though its contents are not seen). You may choose to use the `visibility` property to

hide error messages that are displayed only if the user needs to see them, or to hide answers to a quiz until the user selects an option.

The `visibility` property can take the values listed in the table that follows.

Value	Purpose
<code>visible</code>	The box and its contents are shown to the user.
<code>hidden</code>	The box and its contents are made invisible, although they still affect the layout of the page.
<code>collapse</code>	This is for use only with dynamic table columns and row effects, which are not covered in this chapter because they are outside the scope of this book and are poorly supported.

For example, here are four paragraphs of text (`ch08_eg23.html`):

```
<body>
  <p>Here is a paragraph of text.</p>
  <p>Here is a paragraph of text.</p>
  <p class="invisible">This paragraph of text should be invisible.</p>
  <p>Here is a paragraph of text.</p>
</body>
```

Note that the third paragraph has a `class` attribute whose value indicates that it's part of the `invisible` class. Now look at the rule for this class (`ch08_eg23.css`):

```
p.invisible {visibility:hidden;}
```

You can see from Figure 8-24 that the invisible paragraph still takes up space, but it is not visible to the user.

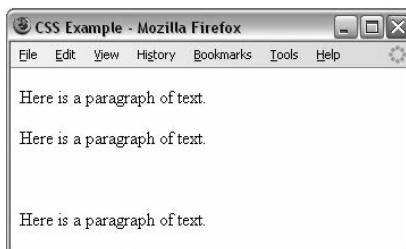


Figure 8-24

Remember that the source code will still contain whatever is in the invisible paragraph, so you should not use this to hide sensitive information such as credit card details or passwords.

# Additional Rules

Before you move on to look at how you can use CSS to position elements on a page, consider the following three rules:

- ❑ `@import` imports another style sheet into the current style sheet.
- ❑ `@charset` indicates the character set the style sheet uses.
- ❑ `!important` indicates that a user-defined rule should take precedence over the author's style sheets.

## The `@import` Rule: Modularized Style Sheets

The `@import` rule allows you to import styles from another style sheet. It should appear right at the start of the style sheet before any of the rules, and its value is a URL. It can be written in one of two ways:

```
@import "mystyle.css";
@import url("mystyle.css");
```

Either works fine. The significance of the `@import` rule is that it allows you to develop your style sheets with a modular approach. You can create separate style sheets for different aspects of your site. This is the concept I started to introduce in the last chapter when you created a style sheet for code styles. Now if you want to include those styles in any other style sheet you write, rather than repeating them you just use the `@import` rule to bring those rules into the style sheet you are writing.

Here is an example of a style sheet that imports the `codeStyles.css` style sheet from the last chapter (for convenience, this file has been copied into the folder for the code download for this chapter). This example is `ch08_eg24.css`:

```
@import "codeStyles.css"
body {
    background-color:#ffffff;
    font-family:arial, verdana, helvetica, sans-serif;}
h1 {font-size:24pt;}
```

As you can see, it does not contain many rules itself; the code styles have all been taken from the imported style sheet. Figure 8-25 shows a page that uses this style sheet that has located the styles for the code (`ch08_eg24.html`).



Figure 8-25

You might also consider developing a forms style sheet for any pages or sites that use a lot of forms. This would enable you to create a nicer presentation for form controls.

### **The @charset Rule**

If you are writing your document using a character set other than ASCII or ISO-8859-1, you might want to set the @charset rule at the top of your style sheet to indicate what character set the style sheet is written in.

The @charset rule must be written right at the beginning of the style sheet without even a space before it. The value is held in quotes and should be one of the language codes specified in Appendix G.

```
@charset "iso-8859-1"
```

### **The !important Rule**

As you know, part of the aim of CSS and the separation of style from content was to make documents more accessible to those with visual impairments. So, after you have spent your valuable time learning about CSS and how to write your style sheets to make your sites attractive, I have to tell you that users can create their own style sheets, too!

In reality, very few people do create their own CSS style sheets to view pages the way they want, but the ability is there, and was designed for those with disabilities. By default, your style sheet rather than theirs should be viewed; however, the user's style sheet can contain the !important rule, which says "override the site's style sheet for this property." For example, a user might use the rule like so:

```
p {font-size:18pt !important;  
font-weight:bold !important;}
```

There is nothing you can do to force the user to use your style sheet, and in practice, a very small percentage (if any) of your visitors will create their own style sheet, so you should not worry about it — it's covered here only so that you understand what the rule is and why you may come across it.

*Note that in CSS1, the !important rule allowed authors to overrule users' style sheets, but this was switched over in the second version.*

## **Positioning with CSS**

Up to this point, you have learned how the content of each element is represented in CSS using a box and you've seen many of the properties you can use to affect the appearance of the box and its content. Now it's time to look at how to control where the content of an element appears on the page by specifying where that box should be positioned within a page.

Before CSS, tables were often used to control precisely where the content of a page appeared, and the content was displayed in the order it appeared in the XHTML document. Using CSS positioning, however, you can lay out your pages without the use of tables and even present information in a different order than it appeared in the XHTML document.

## Chapter 8: More Cascading Style Sheets

---

In CSS2, there are three types of positioning to help control layout of a page: *normal*, *float*, and *absolute* positioning. In the following sections, you'll be seeing how you can use each of these *positioning schemes* to indicate where the content of an element should appear on the page.

*Unfortunately, you will frequently still see tables used for positioning elements on a page — you look at page layout in more depth in Chapter 9. However, there has been a strong trend toward using CSS for positioning for a while now, and it does make your content a lot more reusable. As soon as a page resorts to using tables for layout, it generally confines the page to the medium it was originally designed for. As more devices with different capabilities access the Internet, you are likely to see the use of CSS for positioning increase, allowing layouts to scale to the screen and enabling different style sheets to be used with the same document.*

### Normal Flow

By default, elements are laid out on the page using what is known as *normal flow*. In normal flow, the block-level elements within a page will flow from top to bottom (remember that each block-level element will appear as if it is on a new line), and inline elements will flow from left to right (since they do not need to start on a new line).

For example, each heading and paragraph should appear on a different line, whereas the contents of elements such as `<b>`, `<em>`, and `<span>` sit within a paragraph or other block-level element; they do not start on new lines.

Figure 8-26 illustrates this with three paragraphs, each of which is a block-level element sitting on top of the other. Inside each paragraph is an example of an inline element, in this case the `<b>` element (`ch08_eg25.html`).

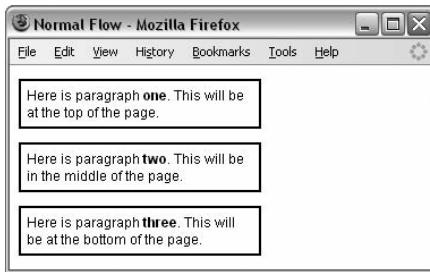


Figure 8-26

If you want the content of elements to appear in other places than where they would in normal flow, you have two properties to help you: `position` and `float`.

### The `position` Property

The `position` property allows you to specify a position for a box. It can take the four values listed in the table that follows.

Value	Meaning
static	This is the same as normal flow, and is the default, so you will rarely (if ever) see it specified.
relative	The position of the box can be offset from where it would be in normal flow.
absolute	The box is positioned exactly from the position in the containing element using x and y coordinates from the top-left corner of the containing element.
fixed	The position is calculated from a fixed point; in the case of the browser, this point is the top-left corner of a browser window and does not change position if the user scrolls the window.

You will see how these are used in the coming sections.

## Box Offset Properties

As you'll see in the coming sections, when boxes have a `position` property whose value is `relative`, `absolute`, or `fixed`, they will also use `box offset` properties to indicate where these boxes should be positioned. The table that follows lists the `box offset` properties.

Property	Meaning
<code>top</code>	Offset position from the top of the containing element
<code>right</code>	Offset position from the right of the containing element
<code>bottom</code>	Offset position from the bottom of the containing element
<code>left</code>	Offset position from the left of the containing element

Each can take a value of a length, a percentage, or `auto`. Relative units, including percentages, are calculated with respect to the containing boxes' dimensions or properties.

## Relative Positioning

Relative positioning takes an element and positions it in relation to where it would otherwise sit in normal flow. It is displaced from that position by an amount given using the `box offset` properties.

Now we'll go back to the example that we met in the section on normal positioning, but this time you can reposition the second paragraph using relative positioning, as shown in Figure 8-27.

## Chapter 8: More Cascading Style Sheets

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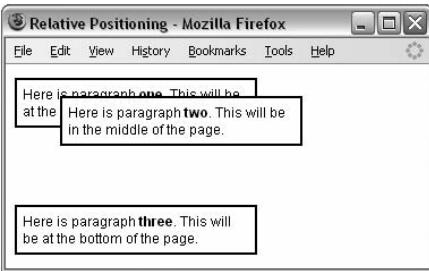


Figure 8-27

The second paragraph in this example is offset from where it would be in normal flow (where it was in the last example) by 40 pixels from the left and 40 pixels from the top — note the minus sign, which raises it above its position in normal flow (ch08\_eg26.css).

```
p {border-style:solid;
  border-color:#000000;
  border-width:2px;
  padding:5px;
  background-color:#FFFFFF; }

p.two {
  position:relative;
  left: 40px;
  top: -40px;}
```

The value of the box offsets (in this case top and left) can be a length, a percentage, or auto. If it is an absolute length, it can be a negative value.

*You should specify only a left or right offset and a top or bottom offset. If you specify both left and right or both top and bottom, one must be the absolute negative of the other (for example top:3px; bottom:-3px;). If you have top and bottom or left and right, and they do not have absolute negative values of each other, the right or bottom offset will be ignored.*

When you are using relative positioning, you can end up with some boxes overlapping others, as in the previous example. Because you are offsetting a box relative to normal flow, if the offset is large enough, one box will end up on top of another. This may create an effect you are looking for; however, there are a couple of pitfalls you should be aware of:

- ❑ Unless you set a background for a box (either a background color or image) it will be transparent by default, making any overlapping text an unreadable mess. In the preceding example, I used the background-color property to make the background of the paragraphs white and thereby prevent this from happening.
- ❑ The CSS specification does not say which element should appear on top when relatively positioned elements overlap each other, so there can be differences between browsers (although you can control this using the z-index property, which you will meet shortly).

### Absolute Positioning

Absolute positioning completely removes an element's content from normal flow, allowing you to fix its position.

You can specify that an element's content should be absolutely positioned by giving it the `position` property with a value of `absolute`; then you use the `box offset` properties to position it where you want.

The box offsets fix the position of a box relative to the containing block — a containing block being an element whose `position` property is set to `relative` or `fixed`.

Take a look at the following style sheet. This style sheet is for use with three paragraphs again, but this time the paragraphs are held within a `<div>` element that also uses absolute positioning (`ch20_eg27.css`):

```
div.page {  
    position: absolute;  
    left: 50px;  
    top: 100px;  
    border-style:solid; border-width:2px; border-color:#000000; }  
p {  
    background-color:#FFFFFF;  
    width:200px;  
    padding:5px;  
    border-style:solid; border-color:#000000; border-width:2px; }  
p.two {  
    position: absolute;  
    left:50px;  
    top: -25px; }
```

Figure 8-28 shows you what this would look like in a browser; as you can clearly see, the second paragraph is no longer in the middle of the page. The second paragraph element has been taken out of normal flow because the third paragraph is now in the place where the second paragraph would have been if it participated in normal flow. Furthermore, it even appears before the first paragraph and over to the right!

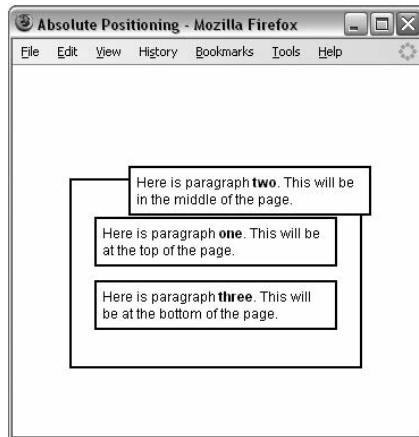


Figure 8-28

## Chapter 8: More Cascading Style Sheets

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The presence of the `<div class="page">` element here is to show that the paragraph is being positioned according the containing block — the absolutely positioned `<div>` element.

Absolutely positioned elements always come out above relatively positioned elements, as you see here, unless the `z-index` property (which you learn about later in this chapter) is used.

It is also worth noting that, because absolutely positioned boxes are taken out of normal flow, even if two vertical margins meet, their margins do not collapse.

## Fixed Positioning

The final value you need to be aware of for the `positioning` property is the value `fixed`. This value specifies that the content of the element should not only be completely removed from normal flow, but also that the box should not move when users scroll down the page.

While Firefox and Safari have offered support for fixed positioning for a while, IE7 was the first version of Internet Explorer to support it.

The following sample of XHTML from `ch08_eg28.html` demonstrates fixed positioning. This example continues with several more paragraphs so that you can see the page scrolling while the content of the `<div>` element remains fixed at the top of the page:

```
<div class="header">Beginning Web Development</div>
<p class="one">This page has to contain several paragraphs so you can see
the effect of fixed positioning. Fixed positioning has been used on the
header so it does not move even when the rest of the page scrolls.</p>
```

Here you can see the style sheet for this example (`ch08_eg28.css`). The header has the `position` property with the value `fixed` and is positioned to the top left of the browser window:

```
div.header {
    position:fixed;
    top: 0px;
    left:0px;
    width:100%;
    padding:20px;
    font-size:28px;
    color:#ffffff; background-color:#666666;
    border-style:solid; border-width:2px; border-color:#000000;}
p {
    width:300px;
    padding:5px;
    color:#000000; background-color:#FFFFFF;
    border-style:solid; border-color:#000000; border-width:2px;}
p.one {margin-top:100px; }
```

This last rule is supposed to make the first paragraph drop down from the top of the page so that it's in view, but unfortunately it does not work in this context.

Figure 8-29 shows you what this fixed header element looks like even though the user has scrolled halfway down the page.

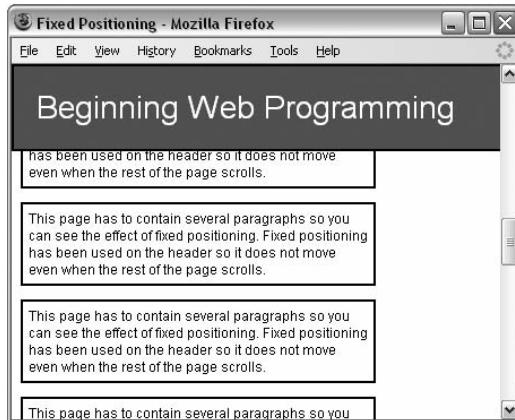


Figure 8-29

### The **z-index** Property

Absolutely positioned elements have a tendency to overlap other elements. When this happens the default behavior is to have the first elements underneath later ones. This is known as *stacking context*. If you have boxes that are absolutely or relatively positioned, you can control which of the boxes appears on top using the **z-index** property to alter the stacking context. If you are familiar with graphic design packages, the stacking context is similar to using the “bring to top” and “send to back” features.

The value of the **z-index** property is a number, and the higher the number the nearer the top that element should be displayed.

To better understand **z-index**, take a look at another example of absolute positioning — this time there are just three paragraphs:

```
<p class="one">Here is paragraph <b>one</b>. This will be at the top of the  
page.</p>  
<p class="two">Here is paragraph <b>two</b>. This will be underneath the other  
elements.</p>  
<p class="three">Here is paragraph <b>three</b>. This will be at the bottom of  
the page.</p>
```

Each of these paragraphs shares common `width`, `background-color`, `padding`, and `border` properties. Then each paragraph is positioned separately using absolute positioning. Because these paragraphs now all overlap, the **z-index** property is added to control which one appears on top; the higher the value, the nearer the top it ends up (`ch08_eg29.css`):

```
p {  
    width:200px;  
    background-color:#ffffff;  
    padding:5px; margin:10px;  
    border-style:solid; border-color:#000000; border-width:2px; }  
p.one {  
    z-index:3;
```

## Chapter 8: More Cascading Style Sheets

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```
position:absolute;  
left:0px; top:0px; }  
p.two {  
z-index:1;  
position:absolute;  
left:150px; top: 25px; }  
p.three {  
z-index:2;  
position:absolute;  
left:40px; top:35px; }
```

Figure 8-30 shows how the second paragraph now appears to be underneath the first and third paragraphs, and the first one remains on top.

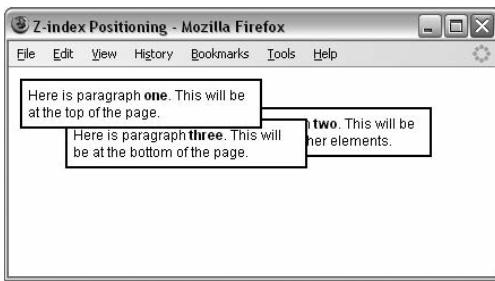


Figure 8-30

## Floating Using the *float* Property

The *float* element allows you to take an element out of normal flow and place it as far to the left or right of a containing box as possible within that element's padding. Its vertical margins will not be collapsed above or below it like block boxes in normal flow can be (because it has been taken out of normal flow); and the floated box will be aligned with the top of the containing box.

To indicate that you want a box floated either to the left or the right of the containing box, you set the *float* property, which can take one of the values listed in the table that follows.

Value	Purpose
left	The box is floated to the left of the containing element and the content of the containing element will flow to the right of it.
right	The box is floated to the right of the containing element and the content of the containing element will flow to the left of it.

Value	Purpose
none	The box is not floated and remains where it would have been positioned in normal flow.
inherit	The box takes the same property as its containing element.

Whenever you specify a `float` property, you should also set a `width` property indicating the width of the containing box that the floating box should take up; otherwise, it will automatically take up 100 percent of the width of the containing box leaving no space for things to flow around it, therefore making it just like a plain block-level element.

Look at the following XHTML (`ch08_eg30.html`) and note how there is a `<span>` element at the beginning of the first paragraph:

```

<body>
  <h1>Heading</h1>
  <p><span class="pullQuote">Here is the pullquote. It will be removed from
normal flow and appear on the right of the page.</span>
  Here is paragraph <b>one</b>. This will be at the top of the page. Here is
  paragraph <b>one</b>. This will be at the top of the page. Here is paragraph
  <b>one</b>. This will be at the top of the page. Here is paragraph
  <b>one</b>. This will be at the top of the page. Here is paragraph <b>one
  </b>. This will be at the top of the page.</p>
  <p>Here is paragraph <b>two</b>. This will be at the bottom of the page.</p>
</body>

```

Even the inline `<span>` element can be floated, taking it away from its containing element. (It is not just block boxes that can be floated.) It will be taken out of the normal flow and placed to the right of the containing `<p>` element using the `float` property with a value of `right` (`ch08_eg30.css`):

```

p {
  border-style:solid;
  border-color:#000000;
  border-width:2px;
  padding:5px;
  background-color:#FFFFFF;
  width:500px; }

.pullQuote {
  float:right;
  width:150px;
  padding:5px;
  margin:5px;
  border-style:solid;
  border-width:1px; }

```

## Chapter 8: More Cascading Style Sheets

You can see how the content of the `<span>` element with the `class` attribute whose value is `pullQuote` ends up to the right of the page, with the rest of the paragraph flowing to the left and then underneath it, as shown in Figure 8-31.

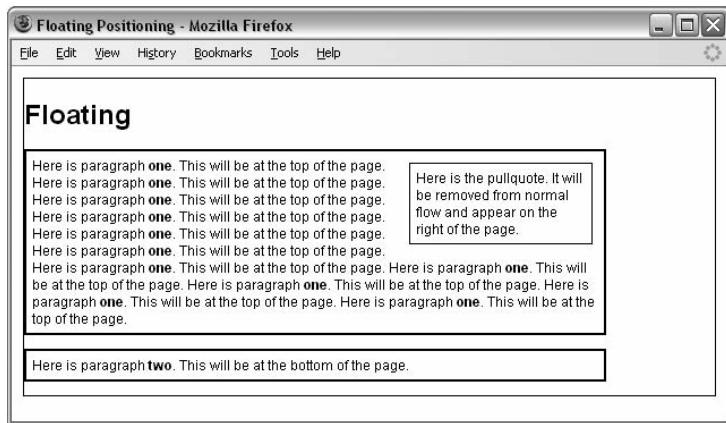


Figure 8-31

You will see lots more examples of how the `float` property works in the next chapter when you look at page layout.

### The `clear` Property

The `clear` property is especially helpful when working with boxes that are floated. As you just saw in Figure 8-31, content can flow around a floated element; however, you might not want this to happen — you might prefer that nothing sat next to the floated element, and that surrounding content be pushed underneath the floated element. This is what the `clear` property is for, and the following table shows you the values that this property can take.

Value	Purpose
<code>left</code>	The content of the element with the <code>clear</code> property is cleared from the left side of a float (it cannot appear to the left of a floating element).
<code>right</code>	The content of the element with the <code>clear</code> property is cleared from the right side of a float (it cannot appear to the right of a floating element).
<code>both</code>	The content of the element with the <code>clear</code> property is cleared from either side of a float (it cannot appear to either side of a floating element).
<code>none</code>	Allows floating on either side.

Look at this example, which is slightly different from the last one (`ch08_eg31.html`) because this time the `pullQuote` is in a `<div>` element rather than a `<span>` and it is not contained in the paragraph:

```
<h1>Floating</h1>
<div class="pullQuote">Here is the pullquote. It will be removed from
    normal flow and appear on the right of the page.</div>
<p>Here is paragraph <b>one</b>. This paragraph will get pushed underneath the
    floating element. </p>
```

The following style sheet will float the pull quote to the right, but the paragraph element uses the `clear` property to prevent any floated content appearing to the right of it (`ch08_eg31.css`):

```
p {
    clear:right;
    background-color:#FFFFFF; }
div.pullQuote {
    float:right;
    padding:5px;
    margin:5px;
    width:150px;
    border-style:solid; border-width:1px; }
```

Figure 8-32 shows you how the `clear` property works in this example.

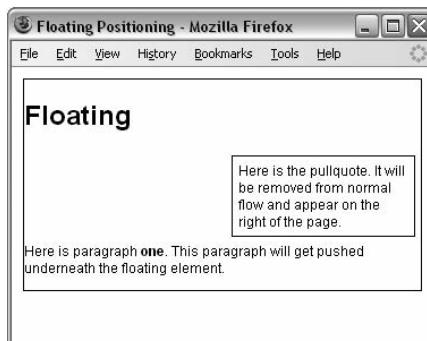


Figure 8-32

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### Try It Out A Sample Layout

In this example, you are going to create a sample page layout that uses a combination of the techniques you learned in this chapter to present an article using CSS rather than tables.

The page you are going to work with is shown in Figure 8-33 without the style sheet attached.

## Chapter 8: More Cascading Style Sheets

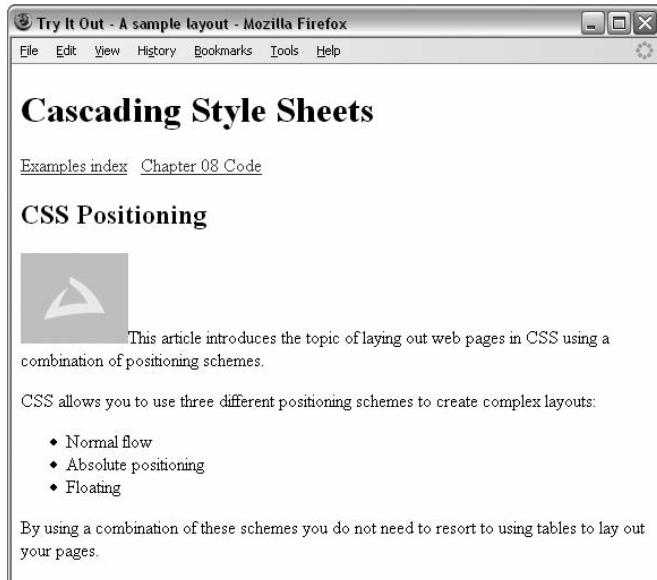


Figure 8-33

```
<body>
<h1>Cascading Style Sheets</h1>
<div class="nav"><a href="../index.htm">Examples index</a>
  &nbsp; <a href="">Chapter 8 Code</a></div>
<h2>CSS Positioning</h2>
<p class="abstract">This article introduces the topic of laying out
   web pages in CSS using a combination of positioning schemes.</p>
<p>CSS allows you to use three different positioning schemes to create
   complex layouts:</p>
<ul>
  <li>Normal flow</li>
  <li>Absolute positioning</li>
  <li>Floating</li>
</ul>
<p>By using a combination of these schemes you do not need to resort to
   using tables to lay out your pages.</p>
</body>
```

This example illustrates some of the issues that you need to be aware of with CSS — in particular it is important to demonstrate that while you have seen some very helpful properties, some of them are supported in the latest browsers only. While you can design your site in such a way that it will work with most browsers, you might not be able to get some techniques to work in all the browsers you want it to — so you need to test your site thoroughly.

## Chapter 8: More Cascading Style Sheets

In Firefox, this Try It Out example will look like Figure 8-34; and you would get a similar result in IE7.

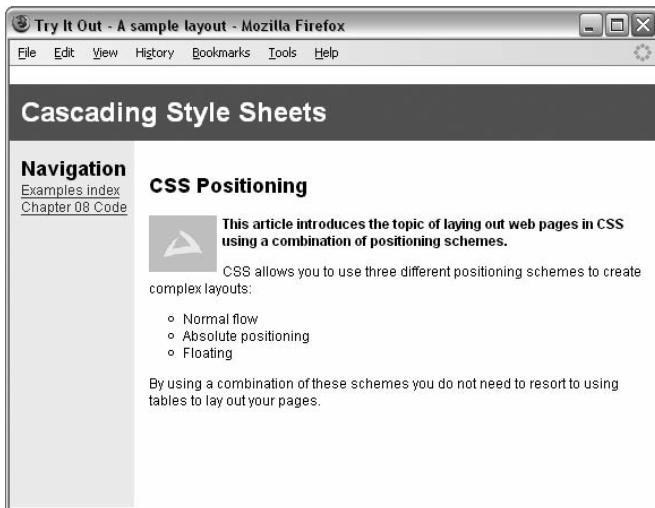


Figure 8-34

However, Figure 8-35 shows you what this page would look like in IE6 — so if you still have visitors coming to your site who use IE6, you need to consider which features will and won't work.

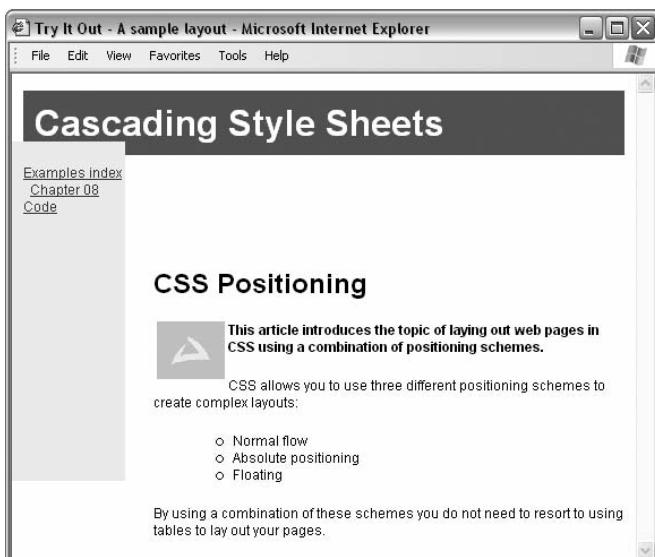


Figure 8-35

## Chapter 8: More Cascading Style Sheets

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To start working on the CSS file for this page, start up your web-page editor and follow these steps:

1. Create a file called `samplePage.css`, add the elements from the XHTML page, and use class selectors where appropriate to identify each type of element. You should end up with a list like the one that follows; then you will be able to look at the rule for each element in turn.

```
body {}  
h1 {}  
div.nav {}  
h2 {}  
p {}  
p.abstract {}  
img {}  
ul {}
```

2. First comes the rule for the `<body>` element, which just sets up some defaults for the page:

```
body {  
    color:#000000;  
    background-color:#ffffff;  
    font-family:arial, verdana, sans-serif;  
    font-size:12px;}
```

3. Next is the header for the site, which uses fixed positioning to anchor it to the top of the page even if the user scrolls. It also has a `z-index` property to ensure that this heading remains on top of the navigation.

```
h1 {  
    position:fixed;  
    top:0px; left:0px;  
    width:100%;  
    color:#ffffff; background-color:#666666;  
    padding:10px;  
    z-index:2;}
```

4. The navigation is removed from normal flow because it is absolutely positioned. It is positioned 60 pixels from the top so that the links will not disappear underneath the page's heading when the page first loads. The navigation is placed in a box that is 100 pixels wide and 300 pixels high with a light gray background, and it has a `z-index` of 1 to make sure that it goes underneath the heading for the page (which you just saw with a `z-index` of 2).

```
div.nav {  
    z-index:1;  
    position:absolute;  
    top:60px;  
    left:0px;  
    width:100px;  
    height:300px;  
    padding-left:10px; padding-top:20px; padding-bottom:10px;  
    background-color:#efefef;}
```

5. You may have noticed that the navigation bar contains the word “Navigation,” which was not in the original HTML file. This style sheet uses the CSS :before pseudo-class to add this word in. You can see here that it also has other styles associated with it.

```
div.nav:before {  
    content: "Navigation ";  
    font-size:18px;  
    font-weight:bold;}
```

6. Next is the rule for the <h2> element, which needs to be indented from the left because the navigation takes up the first 110 pixels to the left of it. It also has padding at the top to bring the text underneath the heading.

```
h2 {  
    padding-top:80px;  
    padding-left:115px;}
```

7. Next are the two rules for paragraphs, the first for all paragraphs, and the second one to make sure that the abstract of the article is in bold. Like the <h2> element, all paragraphs need to be indented from the left.

```
p {padding-left:115px;}  
p.abstract{font-weight:bold;}
```

8. The image that sits in the first paragraph is floated to the left of the text. As you can see, the text in the paragraph flows around the image. It also has a 5-pixel padding to the right.

```
img {  
    float:left;  
    width:60px;  
    padding-right:5px;}
```

9. Finally you have the rule for the unordered list element, which needs to be indented further than the paragraphs or level 2 heading. It also specifies the style of bullet to be used with the list-style property.

```
ul {  
    clear:left;  
    list-style:circle;  
    padding-left:145px;}
```

10. Save your style sheet and try loading the samplePage.html file that is going to use it.

### How It Works

As I already mentioned, it is important to note that not all of the rules in this example work in all browsers. However, you can get a good idea of what this example should look like in Firefox and IE7, so the following discussion focuses on the result you saw in Figure 8-34.

## Chapter 8: More Cascading Style Sheets

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Starting with the fixed heading, the `<h1>` element is taken out of normal flow and fixed to the top of the browser window (note that the white space above the heading should not really appear). Absolutely positioned elements always stay on top, so this would cover other content on the page if those elements (namely the navigation and the paragraphs) did not use padding to prevent them from overlapping.

The navigation bar not only uses the `padding-top` property to bring it down beneath the heading, but it also uses the `z-index` property. The `z-index` property is there to ensure that, if there is any overlap between the navigation and the title, the title will appear on the top. You cannot *rely* on pixel-perfect positioning from CSS, and if the navigation bar were to appear on top, it would look a little odd.

The headings, paragraphs, and unordered list that make up the body of the article must all have padding to bring them in off the left side of the browser, where they would otherwise overlap with the navigation (which you may remember has been taken out of normal flow because it is absolutely positioned). These paragraphs and other elements that remain in normal flow therefore must move out of the way of the absolutely positioned elements.

The image inside the first paragraph is floated within the block-level paragraph container and has a `padding-right` property set to 5 pixels so that the writing does not run right to the edge of it.

Finally, the unordered list has to be moved further in from the left margin than the paragraph or heading because it has bullet points to the left of where the text starts. If the unordered list were given a `padding-left` property with a value of 115 like the heading or paragraph, the text would start 115 pixels in from the left, but the markers (the bullet points) would be even further to the left. Hence this property is set to 145 so that it remains further indented than the text.

---

## Summary

In this chapter you learned the CSS properties that allow you to control lists, links, tables, outlines, and backgrounds with CSS. You then saw how CSS allows you to add content from the style sheet into the document. The `:before` and `:after` pseudo-classes allow you to add content before or after an element specified in the selector. This includes text, an image, or content from a file. It even allows for automatic numbering or counting of any element using the `counter()` function and can manage complex sets of quotation marks (although not all browsers support all these functions yet).

You also learned how to use the `@import` rule to include rules from other style sheets into the current one and create modularized style sheets and re-use rules from different sections of sites, while the `@charset` rule indicates which character set is being used in the style sheet.

Finally, this chapter looked at the three main positioning schemes in CSS: normal flow (and its offshoot relative positioning), absolute positioning (and its offshoot fixed positioning), and floating. These are powerful tools for controlling where the content of a document should appear; they complete the picture of separating style from content as you don't have to use tables to control the layout of documents (which you explore in greater detail in the next chapter).

As the examples in this chapter, and in particular the longer example at the end, have shown, support for CSS, even in the latest browsers, is still not complete. Bearing in mind that the CSS2 recommendation

was completed in 1998, it is a pity that browser manufacturers have not made a better attempt at implementing it.

With careful attention, it is possible to create pages that use CSS for layouts, but older browsers will not always support these layouts as you would like them to. As a result, some designers will use a combination of older techniques for page layout and CSS for some of the styling.

## Exercises

The answers to all of the exercises are in Appendix A.

1. In this exercise you create a linked table of contents that will sit at the top of a long document in an ordered list and link to the headings in the main part of the document.

The XHTML file `exercise1.html` is provided with the download code for this book, ready for you to create the style sheet. Your style sheet should do the following:

- Set the styles of all links including active and visited links
- Make the contents of the list bold
- Make the background of the list light gray and use padding to ensure the bullet points show
- Make the width of the links box 250 pixels wide
- Change the styles of heading bullet points to empty circles
- Change the style of link bullet points to squares

Your page should look something like Figure 8-36.

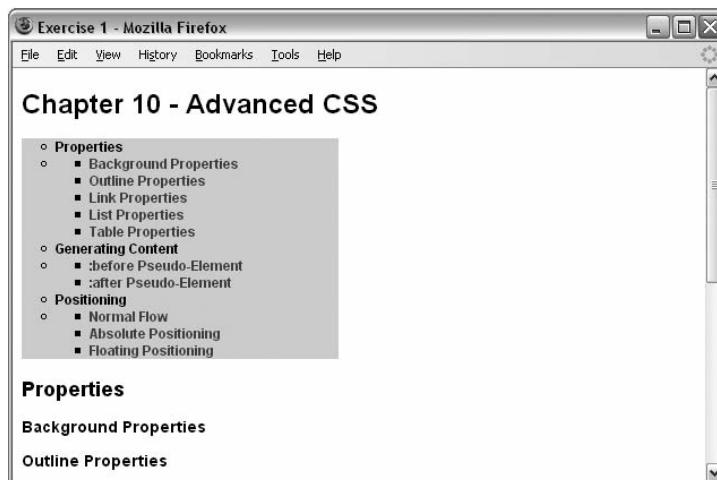


Figure 8-36

## Chapter 8: More Cascading Style Sheets

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2. In this exercise, you test your CSS positioning skills. You should create a page that represents the links to the different sections of the chapter in a very different way. Each of the sections will be shown in a different block, and each block will be absolutely positioned in a diagonal top left to bottom right direction. The middle box should appear on top, as shown in the Figure 8-37.

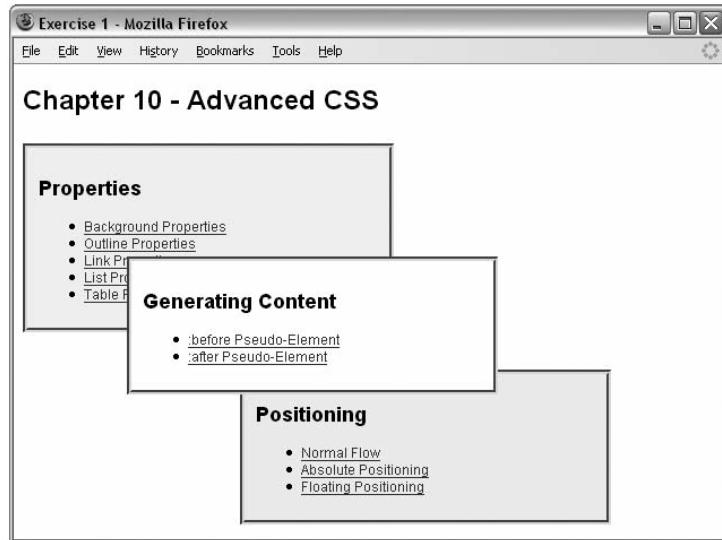


Figure 8-37

You can find the source XHTML file (`exercise2.html`) with the download code for this chapter.

# 9

## Page Layout

This chapter is the first of two chapters about design issues. It addresses designing and constructing *layouts* for web pages. Although there is no rule book that says how you should design your page, there are some important factors that you should consider regarding the appearance of a page, and it is these issues you'll learn about in this chapter.

No one can tell you how to make an attractive page — that is a matter of taste. What you will see in this chapter is a discussion about the aims of the site, the size of your page, what should appear on the page, and where each item should go on that page. You also need to know how to make these designs work in code. This chapter is broadly grouped into four sections to reflect these topics:

- Understanding the aims of the site correctly
- Looking at a page as a whole and addressing the question of how big you should make the page
- Knowing the elements that make up each page such as logos, headings, links, and possibly ads
- Positioning the various elements within the page

Once you have looked at the overall layout of the page in this chapter, see Chapter 10 for some more specific issues of design *within* the page, such as design of menus, forms, links, and text.

## Understanding the Site

Whether you are going to create a web site for yourself or are hoping to create sites for clients, you must have a good understanding of the site you want to create before you can start designing it. There are some fundamental questions you need to be asking to make sure you understand both the aims of the site's owner and what the audience who come to look at the site will expect to find; specifically, you need to be sure that you know:

- Whom you expect to visit the site
- What sort of information you think they would expect to find at your site

## Chapter 9: Page Layout

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- How often you can realistically expect them to visit
- What *you* want your site to do for your visitors

Without being clear on these items you cannot design an effective site. It is worth noting here that the first three questions are about your visitors and what they want from your site rather than what you want from your visitors. For example, I might want visitors to come and look at a site every day — but it is important to consider whether that is a realistic expectation. After all, if they are only likely to visit occasionally that could have a big impact on the design (and how often various parts of the pages are updated).

The following sections will help you answer these questions before you start working on the site.

### ***Understanding a Site's Aims***

Before you can even start working on a site, you must ensure that you have clearly defined the aims of the site. It is possible that the site may have several purposes, but by asking some of these questions at the beginning you will be able to crystallize what you are trying to achieve.

For example, if you are creating a site for a company, you might ask yourself:

- Are you dealing with a product or a service?
- How often will people require this product or service?
- Once they've ordered a product or service, are they likely to come back to the site to order again or find out more information?
- Are you trying to promote a product or service to people who will not have heard of it, or trying to explain more about this particular product or service to people who know what they are after?
- What is special about your product or service that differentiates it from the rival?
- Are you trying to sell direct from the site, put the visitor in touch with a sales person (create a sales lead), or tell people where they can get a product or service?

Perhaps the site you are working on is not designed to push a product or service; you may be trying to teach new skills; create a community; post a resume; create a portfolio; publish information about hobbies/interests; support a print publication, radio show, TV program, or other form of media; or publish your opinion on a topic. Each would have its own set of questions, but it is important to think of what the site is really trying to achieve, and what is required to meet those goals.

If you intend to start creating web sites for companies, you may come across clients who think they need a web site (or an update to their existing web site) but are not sure what they should be putting on it. Particularly when you are building sites for small- and medium-sized companies, you often have to help the client understand what a web site can do for the business before you start work on it.

Let's consider a few examples:

A photographer might want a site to act as a portfolio of his or her work along with contact details for anyone who wants to hire photographic services.

A locally run family pie company might decide that its main aim is to generate sales leads to sell gourmet pies to the catering trade.

A hotel might want to show photographs of the property, provide details about the accommodations, show a map of the location with information about the local amenities, and be able to take bookings.

A scientific research company might want to show investors information about the research being conducted currently, past successes, and the team behind the research.

The varieties of purposes a web site can have are nearly endless. But at the beginning of each new site you should try to list all of the aims; once you have done this you can start looking at how you are going to structure that information.

If you are working on a site for a client, it is good to get the client to agree to the aims of the site when you have defined them. Many clients can decide they want extra functionality added during the development of the site, so pinning down the aims from the start is important. If the client wants to then expand on these aims you can re-negotiate terms for these extra features (such as extra development time and extra expenses).

### **Whom You Expect to Visit**

Throughout the design process, you must keep one thing in mind: You need to design the page for the target audience of the site — not just the client. Whether you are choosing where to position an element of the site or deciding whether to use a technology or feature (such as sound or animation), the major influence for your decisions should always be what your target audience would want. So, naturally, it's very important to understand your target audience.

Unfortunately, some companies ask designers to push messages that the leadership thinks are most interesting or important instead of putting themselves in the position of their visitors. For example, it is not uncommon to see company web sites where information for investors, such as quarterly reports or information about the board of directors, takes up a primary space on the front page. This can suggest to some visitors that the site is aimed at the companies' investors, not its customers, and that it may be more interested in making money than in its customers interests. As a customer, I don't want to be reminded about how much profit a company is making if I'm about to hand over my hard-earned money! Instead, the site should have a link to the section of the site aimed at the small number of visitors who are investors, and use the valuable front-page space for links that customers will be interested in.

So you need to ask yourself the following:

- Who will be visiting your site? Will your visitors be potential customers (members of the public or other companies), investors, hobbyists, press and media, or students and researchers?
- Why are they coming? Do they want to buy a product or service? Or find where you are located, your opening hours, or a contact number/e-mail? Do they want to learn a new skill? Find out more about your company, service, or area of interest? Decide whether you are a good investment?

## Chapter 9: Page Layout

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- ❑ What is their underlying motivation for coming? Are they coming for entertainment (and therefore likely to be browsing), or to get something done such as placing an order or finding out some information (in which case they may want a quick result). With both this point and the previous point, you may decide that you expect 50 percent of your visitors to come for one reason, and another 50 percent to come for another reason.
- ❑ What do you know about these visitors? You may have an idea of the demographic of people usually interested in the product or service you supply or the topic you are covering. Things such as age, gender, and technical ability may affect some of your design decisions.

### New Content

Another important question to address early in the development cycle of any site is whether people are going to spend any time developing and maintaining new content for the site after it has been launched. There is a very simple reason for asking this: If the content of your site does not change, how can you expect visitors to come back to your site more than once?

Some sites, such as those containing helpful reference information, may be visited numerous times by the same people, but the average site for a small company — one that explains that company's products or services — will rarely generate a lot of return viewers unless people keep coming back to order the same product or service, or the company is regularly releasing new products.

Some sites do not need to change often; for example if you are a roofer it is unlikely that visitors will come back quickly once they have had a roof replaced. (They might come in the first place to see samples of your work, but after the roof has been replaced, they have little incentive to visit regularly.) If you are creating a site about new book or music releases, however, there will likely be new information you could post regularly that might attract visitors back every few weeks. Or your expectations may fall somewhere in between, such as a clothing site that showcases new clothing lines twice a year, or a reference site that visitors may come back to on occasion.

So you need to question how often you expect these same people to come back to your site. If you want them to come back regularly, you are going to have to provide them with an incentive to come back.

The problem with keeping content fresh is that it takes a lot of time, and someone has to be responsible for updating the site on a regular basis.

### Defining Your Site's Content

Now that you have a good idea of the goals of your site, whom it's aimed at, and how often the content is going to change, you can take a closer look at what's going to be the actual content of your site.

When generating the potential content of your site you should treat it like a brainstorming session — don't hold back! Remember, your site must address the needs of your visitors and what they will expect from the site, not just what you want them to see.

This list could include things such as information about products and services the company offers, photos or examples of work; how these products and services can be attained; contact details; and information about the company. (Customers often like to know a bit of the background behind small to medium-sized companies that trade on the Internet; it helps reassure them that it is safe to hand over their money.) Don't

forget to drill down further; for example, what information are you going to include about a product or service? A product could have a photo, description, dimensions, information about how and where it is made, typical uses for it, and so on. A service might require descriptions of the work involved, how long it takes to complete, what is required so the service can be performed, who will be performing the service, and how they are qualified to perform the service.

*If you sell something, you should always try to indicate a price — if the price varies (for example, a roofer might charge different amounts for different types and sizes of roof) adding a price guide for a product or service results in a higher level of inquiries than a site that gives no indication of price.*

You should also look at other sites that address a similar topic — the competition — and look at what they do and don't do well and whether these sites meet the needs of the people you expect to visit your site. One of the key points to think about here is what you can do differently or better — something that makes you look better than the competition.

Don't forget that you will want to add things such as your logo or branding to most pages, maybe a search form, and possibly advertising. You should also remember some boring yet necessary features such as a copyright notice, terms and conditions, and a privacy policy (the latter is important if you collect information about users or use a technology known as *cookies* for storing information on the user's computer).

Once you have every possible thing your customers might want to know on your list you can trim your ideas back to what you are actually going to do for this web site. Remember that unused ideas can always be used in a future update of the site.

## **Grouping and Categorization**

Now you can start to group together the ideas of what you want to cover. If the site is advertising several products or services, these may be placed together in related groups of products or services, which can be split into subgroups. For example:

- You might group the information about how the company was formed and its history along with information about the company today in a general "about us" section. In this section you might also include profiles of the people running the business.
- The different ways in which people can get in touch with you (phone, e-mail, fax, opening hours, maybe a map, and so on) and ideally a contact form could all be put in one "contact us" group.
- If a company has outside investors and is listed on the stock market, you might want to create a section for the investors, with company reports, information on the board of directors, and so on.

For most sites, you should try to create no more than six or seven sections. These sections will form the *primary* or *global navigation* items of your site. For example, you might have sections such as Products, Where to Buy, Trade Enquiries, About Us, and Contact Us. You will also have a home page (which is not included in the six or seven primary groups). This method of grouping the site will make it much easier to navigate and understand.

Some of the sections will likely contain subsections with several pages of their own, and there may be more than seven subsections in each category. For example, a publisher might have more than seven genres of books in a books section, or a cookery site may organize a recipes section by classes of ingredients or types of meals. These subsections form *secondary* or *category navigation*.

## Chapter 9: Page Layout

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Remember that your grouping should reflect what you expect the visitors to your site will want to do and the customers' understanding of your products, services, or subject. For example, if your customers are looking for a type of product on your site, will they be looking within a list of manufacturers or in a list of product types?

These categories and subcategories are like a table of contents and will form the basis of the navigation for your site — the sections will each need to take part in the main menu while the subsections will often form their own submenus. This organization is very important on web sites because they do not have the linear order a book does; users are far more likely to take different routes through a web site. The better organized your site, the more chance users will find what they are looking for.

### **Creating a Site Map**

By now you should be getting a good idea of the sections and pages that are going to make up your site, so you should start drawing up a site map, which should look something like either a family tree or folder list in Windows Explorer. It should start with the home page for the site and all of the main categories at the top of the tree.

If any of the categories contain subcategories or more than one page, these pages should appear as children of the first page. For example, if one of your main categories is "products" then you might have this split into several subsections with a page about each item in that category, or you might just have two or three products to list off that page — and each of those may then have its own page in the position of a grandchild of the product.

You can see an example of a site map in Figure 9-1; you could draw this either vertically as was done here, or horizontally (more like a family tree).

Once you have created a site map, you will know the following:

- How many pages are on your site
- What information will appear on each of those pages
- What links will appear on each page (and where those links point to)

Once you have created your site map, it is a good idea to try to look at the things that you initially expected users to come to the site for, and look at how users would navigate through the site map, step by step, to get to the information that you think they will need. For example, a company manufacturing specialist carpenters' tools might define visitors into two groups:

- Trade buyers wanting to:
  - Browse the list of products that they could stock in their DIY/hardware stores
  - Find a specific product that a customer is requesting
  - Contact details for the sales team
- Public wanting to:
  - Browse the list of products that they could find in a DIY/hardware store
  - Find specific products they need
  - Know how to contact the company

In programming terminology, the steps that form an interaction between a person and a computer system in order to achieve a specific task is often referred to as a *use case*.

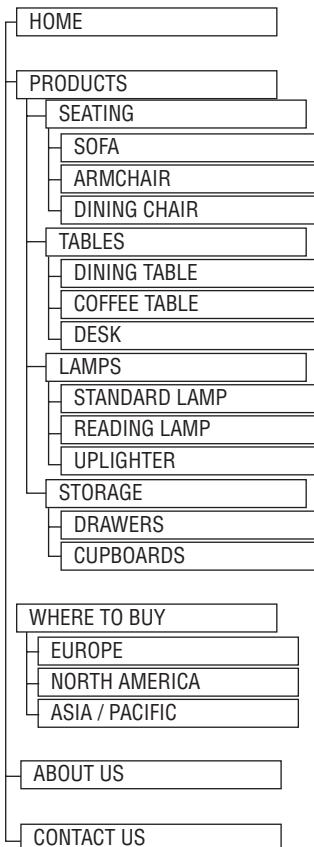


Figure 9-1

### Identifying Key Elements for Every Page

Before you can start to really design a page, you need to perform one last step. You need to identify the key items or *elements* that should appear on each page. These elements will include things such as branding or logos, primary navigation, category navigation (on the relevant category pages), headings, the main content of the page, a search box, and space for self-promotions or for advertising other companies' products and services.

You should create the list of the key elements of each page before you even start thinking about where to position them, although it is very helpful if you have an idea of how much space each element will take.

## Chapter 9: Page Layout

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These elements will reflect the aims of the site. But be warned: Many clients will want to put everything on every page. You must show them how the organization and planning you have done will lead to a good design and simple navigation that avoids the need to put everything on each page. (You learn more about navigation in Chapter 10.) A site that is less cluttered yet easy to navigate is better than a site that has everything on each page because it is harder to find what you want on a page where there is too much information.

## Page Size (and Screen Resolution)

Now that you know what should go on each page, you are ready to start looking at designing the pages themselves. In the same way that an artist must decide on the size of canvas before starting to paint, so you must decide what size of page you are going to use for your site.

Unfortunately, different visitors to your site will have different size monitors working at different resolutions. Therefore, your page will not look the same to everyone who visits your site; you cannot design something that looks good on your monitor and expect it to look good on someone else's computer. Several factors affect how big your "canvas" should be. Consider the following:

- Different computers have different screen resolutions ( $800 \times 600$  and  $1024 \times 768$  are the most popular).
- Different users have different size monitors (15, 17, 19, 21+ inch monitors).
- People often don't browse with the whole screen showing — they tend to have toolbars and other applications taking up part of the space.

If you don't use sensible dimensions for a page when you start to design and build your site, you could end up rebuilding the whole thing when one of your clients gets home and notices that what looked great on the computer at work simply doesn't fit on a monitor at home.

The issue of screen resolution refers to the number of pixels that make up a picture on a monitor screen. A screen that has a  $800 \times 600$  resolution will be 800 pixels wide and 600 pixels tall, and a screen that is  $1024 \times 768$  resolution will be 1024 pixels wide and 768 pixels tall.

The following table shows you statistics for screen resolutions from a site called theCounter.com. The statistics are taken from visitors to the site in the month of January over eight years, and they show the percentage of visitors that had different screen resolutions. You can view these statistics on an ongoing basis at [www.theCounter.com/stats/](http://www.theCounter.com/stats/). The same site also hosts a number of other helpful statistics, including the percentage of visitors using different browser versions.

Month/Year	$640 \times 480$	$800 \times 600$	$1024 \times 768$	$1152 \times 864$	$1280 \times 1024$
Jan 2008	0 percent	8 percent	48 percent	3 percent	28 percent
Jan 2007	0 percent	13 percent	53 percent	3 percent	22 percent
Jan 2006	0 percent	21 percent	58 percent	3 percent	12 percent
Jan 2005	0 percent	28 percent	54 percent	3 percent	10 percent

Month/Year	640 × 480	800 × 600	1024 × 768	1152 × 864	1280 × 1024
Jan 2004	1 percent	37 percent	49 percent	3 percent	6 percent
Jan 2003	2 percent	46 percent	40 percent	3 percent	4 percent
Jan 2002	4 percent	52 percent	34 percent	2 percent	3 percent
Jan 2001	7 percent	54 percent	30 percent	2 percent	2 percent
Jan 2000	11 percent	56 percent	25 percent	2 percent	2 percent

As you can see, in January 2008 only 8 percent of users had 800 × 600 resolution, and 90 percent of users had a resolution of 1024×768 or higher. At this time it was common for pages to be around 980 pixels wide.

However, when deciding the width of the page, it is important to remember that you should be designing sites for your visitors. Even if you or a client of yours uses a 21-inch monitor at 1280 × 1024 resolution, you should make sure that your design is usable on a 15-inch 800 × 600 screen. (As you will see later in the chapter, content on web pages is often split into columns, and many sites use the space on the right hand page for information that is not essential to the use of the site.)

*Most operating systems allow you to change the resolution of your monitor, so you can try altering that resolution to get an idea of how different it can look for different users. On a PC you will find this in the Windows Control Panel under the Displays option; on a Mac, it's in System Preferences under the Displays option.*

Vertically you should account for the fact that a lot of users will have a menu or taskbar (such as the taskbar on Windows or the dock on Mac OS X) that will take up part of the screen's vertical height. You also have to consider the various toolbars that can appear in a browser window. Therefore, you should make sure that the key points of a page appear in the top 550 pixels or so of the browser window; you will sometimes hear this space referred to as being *above the fold* meaning the space on the screen before the user has to start scrolling.

**While you should generally avoid expecting users to scroll horizontally, you can safely expect them to scroll vertically. Visitors should, however, be able to tell what the page is about without scrolling, so make sure that the main parts are in view when the page loads. Generally speaking, you should at least be able to see the company logo or branding, the main heading for any page, as well as the first few items of primary navigation.**

## Fixed-Width vs. Liquid Designs

Although I said that you should make the content fit within a page that is 980 pixels wide, and that a user should be able to understand what a page is about from the top 550 pixels of the screen, you may have noticed that some designs stretch to fit the whole page. This is known as a *liquid design*. By contrast, designs that force a page to a certain width or height are known as *fixed-width designs*.

## Chapter 9: Page Layout

*It is interesting to note that users with higher resolution monitors tend to leave larger gaps around the edge of the window they browse in, exposing more of their desktop and other applications that are running. So, even when users have high-resolution screens their browser windows are rarely taking up the whole screen.*

One of the most common misconceptions I've come across when working on web sites for clients is that they think every web page takes up the whole screen. This is simply not true!

Of course, some sites stretch to fit the whole browser window. In these cases, parts of the page stretch and shrink depending upon the size of the browser, and if the user resizes his or her browser, the page will usually change size with the window. Figure 9-2 shows a fictional news site that uses a liquid design to take up the whole page. (Note that the browser windows in the next two figures are the same width.)

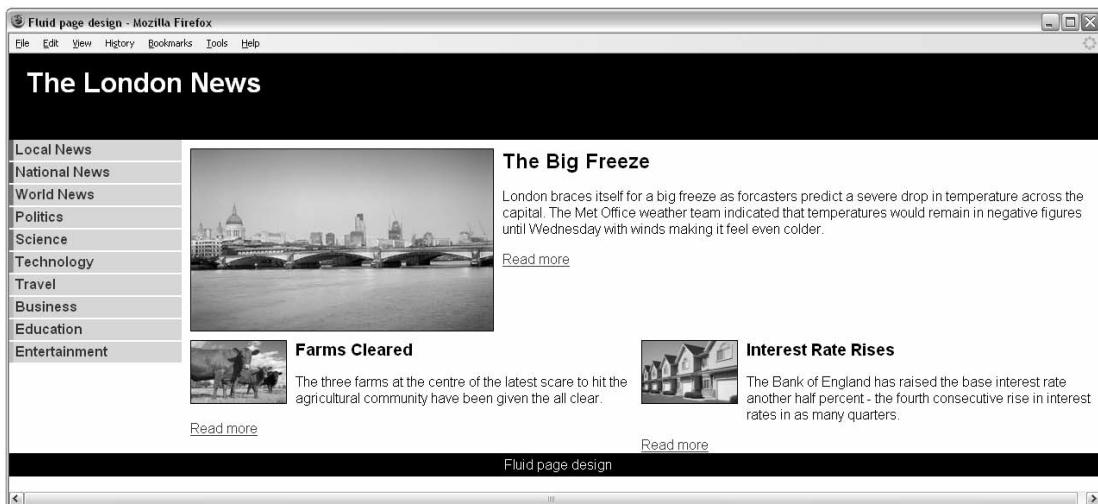
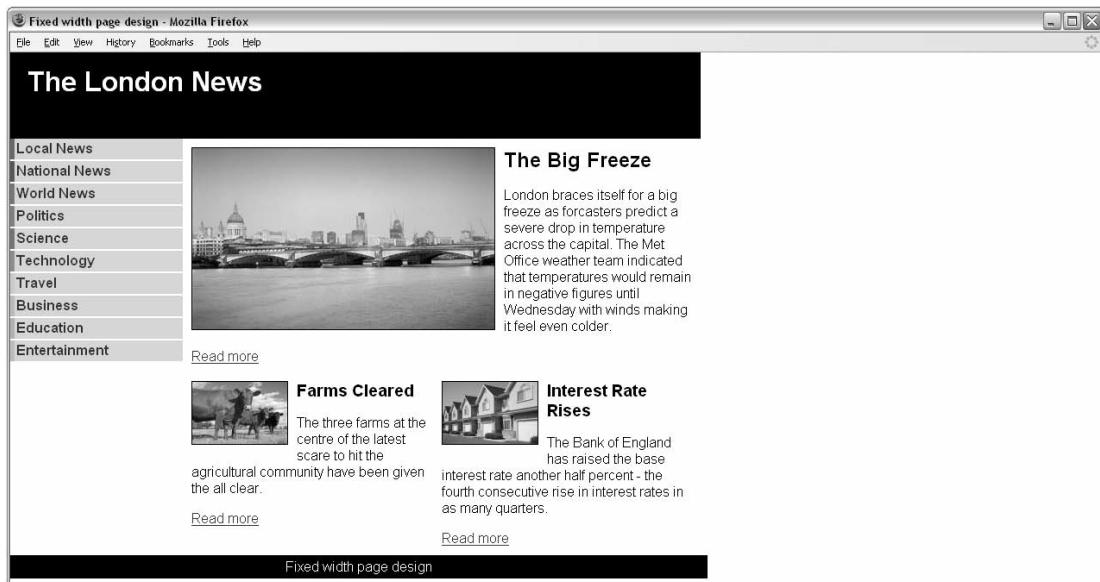


Figure 9-2

In fact, Figure 9-2 is actually a mix of fluid design and fixed-width design because the navigation on the left-hand side stays the same width, while the main part of the page stretches to fit the browser window.

Many sites, however, have a completely fixed-width and are either aligned to the left or the center of the page. These sites should take into account the limited width of a browser window (as discussed earlier). The key difference with this approach (compared with the liquid designs) is that the designer has much greater control over the layout of a page because she knows how large it will be. It also means that the designer can limit the width of things such as columns of text. Controlling the size of a page can be especially helpful on the Web because users often find it difficult to read paragraphs that are too wide; when you get to the end of a line of text it's harder for the eye to return to the correct next line.

An example of a fixed-width design is shown in Figure 9-3. When the user increases the size of the browser window, the page stays the same size but gains white space on the right (the browser window in this figure is the same width it was in Figure 9-2).

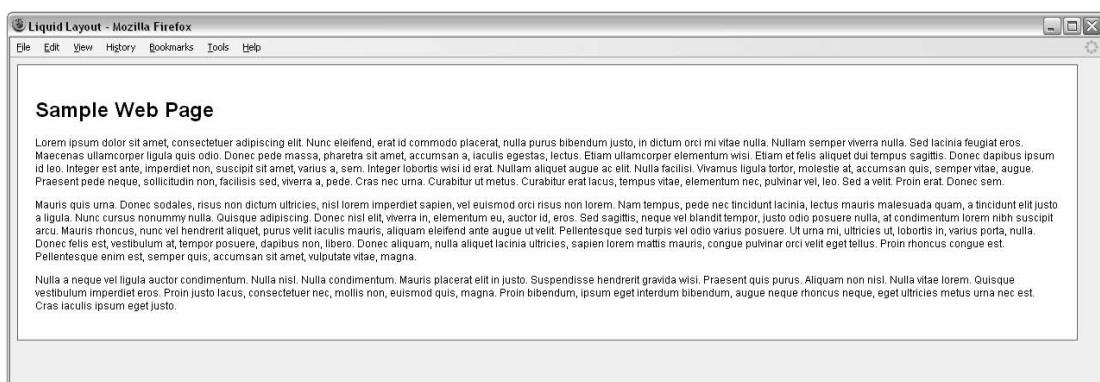


**Figure 9-3**

Now that you've seen liquid and fixed-width designs, the following sections show you how to create them in code.

## Liquid Design

A liquid design can stretch to fit the page. In order to do so, you specify proportions of a page using percentage values. For example, you might decide your page takes up 95 percent of the width of the browser so that there is always a small gap around the edge. Figure 9-4 shows a page that takes up 95 percent of the window. If the user increases the size of the browser window, the page increases in size but retains the border around the outside.



**Figure 9-4**

## Chapter 9: Page Layout

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Here (ch09\_eg01.html) you can see how this effect can be created using a `<div>` element:

```
<body>
  <div id="page">
    <!-- CONTENT OF PAGE GOES HERE -->
  </div>
</body>
```

The style sheet contains a rule for the `<div>` element setting the `width` property to have a value of 95 percent. There are also a few other properties set to show you the containing box and make the example look a little more attractive:

```
div.page {
  width:95%;
  background-color:#ffffff;
  border:1px solid #666666;
  padding:20px;
  font-size:12px;}
```

Before CSS came along, web designers commonly used tables to control the positioning of content on a page, especially when they wanted more than one column in their layouts.

Wherever possible, you should avoid using `<table>` element to control layouts, unless you are presenting tabular data. A train timetable, for example, is real tabular data containing many rows and columns and, therefore, it should be placed in a table. A news page, however, does not really constitute tabular data even if the news is split into a two-column layout.

Ideally, the only exception to this rule would be when you have to target older browsers, such as Internet Explorer 5 or Netscape 5 (which very few users run these days).

*The very observant of you might notice that in both IE and Firefox the page often ends up with a little more space on the right than on the left. However, it is barely noticeable.*

There are advantages and disadvantages to the liquid layout approach. The advantages are as follows:

- ❑ The page expands to fill the browser window and therefore does not leave large spaces around the page when there is a large window.
- ❑ If the user has a small window open in his or her browser, the page can contract to fit that window without the users having to scroll.
- ❑ The design is tolerant of users setting font sizes larger than the designer intended, as the page layout can stretch.

The disadvantages are:

- ❑ If you do not control the width of sections of your page, the page can look much different than you intended, and you can end up with unsightly gaps around certain elements, or items that are squashed together.

- ❑ If the user has a very wide window, lines of text can become very long, and these become hard to read.
- ❑ If the user has a very narrow window, words may be squashed too small and you could end up with just a word or two on each line.

## Fixed-Width Design

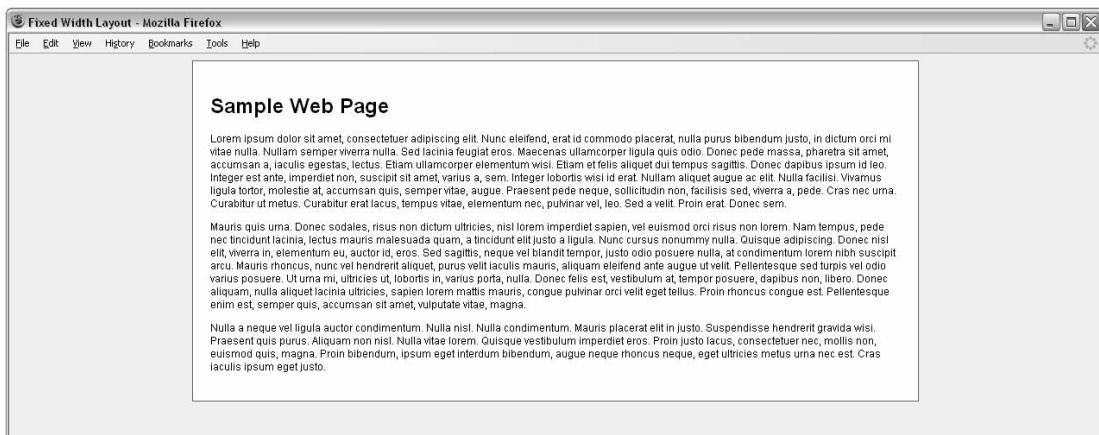
Fixed-width designs use lengths to indicate the dimensions of the page, such as pixels, ems, and centimeters. Fixed-width designs allow designers much greater control over how their pages appear because the designer knows the size of the canvas; it cannot stretch and shrink as the users resize their windows. Even though a design might look a slightly different size on different resolution monitors, the proportions of elements on the page can remain the same. You can see an example of a fixed-width page in Figure 9-5. The code for this page (`ch9_eg02.html`) follows shortly.

While Figure 9-5 may look similar to Figure 9-4, if you try out the corresponding code that is provided with the download code for the rest of the book from [www.wrox.com](http://www.wrox.com), you will find that this example does not stretch to take up more of the browser window, unlike the previous example of a liquid layout.

When the `width` property is used on a block-level element, no matter how big the user's browser is, the element (and therefore the layout of the page) remains that size. If the user's browser is narrower than the layout specifies, horizontal scrollbars will appear, whereas if the window is wider than the layout specifies there will be space to the right-hand side of the page or both sides if the box that contains the page is centered.

The value of the `width` attribute is most often given in pixels in a fixed-width design. Here you can see the element that holds the page carries an `id` attribute whose value is `page` (`ch9_eg02.html`):

```
<body>
  <div id="page">
    <!-- CONTENT OF PAGE GOES HERE -->
  </div>
</body>
```



## Chapter 9: Page Layout

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Now take a look at the CSS rules that correspond with this element (`ch9_eg02.css`):

```
div#page{  
    width:800px;  
    margin-left:auto;  
    margin-right:auto;  
    background-color:#ffffff;  
    border:1px solid #666666;  
    padding:20px;  
    font-size:12px;}
```

The value of the `width` property is what fixes the width of the page to make it 800 pixels wide no matter whether the browser is more or less than 800 pixels wide. You might also have noticed that the `margin-left` and `margin-right` properties have a value of `auto`, which ensures that the page is centered in the browser window.

*Note that fixed-width designs that use pixels look smaller on higher-resolution monitors because when the same size monitor is set with a higher resolution more pixels are visible on the screen.*

When you are using dimensions in pixels that are similar to these (between 700 and 1000 pixels), you are confining the use of the site to a browser on a desktop (or laptop) computer. It will not necessarily be accessible to those with smaller-screened devices such as PDAs or mobile phones. It will probably be too big for TV set-top boxes, too, because TVs have lower resolutions than computer screens (320 × 240 in the U.S., if you're curious).

As with the liquid design, there are both advantages and disadvantages to the fixed-width page approach.

The advantages are as follows:

- ❑ Pixel values are accurate at controlling width and positioning of elements.
- ❑ The designer has far greater control over the appearance and position of items on the page.
- ❑ The size of an image will always remain the same relative to the page.
- ❑ You can control the lengths of lines of text regardless of the size of the user's window.

The disadvantages are as follows:

- ❑ If a user has font sizes set to a larger value, the text might not fit as intended in the allotted space.
- ❑ If users browse at higher resolution than the page was designed for, the page can look smaller on their screens and can therefore be hard to read.
- ❑ The design works only on devices that have size and resolution of screens similar to desktop computers (likely ruling out use of the page by mobile phones or PDAs, for example).
- ❑ Your code can end up with lots of *container elements*; elements which are just used to control the layout of the page. This not only makes the page more cluttered, but also makes it easier to break.
- ❑ You can have a page sitting in the middle of a window with big gaps around it.

Now that you've seen how to control the size of a page, you should look at designing the content.

# Designing Pages

By now you should know how many pages you have, which pages link to which other pages, what the main *elements* of each page are (elements here means items on the page such as navigation, branding, articles/products, and so on, rather than tags and their content), and whether your page will be a fixed size or whether it will stretch. Now it's time to work out how the content is going to fit onto the page, which elements should be grouped together, and where they should be positioned on the page. All of this should happen before you start building your page.

*Before you even start to design a site, however, it can often help to ask clients what their favorite web sites are and what they like about each of these sites. This will give you an idea of their tastes and what they find attractive.*

## Sketching the Placement of Elements

Now it's time to start getting a feel for the way this information will work on a page, and where each of the elements should go on a page. At this point you should just be using text and lines to sketch out where each element (such as the heading or main body of text) goes on the page and how much space it gets; you should not be thinking yet about colors, fonts, backgrounds, images, or other design issues.

While it may seem strange (and difficult at first) not to add visual presentation at this stage, it is important that you focus just on making sure you include every item the user can interact with and give it the necessary space. This process is sometimes referred to as *wireframing*. Figure 9-6 shows you an example of a wireframe for a web site:

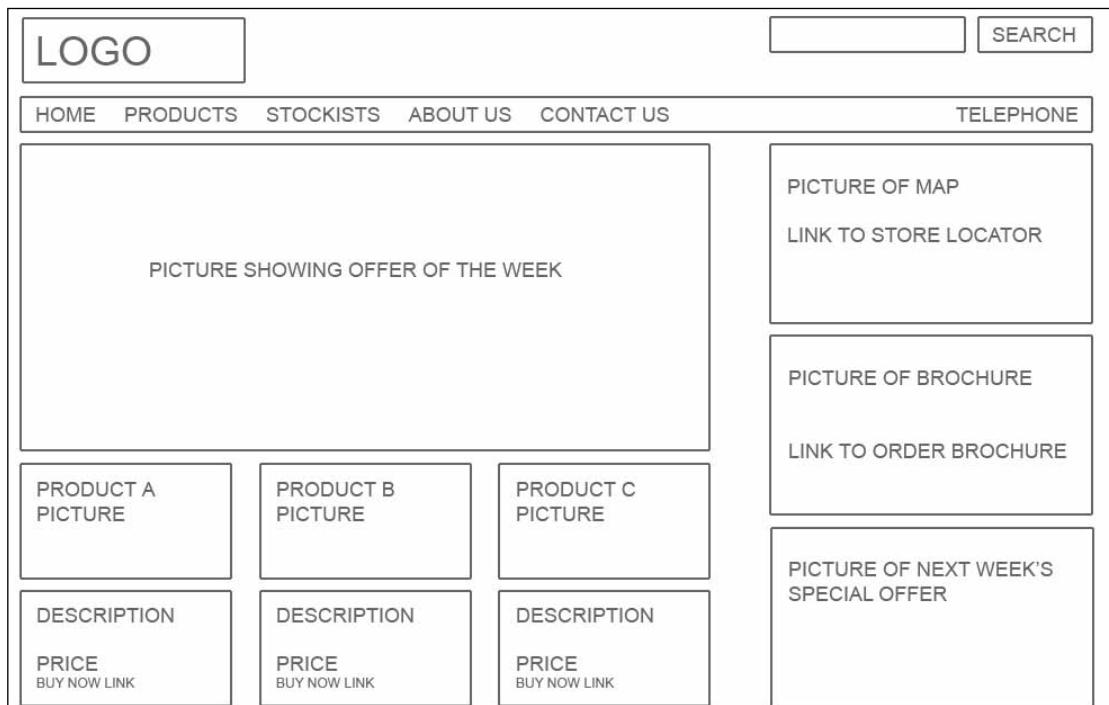


Figure 9-6

## Chapter 9: Page Layout

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Once you have created a wireframe model, you can then go back to the list of target visitors you expect to visit your site and make sure they can easily find what you think they will come to the site for. You can see from this simple model where the links go, and you get a good idea of the functionality of the site without getting distracted by the issues surrounding the look of the page. This is particularly important for two reasons:

- ❑ When you show users and clients a prototype of the fully designed site, they tend to focus on the visual elements rather than the proposed function. So, a skeletal model ensures that the client focuses on the function and structure of the content and not its appearance.
- ❑ If you do need to make changes, you can do so before the design or programming starts, which can save you from rewriting and/or redesigning much of the site later on.

An important point at this stage in the process is deciding which of these elements is most important and should go at the top of the page. Chances are that not all of the content of your pages will fit onto the screen at once — or at least not on all resolutions.

*Assuming that for the longer pages users will have to scroll vertically, you will want to make sure that the most important elements are at the top of the page, and that you can tell what the page is about from what you can see when the page opens.*

The general rule is that the most used functions should always take priority on a site, rather than what the marketing department wants to push this week or month. It all comes back to designing your site with your visitors in mind. If you do not keep the visitors happy, they will not make your site a success.

Generally speaking, you want the following items to be visible as the page loads:

- ❑ Branding
- ❑ Global navigation (a link to the home page and the main sections of the site — note that the home page should almost always be the first item of navigation)
- ❑ Subsection navigation (if you are in one of the subsections of the site, the subsection navigation should contain links to the sections within that section)
- ❑ A heading or title for the page (except for the home page which probably does not need one)
- ❑ Enough of the content that users can tell what the page is about
- ❑ An option to search the site
- ❑ Promotions/Advertising (self or others)

The items that do not need to appear on the portion of the page that's visible when the page loads are as follows:

- ❑ The detail of the rest of the page (for example if you have a news article, it is only necessary to be able to view the headline and ideally a summary; the entire article does not need to fit in the top part of the page)
- ❑ Links to related information or other sites (things that are not essential to the use of this site)

- ❑ Advertising
- ❑ Footer navigation — Copyright, Terms and Conditions, Privacy Policy (these are things that are generally required, but rarely used, and can, therefore, go at the bottom of the page)

It is also important to bear in mind that visitors to web pages tend to scan the page to find out whether it is relevant to them, and if so to help them pick which elements to focus on — they almost never read all of the text on a page. Research by a renowned web usability researcher and author, Jacob Nielsen, has indicated that people commonly scan a page using an “F” shape — starting with two horizontal stripes and then a vertical stripe (the shape and size of the F depend on your design, the type of page, and the amount of information on the page).

Therefore, putting your primary navigation down the right-hand side of a page might not be a good idea; under the logo, left to right might be better.

It is also important that your text be easy to scan, which means clear and concise headings and subheadings. Where possible make sure that the first couple of words in a heading indicate the topic of the following paragraph(s).

If you are designing a site for a company that’s likely to want to change the main feature on a site regularly, you will probably want to allocate a part of the page for the company to control. You may give a proportion of the home page (or home pages of the subcategories) to them for regularly changing features. For example, a shop might change the main section of a page every time there is an upcoming occasion it wants to market, such as religious holidays, New Year’s, Valentine’s Day, Mother’s Day, Father’s Day, start of school terms, and so on.

## ***Introducing the Style***

Now that you have an idea of what the site looks like in terms of text and simple lines, you can start adding the style or character of the page — playing with colors and fonts, backgrounds and images — to create a page that’s visually appealing.

Now that you know where each of the elements should appear on the page, this can be a much easier task.

*Some designers may have problems with being told that all the elements have already been placed on the page and that these will take up a certain amount of space. The designer may feel he’s being asked to color a picture rather than draw one. So you may want to ask the designer to be involved in the wireframe as well. Some designers may also find this difficult because it requires a very different approach than they are used to.*

The size and positioning of elements on a page is a valid part of the design process (not only the visual appearance but also the interface or interaction design — how the site handles). However, the process of wireframing a design will help the user or client focus on what the site actually does and will help you finalize the functionality before starting to design the page. You may choose to tell the client that the exact positions of the elements in the wireframe may change, but that it is an indication of the content that will appear on those pages.

## Chapter 9: Page Layout

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*If you use a designer to work on web pages, you will often have to strike a balance and sometimes allow the designer to completely reposition the elements that you have already positioned on each page, as well as to change the amount of space for items. Just make sure that the necessary items fit in the part of the page that is viewable when the page loads. You will most likely find your own balance as you work on a few sites.*

### What Is Already Done for You?

As with any form of marketing, creating an easily identifiable style will help re-enforce a brand. If a company has a logo, you should use that logo. If they have company colors, you should feature those colors in the site's color scheme. But beyond that, it's often up to you to design something that is visually attractive.

**Unless clients specifically ask you to redesign the company logo or change their colors you should avoid doing so because it is part of the brand they have built up, and it probably appears on things such as stationery and signs for the company.**

You should ask your client if you can have a digital copy of the logo (rather than scanning it in from a brochure). If an ad or leaflet is in print, the client, or the people who designed it, should have an electronic version you can use.

*I have worked in the past with clients who have terrible logos that really bring down the look of the site, yet they are not interested in changing them. If you are unfortunate enough to come across such a logo, you are best off keeping the actual size of the logo relatively small; then you can rely on the company's colors to maintain the identity, and sometimes can even add the company name in a larger plain font near the logo.*

You should also ask the company for any materials it is supposed to provide such as photographs of products or work done for previous customers, along with any text it is supposed to be supplying. If the client can supply good photographs for the site, it will make the site look a lot more professional.

### Common Page Elements

In most cases, there should be some degree of consistency across all of the pages within a site. As with any form of branding, this helps visitors identify the site from its look. The first step in designing your pages should therefore be to look at the elements that will appear on every page. This usually means starting with the branding and the primary navigation.

The branding and primary navigation should be in the same place on every page. For example, if you decide to put your primary navigation under the logo stretching from left to right, it should be under the logo stretching from left to right on every page. You may then choose to place the subnavigation in a different part of the page, say down the left side. But when elements appear on more than one page, they should appear in the same place on each page, so the user can learn how to use the site more quickly.

Similarly, if your site dedicates a page to each product or service you offer, or each article or story you publish, then each of these pages should follow a consistent design. For example, if you are creating an online store, you will want the information for each product to be laid out in a similar way, so that the information (such as the size or price of a product) is easy to find. Similarly, if you are doing an article/news-based site, the layout of articles is likely to be similar.

If the bottom of the page contains links to other pages such as the copyright, privacy policy, and terms and conditions pages, it should also look the same across the bottom of all pages.

You will often hear the terms *header* and *footer* used in relation to pages. The term “header” is generally used to describe the heading of any page on a site that tends to be consistent across the site and features the logo and often the primary navigation. The footer, meanwhile, is anything that appears on the bottom of every page. Between the header and the footer is the content or body of the page.

### **The Influence of Images on Design**

The use of images often has a strong influence on visitors’ perceptions of a site. Great logos, graphics, and photographs can make the difference between a below-average site and an attractive site. A bad logo or a poor photo on the front page can discourage a user from looking through the site, no matter how good the content is.

Increasingly, sites are featuring high quality photographs shot especially for that company, and often these are not just photos of products — they are images that represent a lifestyle or image the company is trying to associate with the brand. These images may tie in with (or be taken from) other marketing efforts by the company.

The quality of photographs often depends on the budget for the site. If your client has photos taken by a professional for its marketing material, you should consider using these. Or if the client’s budget is large enough, you can hire a photographer to take appropriate shots. It is actually quite hard to find examples of sites for multinational companies and popular brands that do not contain impressive graphics.

*While a lot of free clip art is on the Web, it can make a site look quite amateurish. It's fine for a hobby site, but not ideal for a company web site.*

You can also use a number of stock photo sites to obtain images, rather than hiring a photographer. But be warned that you usually need to pay to use the images, and the fees can vary from relatively cheap to quite expensive. At the cheaper end of the market are sites such as [www.istockphoto.com](http://www.istockphoto.com) and [www.sxc.hu/](http://www.sxc.hu/), and at the more expensive end of the spectrum are sites such as [www.gettyimages.com](http://www.gettyimages.com) and [www.corbis.com](http://www.corbis.com).

**You should always ensure that you have the necessary copyright permission before using an image. If you do not, you could end up with either a court case, a heavy fine, or at the very least a letter telling you to remove the image, which would require you to redesign the site and explain your mistake to the client.**

### **Grouping Elements**

You can use the following methods to make it clear to a user that several elements of a page are related. For example, you might want to group together links for new products, the elements of a registration form, or summary details for a product:

- ❑ **Location:** Making sure that similar elements of the design are near to each other
- ❑ **Color:** Using both foreground and blocks of background colors can make it clear which items relate to each other

## Chapter 9: Page Layout

- ❑ **Borders and padding:** Creating a gap between one group of elements and other items on the page to indicate which are grouped together
- ❑ **Styles:** Such as using similar buttons for navigation items

Figure 9-7 shows a page from the Apple store that demonstrates examples of each of these. The page demonstrates several examples of grouping related elements (the primary navigation, the types of Mac on sale in the store, the different models grouped together). Color is used to distinguish the primary navigation, borders are used to group together different sections of the page, and the select buttons have a clear style.

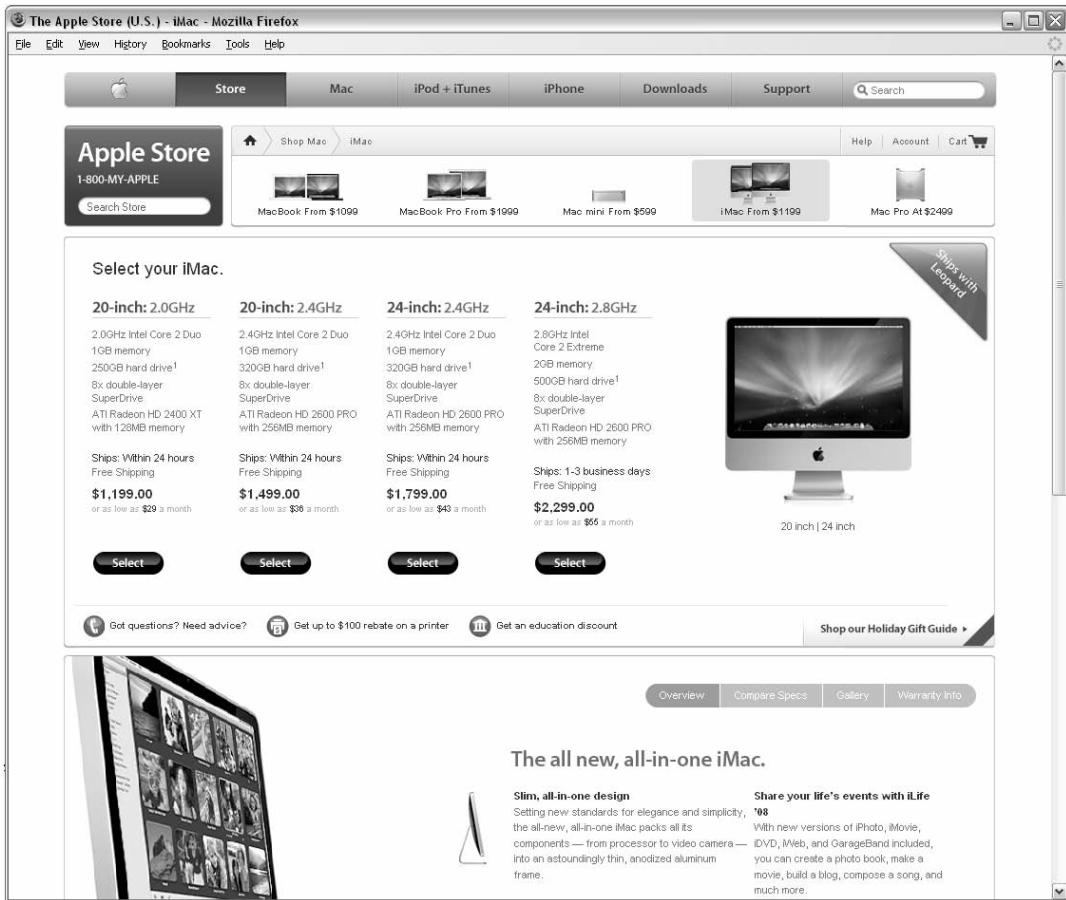


Figure 9-7

## Navigation

Placement of your navigation is likely to be one of the early decisions you make when working with any design.

How you design your navigation will largely depend on how many items you need to have in that menu. You should already have a good idea of the structure of the site, and you should have created a hierarchy

of pages that will inform the navigation when you create the site map — remember that you should ideally be looking to fit your site into a maximum of about seven sections. You should certainly avoid having more than ten primary links on the page.

In the subsections of the site, you can have more than seven subheadings and links, and the sub-navigation or secondary navigation sometimes appears in a different position on the page than the primary navigation.

## Top Navigation

Placing navigation directly under a header is a very popular option. This is usually either aligned to the left side of the page or to the center of the page. You just saw an example of top navigation in Figure 9-7, which showed the Apple.com web site.

## Left Navigation

Placing your navigation bar on the left is a less common option, but some sites do place their primary navigation on the left-hand side. Figure 9-8 shows the BBC News site, whose primary navigation is on the left.



Figure 9-8

# Chapter 9: Page Layout

## Top and Left Navigation

Many sites combine both top navigation for primary navigation, and then left navigation for secondary or sub-navigation. You can see an example of this in Figure 9-9 with eBay.com, which actually has two sets of navigation at the top, and a sub-navigation that depends on the section the user is in on the left-hand side.

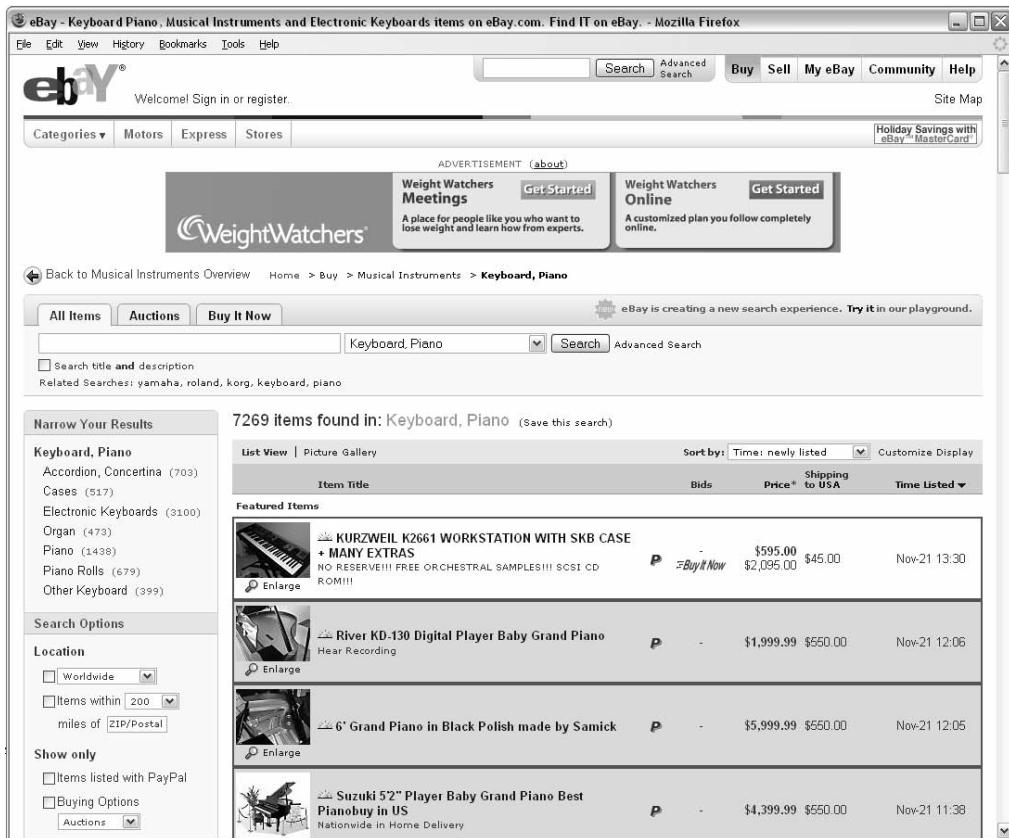


Figure 9-9

## Bottom Navigation

You should generally avoid putting your primary navigation links at the bottom of the page because you can't guarantee that they will be in view when the page loads without using either frames (which complicate the writing of pages — I recommend you use frames only if the content really requires them) or by using CSS positioning properties that are supported only in the very latest browsers.

It is common, however, to place links of lower importance at the bottom of the page — for example, links to a copyright statement, privacy policy, and terms and conditions. These are items that you might want to have appear on every page, but that you don't want to take up valuable space on the screen when the page first loads.

You will also find that some sites place a text-only version of a navigation bar at the bottom of the page if the main navigation bar is created using complicated images. This is done to help those using screen readers access the links faster and more easily.

### **Right Navigation**

It is rare to find a site with a right-side navigation bar, but it is not unheard of. The disadvantage of putting your primary links on the right side of a page is that users with a narrow browser window may not see the link when they load the site; it's not as likely to be on immediate display as a left-side navigation bar or top navigation. Also, users have less experience of sites that have right-hand navigation and are therefore less likely to expect to find it there.

More often, right-hand columns are used for additional content and links to other parts of the site that are not vital to a user's navigation. For example, an e-commerce store might have a right column containing a set of links to related products or the latest items added to the store; these are added features for the users of the site that are not essential to navigation.

### **Home Pages**

First impressions do count, so your front page is very important. Unless you are working on a site for a company or subject that is a household name, it's important that a visitor be able to ascertain the main purpose of your site easily from the front page — you can consider using a one-sentence tagline by the company name or logo to help this.

You then need to emphasize the tasks that users are most likely to want to come to the site to do — in order to help the most people possible find the information they came to see as quickly as possible.

I've said this before, but it's crucial to remember that your front page should not only cover what a company's marketing department wants it to cover that week or month. It's not just some advertising billboard they can use as they fancy — it must also address the needs of the majority of visitors to the site. For example, the marketing department may want to push a new product, whereas most customers visiting the site want to find out about an older, more established one. If those users cannot find the information they came to the site looking for, the marketing department will not have as large an audience for the things they want to push. Balancing what the users and what the company wants is extremely important — and users should take priority.

Because visitors tend to scan pages rather than reading all of their content, all headings and link names should begin with important keywords that help the user understand what is in that section or link.

*As a side note, I have been asked by several clients to create a flash animation to show before the user gets to the home page of the site. These so-called splash pages, however, are generally frowned upon no matter how impressive the animation is because they get between users and what they really came to see.*

### Content Pages

Content pages are the meat of most sites; on news sites they can contain articles and on e-commerce sites they contain details of each product. A content page should display the content in a way that makes it easy for the user to read the information.

As mentioned earlier, if you have several products or services, the information that you offer should be consistent for each item. If you are dealing with clothes, a visitor should quickly and easily be able to tell the colors and sizes in which a garment is available. You do this by placing equivalent information on the same place on every page. To this extent, you should really need to design only one article page or product page, and all other pages should follow that template.

You should not make a page too busy; a clean presentation allows users to focus on the content. Even if you have a lot of information to fit on a page, make sure there is plenty of space between different elements.

Images should be relevant to the product, service, or topic in question and will usually look better if they are left- or right-aligned, with the text flowing around them. There should also be a gap between any images and the text that flows around them (set using either the padding or margin properties in CSS).

*You should avoid filling any commercial site with clip art and animated GIFs, although you may use them on a personal site if you want to. While that dancing cat might appear very cute at first, if it has nothing to do with the topic you are trying to get across to the users, it will only distract them from the real purpose of the site.*

If you are dealing with products a company sells, these pages need to be action-oriented — they must allow the customer to locate or select an item, find the desired information about it, and then, most likely, buy it.

When you have to present large amounts of text, make sure that your text does not spread too widely across the page. As I already mentioned, many people have difficulty reading wide lines of text on computer screens. Furthermore, make sure that all text is split into appropriate subheadings, and where possible write copy specifically for the Web using fairly short paragraphs.

*A lot of companies think that simply advertising their products or services on the Web will get them new business, and that customers will contact them if they want a price. They seem to think that speaking to the person will make it easier to close a sale. In my experience, sites have gained more inquiries once they have added a price to the site. (If the price of every product/service you offer varies, it is good practice to offer sample prices of work you have done.) Remember, getting an e-mail inquiry for a price will not make it easier to close the deal (unless the user provides telephone contact details), as the customer is still anonymous to you and can ignore e-mails you send.*

### Structuring Pages

We have already seen how to control the size of a page and have looked at some of the issues regarding design of web pages in general. If you were working on a site now, then you should have a good idea of how you want to translate your wireframe into a usable and attractive site. Now you have to translate these designs into code.

If you want anything other than the normal flow of elements down a page, where each element just appears in the order it was written, you are going to have to look at positioning elements on a page using

either tables or CSS. One of the most common effects designers want to create is a layout that has more than one column — for example, a narrow column for the navigation on the left followed by a second column that contains the main content of the page (and then sometimes more than one column to the right).

Professional designers tend to lay out pages using a grid — a set of rows and columns that defines the shape of the page and where the content goes. For example, Figure 9-10 shows you how a page can be divided into rows and columns (the thick black lines separate rows and columns).

These rows and columns may be of different heights and widths, but there is a grid nevertheless. The header contains several rows (the advert, the title and search bar, the navigation, and hot topics/editions). Then at the start of the main body of the page there are two more rows (the first showing the date, the second the title/story highlights). After that, the main body of the page has a two-column layout; the main column houses the article, and the second column houses the adverts.

In the following sections you will learn how to create single and multicolumn layouts.



Figure 9-10

### Single-Column Layouts

The single-column layout is one of the easiest and is often ideal for smaller sites. Single-column sites tend to have at least three or four rows.

If you look at Figure 9-11, you can see how the outline for this example site is based on a fixed-width page with one column and three rows. Looking at the rows in turn, the first contains the company name, logo or branding, the second contains the navigation, and the third contains the content. Each of these rows has a different background color to help you distinguish them. (A fourth row might have contained a copyright notice, links to terms and conditions or privacy policy and other required links that few visitors will use.)

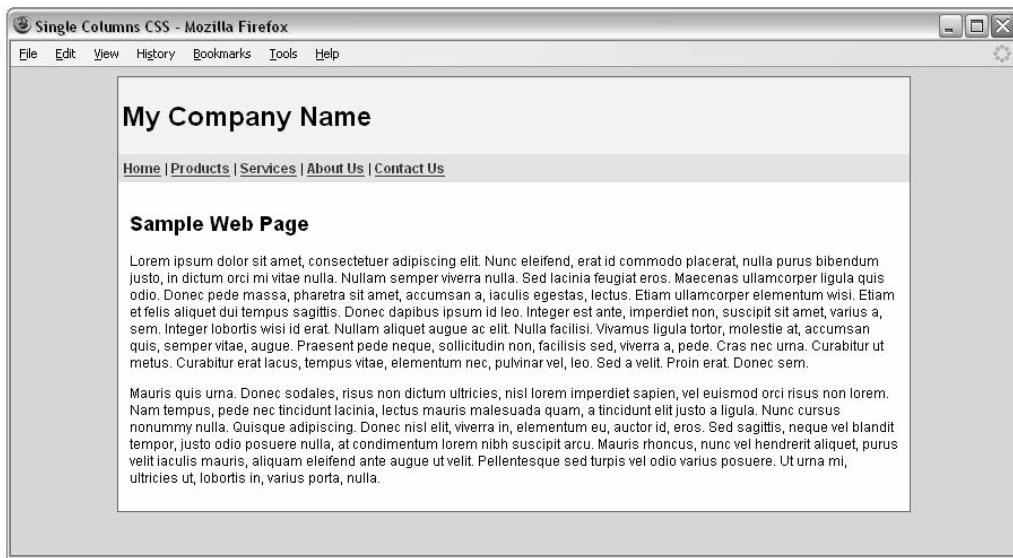


Figure 9-11

Remember that on this kind of site you should control the width of the text. If the width of the `<div>` that contains the page had not been fixed and were allowed to stretch across the full width of the browser, you could end up with some very long lines of text, which, as I have already mentioned, would make the page hard to page.

Here you can see the code that generates this structure (`ch9_eg03.html`):

```
<body>
  <div class="page">
    <div class="header"><h1>My Company Name</h1></div>
    <div class="nav">
      <!--NAVIGATION GOES HERE -->
    </div>
    <div class="content">
      <!-- MAIN PAGE CONTENT GOES HERE -->
    </div>
  </div>
</body>
```

Now let's take a look at the CSS for this page. The main point to note here is that a `width` property has been set for the `page` class to create a fixed-width page, and the `margin-left` and `margin-right` properties are set to `auto` to center the page on the screen (a few other background and border styles are set just to make the example easier to see).

```
body {  
    background-color:#d6d6d6;  
    font-family:arial, verdana, sans-serif;}  
.page {  
    width:700px;  
    margin-left:auto;  
    margin-right:auto;  
    font-size:12px;  
    background-color:#ffffff;  
    border-style:solid; border-width:1px; border-color:#666666;}  
.header {background-color:#f3f3f3; padding:3px;}  
.nav {font-weight:bold; background-color:#e3e3e3; padding:5px;}  
.content {padding:10px;}
```

According to the CSS recommendation, any block-level element (in this case the `<div>` element) that has equal margins on both the left and right sides should be displayed in the center of the page. As you may have guessed by the "should" in that last sentence, this does not work in older browsers. It was first supported in IE and Netscape in version 6 (and IE only supported it then if the document had a strict HTML 4.0 or XHTML DOCTYPE declaration). You can see what this looks like in IE6 in Figure 9-12.

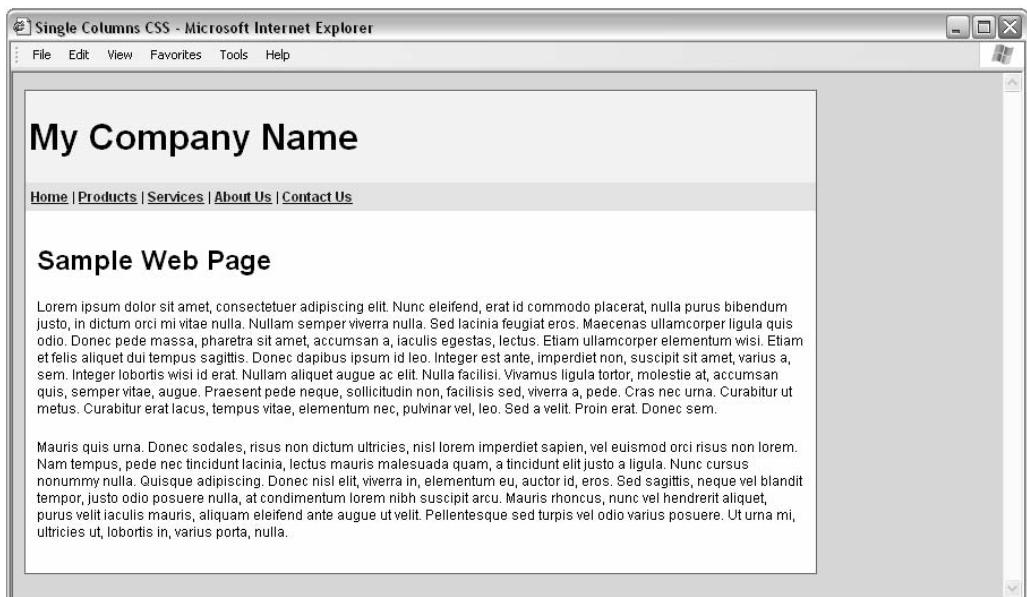


Figure 9-12

A simple trick, however, can help you get around this problem by adding two `text-align` properties. The first is added to the containing element (in this case the `<body>` element) and is given a value of `center` to center the elements inside it; then the `<div>` element, whose `class` element has a value of

## Chapter 9: Page Layout

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left to prevent the text inside that element from being centered, is added. The result is something like this (ch11\_eg03.css):

```
body {background-color:#d6d6d6;
    font-family:arial, verdana, sans-serif;
    text-align:center;}
.page {
    margin-left:auto;
    margin-right:auto;
    text-align:left;
    width:700px;
    font-size:12px;
    background-color:#ffffff;
    border-style:solid; border-width:1px; border-color:#666666;}
.header {background-color:#f3f3f3; padding:3px;}
.nav {font-weight:bold; background-color:#e3e3e3; padding:5px;}
.content {padding:10px;}
```

The fact that you need little “hacks” such as this one to get the page to display correctly has held back the adoption of CSS as a presentation format.

## Two-Column Layouts

Two-column layouts tend to be used in one of two scenarios:

- ❑ Where the left-hand column contains left navigation and the other contains the main content of the page
- ❑ Where the left-hand column contains the main content of the page and the right-hand side contains related content, advertising, or other information that is not vital to understand the content in the main window

In these designs the page will still usually have a heading that spans both of the columns. Here you can see that the XHTML for this page is identical to the XHTML in the last example (ch11\_eg04.html):

```
<body>
<div class="page">
    <div class="header"><h1>My Company Name</h1></div>
    <div class="nav">
        <!--NAVIGATION GOES HERE -->
    </div>
    <div class="content">
        <!-- MAIN PAGE CONTENT GOES HERE -->
    </div>
</div>
</body>
```

So let's take a look at the CSS, which does the job of creating the two columns. We could just try to alter the CSS rules for the `<div>` element whose `class` attribute had a value of `nav`:

```
.nav {
    float:left;
    width:100px;
```

```
font-weight:bold;
background-color:#e3e3e3;
padding:5px;}
```

This element needs to have a `float` property with a value of `left`. You have to specify the `float` property on this element because it also affects how the content of the following element should be rendered. Also, whenever you specify a `float` property, you should also specify a width for that block. If you do not, it will take up the full width of its containing block.

You can see what this will look like in Figure 9-13.



Figure 9-13

As you can see, we come across quite a serious issue — the left-hand column does not reach the full height of the page and the main body of the content comes underneath it. This problem is highlighted by the fact that we have a background color for the page. Imagine that you are creating a template for, say, a news site; each article may be a different length, and you would want the left-hand column to not only stretch the full height of the page, but also have a similar colored background. However, because the height of the article varies you cannot set a fixed height. And simply giving the `height` property a value of 100 percent does not work either. Instead, what we have to do is make changes to two other rules in the style sheet:

- Add a left margin to the main content of the page. The margin should be the same size as the width of the navigation (this is the second highlighted portion of code).
- Rather than using background colors to control the background color of the column, use a background image on the containing element (the `<div class="page">` element).

So here is what the style sheet looks like now (`ch09_eg04.css`):

```
body {background-color:#efefef;
font-family:arial, verdana, sans-serif;
```

## Chapter 9: Page Layout

```
text-align:center;}  
.page {  
margin-left:auto;  
margin-right:auto;  
text-align:left;  
width:700px;  
font-size:12px;  
background-image:url(images/2columnbackground.gif);  
background-repeat:repeat-y;  
border:1px solid #666666;}  
  
.header {  
padding:3px;  
background-color:#ffffff;}  
.nav {  
font-weight:bold;  
padding:5px;  
float:left;  
width:100px;}  
.content {  
padding:10px;  
margin-left:100px;}
```

The background image only needs to be 1 pixel tall, so the image size will be very small. And because the containing element is going to be the same height as the longer of the two columns, we know that it will add shading for both columns that remains the full height of the page. You can see what this page looks like now in Figure 9-14.

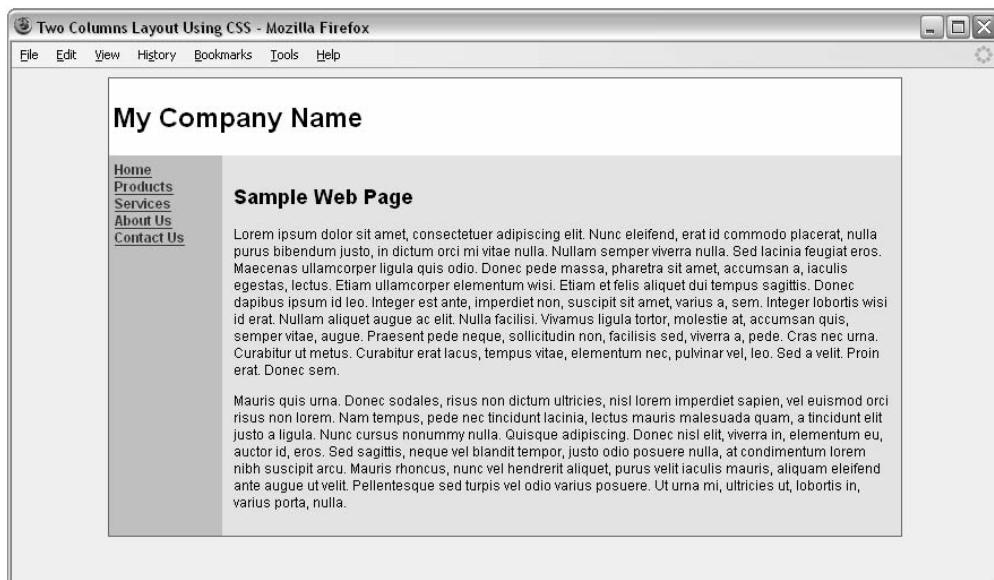


Figure 9-14

## Three-Column Layouts

Three-column layouts tend to have navigation on the left, the main content in the center, and then additional content such as related links, further items of interest, advertisements, and so on in the right column. You can see an example of a three-column layout in Figure 9-15.



**Figure 9-15**

The following example shows you how to create this layout in XHTML, using a table with three columns, each of which is a fixed width (ch9\_eg05.html):

```
<body>
  <div class="page">
    <div class="header">
      <!-- heading goes here -->
    </div>
    <div class="nav">
      <!-- navigation goes here -->
    </div>
    <div class="content">
      <!-- content goes here -->
    </div>
    <div class="right">
      <!-- right hand column content goes here -->
    </div>
  </div>
</body>
```

## Chapter 9: Page Layout

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With this example, we can take a similar approach to the last example; however, we will use the `float` property to position all three columns.

```
body {  
    color:#000000;  
    background-color:#efefef;  
    font-family:arial, verdana, sans-serif;}  
.page {  
    width:980px;  
    border:1px solid #000000;  
    background-image:url(images/3columnbackground.gif);  
    background-repeat:repeat-y;  
    margin-left:auto;  
    margin-right:auto;  
    margin-top:0px;  
    padding:0px;}  
.header {background-color:#ffffff;}  
.nav {  
    float:left;  
    width:100px;}  
.content {  
    float:left;  
    width:600px;}  
.right {  
    float:left;  
    width:278px;}  
.clear{clear:both;}
```

Here you can see that the `<div>` element whose `class` attribute has a value of `page` acts as a container for the whole page and has a background image to ensure that the three columns all have consistent shading.

One interesting point to note here is that, while the entire page is 980 pixels wide, if you add up the value of the `width` attribute on every column it only comes to 978 pixels. This is because Internet Explorer 6 (and earlier versions) count borders and padding as part of the width of any boxes. Bearing in mind that IE will therefore count the single pixel border on either side of the page as part of the width of the containing box, you are only left with 978 pixels for the three columns. (If the columns added up to 980 pixels in IE, the right-hand column would get pushed underneath the other two columns.)

This bug is known as the box-model bug, and is commonly documented on the Web. According to the CSS specification, the width of the block-level element should only represent the content of any boxes, with padding, borders, and margins applied afterwards, whereas IE 5 and 6 added counted borders and padding as part of the box. To avoid this in IE6 you can include a strict XHTML `!DOCTYPE` declaration.

I should also mention that because padding *should* be added to the width of a box, in order to ensure that any content in the three columns does not meet the edge of the box, you would either need to create narrower columns and add the padding properties, or you would need to add a margin or padding to all direct children of the `<div>` elements that create each column.

## Sacrificial Columns

Sometimes you might hear the third (right-hand) column in a design like the one you just saw referred to as a *sacrificial column*. The idea is that while the content of the sacrificial column may help users understand

the site better and improve their experience, it is not essential to the day-to-day use of the site. Thus, if you are on a screen whose resolution is lower than the width of the entire page you can still use the site. So if your screen is 600 × 800 resolution (600 pixels high by 800 pixels wide) you will still be able to see the left and center columns; but you might have to scroll for the right-hand column.

Users on 800 × 600 monitors could scroll to see the sacrificial column, but the page design tends to make it clear that you are seeing all the main content of the page.

If a user's browser does not show the sacrificial column within the width of the window, the user should not lose any meaning from the page, and its main content should be no harder to comprehend, although the user may miss out on extra information or advertising that's off-screen.

Figure 9-16 shows an example of a design using a sacrificial column. The browser is set to 760 pixels wide, and you can clearly see the main article from this newspaper, and the primary navigation. While there is extra information and advertising on the right-hand side of the page, it is not vital in order to use the page.



Figure 9-16

### Advanced Layout Using CSS

It's only since IE6 gained a strong hold in the browser market that it's become common to use CSS to control the layout of web pages. However, this has quickly become considered the right way to lay out web pages, and a lot of sites have offered tips on using CSS to create attractive layouts. Here are some sites that could help you create attractive layouts using CSS:

- [www.thenoodleincident.com/tutorials/box\\_lesson/boxes.html](http://www.thenoodleincident.com/tutorials/box_lesson/boxes.html)
- [www.bluerobot.com/web/layouts/](http://www.bluerobot.com/web/layouts/)
- [www.glish.com/css/](http://www.glish.com/css/)
- [www.alistapart.com/topics/code/css/](http://www.alistapart.com/topics/code/css/)
- [www.meyerweb.com/eric/css/edge/](http://www.meyerweb.com/eric/css/edge/)
- [www.positioniseverything.net/](http://www.positioniseverything.net/) (This site is particularly helpful when it comes to dealing with browser bugs, where the CSS you write doesn't look the way you might expect it to.)

Before this, tables were far more commonly used to control where elements should appear on the page. If you view the source code of enough of the web pages you browse, you will still see plenty of sites that use tables to control layout; before finishing a chapter on layout, you should probably take a look at one such example.

### Creating a Layout Using Nested Tables

As we saw in Chapter 4 when looking at tables, they can be used to control the position of elements on a page, and you now know this was a common technique before browsers supporting CSS for layout became popular among the majority of web users. Take a look at the page in Figure 9-17.

One table holds the whole of this page: the header is in one row of this table, the main content of the page in the second, and the footer in the third. In each row are nested tables that contain the header in the first row, the main content in the second, and the footer in the third.

The use of nested tables allows the page to look as if it stretches across the whole browser window, but at the same time allows you to control the width of the content itself. The background color of the top and the bottom of the page can stretch the width of the browser, while the text and images live in the nested tables that can have a fixed width.

In this design the outermost table stretches the full width and height of the browser window. Within this table, the first row contains the header, the second the main content, and the third the footer. Inside these rows are nested tables with fixed widths that ensure that the content of the page remains the same width.

Let's look at the XHTML for this page (`ch9_eg06.html`). I have incorporated some older-style techniques in this example, so that if you come across a page written like this you'll understand how it works. The first table is the outermost table that contains the whole page. Make sure that it stretches the full height and width of the browser window (the `height` attribute is an extension to the XHTML recommendation supported by both IE4 and later, and Netscape 3 and later):

```
<body>
<table width="100%" height="100%" border="0" cellpadding="0" cellspacing="0">
  <tr valign="top"><td valign="top">
```



**Figure 9-17**

Inside the first row, you find another table that holds the heading for the page. This nested table in this first row is slightly different from the other two rows (which hold the main content and the footer) because the header actually features three rows with three different shades that make up the header:

- ❑ The first is black and says “Latin Example” to the right.
- ❑ The second is mid-gray and contains the logo and a banner ad.
- ❑ The third is light gray and contains the navigation bar.

So the header lives in a nested table that also contains three rows and stretches the full width of the browser. Each row has a different class that corresponds with a CSS rule to indicate the appropriate background color. The content of these rows, however, needs to stay the same width of 700 pixels. To achieve that width, you put the content in another nested table with a fixed width.

```
<table width="100%" border="0" cellpadding="0" cellspacing="0">
<tr class="topBar">
<td height="20">
<table width="700" border="0" align="center" cellpadding="0"
cellspacing="0">
<tr>
<td class="TM">Latin Example</td>
</tr>
</table>
```

## Chapter 9: Page Layout

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```
</td>
</tr>
<tr>
<td height="100" class="masthead">
<table width="700" border="0" align="center" cellpadding="0"
cellspacing="0">
<tr>
<td><!--LOGO IMAGE GOES HERE --></td>
<td><!-- BANNER AD GOES HERE --></td>
</tr>
</table>
</td>
</tr>
<tr>
<td height="20" class="nav">
<table width="700" border="0" align="center" cellpadding="0"
cellspacing="0" class="nav">
<tr>
<td><a href="">Home</a> | <a href="">Products</a> |
<a href="">Services</a> | <a href="">About Us</a> |
<a href="">Contact Us</a> </td>
</tr>
</table>
</td>
</tr>
</table>
</td></tr>
```

This is the end of the header and the end of the first row of the table that contains the whole page.

In the next row is another nested table that holds the main content of the page.

```
<tr valign="middle"><td valign="middle">
<table width="700" border="0" align="center" cellpadding="0"
cellspacing="10">
<tr>
<td valign="top" width="100%">
<h2>Sample Web Page</h2>
<p><!-- LATIN TEXT GOES HERE --></p>
</td>
</tr>
</table>
</td></tr>
```

In the final row you get the footer of the page, which looks as if it stretches across the whole page just like the header did. This effect is created by giving the whole row the same background color and then nesting a table inside this row with a fixed width that contains the footer:

```
<tr valign="bottom" class="footer">
<td valign="bottom">
<table width="700" border="0" align="center" cellpadding="0"
cellspacing="0">
<tr>
```

```
<td height="20" class="footer">&copy; 2008 Latin Example</td>
</tr>
</table>
</td>
</tr>
</table>
</body>
</html>
```

You must remember when working with tables that a cell must wholly contain any other element — elements are not allowed to straddle two table cells.

## Summary

This chapter has covered the basics of page layout. All designers learn new tricks as they create more sites and try out more complex techniques. This chapter has given you the basic skills you need to start turning your ideas into working layouts.

This chapter has been concerned with more than the physical appearance of pages; it has also covered how you approach the design of a site. Before sketching out any designs, you need to make sure you have a good idea of what the site's aims are, whom you expect to visit the site, and what you expect visitors to want from your site. You can then decide what kind of information you will need to put on the pages and organize that into sections. These sections should reflect the structure the site will take, and you can also create a site map that shows you how all the pages fit together and how users might navigate the site to achieve tasks that you think they will want to complete.

One of the first real design decisions should be whether you are going to use a fixed-width or liquid layout — whether your page should always stay the same size or expand and contract to fit the browser window.

When you know the overall structure of your site, the size of the pages, and what will appear on each page, you can create a wireframe design of the site that uses only lines and text — holding back on the style until the client understands and agrees with the type of content that should be on the site and how visitors should achieve what they came to the site for.

Having waited so long, you can start to add the style to your pages — fonts, colors, images, positioning, and so on. Once you decide how your page should look, you can use CSS to position these elements on the page.

I hope the practical advice in this chapter will make it easier for you to design your web sites, as well as help you deal with those people or organizations you might be creating sites for. In the next chapter we will look at some more specific aspects of how to design for the Web.

## Exercises

The answers to all the exercises are in Appendix A.

## Chapter 9: Page Layout

- Take another look at the page that we met at the beginning of the chapter; it is shown again in Figure 9-18. List all the different elements on the page that would have been listed in the design stage, and put them together in their relevant grouping or categories.

For example, for the search box you might list the following:

Title  
Navigation  
Main news article

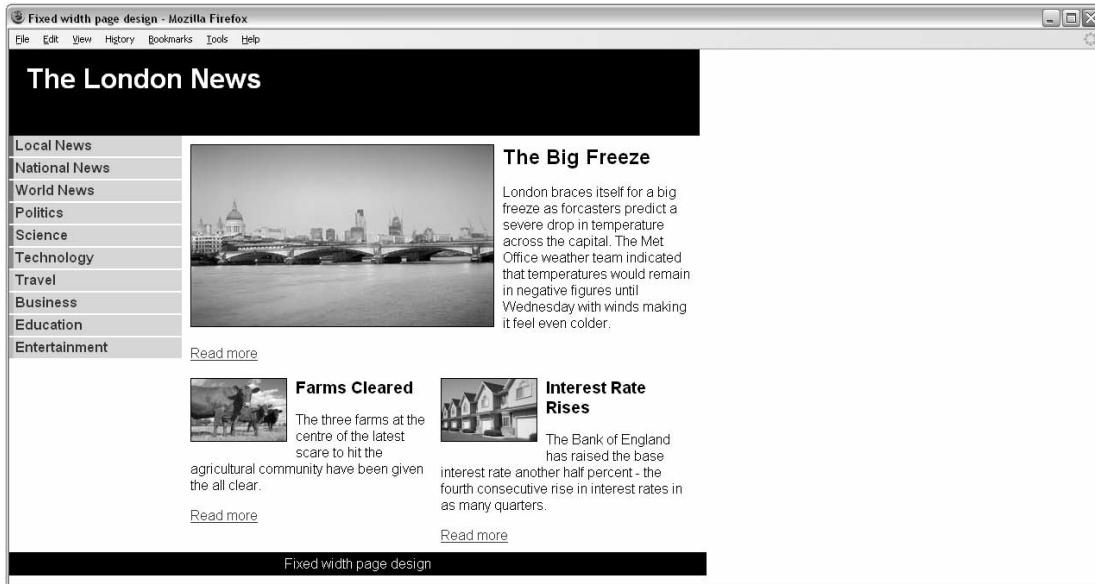


Figure 9-18

- Try to recreate the page you can see in Figure 9-18. Here's a hint; it is a fixed-width design, so use the sample code from the section on creating fixed-width layouts as a starting point, and fill it in with the content.

# 10

## Design Issues

This chapter looks at design issues that affect specific parts of pages — text, menus, tables, and forms. Each is addressed in its own section, and each section contains helpful tips that will make your pages not only look more attractive, but also easy to use for more visitors.

First, you look at text and how to align it, space it out, and control the width of columns. You will then look at choosing fonts and font sizes, and you'll also learn how background images can affect readability of text.

Next, you look at navigation. This topic covers three areas: menus, links, and search features. Almost every site has a menu that helps the user navigate among sections of the site. If your menu is not clear, people will not be able to explore your site, and they won't look at as much of it. So you need to be aware of some key points in designing menus so that they're easy for the user to understand and use. Most sites also feature links in other parts of the page than just the menu, and you need to make it clear to users what the links are on your site so that they know where they can click. You can use techniques such as color, underlining, and change of cursor icon to indicate to the user where links are. Finally, a search option can help users find what they want on a site rather than having to navigate, or a search option can help if they've tried navigating but can't find what they came for.

We'll look quickly at how adding shading to tables can help a user follow the data more easily. Then, we'll look at creating usable forms. Forms are the most common way to gather information from a user. Most people, however, don't like filling out forms, so a well-designed form significantly increases your chances that users will fill them out and — just as important — that they fill out the right information.

While this chapter can't teach you how to be a great web page designer — that requires creativity, a good eye, and flair — it will teach you how to achieve some of the effects that contribute to good design and introduce you to some guidelines you can use when approaching a design that will help you improve both the look and usability of your site.

*You will see throughout this chapter mentions of programs called screen readers. Screen readers are programs that read a page to a user. While screen readers are commonly used by those with visual impairments, they are likely to become more popular in other web-based scenarios, such as for those who want to access information while they are driving or doing something else that prevents them from actually reading a screen.*

# Text

In this section you look at some issues surrounding the positioning of text on a page. First, you look at issues regarding the placement and spacing of text, and then at issues regarding fonts. In all you will see how:

- ❑ Adding white space helps make pages more attractive.
- ❑ Careful alignment of text makes it easier to read.
- ❑ Wide columns of text are harder to read (and are best not used for summaries).
- ❑ Background images can make text hard to read (because of low contrast).
- ❑ Fonts must be carefully chosen.
- ❑ Fixed font sizes will appear different sizes on screens that are different resolutions.

## **White Space Helps Make More Attractive Pages**

You should always give your text space to breath. A page that is too cramped is not only hard to read; it also looks less attractive. But a page with space between navigation, text, images, and other items will be easier to read and more attractive. This space between the elements of a page is what designers refer to as *white space*.

Two key allies will help you create white space on your page: padding and margins. You should note here that white space need not be white; it just refers to the space between elements of a page, such as writing, images, form controls, table borders, and links. (It is usually the same color as the background of the page.)

You can also change the color of a box within your page to help separate a design element from other parts of the page (for example, primary navigation is often placed on a colored background). By giving just one part of the page a slightly different shade of background, it helps it stand out from other items that are nearby. Again, the elements that have a background color should also use padding and margins to create a gap around the edges.

Take a look at Figure 10-1 where there are small gaps or no gaps between the navigation, text, images, and tables on the page (`ch10_eg01.html`).

Now compare that with Figure 10-2. Adding space between the elements of the page makes it instantly more readable and more attractive, while the background colors help group related items (such as the navigation and travel guidelines) and distinguish them from their neighbors (`ch10_eg02.html`).

Notably, there is space inside the box that holds the page; the items in the navigation are not so close to the picture, they have a background color to group together the navigation and separate the heading from the rest of the page, and there are padding and margins around them, which makes them easier to read. Also a space has been added between the main picture and the text that appears next to it by giving the image a margin. Finally, the table at the bottom uses a combination of background colors and padding for cells to add space between the cells.

This extra space was added to the page using CSS. You saw in Chapter 7 how CSS works on a box model, where each element in the XHTML document is represented by a box. Each box has a border with a margin outside the border to separate this box from adjacent ones and padding to separate the content from the border. It is the `border` and `margin` properties that have been used to add white space to this page.

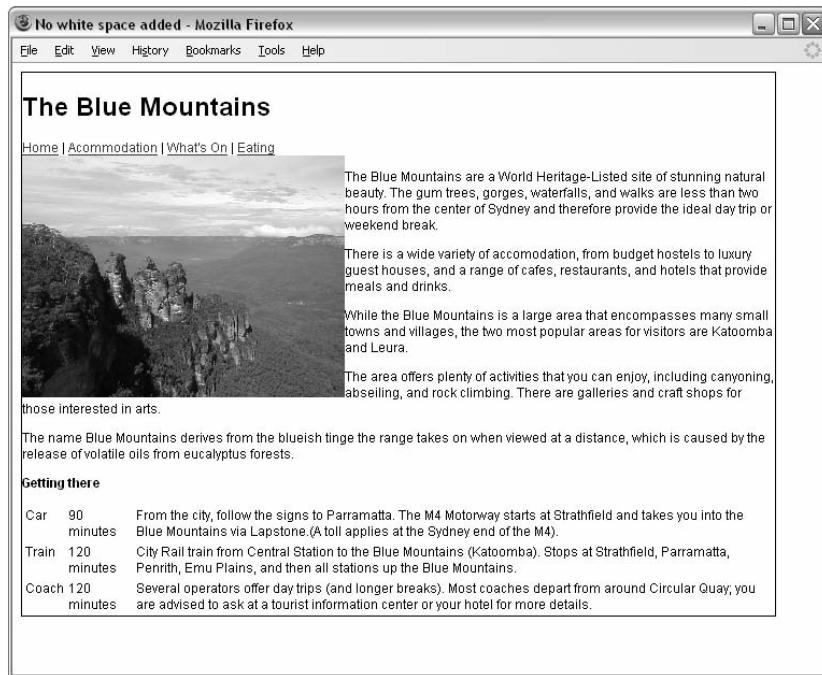


Figure 10-1

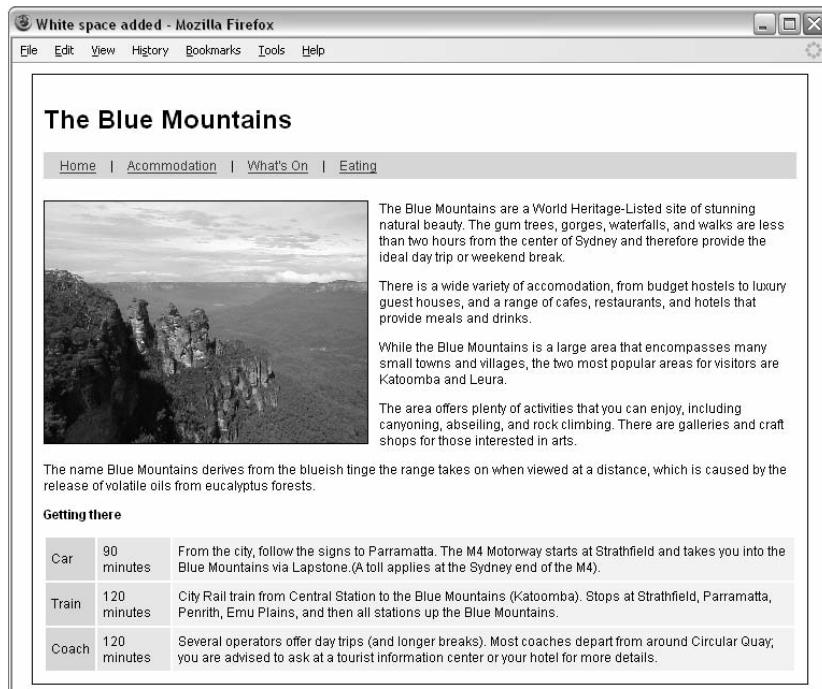


Figure 10-2

## Chapter 10: Design Issues

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The first CSS rule that changed the appearance of this example applied to the `<div class="page">` element that contains the page. There is a 10-pixel margin to add space outside the thin black line that contains the page; then there are 10 pixels of padding inside the thin black line around the page that creates space between that line and the contents of the page (so the text no longer touches this line).

```
.page {  
    width:700px;  
    margin:10px;  
    padding:10px;  
    border:1px solid #000000;}
```

Adding a background color to the navigation helps group the navigation together and helps separate the heading of the page from the rest of the page's content. The margin at the bottom of this box helps to separate the navigation from the page, while padding inside this gray box gives space around the links.

The margin to the left and right of each link in the second rule adds space between the items in the navigation, making it clearer to read each one as a separate item.

```
.navigation {  
    background-color:#d6d6d6;  
    padding:5px;  
    margin-bottom:20px;}  
.navigation a {margin:0px 10px 0px 10px;}
```

The `<img>` element was also given a margin on the right side to increase the distance between it and the text next to it. As you can see from Figure 10-1, it is harder to read text that comes right up to the edge of an image:

```
img {  
    margin-right:10px;  
    border:1px solid #000000;}
```

Finally, you may have noticed that the different cells in the table at the bottom of the page have different background shadings, which, along with the gaps between the cells, help make the content more readable. The padding for each table cell in the page has also added a gap between the text and the border of these cells, which again adds to readability.

```
td {padding:5px;}  
.transport {background-color:#d6d6d6;}  
.duration {background-color:#e6e6e6;}  
.description {background-color:#f2f2f2;}
```

## Carefully Aligned Text Is More Readable

How you align your text determines how easy it is to read. Most commonly, text is left-aligned (this is the default). However, you can also center text, have it right-aligned or justified, or it can be put out of line by other elements on the page.

Generally speaking, if you have a paragraph of text it will be much easier to read if it is left-aligned. While you might think a paragraph of text looks good centered or justified, it will be harder to read. Centered text is best left for headings (and, occasionally, very short paragraphs).

*If you like the use of justified text, you should make sure that the column is wide enough to support it without looking like there are large gaps between some words — justification can look rather odd in narrow paragraphs.*

Figure 10-3 shows an example of three paragraphs of text: the first is centered, the second is left-aligned, and the third is justified (`ch10_eg03.html`).

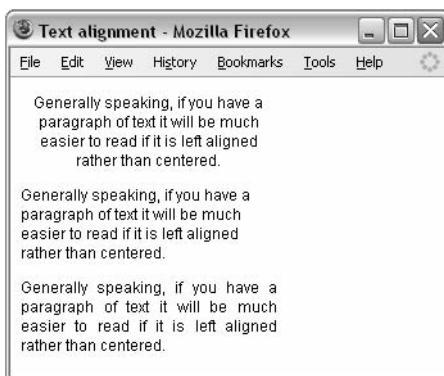


Figure 10-3

### **Adjusting Line Height Makes Text More Readable**

When you are dealing with large amounts of text, it is often helpful to increase the amount of vertical space between each line of text — something that graphic designers and typographers refer to as *leading* (pronounced *ledding*). You can increase or decrease the amount of space between each line of text, using the CSS `line-height` property.

There are two reasons why this increased vertical space is very helpful on the Web:

- If there is more space between each line of text, when you come to the end of a line it's easier to find the start of the next line.
- People often scan the Web rather than read, and when you scan text it's common to focus on the top parts of the letters more than the bottom parts, so this extra space makes it easier to read quickly.

Figure 10-4 shows you an example of two paragraphs, the second of which has increased space between lines of text.

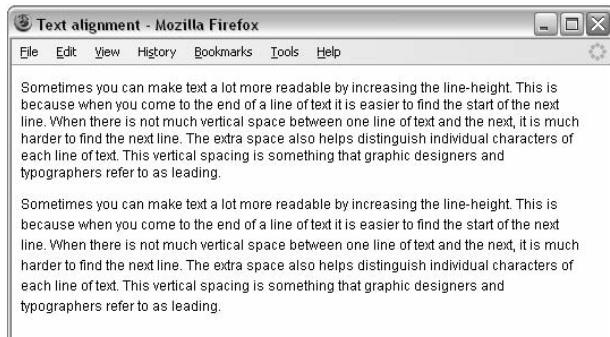


Figure 10-4

### **Wide Columns of Text Are Harder to Read**

Most people find it hard to read long lines of text on a computer screen. As the text becomes wider, it becomes harder for the user to follow onto the correct line — and this problem is exacerbated when users are scanning a page rather than carefully reading it. Therefore, it can help to limit the width of your columns of text.

How wide your columns are depends upon their content. If you're creating a page for a whole article, your columns are likely to be wider than if you are creating a page that contains snippets of several articles that many users will be skimming through quickly. After all, when users decide that they want to read something they will put more effort into following the text correctly than they will if they are just skimming, say, a front page.

This is a particularly important issue for liquid designs where a page stretches to fill the browser. In such cases users with higher resolution displays can end up with very wide pages, and therefore it can be hard to follow the text onto the next line. You can see an example of this in Figure 10-5 (ch10\_eg05.html).

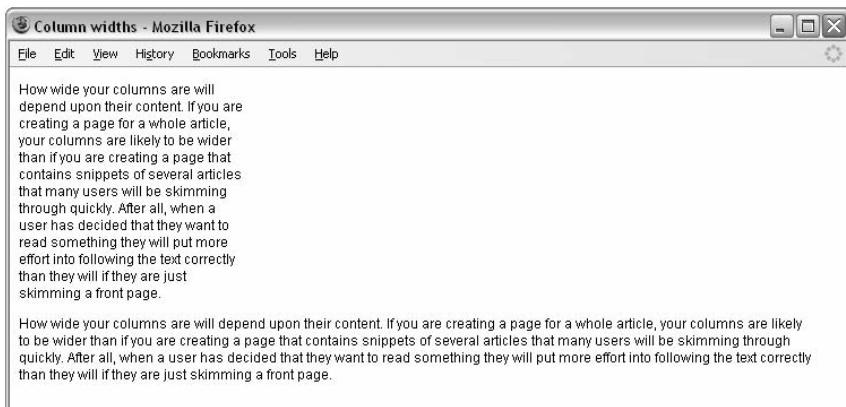


Figure 10-5

You can control the width of text using the CSS `width` property on any block-level element — in this example it was used on the `<p>` element.

You will also find that authors tend to write shorter paragraphs for online formats than when writing for print, as these are easier to read. If you have to write a very long piece, it is often good practice to split it up into several distinct pages rather than having one long page the user has to scroll through.

### **Background Images Can Make Text Hard to Read**

If you want to use a background image behind any text, you should ensure that the text clearly stands out from it. I have seen many web sites — in particular those that use background images as wallpaper for the whole page — where a background image has been chosen because the user likes the image and *not* because it makes a good background.

Photos tend to make particularly poor background images because they have varying contrasts across the picture, which makes the text harder to read. If you really want to use an image for a background you could either:

- Make sure that the image is low contrast — for example a texture — rather than a photo.
- Give a background color to any box that contains text.

Remember that background images should be small files; otherwise, they will take longer to load. It is also good practice to specify a background color similar to the main color of the photo as this is often shown while the page is loading.

### **Choose Fonts Carefully**

It is a generally held belief that serif fonts are easier to read for extended periods of time. There is some evidence that we do not need to read as much of each character in a serif font in order to understand the sentence (compared with a sans-serif font). In fact, when reading books and long articles in a language with which we are familiar, good readers don't need to look at the whole of each character so carefully, either focusing on the top half of characters or sometimes just on the general shape of familiar words.

On the Web, however, the evidence is not so clear. Many people find it easier to read sans-serif fonts on the Web because the serifs on the font (the tops, tails, and curls) actually make the characters less clear (primarily because the resolution of screens is lower than the resolution at which pages are printed). In reality, you are safe using either serif or sans-serif fonts as long as they are large enough to read, but the argument for using a serif font for longer blocks of text does not translate from print to the Web.

When choosing which fonts (or typefaces) to use on a page, you should ensure that you consider which fonts users are likely to have installed on their computers; if users don't have your desired font installed on their computer your design will not show up in that font. Unfortunately, you are quite limited in the fonts you can expect users to have. You can safely assume that most users will have Arial, Verdana, Impact, Courier or Courier New, Georgia, and Times or Times New Roman typefaces installed, but not too much beyond these (especially when your visitors use different operating systems).

## Chapter 10: Design Issues

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You are able to supply alternatives in case users do not have your first choice of font. If the computer does not have your first choice of font, the browser will look for the next one in the list, and then the next, and so on (ending the list is the option for the computer to pick its default font for that family of fonts).

When supplying a list of fonts in order of preference in CSS you use the `font-family` property like so:

```
font-family: Geneva, Arial, Helvetica, sans-serif;
```

Here are some common lists of fonts that are applied:

- ❑ **Sans-serif:** Helvetica, Arial, sans-serif
- ❑ **Sans-serif:** Arial, Verdana, sans-serif
- ❑ **Serif:** Times New Roman, Times, serif
- ❑ **Monospace:** Courier New, Courier, monospace

Indeed, the majority of users will have many more typefaces installed; it's just that you cannot be sure that users will have the same fonts that you have installed. For example, not many users will have ITC New Baskerville, but its appearance is not that dissimilar to Times so you can put ITC New Baskerville as your preferred font and then rely on Times for those who do not have it installed.

*The disadvantage with this approach is that ITC New Baskerville is a wider font so it will take up more space than Times would in a layout — you need to be aware of differences in sizes of fonts when designing a page or such differences can throw off the intended look of the page.*

While there are technologies for downloading fonts to a user's computer, if the users do not have that font installed there are some drawbacks to these technologies:

- ❑ They require that you have permission to distribute the font (which, like CDs, are usually copyrighted).
- ❑ They do not work in all browsers.
- ❑ It takes longer for the page to render.
- ❑ People tend not to like downloading files just to view a page.

If you have a specific font you need to use, such as for a logo, you should use a GIF image of the writing. However, it is considered bad practice to use images for large sections of text, and you should put the text as the value of the `alt` attribute for those who cannot see the image.

You should also make sure that you choose a typeface that gets across the image that you want to portray. For example, if you are trying to put across a professional image, you should avoid fonts such as Comic Sans MS, which is more of a "fun" font.

*If you want to look into this topic in more detail, there is some interesting information on the usability of various fonts at <http://psychology.wichita.edu/surl/usabilitynews/3S/font.htm>.*

## Fixed-Size Fonts Are Affected by Screen Resolution

You should be aware that, if you use fixed font sizes such as pixels or points, the size they appear on screen will depend on the user's monitor. For example, a font that is 12 pixels high will look much smaller on a  $1,280 \times 1,024$  monitor than on an  $800 \times 600$  monitor that is the same physical size because there are 40 percent more pixels on the screen.

Using fixed-size fonts also makes it harder for users to change the size of the font if they are having difficulty reading the text.

## Navigation

One of the most interesting things about navigation is that no matter how well you plan your site, different people will use it in their own individual ways. For example, even if you expect people to start their visit to your site on its home page, once the site has been launched you might find that another site links to a different page within your site and you get a lot of visitors who come to your site via another page.

When designing a site, therefore, it is your job to help people find the information they want as quickly and easily as possible.

A user will navigate your site in one of three highly common ways:

- Using a menu that you provide
- Browsing through links provided in the middle of text and other parts of the page than the menu
- Searching for relevant items of information

In this section you learn how to make it easier for users to get around your site using these three methods.

## Menus

A menu is a key part of *any* web site that features more than one page. It allows users to see the sections of your site quickly and easily and allows them to get where they want to go.

As you saw in Chapter 9, a site may have more than one menu; you may have primary navigation in one menu and secondary navigation in a submenu or separate menu. Usually menus appear either across the top of a site from left to right (above or below the logo) or down the left side of the page.

The menu tends to be the main way in which users will navigate between sections of a site, and good menu design makes a huge difference in the following:

- Whether or not users achieve what they wanted to when they came to your site
- How long they will spend at your site

## Chapter 10: Design Issues

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I introduce you to the following eight guiding rules in this section:

- Menus must focus on what users want to achieve.
- Menus must be concise.
- If you use icons, make sure they are easy to understand and add a text link, too.
- Grouping of menu items must be logical.
- Menus must be quick and easy to read.
- Menu items must be easy to select.
- Menus must load quickly.
- Menus must be consistent across a site.

### **Menus Must Focus on What Visitors Want to Achieve**

For 99 percent of web sites, the main priority of a menu should be satisfying the user — especially commercial sites. Ask yourself the following questions:

- What do users come to my site to find out?** Do they really come to find profiles of who set up the company and who's on the board of directors, or do they come to find out about a product/service you offer?
- How do I best describe this information in concise terms they will understand?** It's important that your menu items are not too wordy or they become hard to skim over, and it is also very important that you do not use jargon that visitors might not understand (otherwise they will not know what to click on).
- What is the most important of these items?** The prominence of each link should reflect the number of visitors who come to your site for that information. For example, if you are working on a site for a music store that sells a lot more guitars than drums, your first menu item (after the home button) should be for guitars not drums (even if you want to build up the business in drums).

This will give you a better idea of the order of items on a menu and what each should say. Remember, you can also use footer navigation for items such as background information about the company or for potential advertisers.

### **Menus Must Be Clearly Separated from Content**

When you design your page, a menu must be immediately identifiable as the way to navigate the site. You can achieve this using a number of techniques:

- You can use a different size font for the menu compared with the main content (generally the menu text should be larger than the main text on a page).
- You can add extra space around the menu (as you saw in the example of white space earlier in this chapter).
- You can place the menu in a box with a different colored background (as you saw earlier in this chapter) or use a line to separate it from the main content.

While using images often makes a menu very distinct from content, you must be careful that your images are not so large that they slow down the loading of the site. Figure 10-6 shows an example of using images for navigation within a separate box.



Figure 10-6

You should take a closer look at how this menu was created; the menu is created inside a `<div>` element; and the CSS rules for that element specify that it should have a background image that repeats from left to right. That background only needs to be 1 pixel wide, making the image smaller, and therefore saving the amount of time that a page takes to load. The background image is also the same height as the images that are used to click on.

Inside this `<div>` element are the images that link to the other pages. When you come to look at the CSS for this example in a moment, note how there is a rule in there that specifies that images within a link should have no border — this is because IE will, by default, add a blue box around such images.

Between each image is a spacer image that is a darker line to separate the links if they are butted up next to each other.

Here is the XHTML for this example (`ch10_eg06.html`):

```
<div class="page">
    <h1>The Used Equipment Exchange</h1>

    <div class="navigation">
        
        <a href="/" title="Home page">
            
        
        <a href="stockList.aspx" title="Stock List">
            
        </a>
        
        <a href="equipmentWanted.aspx" title="Equipment Wanted">
            
        </a>
        
```

## Chapter 10: Design Issues

---

```
<a href="contactUs.aspx" title="Contact Us">
    
</a>

</div>
</div>
</body>
```

And here is the CSS for this example (ch10\_eg06.html):

```
body {
    background-color:#ffffff;
    font-family:arial, verdana, sans-serif; font-size:12px; }

.page {width:700px; }
.navigation {
    background-image:url(images/backdrop.gif);
    background-repeat:repeat-x; }

a img {border:none; }
```

Because all these images are fairly small (and they were saved for the Web using the Save for Web option in Adobe Photoshop), they should not add too much time when downloading the page.

### **If You Use Icons to Represent a Link, Make Sure Everyone Will Understand Them**

Many web sites use images known as icons for links. These icons are images such as a magnifying glass to indicate a search feature. If you are going to use icons, make sure your target audience will understand these images or users will not click them.

Many users are familiar with the following icons:

- A house to indicate the home page
- A magnifying glass to indicate a search feature
- An envelope to indicate an e-mail address or link
- A question mark to indicate help files

If you use icons that are less common, it's a good idea to add the link in words as well as using the image. (Don't expect that users will hover over a link to find a tooltip that tells them more about that link.)

### **Menus Must Be Quick and Easy to Read**

As I have already mentioned, when browsing web pages, most visitors do not really read them — they scan them. Making your menu distinct from the main part of a page (and using bold, a different color, or underlined text for links within the body of a page) will help users scan and register the navigation items more easily.

Any words or images you use in a menu must be large enough to read (especially for users who have high screen resolutions that make text appear smaller), and text must contrast well with its background.

Links should also be short and concise. For example, a link that just reads “Home” is a lot more obvious and easier to read and understand than a link that says “Front door.” Having said that, a couple of simple words are always better than one word of jargon.

### **Grouping of Menu Items Must Be Logical**

If you have a lot of pages, you might well decide to create submenus. If so, it’s very important that you group menu items so that visitors will understand where to look for something without having to search through several sections or categories.

If you do use submenus, you should make sure that they are clearly distinguishable from the main menu, and that it is clear which items belong to which section. Submenus often make use of a different colored background, smaller font, an indented position, or an alternate color to show they are distinct from the main menu.

For example, if you are creating a site for a computer store, you might create a grouping something like this with three main sections, each containing its own subsections:

- ❑ **Computers:** Desktop computers, laptop computers
- ❑ **Software:** Business software, games
- ❑ **Peripherals:** Printers, scanners

This would be easier to navigate than an alphabetized menu of all sections.

### **Menus Items Must Be Easy to Select**

If a menu item is too small or there is not enough space between menu items, it can be very difficult for some users to select the correct menu item. A user with a dodgy mouse, poor eyesight, or difficulties with motor control may have trouble hitting a small or tight target, and even those most able to control a pointing device will find it easier to hit larger targets. Furthermore, most users can find moving targets either irritating or hard to hit — and they are best avoided in most designs.

When you are creating a menu, you need to make sure it will work on all the main browsers. As the Web has grown up, there have been many menus (particularly drop-down menus that use JavaScript) that do not work even on some of the more common browsers.

There are two ways around this problem:

- ❑ Test your menu on many different types of browsers (particularly older versions).
- ❑ Avoid complex code in menus.

Drop-down or pop-up menus, which make new items appear as you hover your mouse over a heading, tend to be particularly problematic for two reasons:

- ❑ They are often written in JavaScript, which is implemented slightly differently in the various browsers — particularly the older ones. So while a menu might appear to work fine in the designer’s browser, some other visitors will simply not be able to navigate the site.
- ❑ They can be too sensitive or move too quickly for users to select the item they require.

## Chapter 10: Design Issues

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*Over the years, I have come across many sites that have attempted to implement drop-down menus that simply do not work in my browser. As a result, and for usability reasons, I now avoid these menus completely.*

Some designers play with more experimental types of menu (particularly in Flash) that often require quite dexterous control — these menus often move and slide between items as the user moves the mouse to the left or right when hovering over an item. While such menus that require fine control of a pointing device often look great on experimental sites, they can exclude those who do not have excellent control over their pointing device, and are therefore best left to the realms of more experimental sites than regular business sites.

### **Menus Must Load Quickly**

When creating a menu you should not expect that every visitor to your site has a fast Internet connection — some visitors may still be on dial-up connections or in an office building with a lot of users on the same connection. Although connection speeds are constantly improving, your menu should load within the first couple of seconds. If your menu takes longer than around eight seconds to load, many users will think that the page is not loading or that the browser has frozen — they will try to reload the page or, even worse, click their Back button or go to another page.

The loading speed is particularly important for designers who use graphics or Flash in their menus (plain text loads very quickly). If you want an image to change when the user rolls his mouse over an image to make it appear highlighted, then your loading time can double (as a second image is required for each image that the user rolls over).

Note that some browsers require the content of a table to load completely before displaying the table, so if you are putting images in a table, users might have to wait quite a while for a page to load.

### **Menus Must Be Consistent Across a Site**

The more pages a site contains, the more navigation items you are going to require. As soon as you have to introduce submenus, the navigation becomes more complicated and will vary from page to page. It is very important that the primary navigation remains consistent across all pages.

The submenus in each section of your site should be in the same position on each page and have a similar look and feel, so that users know exactly where to go to navigate the site.

## **Links**

In addition to the menus your visitors will be using to navigate the site, many web pages contain other hyperlinks in the text that makes up the body of the document. This short section addresses two topics regarding links that are not part of the main menu:

- ❑ Text links
- ❑ Images as links

### Text Links

By default, text links tend to be blue and underlined. Some experts on usability suggest that all links should be left to their default appearance. However, from your experience of the Web, you probably know that using a color that's clearly different from the main text makes it easy to tell what text makes up a link.

As you saw in Chapter 7, you can change the appearance of links as a user hovers over them and when a user has already visited them. Here is a quick reminder of how you change the appearance of links using CSS (ch10\_eg07.css):

```
a {font-weight:bold; color:#ff0000; text-decoration:none;}  
a:hover {color:#FF9900; text-decoration:underline; background-color:#f9f0f0;}  
a:visited {color:#990000;}
```

As users hover over links, these links will be underlined, change color, and gain a background color. The visited links will be in a different shade reminding users where they have been. You can see this best if you run the example available with the download code for the chapter.

*It is generally a bad idea to use a different weight of text when a user hovers over a link because this changes the width of the font, making it hard to read and changing the width of the line.*

### Images as Links

Images are often used as links in menus, advertisements, photos to click on, graphical icons, and so on. Whenever you use an image as a link you should use two attributes on the image:

- ❑ `alt = "description of image or text on image"`: Use this to tell users who cannot see the image what the image is of or what it says.
- ❑ `title="where the link will take the user"`: Use this to show users a tooltip that says where the link will take them; this is also used by screen readers.

If you do not use CSS to control the border of images that are links (and set them to “no border”), you should also add the `border` attribute:

- ❑ `border="0"`: If you don't use CSS to control borders or this attribute you will get a border around the image in many browsers, which can look unsightly.

You saw an example of using images as links earlier in the chapter (ch10\_eg06.html). In Chapter 12, you'll see an example of using JavaScript to create what are known as *rollover images*, or images that change as the user hovers over them.

### Site Search Features

The third way a user can navigate your site is by using a search feature. A search feature allows users to immediately look for a keyword (or words) that relate to the information they are trying to find from your

## Chapter 10: Design Issues

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site. Searching can save users from having to learn your scheme for navigating the site and offers another way to find the information if they are having difficulty finding what they came for.

### **Search Features Make Sites More Usable**

Search features are increasingly important as your sites grow. If you have only a few pages then your menu should be rather easy to understand anyway. However, larger sites, which may incorporate sub-menus where not all options are featured on every page, can really benefit from this addition.

There are many ways in which you can implement a search feature on your site. While some methods require fairly advanced programming experience, there are ways in which you can add a fairly simple search feature.

Large commercial sites, where the content is stored in a database, can use programming commands called *queries* to ask the database which pages contain the terms a user searched for, or they can use a special indexing application to index the site and make the search facilities available.

For sites that do not use databases or indexing tools, the easiest way to add a search feature to your site is to use a third-party search utility to index your site for you. These services also give you the code to create a search box that will send queries to the service's site. When visitors to your site use a search box, their query gets sent to the server of the company offering the search service, and the server will then return the answers to the user on your behalf.

The best-known company to offer this kind of service is Google, which does it for free at the time of this writing. (Google makes its revenue from supplying ads with the search results — but as you can see from Figure 10-7, these are not intrusive; they appear only on the right side of the results page, as they do when you send a query to Google.com.)

### **Adding a Google Search to Your Site**

Google, which is currently the most widely used search engine on the Internet, offers a very powerful and flexible service whereby you can use its search engine to provide a search feature on your own site. At the time of this writing you have to register in order to use the service. However, the instructions and setup on the site are quite simple and the service is free.

Figure 10-7 shows you how an arts and music site called Neumu.net has a small search box underneath the navigation bar.

When a visitor to this site searches the Neumu site, the request is sent to Google, which then generates a page with items from Neumu containing those words and sends it to the user. Obviously, the results point back to the Neumu site, as you can see in Figure 10-8.

You can see the code for the search box by selecting View Source on the menu.

**Remember that you cannot just copy this code; you need to register for the service yourself.**

Another site that offers a free search service for a limited number of pages is [www.Atomz.com](http://www.atomz.com), but it does charge for larger sites.

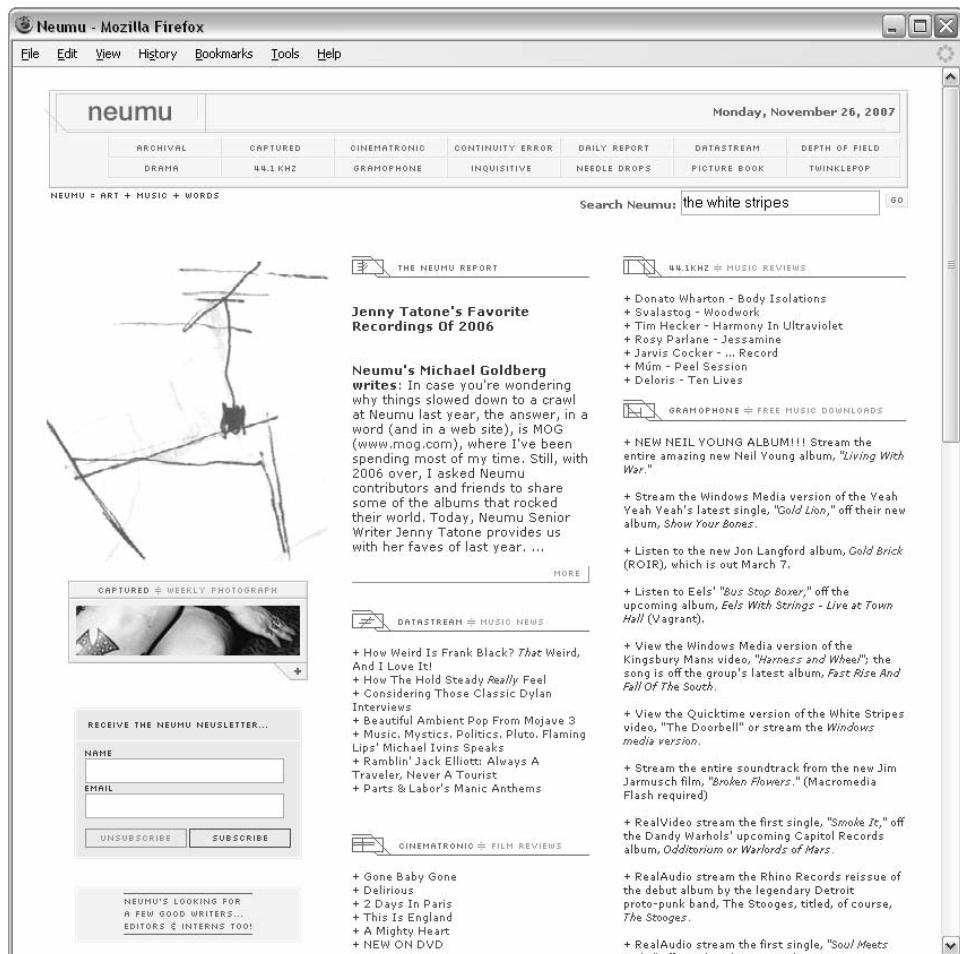


Figure 10-7

## Chapter 10: Design Issues



Figure 10-8

## Shading Multiple Rows of a Table

When dealing with tables that contain multiple rows of information, you can make it easier for visitors to follow the rows of the tables if you alternate the background color of the rows very slightly. Figure 10-9 shows you an example of a table that has alternating colors for each row.

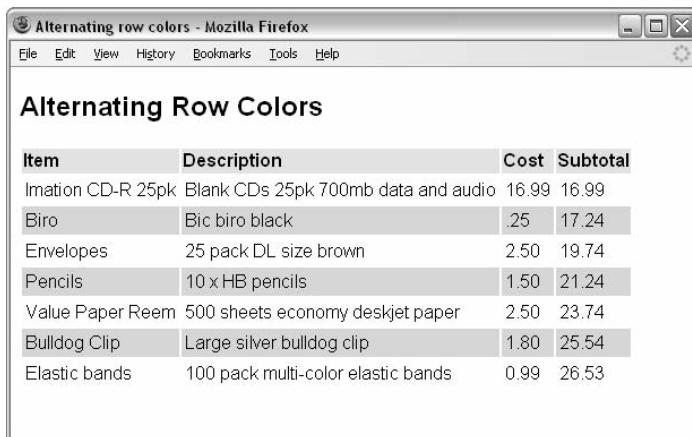
This was achieved using `odd` and `even` classes on rows like so (`ch10_eg08.html`):

```
<table>
<tr>
<th>Item</th>
<th>Description</th>
<th>Cost</th>
```

```

<th>Subtotal</th>
</tr>
<tr class="even">
    <td>Imation CD-R 25pk</td>
    <td>Blank CDs 25pk 700mb data and audio</td>
    <td>16.99</td>
    <td>16.99</td>
</tr>
<tr class="odd">
    <td>Biro</td>
    <td>Bic biro black</td>
    <td>.25</td>
    <td>17.24</td>
</tr>
<tr class="even">
    <td>Envelopes</td>
    <td>25 pack DL size brown</td>
    <td>2.50</td>
    <td>19.74</td>
</tr>
</table>

```



The screenshot shows a Mozilla Firefox window displaying a table titled "Alternating Row Colors". The table has a header row with columns for Item, Description, Cost, and Subtotal. The body of the table contains seven rows, each representing a different item with its description, cost, and subtotal. The rows alternate in background color between white and a very light gray.

Item	Description	Cost	Subtotal
Imation CD-R 25pk	Blank CDs 25pk 700mb data and audio	16.99	16.99
Biro	Bic biro black	.25	17.24
Envelopes	25 pack DL size brown	2.50	19.74
Pencils	10 x HB pencils	1.50	21.24
Value Paper Reem	500 sheets economy deskjet paper	2.50	23.74
Bulldog Clip	Large silver bulldog clip	1.80	25.54
Elastic bands	100 pack multi-color elastic bands	0.99	26.53

Figure 10-9

Here is the CSS that goes with this example:

```

body{
    color:#000000; background-color:#ffffff;
    font-family:arial, verdana, sans-serif; font-size:12pt;}
th {font-weight:bold; text-align:left; background-color:#ffff3366;}
.odd {background-color:#d6d6d6;}
.even {background-color:#ffffff;}

```

Remember that whatever background colors you use, there must be a good contrast between the background and the text in order for the user to be able to read it easily. The very light gray in this example is a good example of a color that does not dramatically affect the readability of the table itself.

# Forms

I have yet to meet anyone who enjoys filling in forms — especially on the Web. Therefore, if your site must include a form, good design is essential or people will not fill it in (and if you are an online shop that is an essential part of your core business).

In this section you are going to learn about the following:

- What to do before designing the form
- How to design a form, select the right form controls, group them correctly, and label them
- How best to lay out a form

To work through the points in this section, you will see an example of a basic form that users have to fill in before they can register for an online service.

## ***Before Designing the Form***

Before you address how a form should really look, you need to do some preparation — this is just like the preparation you need to do before you start designing a site, although it should take less time.

### ***Listing Required Information First***

When designing a form, you should start out by creating a complete list of the information you require from a user. You might start with a general list with items such as login details, name, mailing address, and e-mail address, but you need to make sure for each item that you know what makes up these requirements. For example, do you need to get a user's first name and last name separately? If so these will have to be separate items on the form. What makes up the address: house number/name, street name, suburb, ZIP Code, and so on? Which ones need to be separated from the others?

Here is a list of the information that is needed for our registration form:

- Login information
- User's name
- User's address
- User's contact details

When this is broken down, the exact information that's needed is as follows:

- Login information:** Username and password
- Name:** First name, last name
- Land address:** Street address, city ZIP Code
- Contact information:** E-mail address, area code, phone number

When you are creating forms, you should ask only for the information you really need to get a job done. It's very tempting when gathering information from visitors to ask as many questions as you can; but the longer a form is, the less likely it is that users will complete it.

If you want to collect lots of nonessential information (for example, to get a better idea of the demographic of visitors to your site), consider offering users an incentive to participate and answer the questions after they have registered/purchased an item, such as an entry into a prize draw.

**Note that when collecting and storing information about customers, you must also ensure that you meet the data protection laws of your country.**

### **Group-Related Information**

Once you know what information you want to collect from a visitor to your site, you need to look to see if there is a logical grouping to the information you require from visitors to help them understand the form.

If you find such a grouping in related information, you should make sure that these items go together in the form. In the example for this section you need three groups of information:

- Name and e-mail address
- Login details
- Other contact details

In this example, the grouping is the same as the initial list of required information before it was broken down, but sometimes the grouping can be quite different.

### **Model Paper Forms Users Are Familiar With**

If you are creating an online application that represents a form that would previously have been filled in on paper *and* that your users would be familiar with, then you should make sure that your online form reflects that paper form. (Note that if the form would not have been familiar to users this is not necessary.) If the goal of your application is to put existing software online, then it could also be modeled on the software.

The reason for modeling your form on something the user is familiar with is quite obvious; it makes it easier for the user to fill in. That is not to say that the layout of the form should be exactly the same (often paper forms cram too many questions into a small space). Rather, you should be asking similar questions in a similar order and grouping.

### **Are Users Going to Provide the Same Information Each Time?**

Will users have to provide the same information each time they visit the site? Or will some data be stored in a database (or other application) and retrieved when they log in again? For example, if you are working on an online store, once the user has logged in, will the application remember the user's name, address, and contact details?

*If you are going to store information about users — in particular their credit card details — you must make sure you are abiding by your country's laws on storage of such information.*

You should also consider how your form is going to be processed. If it's going to be processed by a human, the human can interpret the data the user enters, whereas if it goes straight into a database, users must be a lot more precise about the information they enter. This may affect your choice of form control required to collect the information.

## Chapter 10: Design Issues

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### What Else Needs to Appear on the Form?

Several forms contain extra information, such as shipping information, price lists, legal notices, and so on. Before you start designing the form you should be aware of all the information that might be put on it, not just the form controls themselves.

### Designing the Form

Now that you know what information must be captured by the form, you can design it. You can start by selecting the appropriate type of control and then grouping the controls together and labeling them. You can then add final touches to the layout of the form to control its presentation.

### Selecting the Type of Form Control

You learned in Chapter 5 about the different types of form controls that you can use. It's important that you choose the correct type of form control for the information that you are trying to collect. Once you have decided on which form control to use for each piece of information you'll have an idea of the possible length and layout of the form.

Entering text:

- ❑ If there is just one line of text, you use an `<input>` element whose `type` attribute has the value of `text`.
- ❑ If you want the user to enter more than one line of text you use the `<textarea>` element.
- ❑ If the information is sensitive (such as a credit card or password) use an `<input>` element whose `type` attribute has a value of `password`.

Giving the user a limited choice of options:

- ❑ If the user can select only one option (from several), use a group of radio buttons (with the same name) or a drop-down select box.
- ❑ If the user can select multiple items, use checkboxes or a multiple select box.

Also consider how visitors would be used to giving this kind of information. For example, use a set of text inputs for each line of an address rather than, say, using a combination of a text input for the street name and a select box to indicate whether the street is a street, road, or avenue for the first line of the address.

Remember that each form control should use a name that describes its content. Rather than just arbitrary names such as `input1` and `input2`, you will often see form control names that are given a prefix to describe what kind of form control they relate to:

- ❑ `txtName` for text boxes and text areas
- ❑ `radName` for radio buttons
- ❑ `chkName` for checkboxes
- ❑ `selName` for select boxes

## Radio Buttons and Checkboxes

Although radio buttons and checkboxes take up more room than select boxes, they tend to be easier for visitors to use because users can see all the options at once (as long as the list of options is not too long, such as a list of all the countries in the world, in which case you might use a drop down select box instead).

If there are only three or four options, and the user is allowed to pick only one, then radio buttons are usually a better choice than select boxes because all are visible. An exception to this rule would be if the design contained several select boxes (in which case the consistency of design is more important).

If there are only three or four options, and the user is allowed to pick several, then the use of checkboxes for multiple selections is usually better than a multiple select box no matter how much space they take — not only because checkboxes are more common, but also because if you use a multiple select box you should generally tell the user that they can select multiple items and how to go about this.

Checkboxes are also ideal if users have to indicate that they agree to or have read something, such as terms and conditions. It's important to use a checkbox in these cases rather than a radio button. When you have selected a radio button you can change your choice to a different radio button, but there is no way to deselect all the radio buttons in a group (whereas you can click on the same checkbox to clear it).

*You should never use a programming language (such as JavaScript) to change the intention of radio buttons or checkboxes. In other words, you should never make checkboxes mutually exclusive (as radio buttons are), and you should not allow a user to select more than one radio button from a group because this will confuse users who expect radio buttons and checkboxes to follow their normal default behavior. Also, be careful not to repeatedly mix radio buttons and checkboxes in the same form or you will confuse users.*

Radio buttons and checkboxes also allow you to provide more information to the user than a select box. A radio button or checkbox can have a long description next to it, whereas if you use a long description in a select box the whole box grows wider. You can see an example of a long drop-down (which goes off the screen) and a set of radio buttons in Figure 10-10 (ch10\_eg09.html).

If your radio buttons represent an optional question, you should not automatically select one item by default. You cannot deselect all radio buttons by clicking them again as you can checkboxes; you can make only a different choice. It is also often helpful to give users an “other” option if they might not choose one of the options you have given.



Figure 10-10

## Chapter 10: Design Issues

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### Select Boxes

Select boxes, also known as drop-down list boxes, save space on the screen, especially when there are lots of options, although as Figure 10-10 showed they do not look very good with long descriptions for each option. Indeed, the width of a select box is the width of the widest option in it.

You should remember when providing a select box to include options for all users. For example, if you use a drop-down for U.S. states and you have visitors from outside the U.S., you should have at least one option for those who do not live in a U.S. state, even if the option is just “Outside U.S.”

The order of items in a select box should reflect users’ experience; for example, if you use month names, put them in chronological order, whereas if you use states or countries, alphabetical lists are easier to use.

If one (or a few options) within a long list are more popular or more likely to be chosen than other options, then you should put these at the top of the select box so that the user comes to them first.

### Text Boxes

Text boxes tend to be the most natural way for users to offer the majority of information. Generally speaking, text areas should be large enough for users to enter what they want without having scrollbars appearing (unless they are very long, such as the body of an e-mail or an article for a web site).

Be aware that users often take the size of the text box to be an indication of the length of text that they should provide. This can be especially helpful for things such as dates, as you can see in Figure 10-11, where you want the user to enter four digits for a year.

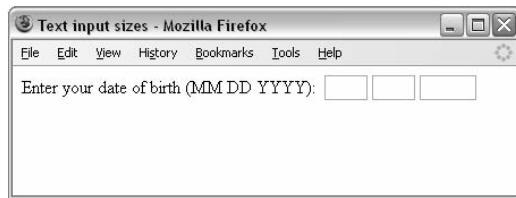


Figure 10-11

### Grouping Controls

Once you’ve decided what form controls you’re going to use, you can start to put them on the page. As I already mentioned, these should be grouped together into related items of information — and these groups should reflect the users’ understanding of the topic.

You can group form elements in the following ways:

- ❑ Fieldsets
- ❑ Labels
- ❑ Splitting the form into several pages

You can also use padding and shading as you saw in the first section of this chapter, which covered white space.

### Using <fieldset> Elements

You already learned about the `<fieldset>` element in Chapter 5. It allows you to group sections of a form between the opening `<fieldset>` and closing `</fieldset>` tags. The form can also carry a `<legend>` element to indicate a caption for the box.

For example, here is a form for a user to enter their login details (`ch10_eg11.html`):

```
<form name="frmLogin" action="login.aspx" method="post">
  <fieldset>
    <legend>Login</legend>
    User name: <input type="text" size="12" name="txtUserName" /><br />
    Password: <input type="password" size="12" name="txtPassword" /><br />
    Confirm password: <input type="password" size="12"
      name="txtPasswordConfirmed" /><br />
    <input type="submit" value="Log in" />
  </fieldset>
</form>
```

Fieldsets were introduced in IE4 and Netscape 6. Older browsers just ignore the `<fieldset>` and `<legend>` buttons if they do not understand them, so you can safely add these elements to all forms. You can see what this example looks like in Figure 10-12.



Figure 10-12

You may also choose to use an alternative to fieldsets to group together parts of a form, such as line breaks, background colors, or a table with associated style rules, but fieldsets have specifically been introduced for grouping form elements, and you can associate styles with the `<fieldset>` element, as was done in this example (`ch10_eg11.css`):

```
fieldset {
  width:250px;
  padding:10px;
  font-size:12px;
  text-align:right;}
```

Note here how the `width` property has been set in the style sheet. This is particularly helpful to add to `<fieldset>` elements because they will otherwise stretch to the width of the browser window (or containing element).

# Chapter 10: Design Issues

## Splitting a Form into Separate Pages

Long forms not only put off users but also make the form harder for the user to fill in. And if you are writing validation and error handling (such as the error messages to say a form field has not been filled in or contains the wrong sort of information), then this code becomes more complicated as a form gets longer. Therefore, if you have a long form you can split it up into several pages. The reasons you might do this include:

- ❑ Smaller forms are less intimidating.
- ❑ When related information is put on the same page, it is easier to digest.

As a general guide, your form should be not much more than a “screenful” (at  $1024 \times 768$  resolution) so the user does not have to scroll much.

If you split a form into separate pages you should clearly indicate to the users how far they are through the form. You can see, in Figure 10-13, a form that has been split up into four pages and a confirmation page.

Splitting a form into several pages can introduce new complexities into the programming because the program has to remember what a user has entered between each form; however, there are several ways of doing this with a little extra effort. You will generally want users to go through these steps in order rather than allowing them to go between pages at random, so avoid links that allow them to jump to any page.

The screenshot shows a Mozilla Firefox browser window with the title bar "Mozilla Firefox". The main content area displays a website for "REEF IMAGING". The header features the company name in large letters and a subtext: "Real estate signboards and services for residential and commercial properties". A navigation menu at the top includes links for Home, About Us, Our Catalogue, Place an Order, and Contact Us. Below the menu, a horizontal bar indicates the current step: "Step 1 of 4 Select a board". The main form area contains fields for Agent's name, address, telephone, fax, and email. The "Agent's name" field is populated with "Reef Imaging". The "Agent's address" field contains "P.O. Box 2922 Taren Point NSW". The "Telephone" field is "02 9531 6164", "Fax" is "02 9531 6164", and "Email" is "info@reefimaging.net". At the bottom of the form, there are "BACK" and "PROCEED TO NEXT STEP" buttons. A note below the buttons states: "\* denotes required field." The footer of the page includes "ABN 56 970 251 929" and "TERMS & CONDITIONS".

Figure 10-13

## Number Questions

If you have a lot of questions, as in an application form or an online test, you should number questions so that the users know where questions start and end. This can also be a help if you want to indicate to a user that he or she should jump to another section of the form because you can explicitly indicate which number question they should be going to.

## Layout of Forms

Ideally, a layout of a form should reflect what a user would expect to see when dealing with such data. Layout is related to the user's experiences with paper forms or software equivalents. You can even consider an everyday experience such as how a user writes out his or her address. (We usually write our address on a few separate lines as opposed to using drop-down boxes.)

## Labeling Controls

The first issue concerned with layout of forms is the labeling of controls. It's very important that each control is clearly labeled so that users know what information they should be adding and where. There are two types of labels:

- Implicit labels that are normal text and markup next to the control
- Explicit labels that use the `<label>` element

You should consider the following as guidelines for where the label for an element should generally appear:

- Text entry fields:** To the left of the input or directly above
- Checkboxes and radio buttons:** To the right of the checkbox or radio button
- Buttons:** On the button itself — its value

Implicit controls are the simplest way to label a control. To add an implicit label, you simply add text directly next to the label in question. For example (`ch10_eg12.html`):

```
First name: <input type="text" name="txtFirstName" size="12" /> <br />
Last name: <input type="text" name="txtLastName" size="12" /> <br />
E-mail address: <input type="text" name="txtEmail" size="12" /> <br />
<input type="submit" value="subscribe" />
```

The disadvantage with this approach is that the presentation is not very attractive — and gets worse with longer forms — because the form controls are not aligned well with each other, as you can see in Figure 10-14.

While `<label>` elements do require a little extra programming effort, it is generally a good idea to get into the habit of using them. You may remember from Chapter 5 that the `<label>` element must either contain the form control or use the `for` attribute whose value is the value of the `id` attribute on the form control:

```
<label for="firstName">First name: </label>
<input type="text" name="txtFirstName" size="12" id="firstName" />
<label for="lastName">Last name: </label>
```

## Chapter 10: Design Issues

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```
<input type="text" name="txtLastName" size="12" id="lastName" />
<label for="email">E-mail address: </label>
<input type="text" name="txtEmail" size="12" id="email" />
```



Figure 10-14

Unfortunately, this will look just the same as the previous example shown in Figure 10-14, but the `<label>` element does have advantages:

- ❑ It makes it easier for screen readers to associate a control with its label. In particular, you can associate labels with form controls even when the label is not next to that item — for example, in a table the label might be in a row above the form control.
- ❑ Labels can increase the clickable area of a radio button or checkbox, which some users find hard to accurately click on because the user can click on the label.

*Labels were first supported only in IE4 and Netscape 6 and later versions; however, older browsers just ignore the `<label>` element and display their contents, so you are safe to use them on any form.*

Here you can see the example of a form that allows you to indicate how you heard about a company. When the users click the label, the radio button associated with that form will be selected (ch10\_eg13.html):

```
<form name="frmExample" action="" method="post">
  <fieldset>
    <legend>How did you hear about us?</legend>
    <input type="radio" id="referrer1" name="radReferrer" value="Mouth" />
    <label for="referrer1" >Word of Mouth</label><br />
    <input type="radio" id="referrer2" name="radReferrer" value="Google" />
    <label for="referrer2" >Google Search</label><br />
    <input type="radio" id="referrer3" name="radReferrer" value="Magazine Ad" />
    <label for="referrer3" >Magazine Ad</label><br />
    <input type="radio" id="referrer4" name="radReferrer" value="Other" />
    <label for="referrer4" >Other</label>&nbsp;&nbsp;
    <input type="text" value="txtOther" size="12" /><br />
    <input type="submit" value="Submit" />
  </fieldset>
</form>
```

You can see this form in Figure 10-15.



Figure 10-15

*Remember that when choosing the prompt or the label for a form, you must choose words that will really mean something to users. What might be obvious to you might not be so clear to a visitor who is not as familiar with the topic as you — for example, a product ID number might be a unique identifying number for a product, but a customer can't be expected to know this or where to find it.*

## Using Tables for Layout

Many designers and programmers use tables to lay out and position form elements on their web pages. However, you must remember how tables linearize in a screen reader (as discussed in Chapter 4).

To remind you how a screen reader would linearize a simple table, look at the following table.

Row 1 Column1	Row 1 Column 2
Row 2 Column 1	Row 2 Column 2
Row 3 Column 1	Row 3 Column 3

The cells of this table would generally be read row by row in the following order:

Row 1 Column 1, Row 1 Column 2, Row 2 Column 1, Row 2 Column 2,  
Row 3 Column 1, Row 3 Column 2.

So, the correct way to lay out the previous example in a table would be as shown here (ch10\_eg14.html). Note that this example does not use the `<label>` element so that you can understand the order in which elements are read without the use of this `<label>` element:

```
<table>
<tr>
    <td class="formPrompt">First name: </td>
    <td><input type="text" name="txtFirstName" size="12" /></td>
</tr>
<tr>
    <td class="formPrompt">Last name: </td>
    <td><input type="text" name="txtLastName" size="12" /></td>
</tr>
<tr>
```

## Chapter 10: Design Issues

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```
<td class="formPrompt">E-mail address: </td>
<td><input type="text" name="txtEmail" size="12" /></td>
</tr>
</table>
```

This will order the elements correctly, and users with a screen reader will understand the form. Note that the `class="formPrompt"` on the `<td>` elements that are labels is associated with a CSS style sheet rule that indicates the text should be right-aligned in the table. This makes for a much neater display on the pages and prevents large gaps between a label and its associated control. You can see the result in Figure 10-16.



Figure 10-16

Tables that get more complex than this need a lot of consideration. For example, take a look at Figure 10-17.



Figure 10-17

Here there are two columns of form controls and the labels are above the elements. This design would necessitate the use of the `<label>` element; otherwise a screen reader would read the labels on the first row and then the two form controls on the second (`ch10_eg15.html`):

```
<table>
<tr>
<td><label for="fname">First name:</label></td>
<td><label for="lname">Last name:</label></td>
</tr>
<tr>
<td><input type="text" name="txtFirstName" id="fname" size="12" /></td>
<td><input type="text" name="txtLastName" id="lname" size="12" /></td>
</tr>
<tr>
```

```
<td><label for="email">E-mail address:</label></td>
<td></td>
</tr>
<tr>
<td><input type="text" name="txtEmail" id="email" size="12" /></td>
<td><input type="submit" value="Register" /></td>
</tr>
</table>
```

Generally, however, it is better to stick to a single column of form controls — and ideally you would use CSS rather than tables to control the layout of the forms. While printed forms often use more than one column of questions, it is not a good idea to have more than one column of form controls on the Web, for these reasons:

- ❑ You do not know the size of the user's screen, and the user might not be able to see the second column (especially the small percentage of users who browse at 800 × 600 resolution).
- ❑ It is more likely that users would miss one of the items on the form.
- ❑ You will have to employ a complex layout that may confuse those with screen readers.

### Keeping Relevant Information Next to or Above Form Controls

By now you are getting the idea of how vital good labeling is to a user's understanding, so here are a couple of examples where the position of a label requires extra care. Take a look at the example in Figure 10-18, which is for a telephone number.

The screenshot shows a Mozilla Firefox window with a title bar "Positioning labels - Mozilla Firefox". The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. Below the menu is a toolbar with icons for back, forward, search, and other functions. The main content area is titled "Contact details". Inside, there is a label "Phone number \*". To its right are two adjacent input fields, each enclosed in a separate box. This layout makes it difficult for users to identify what each individual box represents.

Figure 10-18

As you can see here, there is no indication what the separate boxes are for. While you or I might guess that one box is for the area code and the other for the main part of the number, users with screen readers are likely to be more confused by what the second box is for as they can only listen to the form, not see it. Some users, especially those in a hurry, might try to put the whole number in just one text box.

A far better approach to this example would be to indicate labels for the area code and the number, as shown in Figure 10-19.

The screenshot shows the same Mozilla Firefox window as Figure 10-18, but with improved labeling. The "Phone number \*" label is followed by a single input field that spans both the original boxes. This combined label and input field clearly indicates that the entire field is for the phone number, including the area code.

Figure 10-19

## Chapter 10: Design Issues

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This is much clearer for all, and you can see the code here (`ch10_eg16.html`):

```
<table>
<tr>
  <td class="label">Phone number <span class="important">*</span></td>
  <td>Area code<input type="text" name="txtTelAreaCode" size="5" />
    Number<input type="text" name="txtTelNo" size="10" /></td>
</tr>
</table>
```

Proper labeling is also very important when you have radio buttons or multiple choice buttons that express an option or rating. You can see a problematic example in Figure 10-20.

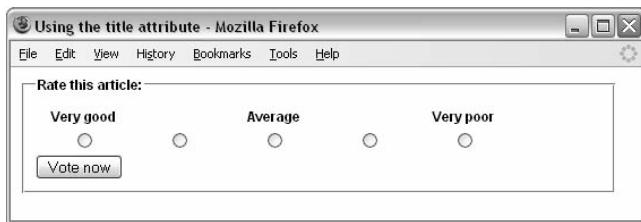


Figure 10-20

The code for this example puts the radio buttons and labels in a table. The problem with this example is not that the labels are not related to the correct radio buttons — as you can see, the `<label>` element is used and associates with the correct table cells in the following code. The problem is that those with screen readers will hear labels for only three options, whereas there are really five options to choose from. You should be offering labels for each.

```
<table>
<tr>
  <td><label for="VeryGood">Very good</label></td>
  <td></td>
  <td><label for="Average">Average</label></td>
  <td></td>
  <td><label for="VeryPoor">Very poor</label></td>
</tr>
<tr>
  <td><input type="radio" name="radRating" value="5" id="VeryGood"></td>
  <td><input type="radio" name="radRating" value="4" id="Good"></td>
  <td><input type="radio" name="radRating" value="3" id="Average"></td>
  <td><input type="radio" name="radRating" value="2" id="Poor"></td>
  <td><input type="radio" name="radRating" value="1" id="VeryPoor"></td>
</tr>
</table>
```

If you really do not want to offer a text alternative for each of these items, a rather drastic alternative is to use a single-pixel transparent GIF with alt text inside the `<label>` element, which will not show up in the browser (ch10\_eg17.html) that explains each option for those with screen readers, as follows:

```
<table>
<tr>
<td><label for="VeryGood">Very good</label></td>
<td><label for="Good"></td>
<td><label for="Average">Average</label></td>
<td><label for="Poor"></td>
<td><label for="VeryPoor">Very poor</label></td>
</tr>
<tr>
<td><input type="radio" name="radRating" value="5" id="VeryGood" /></td>
<td><input type="radio" name="radRating" value="4" id="Good" /></td>
<td><input type="radio" name="radRating" value="3" id="Average" /></td>
<td><input type="radio" name="radRating" value="2" id="Poor" /></td>
<td><input type="radio" name="radRating" value="1" id="VeryPoor" /></td>
</tr>
</table>
```

You cannot actually see the difference between this example and the previous one, but you would be able to hear a difference if you could not see it and were relying on a screen reader.

### Required Information

A form will often include questions that a user must answer in order for it to be processed correctly. If a form control must be filled in, you should tell a user this. It's common practice to use an asterisk (\*) to indicate required fields and, of course, to include a note on the page that acts as a key indicating what the asterisk means. Furthermore, it is common to put the asterisk in a different color (such as red) than the main text next to it so users can see it is important.

```
First name <span class="required">*</span>:
<input type="text" name="txtFirstName" size="12" />
```

The `required` class could be used with a CSS rule like this:

```
span.required {
  font-weight:bold;
  font-size:20px;
  color:#ff0000;}
```

You can see an example of this in Figures 10-18 and 10-19, the screenshots of the telephone number example. In a full form you should also include a key that says in text what the asterisk means.

# Chapter 10: Design Issues

## Careful Placement of Buttons

You should be very careful about where you place buttons on a page. They should be close to the relevant part of the form; for example, in an online store, the button to buy an item should be close to the product, as shown in Figure 10-21.

If you use Next, Proceed, or Submit buttons on a form — for example, to link between different pages of the form to indicate that a user should go on to the next step — these buttons should be on the right side of the page; “Back” buttons should be on the left side. This mirrors the user’s experience with the Back and Forward buttons on a browser window (with Back being the first button on the left and Forward being to the right of it). It also follows the direction of the text that visitors will be reading in languages where the text flows from left to right (so as users come to the end of a form, they should be reading from left to right). You can see an example of this in Figure 10-21.



Figure 10-21

*If you use a Reset or Clear form button, it should be to the left of the Submit or Next button because it reflects the previous experience of web users.*

## Using the title Attribute on Form Controls

One way of adding extra information for users is to add a `title` attribute to the form control. When users put their cursor over the form control, the value of the `title` attribute appears as a tooltip. This is particularly helpful for clarifying the type of information that a user has to enter.

For example, here is a text input that requires a user to enter an authorization code. The `title` attribute clarifies where the authorization code comes from (`ch10_eg18.html`):

```
<form name="frmExample" action="" method="post">
  <fieldset>
    <legend>Enter your authorization code</legend>
    Code:&nbsp;
    <input type="text" name="txtAuthCode" title="Enter the authorization
      code that was e-mailed when you registered." /></td>
  </fieldset>
</form>
```

You can see the result in Figure 10-22, with the tooltip showing as the user hovers over the text input.

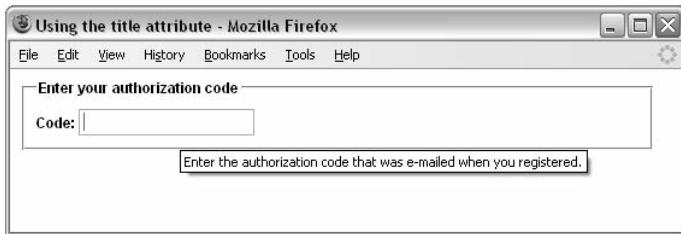


Figure 10-22

### Tab Index

Once you have created your form, you should check the tabbing order of form elements. Users should be able to use the Tab key on their keyboard to move between the form controls. If the order in which the form controls gain focus is not the order in which you would expect to fill out the form, you should use the `tabindex` attribute, which can take a value of 0 to 32,767 (Chapter 5 covered this attribute in more detail).

The `tabindex` attribute can be used on the following elements:

```
<a> <area> <button> <input> <object> <select> <textarea>
```

In Chapter 12, you will see an example of how you can automatically give focus to a form element when the page loads. You will also see how to affect the appearance of the form controls that currently have focus.

### Don't Rely on Color to Convey Information

While color can be a very powerful tool in aiding the understanding of forms, you should never rely on a color alone to convey information, and you must ensure that there is enough contrast between colors to make the distinction clear.

For example, you should not just use color to indicate required fields on a form. In Figure 10-23, the form uses color to indicate which fields are required, but because this book is printed in black and white and the form uses color to convey information you cannot easily see which items must be filled in.

*This is an important issue because a significant number of people have some form of color blindness.*

## Chapter 10: Design Issues

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You can, however, resolve the problem easily. As you can see in Figure 10-24, the fields that are mandatory use the asterisk as well as color.

*A good way to test whether you are relying on color too much is to change the settings of your monitor so that they are showing in grayscale (on Windows use the Display Properties in the Control Panel and on a Mac use the Display settings in the System Preferences). If information is lost when the page is grayscale, then you are relying on color too much.*

The screenshot shows a Mozilla Firefox window with the title bar 'Register for E-mail - Mozilla Firefox'. The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The main content area is a form titled 'Register for our e-mail'. It contains three text input fields: 'First name:' (red border), 'Last name:' (red border), and 'E-mail address:' (red border). Below these fields is a 'Register' button. At the bottom of the form, there is a message: 'You must fill in items with red titles.'

Figure 10-23

The screenshot shows a Mozilla Firefox window with the title bar 'Register for E-mail - Mozilla Firefox'. The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The main content area is a form titled 'Register for our e-mail'. It contains three text input fields: 'First name:' (red border), 'Last name:' (red border), and 'E-mail address: \*' (red border with an asterisk). Below these fields is a 'Register' button. At the bottom of the form, there is a message: 'You must fill in items marked with an asterisk.'

Figure 10-24

### Using CSS with Form Elements

The use of CSS to control form elements has been increasingly popular, in particular to control borders and background colors of text inputs, text areas, and Submit buttons, to create a more stylized form. While use of CSS is quite advanced on PCs, the support for CSS with form elements on the Mac platform isn't as strong.

Figure 10-25 shows a form whose text inputs have solid black borders and light gray backgrounds.

Here is the CSS style that is associated with the <input> elements (ch10\_eg20.html):

```
input {  
    border-style:solid;  
    border-color:#000000;  
    border-width:1px;  
    background-color:#d6d6d6;}
```



Figure 10-25

If you use styles with form elements, you just have to make sure that you do not make the form harder to fill in by adding unnecessary style. As with any kind of text, if you do not have good contrast for text controls, they will be hard to read and users might enter the incorrect information.

### Testing the Form

Once you have laid out your form, you then need to test the form. You will see more about testing a site in Chapter 13. Briefly, however, it is very helpful to watch people using your form once you have designed it to see how they interact with it.

The most important thing while doing this, and which you must remember, is that if you can see that a user is going to make a mistake, don't interrupt him; watch what he does because it will teach you more about how the user expected the form to work.

### Try It Out    A Site Registration Form

In this example, you are going to create a simple registration form for a web site. You will have to collect the information listed in the table that follows, using the form controls listed.

Information	Form control	Required
First name	Text input	Yes
Last name	Text input	Yes
E-mail address	Text input	Yes
Password for accessing the site	Password text input	Yes
Confirmation of Password	Password text input	Yes
Register	Submit button	N/A

Figure 10-26 shows you what the form will look like when you are finished.

## Chapter 10: Design Issues

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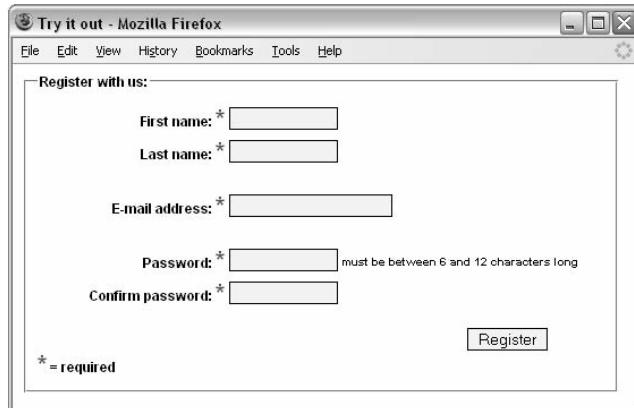


Figure 10-26

1. First set up the skeleton of the document, as you are probably used to doing by now. Don't forget the link to the CSS style sheet called `registration.css`. You can also add a `<form>` element:

```
<html>
  <head>
    <title>Try it out</title>
    <link rel="stylesheet" type="text/css" href="registration.css" />
  </head>
  <body>
    <form name="frmExample" action="register.aspx" method="post">
    </form>
  </body>
</html>
```

2. The form contains only five text inputs so it does not need splitting into separate groups, but it would be a good idea to put the whole thing in a `<fieldset>` element with a `<legend>`:

```
<form name="frmExample" action="" method="post">
  <fieldset>
    <legend>Register with us:</legend>
  </fieldset>
</form>
```

3. The rest of the form lives inside a table within the `<fieldset>` element. The table has two columns, one for labels and the other for form controls, and the cells in each column need to have a separate `class` attribute.

The value of the `class` attribute on the cells that contain labels will be `label`, while the value of the `class` attribute in the cells that contain a form control will be `form`. Each form element's label will use a `<label>` element. And each form control is required so you can add a required notice next to the labels.

The first row will contain a text input for the user's first name. You can add it like this just after the `<legend>` element:

```
<table>
  <tr>
```

```

<td class="label">
    <label for="fname">First name: <span class="required">*</span></label>
</td>
<td class="form">
    <input type="text" name="txtFirstName" id="fname" size="12" />
</td>
</tr>
</table>

```

- 4.** Add the text input for the last name and the e-mail address; these are both in `<tr>` elements which follow on from the row you added in the last step. You can make the size of the e-mail address text input a little larger than the other text inputs because this is likely to be longer:

```

<tr>
    <td class="label">
        <label for="lname">Last name:
        <span class="required">*</span></label>
    </td>
    <td class="form">
        <input type="text" name="txtLastName" id="lname" size="12" />
    </td>
</tr>
<tr><td>&nbsp;</td><td>&nbsp;</td></tr>
<tr>
    <td class="label">
        <label for="email">E-mail address:
        <span class="required">*</span></label>
    </td>
    <td class="form">
        <input type="password" name="txtEmail" id="email" size="20" />
    </td>
</tr>
<tr><td>&nbsp;</td><td>&nbsp;</td></tr>

```

An empty row of the table has been added above and below the e-mail address row to space out the form a bit more. If you just have a long list of form controls, the form can seem longer and more complicated than if the rows are split up a little, although in this case they do not need to be split up into distinct sections.

- 5.** The final two controls users will have to fill in allow them to provide a password for the site and to confirm it. Both `<input>` elements have a `type` attribute whose value is `password`. In order to explain that the password should be between 6 and 12 characters long, a message has been added after the first password box in the right column. The reason for adding the note to the right of the password input is that it would throw out alignment of labels on the left if it were placed on the same side.

```

<tr>
    <td class="label">
        <label for="pwd">Password: <span class="required">*</span></label>
    </td>
    <td class="form">
        <input type="password" name="txtPassword" id="pwd" size="12" />
        <span class="small"> must be between 6 and 12 characters long</span>
    </td>
</tr>

```

## Chapter 10: Design Issues

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```
<tr>
  <td class="label">
    <label for="pwdConf">Confirm password:
    <span class="required">*</span></label>
  </td>
  <td class="form">
    <input type="password" name="txtPasswordConf" id="pwdConf" size="12" />
  </td>
</tr>
```

6. A Submit button has to be added to the end of the form. You put this in a `<div>` so that it can be positioned to the right side of the form. This is followed by the key to explain the purpose of the asterisk.

```
<div class="submit"><input type="submit" value="Register" /></div>
<span class="required">*</span> = required
```

7. Save this form as `registration.html`, and when you open this page in a browser you should see a page that looks like one shown previously in Figure 10-25.

Here is the CSS style sheet used with this example (`registration.css`):

```
body{color:#000000; background-color:#ffffff;
  font-family:arial, verdana, sans-serif; font-size:12pt;}
fieldset {font-size:12px; font-weight:bold; padding:10px;
  width:500px;}
td {font-size:12px;}
td.label {text-align:right;
  width:175px;}
td.form {width:350px;}
div.submit {width:450px; text-align:right; padding-top:15px;}
span.small {font-size:10px;}
span.required {font-weight:bold; font-size:20px; color:#ff0000;}
input {border-style:solid; border-color:#000000; border-width:1px;
  background-color:#f2f2f2;}
```

### How It Works

This example is fairly straightforward, but here are some things to note about it:

- ❑ The form labels and form controls are aligned using a two-column table and CSS. This makes the form much neater and easier to read compared with a table where form elements are not aligned.
- ❑ Each form control is labeled with a `<label>` element.
- ❑ A screen reader should easily be able to read the correct information to the user because of the way the table linearizes the content.
- ❑ The form is contained in a `<fieldset>` element to show the boundary and size of the form, and this is given a `<legend>` to describe the purpose of the form.
- ❑ Required information is indicated with a red asterisk that uses color and a symbol to indicate some extra meaning (remember that you should not rely on color alone to convey meaning).

- ❑ White space is added to either side of the e-mail input to make the layout more attractive and less intimidating.
  - ❑ The Submit button is moved to the right of the form with the use of a <div>. Putting submission buttons to the right follows the way the eye scans a page and indicates moving forward, not backward — and coincides with users' experience of how the forward button is positioned to the right of the Back button on a browser menu.
  - ❑ The text inputs and Submit button were given CSS styles to give them outlines and backgrounds, a more stylized presentation than plain XHTML form controls.
- 

## Summary

In this chapter you have learned a lot more about web page layout. In Chapter 9, you looked at the general layout or structure of a page. In this chapter, you learned about issues regarding particular parts of pages: text, navigation, tables, and forms — the bits that fill in that structure. From adding white space between elements on a page, such as text and images, to aligning parts of a form inside a table, you've seen lots of handy hints that will help you design better pages.

You have to remember, however, that there are no set rules that will make you a good designer; whether you have the eye for web design depends on how artistic and creative you are. The job could almost be said to be a combination of a number of professions. It's a bit like being an artist because it requires skill, patience, and practice. It's also a little like being well-dressed because having good taste in clothes is hard to explain — or like being an interior decorator because you have to know how things will work together. Like an architect, you need to ensure that everyone is able to access the site. And like being a brand consultant, you need to choose the right colors and select fonts that work well with the aims and values of your site.

What you have learned in this chapter is how to make the designs you might sketch on paper come to life, as well as tips and tricks on how to make them work.

The only real restrictions you should impose upon yourself when designing a web page surround what your audience would find attractive and easy to use. Remember that if you want your site to attract a lot of visitors, don't design the site just for yourself, and don't just design it for your clients; design it for expected visitors to the site.

## Exercises

The answers to all of the exercises are in Appendix A.

1. In this exercise you should add a second page to the Try It Out form at the end of the chapter (`registration.html`). The table that follows shows the new items you must add to the form.

You should also add the following:

- ❑ An indication at the top of the page as to how much of the form the user has completed
- ❑ A Back button and a Proceed button at the bottom (instead of the Submit button)

## Chapter 10: Design Issues

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Information	Form control	Required
Address 1	Text input	Yes
Address 2	Text input	No
Town/Suburb	Text input	No
City/State	Text input	Yes
ZIP Code	Text input	Yes

When you have finished, the page should look something like Figure 10-27 (registration2.html).

The screenshot shows a Mozilla Firefox window titled "Try it out - Mozilla Firefox". The menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. A tab bar at the top has three tabs: "Login details", "Contact details" (which is highlighted in blue), and "Confirm details". Below the tabs is a section titled "Contact details:" containing five text input fields. The fields are labeled "Address 1:", "Address 2:", "Town/Suburb:", "City/State:", and "Postal/Zip Code:". At the bottom left is a "Back" button, and at the bottom right is a "Proceed" button. A note at the bottom states "\* = required".

Figure 10-27

# 11

## Learning JavaScript

In the previous chapters, you learned about a markup language (XHTML) and a style sheet language (CSS). While you can think of learning these languages as “starting to program,” most seasoned programmers would make a distinction between marking up documents and proper “programming” where calculations are performed on data and decisions are made programmatically based upon some input the program receives. In this chapter, you really are going to start learning to program; you learn the basics of a programming language called JavaScript. JavaScript is a lightweight programming language, often referred to as a scripting language, but in working with it, you can learn many of the basic concepts of programming.

It’s not possible to teach you everything there is to learn about JavaScript in one or two chapters, but what you will learn in this chapter and the next should be enough to help you understand the thousands of free scripts that are available on the Web and allow you to incorporate them into your web pages. You should even be able to customize these scripts and write some of your own based upon what you will learn in this and the following chapter. In addition, it will give you an idea of what programming is really about.

So this chapter is going to cover the basics of JavaScript; then in Chapter 12 you are going to see lots of examples that should both act as a library of helpful scripts that you can use in your own pages and also clarify how the basic concepts you learned in this chapter work in practice.

As you will see, JavaScript gives web developers a programming language for use in web pages and allows them to perform tasks such as the following:

- ❑ Read elements from documents and write new elements and text into documents
- ❑ Manipulate or move text
- ❑ Create pop-up windows
- ❑ Perform mathematical calculations on data
- ❑ React to events, such as a user’s rolling over an image or clicking a button

## Chapter 11: Learning JavaScript

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- Retrieve the current date and time from a user's computer or the last time a document was modified
- Determine the user's screen size, browser version, or screen resolution
- Perform actions based upon conditions such as alerting users if they enter the wrong information into a form or if they press a certain button

JavaScript was first introduced into the browser in Netscape 2.0, although it was known as LiveScript at the time. The idea behind it was to add interactive features to documents on the Web, which up to that point had been static. Back then you could only enter a URL or click a link and read the page and view the images. JavaScript allowed web-page authors to access and manipulate features and content of the document and the browsers used to view them.

**You should note that JavaScript is not the same as Java, which is a bigger programming language (although there are some similarities).**

You might need to read through this chapter more than once to get a good grasp of what you can do with JavaScript; then once you have seen the examples in the next chapter, you should have a better idea of its power. There is a lot to learn, but these two chapters should get you well on your way.

## What Is Programming About?

As you will see in this chapter, programming is largely about performing calculations upon data. Examples of the tasks you can perform include:

- Mathematical calculations on numbers such as addition, subtraction, multiplication, and division.
- Checking if a value matches another (whether a user enters some specific text or a number).
- Finding a subsection of text, such as the third and fourth letters of a word or the first or last words of a sentence.
- Checking how long a piece of text is, or where the first occurrence of the letter "t" is within a section of text.
- Checking whether two values are different, or whether one is longer or shorter than the other.
- Performing different actions based upon whether a condition (or one of several conditions) is met. For example, if a user enters a number less than 10, a program can perform one action; otherwise it will perform a different action.
- Repeating an action a certain number of times or until a condition is met (such as a user's pressing a button).

These actions might sound rather simple, but they can be combined so that they become quite complicated and powerful. Different sets of actions can be performed in different situations different numbers of times.

In order to mean anything, the programming language first requires an environment to work within. In this case, you will be looking at using JavaScript with web documents in the browser (technically, JavaScript may also reside in other applications or on a web server, but you will be focusing on its use in browsers). So the values used to perform calculations will largely come from the web documents that are loaded into the browser. For example, you might check whether a user has entered a password into a form field. If the user has not entered anything, you can ask him or her to provide a password before submitting the form to the server; otherwise you will submit the form as normal.

Since different programming languages often have to work with the same applications or the same kinds of documents, there are things called *Application Programming Interfaces*, or *APIs*, that are like a manual of what can be asked using the programming language, and how the reply will be formatted.

The API for web documents is known as the *DOM* or *document object model*. For example, the DOM defines what *properties* of a web document can be either retrieved or set and *methods* that can be performed. Properties are information about the document and its contents — for example, the value of the `height` attribute of any image, the `href` attribute of any link, or the length of a password entered into a text box in a form. Meanwhile, *methods* allow you to perform actions, such as the `reset()` or `submit()` methods on a form that allow you to reset or submit a form.

It's important to understand the distinction between properties and methods. Properties tell you about something (for example, the properties of a car might be its color or its engine size). Methods actually perform some action (so a method might be to accelerate or to change a gear).

Let's go back to the example of the DOM: If you want to create an image that changes when a mouse moves over it (known as a *rollover image*) you will want to create two images — one is the normal default state, and the second is used when the user rolls over the image. So the DOM can be used to access the `src` property of that image, and when the user rolls over the image the script is used to load the alternative image. You will then want it to change back to the original value when the user's mouse pointer is no longer over the image. To react to a user moving the mouse over an image like this, you also need to know about *events*.

So that people can interact with programs, a programming language needs to be able to respond to events, such as a user moving a mouse over an element, clicking a mouse button, pressing a key on his keyboard, or clicking the submit button on a form. When any of these actions occur, an event *fires*. When an event fires, it can be used to trigger a specific part of a script (such as the rollover script for an image, as discussed previously).

Another common example of a script that is triggered by an event is when a user submits a form. Often a script on the browser will check that a user has entered appropriate data into the form; if the values do not meet conditions set in the script, an error message warns the users that they have to enter appropriate data.

So the DOM specifies how JavaScript (and other programming languages) can be used to access information about a document. Then you can perform calculations and decisions based on the values retrieved from the document using JavaScript. Your scripts may even invoke methods and change some of the properties of the document. You may also use events to trigger certain scripts. Now that you know what a script can do, you need to learn how to add one to your web page.

## How to Add a Script to Your Pages

Rather like CSS rules, JavaScript can either be embedded in a page or placed in an external script file. But in order to work in the browser, the browser must support JavaScript *and* must have it enabled (most browsers allow you to disable JavaScript). Bearing in mind that a user might not have JavaScript enabled in the browser, you should use JavaScript only to enhance the experience of using your pages; you should not make it a requirement in order to use or view the page.

You add scripts to your page inside the `<script>` element. The `type` attribute on the opening `<script>` tag indicates what scripting language will be found inside the element. There are several other scripting languages (such as VBScript or Perl), but JavaScript is by far the most popular for use in a browser. Here you can see a very simple script that will write the words “My first JavaScript” into the page (`ch11_eg01.html`):

```
<html>
<body>
<p>
<script type="text/javascript">
    document.write("My first JavaScript")
</script>
</p>
</body>
</html>
```

JavaScript uses the `write()` method to write text into the document (remember that methods perform an action/calculation). The text is outputted where the script is written in the page. Figure 11-1 shows what this simple page would look like.

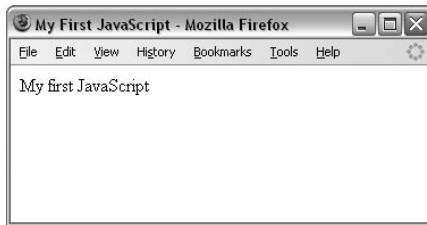


Figure 11-1

Where you put your JavaScript within a page is very important. If you put it in the body of a page — as in this example — then it will run (or execute) as the page loads. Sometimes, however, you will want a script to run only when an *event* triggers; an event can be something like a key being pressed or a submit button being clicked. This will usually result in something known as a *function* being called. Functions are put inside `<script>` elements that live in the `<head>` of a page to ensure that they load before the page is displayed and are therefore ready for use immediately when the page has loaded. A function also allows you to reuse the same script in different parts of the page.

You can also write JavaScript in external documents that have the file extension `.js`. This is a particularly good option if your script is used by more than one page — because you do not need to repeat the script in each page that uses it, and if you want to update your script you need only change it in one place. When you place your JavaScript in an external file, you need to use the `src` attribute on the `<script>` element; the value of the `src` attribute should be an absolute or relative URL pointing to the file containing the JavaScript. For example:

```
<script type="JavaScript" src="scripts/validation.js" />
```

So there are three places where you can put your JavaScripts — and a single XHTML document can use all three because there is no limit on the number of scripts one document can contain:

- ❑ **In the `<head>` of a page:** These scripts will be called when an event triggers them.
- ❑ **In the `<body>` section:** These scripts will run as the page loads.
- ❑ **In an external file:** If the link is placed inside the `<head>` element, the script is treated the same as when the script lives inside the head of the document waiting for an event to trigger it, whereas if it is placed in the `<body>` element it will act like a script in the body section and execute as the page loads.

Some early browsers did not support JavaScript; therefore, you will sometimes see JavaScript written inside an HTML or XHTML comment so that older browsers can ignore the script, which would otherwise cause errors, as shown here. Newer browsers will just ignore these comments in the `<script>` element:

```
<script type="text/javascript">
<!--
    document.write("My first JavaScript")
<!---
&lt;/script&gt;</pre>
```

Note how two forward slash characters (`//`) precede the closing characters of the XHTML comment. This is actually a JavaScript comment that prevents the JavaScript compiler from trying to process the `-->` characters.

In order to create well-formed XHTML, you have to be very careful about how you include scripts in your documents, because JavaScript contains characters (such as the angle brackets `<` and `>`) that should not be used outside of something known as a *CDATA section* in Strict XHTML. The CDATA section indicates to any program processing the document that this section of code does not contain markup (and therefore should not be processed as if it were markup). This effectively allows you to use characters that cannot otherwise appear in the document.

## Chapter 11: Learning JavaScript

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Unfortunately, including scripts inside the CDATA section — as you should with XHTML — can cause problems for early browsers that do not understand XML. However, it is possible to combine JavaScript comments with CDATA sections for backward compatibility, like so:

```
<script type="text/javascript">
//<![CDATA[
...
]]>
</script>
```

A good alternative to worrying about browsers that cannot support scripts is to use external scripts, because if the browser cannot process the `<script>` element, it will not even try to load the document containing the script.

## Comments in JavaScript

You can add comments to your JavaScript code in two ways. The first way, which you have already seen, allows you to comment out anything on that line after the comment marks. Here, anything on the same line after the two forward slash characters is treated as a comment:

```
<script type="text/javascript">
document.write("My first JavaScript") // comment goes here
</script>
```

You can also comment out multiple lines using the following syntax, holding the comment between an opening pair of characters `/*` and a closing pair of characters `*/` like so:

```
/* This whole section is commented
out so it is not treated as a part of
the script. */
```

This is similar to comments in CSS.

*As with all code, it's good practice to comment your code clearly, even if you are the only person likely to be using it, because what may have seemed clear when you wrote a script may not be so obvious when you come back to it later. Adding variable name descriptions and explanations of functions and their parameters are good examples of where comments make code easier to read.*

## The `<noscript>` Element

The `<noscript>` element offers alternative content for users whose browsers do not support JavaScript or have it disabled. It can contain any XHTML content that the author wants to be seen in the browser if the user does not have JavaScript enabled.

*Strictly speaking, the W3C's recommendations say only that the content of this element should be displayed when the browser does not support the scripting language required; however, the browser manufacturers have decided that it should also work when scripting is disabled. The only exception is Netscape 2, which would show the content even when scripting is supported — although so few people would still have this browser installed that you do not need to worry about it.*

### Try It Out      Creating an External JavaScript

You have already seen a basic example of a JavaScript that writes to a page. In this example, you will move that code to an external file. The external file is going to be used to write some text to the page.

1. Open your editor and type the following code:

```
document.write("Here is some text from an external file.");
```

2. Save this file as `external.js`.
3. Open a new page in your editor and add the following. Note how the `<script>` element is empty this time, but carries the `src` attribute whose value is the JavaScript file:

```
<html>
<body>
    <script src="external.js" type="text/JavaScript">
    </script>
    <noscript>This only shows if the browser has JavaScript turned off.
    </noscript>
</body>
</html>
```

4. Save this example as `ch11_eg02.html` and open it in your browser. You should see something like Figure 11-2.

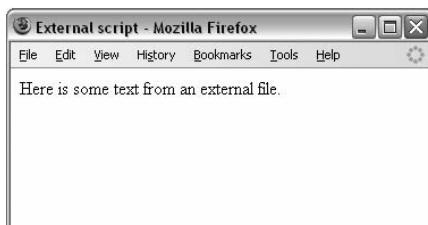


Figure 11-2

### How It Works

When the `<script>` element in an XHTML document carries an `src` attribute, the element is used to load an external JavaScript file. The `src` attribute indicates the source of the file — where it can be found. This may be a relative or full URL.

You can use this approach to include external JavaScripts in either the `<head>` or the `<body>` of a document. If you place them in the body of the document they are executed as the page loads — just as if the script were actually in the page there — as in this example. If you place them in the head, then they will be triggered by an event.

I tend to use external JavaScript files for most functions and place the `<script>` element in the head of the document. This allows me to re-use scripts on different sites I develop and ensures that the XHTML documents focus on content rather than being littered with scripts.

# The Document Object Model

As I mentioned at the start of the chapter, JavaScript by itself doesn't do much more than allow you to perform calculations or work with basic strings. In order to make a document more interactive, the script needs to be able to access the contents of the document and know when the user is interacting with it. It does this by interacting with the browser through using the properties and methods set out in an application programming interface called the document object model.

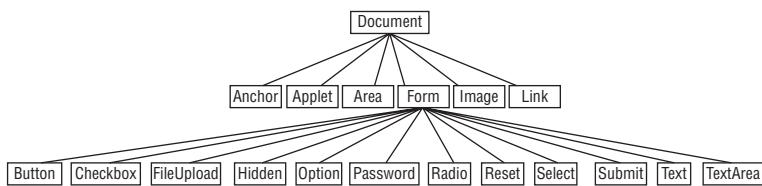
In this section, you will be focusing on three objects in the document object model: the document object, the forms collection (and its children), and the images object. You meet other objects nearer the end of this chapter.

## ***Introducing the Document Object Model***

The *document object model* explains what *properties* of a document a script can retrieve and which ones it can alter; it also defines some *methods* that can be called to perform an action on the document. As you will see in this chapter, the properties of a document often correspond with attributes that are carried by XHTML elements in the document, while methods perform a range of tasks.

For example, the document object model specifies how you can retrieve values users have entered into a form. Once you have retrieved these values, you can use JavaScript to ensure the user has entered an appropriate value for that form control. JavaScript is the programming language doing the calculations — in this case checking the values a user has entered — and the document object model (DOM) explains how to access the document.

Figure 11-3 shows you an illustration of the Level 0 HTML Document Object Model (as you will see shortly, there are different levels of the DOM). You should note the resemblance in structure to a family tree.



**Figure 11-3**

*Note that the DOM is not part of JavaScript; it just explains how all programming languages should be able to access the properties of documents. Other languages can access the properties of the document in the same way. How a browser (or other application) implements the DOM is also open — for example, Firefox and Internet Explorer will use different code to retrieve or set properties, and to perform methods, although the effect of both should be the same.*

Figure 11-3 shows you how the elements of a page are made available in scripts as *scriptable objects*. The Document Object represents the whole document, and then each of the child objects represents a *collection* of similar tags within that document:

- ❑ The *forms* collection contains all the `<form>` tags in the document.
- ❑ The *image* collection represents all the images in a document.

- ❑ The *link* collection represents all the hyperlinks within a page.
- ❑ The *anchor* collection represents all the anchors in a document (*<a>* elements with a *name* or *id* attribute rather than an *href* attribute).
- ❑ The *area* collection represents all the image maps that use an *<area>* element in the document.
- ❑ The *applet* collection represents all the applets within a document.

The forms collection also has child objects to represent each of the different types of form controls that can appear on a form: Button, CheckBox, FileUpload, Hidden, Option, Password, Radio, Reset, Select, Submit, Text, and TextArea.

To better understand how to access the document using the DOM, take a look at the following simple document, which contains one form and two links:

```
<h1>User Registration</h1>
<form name="frmLogin" action="login.aspx" method="post">
    Username <input type="text" name="txtUsername" size="12" /> <br />
    Password <input type="password" name="pwdPassword" size="12" /> <br />
    <input type="submit" value="Log In" />
</form>
<p>If you are a new user <a href="register.aspx">Register here</a> |<br/>
   If you have lost your password you can <a href="lostPassword.aspx">retrieve<br/>
   your password here</a>.</p>
```

The DOM would therefore make the content of the form available for use in the script as part of the forms collection and the links as part of the links collection.

*The pages referred to in the action attribute of the forms are just hypothetical pages; they are not in the code download. The XHTML page with the JavaScript you are about to look at exists independently from the pages with the .aspx extensions that would live on the server.*

There are two ways to access values from this document — both involve indicating the part of the document you are interested in by using a *dot notation*. This involves using a period or full-stop character between each object in the object model, and the best way to explain this is with an example.

In order to access the first link in the document, you could use something like this:

```
document.links[0].href
```

There are four parts of this statement, three of which are separated by periods, to get to the first link:

- ❑ The word *document* indicates I am accessing the *document* object.
- ❑ The word *links* corresponds to the *links* collection (after all, this example is to retrieve the value of the first link in the document).
- ❑ The *[0]* indicates that I want the first link in the document. Rather confusingly, the items of a collection are numbered from 0 rather than 1, which means the second link in the *links* collection is represented using *[1]*, the third using *[2]*, and so on.
- ❑ I have indicated that I want to retrieve the *href* property for this link.

## Chapter 11: Learning JavaScript

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Each object has different properties that correspond to that type of element; for example, links have properties, such as the `href` property that accesses the value of the `href` attribute on this `<a>` element. Similarly, a `<textarea>` object has properties such as `cols`, `disabled`, `readOnly`, and `rows`, which correspond to the attributes on that element.

An alternative approach is to use the names of elements to navigate a document. For example, the following line requests the value of the password box:

```
document.frmLogin.pwdPassword.value
```

Again there are four parts to this statement:

- ❑ The document comes first again as it is the top-level object.
- ❑ The name of the form, `frmLogin`.
- ❑ This is followed by the name of the form control, `pwdPassword`.
- ❑ Finally the property I am interested in is the value of the password box, and this property is called `value`

Both of these approaches enable you to navigate through a document, choosing the elements and properties of those elements you are interested in. Then you can retrieve those values, perform calculations upon them, and provide alternative values.

There is also a second type of object model, the *Browser Object Model*, which makes features of the browser available to the programmer, such as the `window` object that can be used to create new pop-up windows. You learn about the `window` object later in the chapter.

*For the purpose of learning JavaScript, we are dealing with what is often called DOM Level 0 in this chapter because it works in most browsers. Its syntax was created before the W3C created its DOM Level 1, 2, and 3 recommendations (which get more complicated and have varying levels of support in different browsers). Once you are familiar with the basics, you can move on to look at these in more detail if you wish.*

## Objects, Methods, and Properties

As you saw in Figure 11-3, an object model (such as the `document` object model) is made up of several objects that represent different parts of the document. Each object can have *properties* and *methods*:

- ❑ A property tells you something about an object.
- ❑ A method performs an action.

Once you understand how to work with one object, it's much easier to work with all kinds of objects — and you will come across many different types of object when you start programming. The following sections cover some of the properties and methods for the `document` object.

## Properties of the Document Object

In the following table, you can see the properties of the document object. Several of these properties correspond to attributes that would be carried by the `<body>` element, which contains the document.

Many properties you can set as well as read. If you can set a property, it is known as a read/write property (because you can read it or write to it), whereas the ones you can only read are known as read-only. You can see which properties can be read and which can be written to in the last column of the table that follows.

Property Name	Purpose	Read/Write
<code>alinkColor</code>	Specifies link colors. (Like the deprecated <code>alink</code> attribute on the <code>&lt;body&gt;</code> element.)	Read/write
<code>bgcolor</code>	Specifies background color. (Like the deprecated <code>bgcolor</code> attribute on the <code>&lt;body&gt;</code> element.)	Read/write
<code>fgcolor</code>	Foreground/text color. (Like the deprecated <code>text</code> attribute of the <code>&lt;body&gt;</code> element.)	Read/write
<code>lastModified</code>	The date the document was last modified. (This is usually sent by the web server in things known as HTTP headers that you do not see.)	Read only
<code>linkColor</code>	Specifies link colors. (Like the deprecated <code>link</code> attribute of the <code>&lt;body&gt;</code> element.)	Read/write
<code>referrer</code>	The URL of the XHTML page that users came from if they clicked a link. Empty if there is no referrer.	Read only
<code>title</code>	The <code>title</code> of the page in the <code>&lt;title&gt;</code> element.	Read only (until IE 5 and Netscape 6 and later versions)
<code>vlinkColor</code>	The <code>vlink</code> attribute of the <code>&lt;body&gt;</code> element (deprecated).	Read/write

*The deprecated properties have been dropped in favor of using CSS to style text, links, and backgrounds.*

For example, you can access the title of a document like so:

```
document.title
```

# Chapter 11: Learning JavaScript

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Or you could find out the date a document was last modified like so:

```
document.lastModified
```

Note that if the server does not support the `lastModified` property, IE will display the current date, while other browsers will often display 1 January 1970 (which is the date from which most computers calculate all dates).

## Methods of the Document Object

Methods perform actions and are always written followed by a pair of brackets. Inside the brackets of some methods you can sometimes see things known as *parameters* or *arguments*, which can affect what action the method takes.

For example, in the table that follows, you can see two methods that take a string as an argument; both of these will write the string into the page. (A *string* is a sequence of characters that may include letters, numbers, spaces and punctuation.)

Method Name	Purpose
<code>write(string)</code>	Allows you to add text or elements into a document
<code>writeln(string)</code>	The same as <code>write()</code> but adds a new line at the end of the output (as if you had pressed the Enter key after you had finished what you were writing).

You have already seen the `write()` method of the `document` object in `ch11_eg01.html`, which showed how it can be used to write content into a document:

```
document.write('This is a document');
```

The `write()` method can take a string as a parameter. In this case, the string is the words This is a document.

You can also put something called an *expression* as a parameter of the `write()` method. For example, the following will write the text string Page last modified on followed by the last modified date of the document.

```
document.write('Page last modified on ' + document.lastModified);
```

You will see more about expressions later in the chapter, but in this case, the expression *evaluates* into (or results in) a string. For example, you might see something like Page last modified on 12th December 2007.

Now that you've seen the properties and methods of the `document` object, it helps to look at the properties and methods of some of the other objects, too.

## The Forms Collection

The forms collection holds references corresponding to each of the `<form>` elements in the page. This might sound a little complicated, but you can probably imagine a web page that has more than one form — a login form, a registration form for new users, and a search box on the same box. In this case you need to be able to distinguish between the different forms on the page.

So if the login form is the first form in the document and you want to access the `action` property of the login form (which would be on the `<form>` element in the XHTML document), you might use the following index number to select the appropriate form and access its properties and methods (remember that index numbers start at 0 for the first form, 1 for the second form, 2 for the third, and so on):

```
document.forms[0].action
```

Alternatively, you can directly access that form object using its name:

```
document.frmLogin.action
```

The form that you select has its own object with properties (mainly corresponding to the attributes of the `<form>` element) and methods. Once you have seen the properties and methods of the forms, you will then see the objects, properties, and methods that correspond to the different types of form control.

## Properties of the Form Objects

The following table lists the properties of the form objects.

Property Name	Purpose	Read/Write
<code>action</code>	The <code>action</code> attribute of the <code>&lt;form&gt;</code> element	Read/write
<code>length</code>	Gives the number of form controls in the form	Read only
<code>method</code>	The <code>method</code> attribute of the <code>&lt;form&gt;</code> element	Read/write
<code>name</code>	The <code>name</code> attribute of the <code>&lt;form&gt;</code> element	Read only
<code>target</code>	The <code>target</code> attribute of the <code>&lt;form&gt;</code> element	Read/write

## Methods of the Form Objects

The following table lists the methods of the form objects.

Method Name	Purpose
<code>reset()</code>	Resets all form elements to their default values
<code>submit()</code>	Submits the form

# Chapter 11: Learning JavaScript

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You learn about events and event handlers later in the chapter, but you should note that if you use the `submit()` method of a form object, any `onsubmit` event handler that is on the `<form>` element is ignored.

## Form Elements

When you access a form, you usually want to access one or more of its elements. Each `<form>` element has an `elements[]` collection object as a property, which represents all of the elements in that form. This works in a similar way to the `forms[]` collection; it allows you to access the elements you want by index (an index being a number corresponding to their order in the document beginning with 0). Alternatively, you can use their names.

Here are some of the things you might want to do with the elements in a form:

- ❑ **Text fields:** Read data a user has entered or write new text to these elements.
- ❑ **Checkboxes and radio buttons:** Test if they are checked and check or uncheck them.
- ❑ **Buttons:** Disable them until a user has selected an option.
- ❑ **Select boxes:** Select an option or see which option the user has selected.

## Properties of Form Elements

The following table lists the properties of form elements.

Property	Applies to	Purpose	Read/Write
<code>checked</code>	Checkboxes and radio buttons	Returns <code>true</code> when checked or <code>false</code> when not	Read/write
<code>disabled</code>	All except hidden elements	Returns <code>true</code> when disabled and user cannot interact with it (supported in IE4 and Netscape 6 and later versions only)	Read/write
<code>form</code>	All elements	Returns a reference to the form it is part of	Read only
<code>length</code>	Select boxes	Number of options in the <code>&lt;select&gt;</code> element	Read only
<code>name</code>	All elements	Accesses the name attribute of the element	Read only
<code>selectedIndex</code>	Select boxes	Returns the index number of the currently selected item	Read/write
<code>type</code>	All	Returns type of form control	Read only
<code>value</code>	All	Accesses the value attribute of the element or content of a text input	Read/write

If you want one of the form controls to be disabled until someone has performed an action — for example, if you want to disable the Submit button until the user has agreed to the terms and conditions — you should disable the form control in the script as the page loads, rather than disabling it in the form control itself using XHTML; you will see more about this topic in Chapter 12.

## Methods of Form Elements

The following table lists the methods of form elements.

Property Name	Applies to	Read/Write
blur()	All except hidden	Takes focus away from currently active element to next in tabbing order
click()	All except text	Simulates the user's clicking the mouse over the element
focus()	All except hidden	Gives focus to the element
select()	Text elements except hidden	Selects the text in the element

### Try It Out

### Collecting Form Data

In this example, you are going to retrieve the value of a text box and write it into something known as a JavaScript alert box. The main purpose of the example is to show you how the value of the form can be retrieved, although it will also introduce you to an event and the JavaScript alert box.

The simple form will contain just one text input and a submit button. When you enter something into the text box and click the submit button, the value you have entered in the text box will appear in the alert box. You can see the page once the user has clicked the submit button in Figure 11-4.

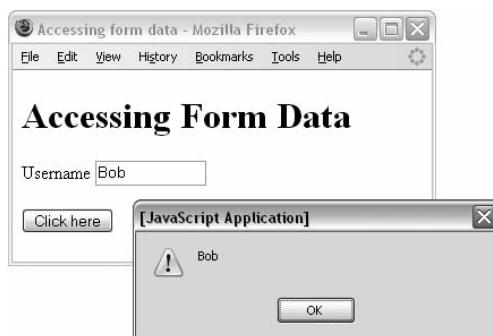


Figure 11-4

When you click OK, the alert box disappears.

## Chapter 11: Learning JavaScript

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1. Create a skeleton document for a Transitional XHTML page, and add a heading that explains what the example demonstrates:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
    <title>Accessing form data</title>
</head>
<body>
    <h1>Accessing Form Data</h1>
</body>
</html>
```

2. Add a `<form>` element to the body of the document. The form should contain a text input for a username and a submit button, like so:

```
<body>
<form name="frmLogin">
    Username <input type="text" name="txtUsername" size="12" /> <br />
    <input type="submit" value="Click here" />
</form>
</body>
```

3. Add the `onsubmit` attribute to the `<form>` element, and give it the following value:

```
<form name="frmLogin" onsubmit="alert(document.frmLogin.txtUsername.value)">
    Username <input type="text" name="txtUsername" size="12" /> <br />
    <input type="submit" value="Click here" />
</form>
```

Save the file as `ch11_eg3.html`, and open it in your browser. When you enter something into the text input and click Submit, you should see an alert box like that in Figure 11-4, which displays the value you entered into the text box.

### How It Works

The line that creates the alert box and makes sure it displays what you entered into the text box is the value of the `onsubmit` event handler attribute:

```
<form name="frmLogin" onsubmit="alert(document.frmLogin.txtUsername.value)">
```

When the `onsubmit` event fires (which happens when the user clicks the Submit button), this simple line of script is run. In this case the `alert()` method is called:

```
alert(document.frmLogin.txtUsername.value)
```

The `alert(string)` method allows you to write a string into the text box. Like the `write()` method of the document object, which you saw earlier, the string does not need to be the actual text you want to display. In the case of this example, rather than writing the same string to the alert box every time the script is run, whatever the user has entered into the text box will be written to the alert box.

You can see that inside the `alert()`, the text input has been selected along with its `value` property. So the value of the text input is written to the alert box. (You might also notice that you do not use the double quotes in this example, which you had to do when writing a string into the page in the first example.)

When the user clicks the Submit button the `onsubmit` event fires, which creates the alert box that contains the value of the text input.

---

## Images Collection

The images collection provides references to image objects, one representing each image in a document. These can again be referenced by name or by their index number in the collection. So the `src` attribute of the first image could be found using the following:

```
document.images[0].src
```

Or the image object corresponding to an image can be accessed directly, using its name. For example, if the image had a `name` attribute whose value was `imgHome`, you could access it using the following:

```
document.imgHome.src
```

The main property you are likely to want to change is the `src` property, especially when creating rollover images.

There are no methods for the image objects, although there are several properties. These properties are supported only in Netscape 3+ and IE4+.

## Properties of the Image Object

The following table lists the properties of the image object.

Property	Purpose	Read/write
<code>border</code>	The <code>border</code> attribute of the <code>&lt;img&gt;</code> element	Read/write
<code>complete</code>	Indicates whether an image has loaded successfully	Read only
<code>height</code>	The <code>height</code> attribute of the <code>&lt;img&gt;</code> element	Read/write
<code>hspace</code>	The <code>hspace</code> attribute of the <code>&lt;img&gt;</code> element	Read/write
<code>lowsrc</code>	The <code>lowsrc</code> attribute of the <code>&lt;img&gt;</code> element (indicating a lower resolution version of the image)	Read/write
<code>name</code>	The <code>name</code> attribute of the <code>&lt;img&gt;</code> element	Read/write
<code>src</code>	The <code>src</code> attribute of the <code>&lt;img&gt;</code> element	Read/write

*Continued*

Property	Purpose	Read/write
vspace	The vspace attribute of the <img> element	Read/write
width	The width attribute of the <img> element	Read/write

## Try It Out A Simple Image Rollover

In this example, you are going to see how to replace one image with another one when the user rolls over the image with the mouse. These kinds of images are commonly used in navigation items to indicate that a user can click on them.

While they require that two images be loaded rather than just one in order for the rollover to work, they can be quite effective, and if you are careful with your choice of images (making sure that the image files are not too large), then the extra overhead of loading another image for each rollover will not be a problem.

In this example, you are going to see two simple images, both saying “click here.” When the page loads, the image will be in green with white writing, but as soon as the user hovers over the image with his mouse it will turn red with white writing.

1. Create the skeleton of a Transitional XHTML document:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
<title>Image Rollover</title>
</head>
<body>
</body>
</html>
```

2. Add the following link and image to the body of your document:

```
<p>Hover over the image with your mouse to see the simple rollover effect.
<br/>
<a href="">
  
</a>
</p>
```

3. Now add the following onmouseover and onmouseout event handler attributes to the <a> element with the specified values:

```
<a href=""
  onmouseover="document.images.button.src='images/click_red.gif';"
  onmouseout="document.images.button.src='images/click_green.gif'">
```

4. Save this example as `ch11_eg4.html` and open it in your browser. Then roll your mouse over the image (without clicking it). You should see something like Figure 11-5 with the mouse over the image.



Figure 11-5

### How It Works

When the user rolls over the image, the `onmouseover` event fires, and when the user moves off it again the `onmouseout` event fires. This is why there are separate attributes that correspond to each of these events, and when one of these two events fires, the script held as a value for the corresponding attribute is executed.

The script in the `onmouseover` and `onmouseout` event handler attributes tells the browser to change the `src` attribute of the image, and therefore a different image is displayed to the user.

The first (`onmouseover`) indicates what should happen when the mouse is placed over the image; the second (`onmouseout`) indicates what should be done when the mouse is moved off the image.

You can see in the code for `ch11_eg04.html` that when the user puts the mouse over an image, the `src` property of the image inside the link — named using the notation `document.images.link` — is changed.

```
<a href="">
    
    </a>
```

The `<img />` element must have a `name` attribute so that the image can be referenced in this way in the link (otherwise you would have to use its index in the `images` collection). It is generally best to use the name in situations like this, rather than the index of that image in the `images` collection, because if you were to add another image into the document before this one the whole script would need changing.

Note that if no event indicated what should happen when the user takes the mouse off the image, it would remain red rather than turning back to green. An image rollover script is a good example of changing or *setting* that property rather than just reading it.

You learn about a more complex version of the image rollover in Chapter 12, which shows you how to create a function that can change several images within the same document; this is particularly helpful if you are using rollovers in a navigation bar.

### Different Types of Objects

You will come across several types of objects in JavaScript, each of which is responsible for a related set of functionalities. For example, the document object has methods and properties that relate to the document; the forms collection, which is part of the document object, deals with information regarding forms; and so on. As you are about to see, there can be lots of different objects, each of which deals with a different set of functionalities and properties.

So, here are some of the types of objects you are likely to come across:

- ❑ **W3C DOM objects:** These are like those covered already in this chapter, although in more recent browsers there are several more objects that are made available to allow you more control over a document. There are also additional objects in each different level of the DOM released by the W3C.
- ❑ **Built-in objects:** Several objects are part of the JavaScript language itself. These include the date object, which deals with dates and times, and the math object, which provides mathematical functions. You will be learning more about these built-in objects later in the chapter.
- ❑ **Custom objects:** If you start to write advanced JavaScript you might even start creating your own JavaScript objects that contain related functionality; for example, you might have a validation object that you have written just to use to validate your forms.

While it is not possible to cover the creation of custom objects in this chapter, you learn about the built-in objects later in this chapter.

### Starting to Program with JavaScript

Having learned about the DOM, you can see how it allows you to access a document in a web browser. However, it is JavaScript that introduces real programming concepts. You know that the DOM allows you to retrieve and set properties, and that methods can be used to evoke actions such as writing new content to a page. Now it is time to look at how you use these values and properties in scripts to create more powerful documents.

As I mentioned earlier, a programming language mainly performs calculations. So here are the key concepts you need to learn about in order to perform different types of calculations:

- ❑ A *variable* is used to store some information; it's like a little bit of memory where you can store numbers, strings (which are a series of characters), or references to objects. You can then perform calculations to alter the data held in variables within your code.
- ❑ *Operators* allow you to do things to variables or references to. There are different types of operators. For example:
  - ❑ Arithmetic operators enable you to do things such as add (+) numbers together, or subtract (-) one from another (providing they are numbers).
  - ❑ Comparison operators enable you to compare two strings and see if one is the same as the other, or different (for example, whether *x* is equal to *y*).
- ❑ *Functions* are related bits of code containing rules that you create to perform an operation. For example, you could have a function that calculates loan repayments when you pass it variables

indicating an amount of money to be borrowed, the number of years the loan will last, and the interest rate the loan should be paid back at. (Functions are very similar to things called methods, except in JavaScript, methods belong to objects, whereas functions are written by the programmer.)

*Conditional statements* allow you to specify a condition using variables and operators. For example, a condition might be whether a variable called `varTimeNow` (which contains the current time) has a value greater than 12. If the condition is met and the current time has a value greater than 12, then something can happen based upon this condition — perhaps the document says “Good afternoon.” Otherwise, if it is earlier than noon the document might say “Good morning.”

- ❑ *Loops* can be set up so that a block of code runs a specified number of times or until a condition is met. For example, you can use a loop to get a document to write your name 100 times.
- ❑ There are also several built in JavaScript objects that have methods that are of practical use. For example, in the same way that the `document` object of the DOM has methods that allowed you to write to the document, the built-in JavaScript date object can tell you the date, time, or day of the week.

The following section looks at these key concepts in more detail.

## Variables

Variables are used to store data. To store information in a variable, you can give the variable a name and put an equal sign between it and the value you want it to have. For example, here is a variable that contains a username:

```
userName = "Bob Stewart"
```

The variable is called `userName` and the value is `Bob Stewart`. If no value is given, then its value is *undefined*. (Note that when you are writing out the value of the variable in the code, the value is given in quotation marks.)

When you first use a variable, you are creating it. The process of creating a variable is referred to as *declaring* the variable. You can declare a variable with the `var` statement, like so:

```
var userName = "Bob Stewart"
```

*I should note here that you need to use the var keyword only if you are creating a variable inside a function that has the same name as a global variable — although to understand this point you need to understand functions and global and local variables, which are covered later.*

A variable’s value can be recalled or changed by the script, and when you want to do either of these you use its name.

There are a few rules you must remember about variables in JavaScript:

- ❑ Variable names are case-sensitive.
- ❑ They must begin with a letter or the underscore character.

## Chapter 11: Learning JavaScript

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- ❑ Avoid giving two variables the same name within the same document as one might override the value of the other, creating an error.
- ❑ Try to use descriptive names for your variables. This makes your code easier to understand (and will help you debug your code if there is a problem with it).

## Assigning a Value to a Variable

When you want to give a value to a variable, you put the variable name first, then an equal sign, and then on the right the value you want to assign to the variable. You have already seen values being assigned to these variables when they were declared a moment ago. So, here is an example of a variable being assigned a value and then the value being changed:

```
var userName = "Bob Stewart"  
userName = "Robert Stewart"
```

userName is now the equivalent of Robert Stewart.

## Lifetime of a Variable

When you declare a variable in a function it can be accessed only in that function. (As promised, you will learn about functions shortly.) After the function has run, you cannot call the variable again. Variables in functions are called *local variables*.

Because a local variable works only within a function, you can have different functions that contain variables of the same name (each is recognized by that function only).

If you declare a variable outside a function, all the functions on your page can access it. The lifetime of these variables starts when they are declared and ends when the page is closed.

Local variables take up less memory and resources than page-level variables because they require only the memory during the time that the function runs, rather than having to be created and remembered for the life of the whole page.

## Operators

The operator itself is a keyword or symbol that does something to a value when used in an *expression*. For example, the arithmetic operator + adds two values together.

The symbol is used in an expression with either one or two values and performs a calculation on the values to generate a result. For example, here is an expression that uses the x operator:

```
area = (width x height)
```

An expression is just like a mathematical expression. The values are known as *operands*. Operators that require only one operand (or value) are sometimes referred to as *unary operators*, while those that require two values are sometimes called *binary operators*.

The different types of operators you will see in this section are:

- Arithmetic operators
- Assignment operators
- Comparison operators
- Logical operators
- String operators

You will see lots of examples of the operators in action both later in this chapter and in the next chapter. First, however, it's time to learn about each type of operator.

## Arithmetic Operators

Arithmetic operators perform arithmetic operations upon operands. (Note that in the examples in the following table,  $x = 10$ .)

Symbol	Description	Example ( $x = 10$ )	Result
+	Addition	$x+5$	15
-	Subtraction	$x-2$	8
*	Multiplication	$x*3$	30
/	Division	$x/2$	15
%	Modulus (division remainder)	$x \% 3$	1
++	Increment (increments the variable by 1 — this technique is often used in counters)	$x++$	11
--	Decrement (decreases the variable by 1)	$x--$	9

## Assignment Operators

The basic assignment operator is the equal sign, but do not take this to mean that it checks whether two values are equal. Rather, it's used to assign a value to the variable on the left of the equal sign, as you have seen in the previous section that introduced variables.

The assignment operator can be combined with several other operators to allow you to assign a value to a variable *and* perform an operation in one step. For example, with the arithmetic operators, the assignment operators can be used to create shorthand versions of operators, as in the following statement:

```
total = total - profit
```

## Chapter 11: Learning JavaScript

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This can be reduced to the following statement:

```
total -= profit
```

While it might not look like much, this kind of shorthand can save a lot of code if you have a lot of calculations such as this (see table below) to perform.

Symbol	Example Using Shorthand	Equivalent Without Shorthand
<code>+=</code>	<code>x+=y</code>	<code>x=x+y</code>
<code>-=</code>	<code>x-=y</code>	<code>x=x-y</code>
<code>*=</code>	<code>x*=y</code>	<code>x=x*y</code>
<code>/=</code>	<code>x/=y</code>	<code>x=x/y</code>
<code>%=</code>	<code>x%=y</code>	<code>x=x%y</code>

## Comparison Operators

As you can see in the table that follows, comparison operators compare two operands and then return either `true` or `false` based on whether the comparison is true or not.

Note that the comparison for checking whether two operands are equal is two equal signs (a single equal sign would be an assignment operator).

Operator	Description	Example
<code>==</code>	Equal to	<code>1==2</code> returns <code>false</code> <code>3==3</code> returns <code>true</code>
<code>!=</code>	Not equal to	<code>1!=2</code> returns <code>true</code> <code>3!=3</code> returns <code>false</code>
<code>&gt;</code>	Greater than	<code>1&gt;2</code> returns <code>false</code> <code>3&gt;3</code> returns <code>false</code> <code>3&gt;2</code> returns <code>true</code>
<code>&lt;</code>	Less than	<code>1&lt;2</code> returns <code>true</code> <code>3&lt;3</code> returns <code>false</code> <code>3&lt;1</code> returns <code>false</code>
<code>&gt;=</code>	Greater than or equal to	<code>1&gt;=2</code> returns <code>false</code> <code>3&gt;=2</code> returns <code>true</code> <code>3&gt;=3</code> returns <code>true</code>
<code>&lt;=</code>	Less than or equal to	<code>1&lt;=2</code> returns <code>true</code> <code>3&lt;=3</code> returns <code>true</code> <code>3&lt;=4</code> returns <code>false</code>

## Logical or Boolean Operators

Logical or Boolean operators return one of two values: `true` or `false`. They are particularly helpful because they allow you to evaluate more than one expression at a time.

Operator	Name	Description	Example (where x=1 and y=2)
<code>&amp;&amp;</code>	And	Allows you to check if both of two conditions are met	<code>(x &lt; 2 &amp;&amp; y &gt; 1)</code> Returns <code>true</code> (because both conditions are met)
<code>??</code>	Or	Allows you to check if one of two conditions are met	<code>(x &lt; 2 ??y &lt; 2)</code> Returns <code>true</code> (because the first condition is met)
<code>!</code>	Not	Allows you to check if something is not the case	<code>!(x &gt; y)</code> Returns <code>true</code> (because <code>x</code> is not more than <code>y</code> )

The two operands in a logical or Boolean operator evaluate to either `true` or `false`. For example, if `x=1` and `y=2`, then `x<2` is `true` and `y>1` is `true`. So the following expression:

`(x<2 && y>1)`

returns `true` because both of the operands evaluate to `true`.

## String Operator

You can also add text to strings using the `+` operator. For example, here the `+` operator is being used to add two variables that are strings together:

```
firstName = "Bob"
lastName = "Stewart"
name = firstName + lastName
```

The value of the `name` variable would now be `Bob Stewart`. The process of adding two strings together is known as *concatenation*.

You can also compare strings using the comparison operators you just met. For example, you could check whether a user has entered a specific value into a text box. (You will see more about this topic when you look at conditional statements shortly.)

## Functions

At last we come to the function, which has been mentioned several times already. A function is some code that is executed when an event fires or a call to that function is made, and typically a function contains several lines of code. Functions are either written in the `<head>` element and can be reused in several places within the page, or in an external file that is linked from inside the `<head>` element.

### How to Define a Function

There are three parts to creating or defining a function:

- ❑ Define a name for it.
- ❑ Indicate any values that might be required as arguments.
- ❑ Add statements.

For example, if you want to create a function to calculate the area of a rectangle, you might name the function `calculateArea()` (remembering a function name should be followed by parentheses). Then in order to calculate the area, you need to know the rectangle's width and height, so these would be passed in as *arguments* (arguments are the information the function needs to do its job). Inside the function between the curly braces are the *statements*, which indicate that area is equal to the width multiplied by the height (both of which have been passed into the function). The area is then returned.

```
function calculateArea(width, height) {  
    area = width * height  
    return area  
}
```

If a function has no arguments it should still have parentheses after its name; for example, `logOut()`.

### How to Call a Function

The `calculateArea()` function does nothing sitting on its own in the head of a document; it has to be called. In this example, you can call the function from a simple form using the `onclick` event, so that when the user clicks the Submit button the area will be calculated.

Here you can see that the form contains two text inputs for the width and height, and these are passed as arguments to the function like so (`ch11_eg05.html`):

```
<form name="frmArea" action="">  
Enter the width and height of your rectangle to calculate the size:<br />  
Width: <input type="text" name="txtWidth" size="5" /><br />  
Height: <input type="text" name="txtHeight" size="5" /><br />  
<input type="button" value="Calculate area"  
      onclick="alert(calculateArea(document.frmArea.txtWidth.value,  
                                document.frmArea.txtHeight.value))" />  
</form>
```

Take a closer look at what is happening when the `onclick` event fires. First a JavaScript alert is being called, and then the `calculateArea()` function is being called inside the alert, so that the area is the value that is written to the alert box. Inside the parentheses where the `calculateArea()` function is being called, the two parameters being passed are the values of the width text box and the height text box using the dot notation you learned early in the section on the DOM.

Note that if your function has no arguments you still need to use the parentheses at the end of the function name when you call it; for example, you might have a function that will run without any extra information passed as an argument:

```
<input type="submit" onClick="exampleFunction()" />
```

## The Return Statement

Functions that return a result must use the `return` statement. This statement specifies the value that will be returned to where the function was called. The `calculateArea()` function, for example, returned the area of the rectangle:

```
function calculateArea(width, height) {  
    area = width * height  
    return area  
}
```

Some functions simply return `true` or `false` values. When you look at events later in the chapter, you will see how a function that returns `false` can stop an action from occurring. For example, if the function associated with an `onsubmit` event on a form returns `false`, the form is not submitted to the server.

## Conditional Statements

Conditional statements allow you to take different actions depending upon different statements. There are three types of conditional statement you will learn about here:

- ❑ `if` statements, which are used when you want the script to execute if a condition is true
- ❑ `if...else` statements, which are used when you want to execute one set of code if a condition is true and another if it is false
- ❑ `switch` statements, which are used when you want to select one block of code from many depending on a situation

### **if Statements**

`if` statements allow code to be executed when the condition specified is true; if the condition is true then the code in the curly braces is executed. Here is the syntax for an `if` statement:

```
if (condition)  
{  
    code to be executed if condition is true  
}
```

For example, you might want to start your home page with the text “Good Morning” if the time is in the morning. You could achieve this using the following script (`ch11_eg06.html`):

```
<script type="text/JavaScript">  
date = new Date();  
time = date.getHours();  
if (time < 12) {  
    document.write('Good Morning');  
}  
</script>
```

## Chapter 11: Learning JavaScript

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If you are executing only one statement (as we are here), the curly braces are not strictly required, so the following would do exactly the same job (although it is good practice to include them anyway as we did previously).

```
<script type="text/JavaScript">
    date = new Date();
    time = date.getHours();
    if (time < 12)
        document.write('Good Morning');
</script>
```

This example first creates a date object (which you learn about later in the chapter) and then calls the `getHours()` method of the date object to find the time in hours (using the 24-hour clock). If the time in hours is less than 12, then the script writes Good Morning to the page (if it is after 12 you will see a blank page because nothing is written to it).

### ***if . . . else Statements***

When you have two possible situations and you want to react differently for each, you can use an `if...else` statement. This means: "If the conditions specified are met, run the first block of code; otherwise run the second block." The syntax is as follows:

```
if (condition)
{
    code to be executed if condition is true
}
else
{
    code to be executed if condition is false
}
```

Returning to the previous example, you can write Good Morning if the time is before noon, and Good Afternoon if it is after noon (`ch11_eg07.html`).

```
<script type="text/JavaScript">
    date = new Date();
    time = date.getHours();
    if (time < 12) {
        document.write('Good Morning');
    }
    else {
        document.write('Good Afternoon');
    }
</script>
```

As you can imagine there are a lot of possibilities for using conditional statements. Indeed, you will see examples in Chapter 12 that include several such statements to create some very powerful and complex examples.

## A switch Statement

A switch statement allows you to deal with several results of a condition. You have a single expression, which is usually a variable. This is evaluated immediately. The value of the expression is then compared with the values for each case in the structure. If there is a match, the block of code will execute.

Here is the syntax for a switch statement:

```
switch (expression)
{
    case option1:
        code to be executed if expression is what is written in option1
        break;
    case option2:
        code to be executed if expression is what is written in option2
        break;
    case option3:
        code to be executed if expression is what is written in option3
        break;
    default:
        code to be executed if expression is different from option1, option2,
        and option3
}
```

You use the `break` to prevent code from running into the next case automatically. For example, you might be checking what type of animal a user has entered into a text box, and you want to write out different things to the screen depending upon what kind of animal is in the text input. Here is a form that appears on the page. When the user has entered an animal and clicks the button, the `checkAnimal()` function contained in the head of the document is called (`ch11_eg08.html`):

```
<p>Enter the name of your favorite type of animal that stars in a cartoon:</p>
<form name="frmAnimal">
    <input type="text" name="txtAnimal" /><br />
    <input type="button" value="Check animal" onclick="checkAnimal()" />
</form>
```

Here is the function that contains the `switch` statement:

```
function checkAnimal() {
    switch (document.frmAnimal.txtAnimal.value){
        case "rabbit":
            alert("Watch out, it's Elmer Fudd!")
            break;
        case "coyote":
            alert("No match for the road runner - meep meep!")
            break;
        case "mouse":
            alert("Watch out Jerry, here comes Tom!")
            break;
        default : alert("Are you sure you picked an animal from a cartoon?");
    }
}
```

## Chapter 11: Learning JavaScript

---

The final option — the default — is shown if none of the cases are met. You can see what this would look like when the user has entered **rabbit** into the text box in Figure 11-6.

Note that, should the user enter text in a different case, it will not match the options in the `switch` statement. Because JavaScript is case-sensitive, if the letter's case does not match the value of the case in the `switch` statement, it will not be a match. You can solve this by making the text all lowercase in the first place before checking it using the `toLowerCase()` method of the built-in JavaScript string object, which you meet later in the chapter.

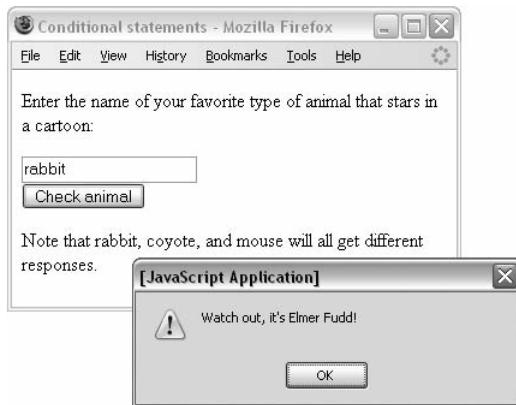


Figure 11-6

## **Conditional (or Ternary) Operator**

A conditional operator (also known as the ternary operator) assigns a value to a variable based upon a condition:

```
variablename=(condition)?value1:value2
```

For example, say you have a variable called `instruction` and a variable called `color`. If the value of `color` is red, then you want the variable to be `STOP`; otherwise you want it to be `CONTINUE`.

```
instruction=(color=="red")?"STOP":"CONTINUE"
```

## **Looping**

Looping statements are used to execute the same block of code a specified number of times:

- A `while` loop runs the same block of code while or until a condition is true.

- ❑ A `do while` loop runs once before the condition is checked. If the condition is true, it will continue to run until the condition is false. (The difference between the `do` and `do while` loops is that `do while` runs once whether or not the condition is met.)
- ❑ A `for` loop runs the same block of code a specified number of times.

### **while**

In a `while` loop, a code block is executed if a condition is true and for as long as that condition remains true. The syntax is as follows:

```
while (condition)
{
    code to be executed
}
```

In the following example, you can see a `while` loop that shows the multiplication table for the number 3. This works based on a counter called `i`; every time the `while` script loops, the counter increments by one (this uses the `++` arithmetic operator, as you can see from the line that says `i++`). So, the first time the script runs the counter is 1, and the loop writes out the line  $1 \times 3 = 3$ ; the next time it loops around the counter is 2, so the loop writes out  $2 \times 3 = 6$ . This continues until the condition — that `i` is no longer less than 11 — is true (`ch11_eg09.html`):

```
<script type="text/JavaScript">
i = 1
while (i < 11) {
    document.write(i + " x 3 = " + (i * 3) + "<br />" );
    i ++
}
</script>
```

You can see the result of this example in Figure 11-7.

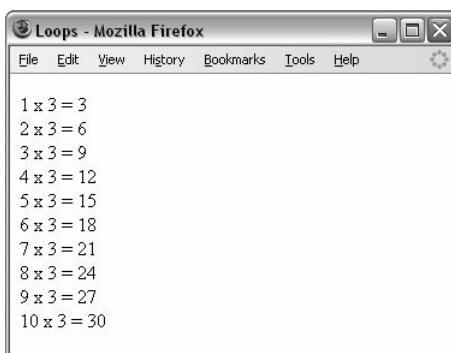


Figure 11-7

### do . . . while

A `do . . . while` loop executes a block of code once and then checks a condition. For as long as the condition is true it continues to loop. So, whatever the condition, the loop runs at least once (as you can see the condition is after the instructions). Here is the syntax:

```
do
{
    code to be executed
}
while (condition)
```

For example, here is the example with the 3 multiplication table again — the counter is set with an initial value of 12, which is higher than required in the condition, so you will see the sum  $12 \times 3 = 36$  once, but nothing after that (because when it comes to the condition, it has been met):

```
<script type="text/JavaScript">
i = 12
do {
    document.write(i + " x 3 = " + (i * 3) + "<br />" );
    i ++
}
while (i < 11)
</script>
```

Now, if you changed the value of the initial counter to 1 you would see that the script loops through the multiplication table as it did in the last example until it gets to 11.

### for

The `for` statement executes a block of code a specified number of times; you use it when you know how many times you want the code to be executed (rather than running while a particular condition is true/false). First, here is the syntax:

```
for (a; b; c)
{
    code to be executed
}
```

Now you need to look at what `a`, `b`, and `c` represent:

- ❑ `a` evaluates before the loop is run, and is only evaluated once. It is ideal for assigning a value to a variable; for example you might use it to set a counter to 0 using `i=0`.
- ❑ `b` should be a condition that indicates whether the loop should be run again; if it returns `true` the loop runs again. For example, you might use this to check whether the counter is less than 11.
- ❑ `c` is evaluated after the loop has run and can contain multiple expressions separated by a comma (for example `i++, j++;`). For example, you might use it to increment the counter.

So if you come back to the 3 multiplication table example again, it would be written something like this:

```
for (i=0; i<11; i++) {  
    document.write(i + " x 3 = " + (i * 3) + "<br />");  
}
```

The `a` is where the counter is assigned to have a value of 0, `b` is where the condition is saying that the loop should run if the value of the counter is less than 11, and `c` is where the counter is incremented by 1 every time the loop runs. The assignment of the counter variable, the condition, and the incrementing of the counter all appear in the parentheses after the keyword `for`.

You can also assign several variables at once in the part corresponding to the letter `a` if you separate them with a comma. For example, `i = 0, j = 5;`.

## Infinite Loops and the break Statement

Note that, if you have an expression that always evaluates to `true` in any loop, you end up with something known as an *infinite loop*. These can tie up system resources and can even crash the computer, although some browsers try to detect infinite loops and will usually stop the loop.

You can, however, add a `break` statement to stop an infinite loop; here it is set to 100 (`ch11_eg12.html`):

```
for (i=0; /* no condition here */ ; i++) {  
    document.write(i + " x 3 = " + (i * 3) + "<br />");  
    if (i == 100) {  
        break;  
    }  
}
```

When the script gets to a `break` statement it simply stops running. This effectively prevents a loop from running too many times.

## Events

You have already seen event handlers used as attributes on XHTML elements — such as the `onclick` and `onsubmit` event handlers. An event occurs when something happens. There are two types of events that can be used to trigger scripts:

- ❑ Window events, which occur when something happens to a window. For example, a page loads or unloads (is replaced by another page or closed) or focus is being moved to or away from a window or frame
- ❑ User events, which occur when the user interacts with elements in the page using a mouse (or other pointing device) or a keyboard.

There is a set of events known as *intrinsic events*, which all browsers are expected to support. Intrinsic events are associated with an element or set of elements, and in the markup they are used on the element just like

## Chapter 11: Learning JavaScript

---

an attribute. The value of the attribute is the script that should be executed when the event occurs on that element (this could call a function in the `<head>` of the document).

For example, the `onmouseover` and `onmouseout` events can be used to change an image's source attribute and create a simple image rollover, as you saw earlier in the chapter:

```
<a href=""  
  onmouseover="document.images.link.src='images/click_red.gif';"  
  onmouseout="document.images.link.src='images/click_green.gif'">  
    
</a>
```

The table that follows provides a recap of the most common events you are likely to come across.

Event	Purpose	Applies To
onload	Document has finished loading (if used in a frameset, all frames have finished loading).	<body> <frameset>
onunload	Document is unloaded, or removed, from a window or frameset.	<body> <frameset>
onclick	Button on mouse (or other pointing device) has been clicked over the element.	Most elements
ondblclick	Button on mouse (or other pointing device) has been double-clicked over the element.	Most elements
onmousedown	Button on mouse (or other pointing device) has been depressed (but not released) over the element.	Most elements
onmouseup	Button on mouse (or other pointing device) has been released over the element.	Most elements
onmouseover	Button on mouse (or other pointing device) has been moved onto the element.	Most elements
onmousemove	Button on mouse (or other pointing device) has been moved while over the element.	Most elements
onmouseout	Button on mouse (or other pointing device) has been moved off the element.	Most elements
onkeypress	A key is pressed and released over the element.	Most elements
onkeydown	A key is held down over an element.	Most elements
onkeyup	A key is released over an element.	Most elements

Event	Purpose	Applies To
onfocus	Element receives focus either by mouse (or other pointing device) clicking it, tabbing order giving focus to that element, or code giving focus to the element.	<a> <area> <button> <input> <label> <select> <textarea>
onblur	Element loses focus.	<a> <area> <button> <input> <label> <select> <textarea>
onsubmit	A form is submitted.	<form>
onreset	A form is reset.	<form>
onselect	User selects some text in a text field.	<input> <textarea>
onchange	A control loses input focus and its value has been changed since gaining focus.	<input> <select> <textarea>

You will see examples of these events used throughout this and the next chapter. You can also check which elements support which methods in Chapters 1 through 6 as those elements are discussed; almost every element can be associated with an event.

## Built-in Objects

You learned about the document object at the beginning of the chapter and now it is time to see some of the objects that are built-in JavaScript objects. You will see the methods that allow you to perform actions upon data, and properties that tell you something about the data.

All of the properties and methods in this section are supported in Netscape 2 and IE3 or higher browsers unless otherwise stated.

### String

The string object allows you to deal with strings of text. Before you can use a built-in object you need to create an instance of that object. You create an instance of the string object by assigning it to a variable like so:

```
myString = new String('Here is some big text')
```

The string object now contains the words "Here is some big text." Once you have this object in a variable you can write the string to the document or perform actions upon it. For example, the following method writes the string as if it were in a `<big>` element:

```
document.write(myString.big())
```

# Chapter 11: Learning JavaScript

---

Note that if you viewed the source of this element, it would not actually have the `<big>` element in it; rather you would see the JavaScript, so that a user who did not have JavaScript enabled would not see these words at all.

You can check the length of this property like so:

```
alert(myString.length)
```

Before you can use the string object, remember you first have to create it and then give it a value.

## Properties

The following table shows the main property for the String object and its purpose.

Property	Purpose
<code>length</code>	Returns the number of characters in a string

## Methods

The following table lists the methods for the String object and their purposes.

Method	Purpose
<code>anchor(name)</code>	Creates an anchor element (an <code>&lt;a&gt;</code> element with a <code>name</code> or <code>id</code> attribute rather than an <code>href</code> attribute).
<code>big()</code>	Displays text as if in a <code>&lt;big&gt;</code> element.
<code>bold()</code>	Displays text as if in a <code>&lt;bold&gt;</code> element.
<code>charAt(index)</code>	Returns the character at a specified position (for example, if you have a string that says “banana” and your method reads <code>charAt(2)</code> then you will end up with the letter n — remember that indexes start at 0).
<code>fixed()</code>	Displays text as if in a <code>&lt;tt&gt;</code> element.
<code>fontcolor(color)</code>	Displays text as if in a <code>&lt;font&gt;</code> element with a <code>color</code> attribute.
<code>fontsize(fontsize)</code>	Displays text as if in a <code>&lt;font&gt;</code> element with a <code>size</code> attribute.
<code>indexOf(searchValue, [fromIndex])</code>	Returns the position of the first occurrence of the specified string <code>searchValue</code> inside another string. For example, if you have the word “banana” as your string, and you want to find the first occurrence of the letter n, you use <code>indexOf(n)</code> .  If the <code>fromIndex</code> argument is used, the search will begin at that index. For example, you might want to start after the fourth character.  The method returns <code>-1</code> if the string being searched for never occurs.

Method	Purpose
<code>italics()</code>	Displays text as if in an <code>&lt;i&gt;</code> element.
<code>lastIndexOf(searchValue, [fromIndex])</code>	Same as <code>indexOf()</code> method, but runs from right to left.
<code>link(targetURL)</code>	Creates a link in the document.
<code>small()</code>	Displays text as if in a <code>&lt;small&gt;</code> element.
<code>strike()</code>	Displays text as if in a <code>&lt;strike&gt;</code> element.
<code>sub()</code>	Displays text as if in a <code>&lt;sub&gt;</code> element.
<code>substr(start}, [length])</code>	Returns the specified characters. 14,7 returns 7 characters, from the 14 <sup>th</sup> character (starts at 0).  Note that this works only in IE4 and Netscape 4 and later versions.
<code>substring(startPosition, endPosition)</code>	Returns the specified characters between the start and end index points. 7,14 returns all characters from the 7 <sup>th</sup> up to but not including the 14 <sup>th</sup> (starts at 0).
<code>sup()</code>	Displays text as if in a <code>&lt;sup&gt;</code> element.
<code>toLowerCase()</code>	Converts a string to lowercase.
<code>toUpperCase()</code>	Converts a string to uppercase.

## Try It Out      Using the String Object

In this example, you see a subsection of a string collected and turned into all uppercase letters. From the text “Learning about Built-in Objects is easy,” this example will just collect the words “Built-in objects” and turn them into uppercase characters.

1. Create a skeleton XHTML document, like so:

```
<?xml version="1.0" ?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
    <head>
        <title>String Object</title>
    </head>
    <body>
    </body>
</html>
```

2. Because the code in this example is going to be run in only one place, the script can be added inside the body of the document, so add the `<script>` element and inside it write the following code:

```
<script type="text/JavaScript">
```

## Chapter 11: Learning JavaScript

---

```
myString = new String('Learning about Built-in Objects is easy')
myString = myString.substring(15, 31)
myString = myString.toUpperCase()
document.write(myString)
</script>
```

3. Save this file as ch11\_eg14.html and when you open it in the browser, you should see the text shown in Figure 11-8.

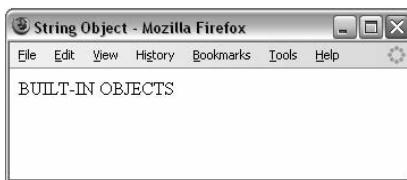


Figure 11-8

### How It Works

The script for this example can sit in the body of the document because it is to be used for this example only (it need not be a function, because it will not be called several times in the page and the script will not be used by other pages).

The interesting part is what is going on inside the `<script>` element. First you have to create an instance of the string object, which is assigned to the variable `myString`:

```
myString = new String('Learning about Built-in Objects is easy')
```

As it has been created, the string object has been made to hold the words `Learning about Built-in Objects is easy`. But, the idea of this exercise was just to select the words "Built-in Objects" so you use the `substring()` method. The syntax is as follows:

```
substring(startPosition, endPosition)
```

So you select the string object (which is in the variable `myString`) and make its value the new substring you want (this is reassigning the value with the `substring` we want):

```
myString = myString.substring(15, 32)
```

This selects the string from the 16<sup>th</sup> character to the 33<sup>rd</sup> character — because it starts at position 0.

Next you must convert the string to uppercase using the `toUpperCase()` method:

```
myString = myString.toUpperCase()
```

And finally you can write it to the document like so:

```
document.write(myString)
```

The result looks quite simple, but when you consider the original string was `Learning about Built-in Objects is easy` it now looks substantially different.

## Date

The date object helps you work with dates and times. You create a new date object using the date constructor like so:

```
new Date()
```

You can create a date object set to a specific date or time, in which case you need to pass it one of four parameters:

- milliseconds: This value should be the number of milliseconds since 01/01/1970.
- dateString: Can be any date in a format recognized by the `parse()` method.
- yr\_num, mo\_num, day\_num: Represents year, month, and day.
- yr\_num, mo\_num, day\_num, hr\_num, min\_num, seconds\_num, ms\_num: Represents the years, days, hours, minutes, seconds, and milliseconds.

Here are some examples; the first uses milliseconds and will read Thu Nov 27 05:33:20 UTC 1975:

```
var birthDate = new Date(8298400000)
document.write(birthDate)
```

The second uses a dateString, and will read Wed Apr 16 00:00:00 UTC+0100 1975:

```
var birthDate = new Date("April 16, 1975")
document.write(birthDate)
```

The third uses yr\_num, mo\_num, and day\_num, and will read Mon May 12 00:00:00 UTC+0100 1975:

```
var birthDate = new Date(1975, 4, 28)
document.write(birthDate)
```

There are a few things to watch out for:

- The first confusing thing you might notice here is that the number 4 corresponds to the month of May! That makes January 0. Similarly, when working with days Sunday is treated as 0.
- You might find that you get different time zones than I do. I am based in London, so I run on Greenwich Mean Time (GMT) or Coordinated Universal Time (UTC). All the date object's workings are performed using UTC, even though your computer may display a time that is consistent with your time zone.
- While you can add or subtract dates, your result will end up in milliseconds. For example, if I wanted to find out the number of days until the end of the year, I might use something like this:

```
var today = new Date()
var newYear = new Date(2008,11,31)
var daysRemaining = (newYear - today)
document.write(daysRemaining)
```

The problem with this is that you end up with a result that is very long (either plus if you read this in 2008 or minus if you read it after 2008). With 86,400,000 milliseconds in each day, you are likely to see a very large figure.

## Chapter 11: Learning JavaScript

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So, you need to divide the `daysRemaining` by 86400000 to find the number of days:

```
var today = new Date()
var newYear = new Date(2008,11,31)
var daysRemaining = (newYear - today)
daysRemaining = daysRemaining/86400000
document.write(daysRemaining)
```

Bearing in mind that a user's computer clock may well be inaccurate and the fact that different users will be in different time zones, using the `date` object can quickly become very complicated. Calculating the number of days before an event can result in an inaccurate answer if the time you provide and the time zone of the user's computer are different.

If you're able to, it is better to use a server-side scripting language to provide things like time to visitors. However it can be useful when dates are specified via user input or via the server when the date format can be controlled.

The following table shows some commonly used methods of the `date` object.

Method	Purpose
<code>date()</code>	Returns a <code>Date</code> object.
<code>getDate()</code>	Returns the date of a <code>Date</code> object (from 1 to 31).
<code>getDay()</code>	Returns the day of a <code>Date</code> object (from 0 to 6; 0=Sunday, 1=Monday, and so on).
<code>getMonth()</code>	Returns the month of a <code>Date</code> object (from 0 to 11; 0=January, 1=February, and so on).
<code>getFullYear()</code>	Returns the year of a <code>Date</code> object (four digits) only in Netscape 4 and IE4 and later versions.
<code>getYear()</code>	Returns the year of a <code>Date</code> object using only two digits (from 0 to 99).  You should use <code>getFullYear()</code> instead because it provides the four-digit year.
<code>getHours()</code>	Returns the hour of a <code>Date</code> object (from 0 to 23).
<code>getMinutes()</code>	Returns the minute of a <code>Date</code> object (from 0 to 59).
<code>getSeconds()</code>	Returns the second of a <code>Date</code> object (from 0 to 59).
<code>getTime()</code>	Returns the number of milliseconds since midnight 1/1/1970.
<code>getTimezoneOffset()</code>	Returns the time difference between the user's computer and GMT.
<code>parse()</code>	Returns a string date value that holds the number of milliseconds since January 01 1970 00:00:00.

Method	Purpose
<code> setDate()</code>	Sets the date of the month in the <code>Date</code> object (from 1 to 31).
<code> setFullYear()</code>	Sets the year in the <code>Date</code> object (four digits). Works in Netscape 4 and IE4 and later versions only.
<code> setHours()</code>	Sets the hour in the <code>Date</code> object (from 0 to 23).
<code> setMinutes()</code>	Sets the minute in the <code>Date</code> object (from 0 to 59).
<code> setMonth()</code>	Sets the month in the <code>Date</code> object (from 0 to 11; 0=January, 1=February).
<code> setSeconds()</code>	Sets the second in the <code>Date</code> object (from 0 to 59).
<code> setTime()</code>	Sets the milliseconds after 1/1/1970.
<code> setYear()</code>	Sets the year in the <code>Date</code> object (00 to 99).
<code> toGMTString()</code>	Converts the <code>Date</code> object to a string, set to GMT time zone.
<code> toLocaleString()</code>	Converts the <code>Date</code> object to a string, set to the current time zone.
<code> toString()</code>	Converts the <code>Date</code> object to a string. Works in Netscape 2 and IE4 and later versions.

Many of the methods in the table that follows were then added again in version 4 browsers offering support for the universal (UTC) time, which takes the format Day Month Date, hh,mm,ss UTC Year.

Method	Purpose
<code> getUTCDate()</code>	Returns the date of a <code>Date</code> object in universal (UTC) time.
<code> getUTCDay()</code>	Returns the day of a <code>Date</code> object in universal time.
<code> getUTCMonth()</code>	Returns the month of a <code>Date</code> object in universal time.
<code> getUTCFullYear()</code>	Returns the four-digit year of a <code>Date</code> object in universal time.
<code> getUTCHours()</code>	Returns the hour of a <code>Date</code> object in universal time.
<code> getUTCMinutes()</code>	Returns the minutes of a <code>Date</code> object in universal time.
<code> getUTCSeconds()</code>	Returns the seconds of a <code>Date</code> object in universal time.
<code> getUTCMilliseconds()</code>	Returns the milliseconds of a <code>Date</code> object in universal time.
<code> setUTCDate()</code>	Sets the date in the <code>Date</code> object in universal time (from 1 to 31).

*Continued*

## Chapter 11: Learning JavaScript

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Method	Purpose
setUTCDate()	Sets the day in the Date object in universal time (from 0 to 6; Sunday=0, Monday=1, and so on).
setUTCMonth()	Sets the month in the Date object in universal time (from 0 to 11; 0=January, 1=February).
setUTCFullYear()	Sets the year in the Date object in universal time (four digits).
setUTCHour()	Sets the hour in the Date object in universal time (from 0 to 23).
setUTCMinutes()	Sets the minutes in the Date object in universal time (from 0 to 59).
setUTCSeconds()	Sets the seconds in the Date object in universal time (from 0 to 59).
setUTCMilliseconds()	Sets the milliseconds in the Date object in universal time (from 0 to 999).

## Math

The math object helps in working with numbers; it does not require a constructor. It has properties for mathematical constants such as pi and the natural logarithm of 10 (approximately 2.3026) and methods representing mathematical functions such as the Tangent or Sine functions.

For example, the following sets a variable called numberPI to hold the constant of pi and then write it to the screen (ch11\_eg16.html):

```
numberPI = Math.PI  
document.write (numberPI)
```

The following example rounds pi to the nearest whole number (integer) and writes it to the screen:

```
numberPI = Math.PI  
numberPI = Math.round(numberPI)  
document.write (numberPI)
```

## Properties

The following table lists the properties of the Math object.

Property	Purpose
E	Returns the base of a natural logarithm.
LN2	Returns the natural logarithm of 2.
LN10	Returns the natural logarithm of 10.

Property	Purpose
LOG2E	Returns the base-2 logarithm of E.
LOG10E	Returns the base-10 logarithm of E.
PI	Returns pi.
SQRT1_2	Returns 1 divided by the square root of 2.
SQRT2	Returns the square root of 2.

## Methods

The following table lists the methods for the Math object.

Method	Purpose
abs(x)	Returns the absolute value of $x$ .
acos(x)	Returns the arccosine of $x$ .
asin(x)	Returns the arcsine of $x$ .
atan(x)	Returns the arctangent of $x$ .
atan2(y, x)	Returns the angle from the x-axis to a point.
ceil(x)	Returns the nearest integer greater than or equal to $x$ .
cos(x)	Returns the cosine of $x$ .
exp(x)	Returns the value of E raised to the power of $x$ .
floor(x)	Returns the nearest integer less than or equal to $x$ .
log(x)	Returns the natural log of $x$ .
max(x, y)	Returns the number with the highest value of $x$ and $y$ .
min(x, y)	Returns the number with the lowest value of $x$ and $y$ .
pow(x, y)	Returns the value of the number $x$ raised to the power of $y$ .
random()	Returns a random number between 0 and 1.
round(x)	Rounds $x$ to the nearest integer.
sin(x)	Returns the sine of $x$ .
sqrt(x)	Returns the square root of $x$ .
tan(x)	Returns the tangent of $x$ .

## Array

An *array* is like a special variable. It's special because it can hold more than one value, and these values can be accessed individually. Arrays are particularly helpful when you want to store a group of values in the same variable rather than having separate variables for each value. You may want to do this because all the values correspond to one particular item; or just for the convenience of having several values in the same variable rather than in differently named variables; or it might be because you do not know how many items of information are going to be stored. You often see arrays used in conjunction with loops, where the loop is used to add information into an array or read it from the array.

You need to use a constructor with an `Array` object, so you can create an array by specifying either the name of the array and how many values it will hold or by adding all the data straight into the array. For example, here is an array that holds the names of musical instruments:

```
instruments = new Array("guitar", "drums", "piano")
```

The elements of the array are indexed using their ordinal number, starting at 0, so you can refer to the guitar as `instruments[0]`, the drums as `instruments[1]`, and so on.

If you do not want to provide all the values when you create the array, you can just indicate how many elements you want to be able to hold (note that this value does not start at 0 so it will create three elements not four):

```
instruments = new Array(3)
```

Now the number is stored in the `length` property of the `Array` object and the elements are not actually assigned yet. If you want to increase the size of an array, you can just assign a new value to the `length` property that is higher than the current length.

Here is an example that creates an array with five items and then checks how many items are in the array using the `length` property:

```
fruit = new Array("apple", "banana", "orange", "mango", "lemon")
document.write(fruit.length)
```

Here is an example of the `toString()` method, which converts the array to a string.

```
document.write('These are ' + fruit.toString())
```

Keeping the related information in the one variable tends to be easier than having five variables, such as `fruit1`, `fruit2`, `fruit3`, `fruit4`, and `fruit5`. Using one array like this also takes up less memory than storing five separate variables, and in situations when you might have varying numbers of fruit it allows the variable to grow and shrink in accordance with your requirements (rather than creating ten variables, half of which might be empty).

## Methods

The table that follows lists the methods of an Array:

Method	Purpose
concat()	Joins two or more arrays to create one new one; supported in Netscape 4 and IE4 and later versions.
join(separator)	Joins all of the elements of an array together separated by the character specified as a separator (the default is a comma); supported in Netscape 3 and IE4 and later versions.
reverse()	Returns the array reversed; supported in Netscape 3 and IE4 and later versions.
slice()	Returns a specified part of the array; supported in Netscape 4 and IE4 and later versions.
sort()	Returns a sorted array; supported in Netscape 3 and IE4 and later versions.

## Window

Every browser window and frame has a corresponding Window object that is created with every instance of a `<body>` or `<frameset>` element.

For example, you can change the text that appears in the browser's status bar using the `status` property. To do this, first you need to add a function in the head that is going to be triggered when the page loads, which will indicate what should appear in the status bar:

```
<script type="text/javascript">
    function statusBarText()
    {
        window.status = "Did you see me down here?"
    }
</script>
```

You then call this function from the `<body>` element's `onload` event, like so:

```
<body onload="statusBarText()">
```

Here's an example of how to open a new window known as a pop-up; you will see a more advanced function for performing this task that goes in the head of the document in Chapter 12, but as you can see, this example provides an inline script within the event handler:

```
<input type="button" value="Open Window"
onclick="window.open('http://www.wrox.com') ">
```

## Properties

The table that follows lists the properties of the Window object.

Property	Purpose
closed	A Boolean determining if a window has been closed. If it has, the value returned is <code>true</code> .
defaultStatus	Defines the default message displayed in a browser window's status bar (usually at the bottom of the page on the left).
document	The document object contained in that window.
frames	An array containing references to all named child frames in the current window.
history	A history object that contains details and URLs visited from that window (mainly for use in creating back and forward buttons like those in the browser).
location	The location object; the URL of the current window.
name	The window's name.
status	Can be set at any time to define a temporary message displayed in the status bar; for example, you could change the message in the status bar when a user hovers over a link by using it with an <code>onmouseover</code> event on that link.
statusbar	Whether the status bar is visible or not, has its own property <code>visible</code> whose value is a Boolean <code>true</code> or <code>false</code> — for example <code>window.statusbar[.visible=false]</code> (Netscape 4+ IE3+).
toolbar	Whether the scrollbar is visible or not, has its own property <code>visible</code> whose value is a Boolean <code>true</code> or <code>false</code> — for example, <code>window.toolbar[.visible=false]</code> . This can be set only when you create the new window (Netscape 4 and IE 3 and later versions).
top	A reference for the topmost browser window if several windows are open on the desktop.
window	The current window or frame.

## Methods

The table that follows lists the methods of the Window object.

Method	Purpose
<code>alert()</code>	Displays an alert box containing a message and an OK button.
<code>back()</code>	Same effect as the browser's Back button.
<code>blur()</code>	Removes focus from the current window.
<code>close()</code>	Closes the current window or another window if a reference to another window is supplied.
<code>confirm()</code>	Brings up a dialog box asking users to confirm that they want to perform an action with either OK or Cancel as the options. They return <code>true</code> and <code>false</code> respectively.
<code>focus()</code>	Gives focus to the specified window and brings it to the top of others.
<code>forward()</code>	Equivalent to clicking the browser's Forward button.
<code>home()</code>	Takes users to their home page.
<code>moveBy(horizontalPixels, verticalPixels)</code>	Moves the window by the specified number of pixels in relation to current coordinates.
<code>moveTo(xposition, yposition)</code>	Moves the top left of the window to the specified x-y coordinates.
<code>open(URL, name [, features])</code>	Opens a new browser window (this method is covered in more detail in the next chapter).
<code>print()</code>	Prints the content of the current window.
<code>prompt()</code>	Creates a dialog box for the user to enter an input.
<code>stop()</code>	Same effect as clicking the Stop button in the browser.

## Writing JavaScript

You need to be aware of a few points when you start writing JavaScript:

- ❑ JavaScript is case-sensitive, so a variable called `myVariable` is different than a variable called `MYVARIABLE` and both are different than a variable called `myvariable`.

## Chapter 11: Learning JavaScript

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- ❑ When you come across symbols such as `(`, `{`, `[`, `",`, and `'` they must have a closing symbol to match `',` `"`, `]`, `}`, and `)`.
- ❑ Like XHTML, JavaScript ignores extra spaces, so you can add white space to your script to make it more readable. The following two lines are equivalent, even though there are more spaces in the second line:

```
myVariable="some value"  
myVariable = "some value"
```

- ❑ You can break up a code line within a text string with a backslash, as you can see here, which is very helpful if you have long strings:

```
document.write("My first \  
JavaScript example")
```

- ❑ But you must not break anything other than strings, so this would be wrong:

```
document.write \  
("My first JavaScript example")
```

- ❑ You can insert special characters such as `,`, `'`, `;`, and `&`, which are otherwise reserved, by using a backslash before them like so:

```
document.write("I want to use a \"quote\" mark \& an ampersand.")
```

This writes out the following line to the browser:

I want to use a "quote" mark & an ampersand.

- ❑ If you have ever used a full programming language such as C++ or Java, you know they require a semicolon at the end of each line. Generally speaking, this is optional in JavaScript unless you want to put more than one statement on a line.

## A Word About Data Types

By now you should be getting the idea that you can do different things with different types of data. For example, you can add numbers together but you cannot mathematically add the letter A to the letter B. Some forms of data require that you are able to deal with numbers that have decimal places (floating point numbers); currency is a common example. Other types of data have inherent limitations; for example, if I am dealing with dates and time, I want to be able to add hours to certain types of data without ending up with 25:30 as a time (even though I often wish I could add more hours to a day).

Different types of data (letters, whole numbers, decimal numbers, dates) are known to have different *data types*; these allow programs to manage the different types of data in different ways. For example, if you use the `+` operator with a string, it concatenates two strings, whereas if it is used with numbers, it adds the two numbers together. Some programming languages require that you specifically indicate what type a variable is and require you to be able to convert between types. While JavaScript supports different data types, as you are about to see, it handles conversion between types itself, so you never need to worry about telling JavaScript that a certain type of data is a date or a *string* (a string is a set of characters that may include letters and numbers).

There are three simple data types in JavaScript:

- ❑ **Number:** Used to perform arithmetic operations (addition, subtraction, multiplication, and division). Any whole number or decimal number that does not appear between quotation marks is considered a number.
- ❑ **String:** Used to handle text. It is a set of characters enclosed by quotation marks.
- ❑ **Boolean:** A Boolean value has only two possible values: `true` and `false`. This data allows you to perform logical operations and check whether something is true or false.

You may well come across two other data types:

- ❑ **Null:** Indicates that a value does not exist. This is written using the keyword `null`. This is an important value because it explicitly states that no value has been given. This can mean a very different thing from a string that just contains a space or a zero.
- ❑ **Undefined:** Indicates a situation where the value has not been defined previously in code and uses the JavaScript keyword `undefined`. You might remember that if you declare a variable but do not give it a value, the variable is said to be undefined (you are particularly likely to see this when something is not right in your code).

## Keywords

You may have noticed that there are several keywords in JavaScript that perform functions, such as `break`, `for`, `if`, and `while`, all of which have special meaning; therefore, these words should not be used in variable, function, method, or object names. The following is a list of the keywords that you should avoid using (some of these are not actually used yet, but are reserved for future use):

```
abstract, boolean, break, byte, case, catch, char, class, const, continue,
default, do, double, else, extends, false, final, finally, float, for,
function, goto, if, implements, import, in, instanceof, int, interface, long,
native, new, null, package, private, protected, public, return, short, static,
super, switch, synchronized, this, throw, throws, transient, true, try, var,
void, while, with.
```

If you are working on a page that contains more than one scripting language, in order to indicate the default scripting language, a `<meta>` element should be used in the `<head>` of the document.

```
<meta http-equiv="Content-Script-Type" content="text/JavaScript">
```

## Summary

This chapter has introduced you to a lot of new concepts: objects, methods, properties, events, arrays, functions, API's, object models, data types, and keywords. While it's a lot to take in all at once, by the time you have looked at some of the examples in the next chapter it should be a lot clearer. After reading that chapter, you can read through this chapter again and you should be able to understand more examples of what can be achieved with JavaScript.

## Chapter 11: Learning JavaScript

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You started off by looking at how you can access information from a document using the document object model. This chapter focused on the Level 0 DOM, which is not a W3C recommendation like the other three levels of DOM that have since been released. Rather, it is based upon features that are common to both Netscape 2 and IE3 and later versions that support these features.

The W3C is moving toward a standardized way of accessing all XML documents, including XHTML ones; however, so many scripts have already been written using DOM level 0 code that it's still the best way to get you started learning JavaScript and writing code that will be available in most browsers.

Once you have figured out how to get information from a document, you can use JavaScript to perform calculations upon the data in the document. JavaScript mainly performs calculations using features such as the following:

- Variables (which store information in memory)
- Operators (such as arithmetic and comparison operators)
- Functions (which live in the `<head>` of a document and contain code that is called by an event)
- Conditional statements (to handle choices of actions based on different circumstances)
- Loops (to repeat statements until a condition has been met)

As you will see in Chapter 12, these simple concepts can be brought together to create quite powerful results. In particular, when you see some of the validation scripts that will check some of the form data users enter, you will see some quite advanced JavaScript, and you will have a good idea of how basic building blocks can create complex structures.

Finally, you looked at a number of other objects made available through JavaScript; you met the String, Date, Math, Array, and Window objects. Each object contains related functionality; they have properties that tell you about the object (such as the date, the time, the size of window, or length of string), whereas methods allow you to do things with this data about the object.

I hope you are starting to get a grasp of how JavaScript can help you add interactivity to your pages, but you will really get to see how it does this in the next chapter when you delve into my JavaScript library and look at examples that will really help you make use of JavaScript.

## Exercises

- 1.** Create a script to write out the multiplication table for the number 5 from 1 to 20 using a `while` loop.
- 2.** Modify `ch11_eg06.html` so that it can say one of three things:
  - "Good Morning" to visitors coming to the page before 12 p.m. (using an `if` statement).
  - "Good Afternoon" to visitors coming to the page between 12 and 6 p.m. (again using an `if` statement. (Hint: You might need to use a logical operator.)
  - "Good Evening" to visitors coming to the page after 6 p.m. up until midnight (again using an `if` statement).

# 12

## Working with JavaScript

You learned the key concepts behind the JavaScript language in Chapter 11; in this chapter, you see how these concepts come together in working scripts. By examining many examples, you learn different ways in which JavaScript can interact with your web pages. You also learn some new coding practices for writing your own JavaScripts, and some very helpful shortcuts to creating interactive pages.

The chapter covers the following major topics, each relating to different JavaScript techniques or parts of documents:

- ❑ **Validation of forms:** Checking that a user has filled in the appropriate form elements and has put a value that matches what you expect
- ❑ **Other forms techniques:** Giving focus to elements when the page loads, auto tabbing between fields, disabling controls, and converting text case
- ❑ **Navigation:** Image rollovers and highlighting navigation items
- ❑ **Windows:** Creating pop-ups
- ❑ **Using existing libraries:** Taking a look at three existing JavaScript libraries that can give you complex functionality with just a few lines of code

By the end of the chapter, not only will you have learned a lot about using JavaScript in your pages, but you will also have a library of helpful functions you can use in your own pages.

### Practical Tips for Writing Scripts

Before you start looking at the examples, there are a few practical hints on developing JavaScripts that should save you time.

### **Has Someone Already Written This Script?**

Thousands of free JavaScripts are already out there on the Web, and before you start writing a script to do anything, you are best off looking on some of these sites to see if someone has already done all the hard work for you. Of course, some tasks will require that you create your own scripts, but if there is a script already written that you can use, then there's no point reinventing the wheel; you should consider just using that script.

Here are a couple of sites that will help you get going (and don't forget you can search using a search engine such as Google, too):

- ❑ [www.HotScripts.com](http://www.HotScripts.com)
- ❑ [www.JavaScriptKit.com](http://www.JavaScriptKit.com)
- ❑ <http://JavaScript.Internet.com>

Even if you do not copy the script exactly, you can learn a lot by looking at how someone else has approached the same task.

You will see more about this topic near the end of the chapter when you look at using existing JavaScript libraries.

### **Reusable Functions**

Along with reusing other people's scripts and folders, you should also write code that you can reuse yourself. For example, if you are going to write a function for a mortgage calculator, it is better to pass the values into the function when you call it rather than writing a function to retrieve them from the form. Consider the following function:

```
calculateLoan(loanAmount, repaymentPeriod, interestRate)
```

This function takes three parameters that have to be passed to it when it is called.

Now imagine the form that calls this function in your document. The `<form>` element will have an `onsubmit` event handler, so that when the user clicks the button to calculate the loan repayments the function is called. Because the function requires the three parameters to be passed, the call to the event might look like this:

```
<form name="frmLoanCalc"
      onsubmit="calculateLoan(document.frmLoanCalc.txtAmount.value,
                           document.frmLoanCalc.txtRepayment.value,
                           document.frmLoanCalc.txtInterest.value)">
```

You might think it would be better to collect the values from the form in the function itself; then you could just call the function in one line as follows:

```
<form name="frmLoanCalc" onsubmit="calculateLoan()">
```

This second approach certainly looks easier to write here, but it is a false economy. It is better to pass these values to the function than write a function to collect these values from the form itself because your function would have to start off collecting the values and might end up looking like this:

```
function calculateLoan() {  
    loanAmount = document.frmLoanCalc.txtAmount.value  
    loanValue = document.frmLoanCalc.txtRepayment.value  
    interestRate = document.frmLoanCalc.txtInterest.value
```

Why is this a problem if you otherwise have to write the same amount of code when you call the function? The answer is that if your function collects the information from the form, it is going to be of use only with that one page and that one form. By passing the values into the function, as with the first approach, the loan calculation could be used with lots of different forms.

You might think that you would not need a mortgage calculator on many sites, but then you might need some other form of loan calculator on a different site. For example, you might write a site for a car dealer who wants to allow users to work out how much they would have to pay in total if they were paying by installment — in which case you could use your loan calculator again. By making functions generic, they can be reused, and you will soon be saving yourself time by reusing your own code.

So, you should aim to make your functions as reusable as possible rather than tying each script into the one page.

## ***Using External JavaScript Files***

Whenever you are going to use a script in more than one page it's a good idea to place it in an external JavaScript file (a technique you learned about at the beginning of Chapter 11). For example, in the "Image Rollovers" section later in the chapter you will see an example of a script that creates image rollovers for a navigation bar. Your navigation will appear on each page, so rather than including the image rollover function in each page, you can just include the one script into every page. This has the following three advantages:

- If you need to change something about the navigation, you need to change only the one function, not every page.
- The file size of the pages is smaller because the JavaScript is in one file that is included on each page rather than repeated.
- You do not have to copy and paste the same code into several files.

## ***Place Scripts in a Scripts Folder***

When you use external scripts you should create a special `scripts` folder — just as you would an `images` folder. This helps improve the organization of your site and your directory structure. Whenever you need to look at or change a script, you know exactly where it will be.

You should also use intuitive names for your script files so that you can find them quickly and easily.

# Form Validation

Form validation is one of the most common tasks performed using JavaScript. You have likely come across forms on the Web that have prompted you when you have not entered a value or when you have entered the wrong kind of value; this is because the form has been *validated*. That is, it's been checked to see whether the text you have entered or choices you have made match some rules that the programmer has written into the page. These rules may include things such as an e-mail address being required to contain an @ symbol or a requirement that a username be at least five characters long. These kinds of rules help ensure that the data provided by users meet the requirements before being submitted.

## When to Validate

Validation can happen in two places, either in the browser using JavaScript or on the server. In fact, most applications that collect important information using a form (such as e-commerce orders) will be validated both in the browser *and* on the server. The reason for the validation on the browser is that it helps the user enter the correct data required for the job without the form being sent to the server, being processed, and then being sent back again if there are any errors. It's much quicker to force the user to fix errors before submitting the form to the server. The server then double checks before passing the form data onto another part of the application — this second level of validation is performed because a simple wrong value in a database could prevent the application from running properly, and if the user does not have JavaScript enabled, then the application will not be compromised by the user's submitting a value that has not been checked using JavaScript in the browser.

## How to Validate

When it comes to validating a form you cannot always check whether users have given you the correct information, but you can check whether they have given you some information in the correct format. For example, you cannot ensure that the user has entered his or her correct phone number; the user could be entering anyone's phone number, but you can check that it's a number rather than other characters, and you can check that the number contains a minimum number of digits. As another example, you can't ensure someone has entered a real e-mail address rather than a false address, but you can check that whatever was entered followed the general structure of an e-mail address (including at least an @ sign and a period). So form validation is a case of minimizing the possibility of user errors by validating form controls.

Forms are usually validated using the `onsubmit` event handler, which triggers a validation function stored in the head of the document (or in an external file that is specified in the head of the document), so the values are checked when the user presses the Submit button. The function must then return `true` in order for the form to be sent. If an error is encountered, the function returns `false` and the user's form will not be sent — at which point the form should indicate to the user where there is a problem with what the user entered on the form.

The `onsubmit` event will often call a function with a name along the lines of `validate(form)` or `validateForm(form)`. Because many forms contain several controls that require validation, you do not usually pass the values of each item you are checking into a validation function. The function is usually written explicitly for that form — although you can reuse the techniques you have learned in different forms (or even reuse entire functions for login or registration forms).

If you use a validation function that is called by the `onsubmit` event handler, but the user's browser does not support JavaScript, then the form should still be submitted but the validation checks do not take place.

The first task in a validation function is to set a variable for the return value of the function to be `true`. Then the values entered are checked, and whenever the function finds an error in what the user has entered, this value can be turned to `false` to prevent the form from being submitted.

### Checking Text Fields

You have probably seen forms on web sites that ask you to provide a username and password, and then to re-enter the password to make sure you did not mistype something. It might resemble Figure 12-1.



Figure 12-1

In such a form you might want to check a few things:

- That the username is of a minimum length
- That the password is of a minimum length
- That the two passwords match

The `validate()` function you are about to look at will live between the following `<script>` tags in the head of the document (remember, if you were going to reuse the function on other pages it could live in an external JavaScript file):

```
<script type="text/JavaScript">
</script>
```

To start, the `validation()` function assigns a variable called `returnValue` to `true`; if no errors are found this will be the value that the function returns, which will allow the form to be sent. Then the form collects the values of the form controls into variables, as follows:

```
function validate(form) {
    var returnValue = true;
    var username = frmRegister.txtUserName.value;
    var password1 = frmRegister.txtPassword.value;
    var password2 = frmRegister.txtPassword2.value;
```

## Chapter 12: Working with JavaScript

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The first thing you want to do is check whether the username is at least six characters long:

```
if(username.length < 6) {  
    returnValue = false;  
    alert("Your username must be at least\n6 characters long.\nPlease try again.");  
    frmRegister.txtUserName.focus();  
}
```

The `length` property of the `username` variable is used to check whether the length of the username entered is longer than six characters. If it is not, the return value of the function will be `false`, the form will not be submitted, and the user will see an alert box with the specified error message. Note how the focus is passed back to the form control that has a problem using the `focus()` method on this control, saving the user from looking through the form to find that entry again. You can also see from this example how the line break is used in the alert box to indicate breaks in the message presented to the user `\n`.

Next you want to check the length of the first password — this uses the same approach but also sets both of the password boxes to blank again if the password is not long enough and gives focus to the first password box:

```
if (password1.length < 6) {  
    returnValue = false;  
    alert("Your password must be at least\n6 characters long.\nPlease try again.");  
    frmRegister.txtPassword.value = "";  
    frmRegister.txtPassword2.value = "";  
    frmRegister.txtPassword.focus();  
}
```

If the code has gotten this far, the username and first password are both long enough. Now, you just have to check whether the value of the first password box is the same as the second one, as shown here. Remember that the `!=` operator used in this condition means “not equal”:

```
if (password1.value != password2.value) {  
    returnValue = false;  
    alter("Your password entries did not match.\nPlease try again.");  
    frmRegister.txtPassword.value = "";  
    frmRegister.txtPassword2.value = "";  
    frmRegister.txtPassword.focus();  
}
```

You can see here that when the user has entered passwords that do not match, the user is shown an alert box with an error message reporting that the password entries did not match. Also the contents of both password inputs are cleared and the focus is passed back to the first password box.

When the user makes a mistake with a password input, there is no point in leaving values in the password form controls because users will not be able to see the values they have entered into these boxes (because it will show dots or asterisks rather than the characters). Therefore, users will have to enter both values again because they will not be able to see where the error is.

The only thing left to do is return the value of the `returnValue` variable — which will be `true` if all the conditions are met or `false` if not.

```
return returnValue;  
}
```

Here is the form that is used with this example (ch12\_eg01.html):

```
<form name="firmRegister" method="post" action="register.aspx"
onsubmit="return validate(this);">
<div class="label"><label for="txtUsername">Username:</label></div>
<div class="formElement">
    <input type="text" name="txtUserName" id="txtUserName" size="12" />
</div>
<div class="label"><label for="txtPassword">Password: </td></label></div>
<div class="formElement">
    <input type="password" name="txtPassword" id="txtPassword" size="12" />
</div>
<div class="label"><label for="txtPassword2">Confirm your password:</label></div>
<div class="formElement">
    <input type="password" name="txtPassword2" id="txtPassword2" size="12" />
</div>

<div class="label">&ampnbsp</label></div>
<div class="formElement"><input type="submit" value="Log in" /></div>

</form>
```

In Figure 12-2 you can see the result if the user's password is not long enough.



Figure 12-2

### Required Text Fields

Often you will want to ensure that a user has entered some value into a text field. You can do this for an individual element using the technique you saw in the last example for the username. As you saw then, if users entered a value that was less than six characters long they were alerted, and the form would not submit.

An alternative technique is to use a loop to go through all of the required elements using a `for` loop, and if any of them are empty, return an error. When you use this technique you need to have a `class` attribute that has a value of `required` on each form element that is required, so the loop can tell if the text input must have a value, and you must have a `name` attribute whose value matches the label for the element.

## Chapter 12: Working with JavaScript

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(because this will be used in any error message). Here is an example of what a text input should look like with the `name` and `class` attributes:

```
<input type="text" name="Username" size="5" class="required" />
```

This time the `validate()` function can loop through the elements of a form checking whether each has a `class` attribute whose value is `required`, and if it does, then it checks whether the value is empty. This function will be triggered using the `onsubmit` event again. The function is passed the form object as a parameter and starts by setting a `return` value to `true`:

```
function validate(form) {  
    var returnValue = true;
```

Then the function loops through the elements on the form to find those that are required. You can see that the `for` loop has three arguments. The first argument initializes a variable called `i` as a counter with a value of 0. The second argument is a condition to see if the counter is less than the number of elements in the form. The third increments the counter by 1 each time the loop is run, as follows:

```
var formElements = form.elements;  
for (var i=0; i<formElements.length; i++)  
{
```

Then inside the loop the value of the current element is retrieved:

```
currentElement = formElements[i];
```

Now you get to see whether the `class` attribute has a value of `required`, and if it does you can check whether the value is blank. If both of these conditions are met, then the variable for the return value is set to `false`, and the `alert` tells the user where he or she has gone wrong. There is also a `break` here to stop the loop as soon as a required field that is blank has been found.

```
if (currentElement.value=="" && currentElement.className=="required") {  
    alert("The required field \\""+currentElement.name +"\\ is empty. Please  
    provide a value for it.");  
    currentElement.focus();  
    returnValue = false;  
    break;  
}  
return returnValue;  
}
```

Note how the `alert()` method uses the value of the `name` attribute for the element to tell the user which element he or she has left off with `currentElement.name`.

You can see this function working with a form that is very similar to the one in the last example, although the values for the `name` attributes have to be descriptive for the user and match the labels for those forms (`ch12_eg02.html`):

```
<form name="frmEnquiry" method="post" action="register.aspx"  
onsubmit="return validate(this);">  
  
<div class="label"><label for="Name">Name:</label></div>  
<div class="formElement">
```

```
<input type="text" class="required" name="Name" size="12" id="Name" />
</div>

<div class="label"><label for="E-mail">E-mail:</div>
<div class="formElement">
    <input type="text" class="required" name="E-mail" size="12" id="E-mail" />
</div>

<div class="label"><label for="txtEmail">Please enter your query here:</div>
<div class="formElement">
    <textarea rows="8" class="required" cols="30" name="Query" id="Query">
    </textarea>
</div>

<div class="label"><label for="txtEmail">&nbsp;</div>
<div class="formElement">
    <input type="submit" class="" value="Submit your query" />
</div>

</form>
```

Figure 12-3 shows the error message generated when the user has not entered a value for the e-mail address. The word e-mail in quotes has been retrieved from the name attribute of that text input.

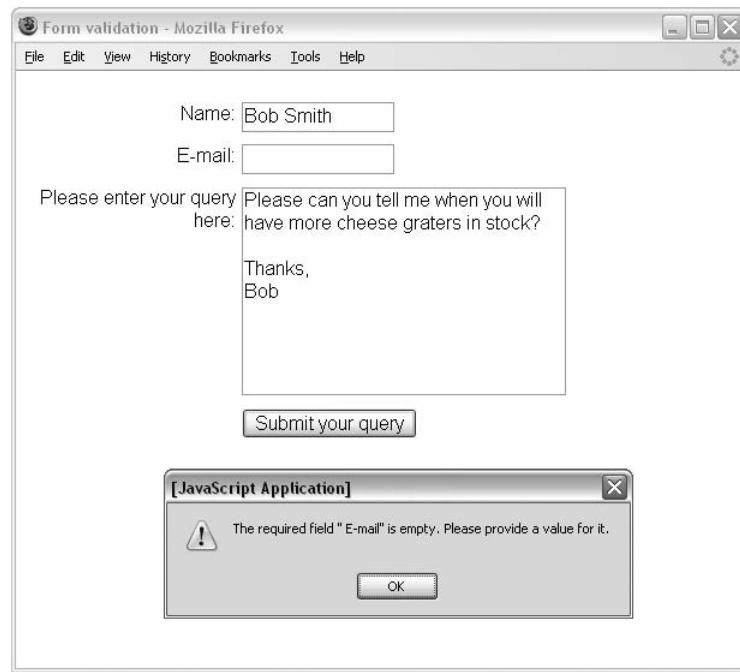


Figure 12-3

### Finding Characters Using `replace()`

A feature that often comes in handy with text inputs is the ability to replace certain characters. JavaScript has the helpful `replace()` method that you can use to replace specified characters with an alternative set of characters.

The `replace()` method allows you to specify a character or set of characters that you want to replace, using either a string or something known as a Regular Expression (you meet Regular Expressions later in this chapter); this is the first argument of the method. The second argument is the character(s) you want to replace the string with. This second argument is often just a replacement string (a replacement set of characters), although it can be a function that determines what the replacement string should be — if it's a function, the return value would be used as the replacement string. So the `replace()` method can therefore use any of the following syntaxes:

```
string.replace(oldSubString, newSubString);
string.replace(regex, newSubString);
string.replace(regex, function());
```

Here's a simple example that uses the `replace()` method with a text area and looks for the string `URL` within the text box. When it finds the string `URL` it will replace it with the string `ABC` (`ch12_eg03.html`). First, here is the form:

```
<form name="myForm">
  <textarea name="myTextArea" id="myTextArea" cols="40" rows="10">I am interested
  in Curl, here is a url for it.</textarea>
  <input type="button" value="Replace characters url"
    onclick="document.myForm.myTextArea.value =
      document.myForm.myTextArea.value.replace(/url/gi, 'abc');" />
</form>
```

Note, however, that this would also change the word `Curl` into `Cabc`, so it is a good idea to add a `\b` on either side of the string `URL` to indicate a word boundary — indicating that you just want to look for whole words — so the string will be replaced only if the string `URL` is a word on its own (you cannot just check for the presence of a space on either side of the letters `URL`, because there might be punctuation next to one of the letters):

```
onclick="document.myForm.myTextArea.value=
  document.myForm.myTextArea.value.replace(/\burl\b/gi, 'abc');"
```

The forward slashes around the string `URL` indicate that it is looking for a match for that string. The `g` after the second slash (known as a *flag*) indicates that the document is looking for a global match across the whole of the text area (without the `g` flag, only the first match in the string is replaced), and the `i` flag indicates that it should be a case-insensitive match (so the string `URL` should also be replaced, or indeed any mix of these characters in upper- and lowercase).

You can match more than one string using the pipestem character; the following example looks for a match with `link`, `url`, or `homepage`:

```
/link| url| homepage/
```

Note that if you want to search for any of the following characters, they must be escaped because they have special meanings in Regular Expressions:

\ | ( ) [ { ^ \$ \* + ? .

If you want to escape these characters, they must be preceded by a backslash (for example /\ \ / matches a backslash and /\\$/ matches a dollar sign).

The table that follows lists some other interesting characters.

Expression	Meaning
\n	Linefeed
\r	Carriage return
\t	Tab
\v	Vertical tab
\f	Form-feed
\d	A digit (same as [0-9], which means any digit 0 through 9)
\D	A non-digit (same as [^0-9] where ^ means not)
\w	A word (alphanumeric) character (same as [a-zA-Z_0-9])
\W	A non-word character (same as [^a-zA-Z_0-9])
\s	A white-space character (same as [ \t\v\n\r\f])
\S	A non-white-space character (same as [ ^\t\v\n\r\f])

So if you wanted to replace all carriage returns or linefeeds with an HTML <br /> tag, you could use the following (ch12\_eg04.html):

```
onclick="document.myForm.myTextArea.value=
    document.myForm.myTextArea.value.replace(/\r\n| \r| \n/g, '<br />');"
```

In this case the `replace()` method is looking for either linefeeds using \n or carriage returns using \r. Then the replacement string is <br />. Figure 12-4 shows you what this example could look like replacing the carriage returns and line feeds with <br /> tags. (In reality, you are more likely to use this function when the form is submitted by the user, rather than giving the user a button to perform the operation.)

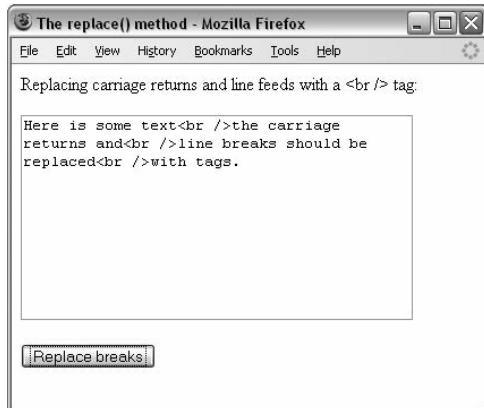


Figure 12-4

Netscape and IE have supported the `replace()` method with strings since version 3, and both introduced support for Regular Expressions in version 4. If you work with earlier browsers, you'll have to use `indexOf()` instead.

### Testing Characters Using Test and Regular Expressions

Regular Expressions can also be used to test patterns of strings entered by users. For example, they can be used to test whether there are any spaces in a string, whether the string follows the format of an e-mail address, whether it's an amount of currency, and so on. This uses the `test()` method like so: first you set variables to hold the return value of `true`, the value entered by a user, and a value to hold the Regular Expression (`ch12_eg05.html`):

```
function validate(form) {  
    var returnValue = true;  
    var amountEntered = document.frmCurrency.txtAmount.value;  
    var currencyFormat = /^ \d+(\.\d{1,2})?$/;
```

Then you test whether the value follows the correct format — if it does not, you alert the user, give focus back to the correct form element, and set the `returnValue` variable to `false`:

```
if (currencyFormat != test(amountEntered))  
{  
    alert("You did not enter an amount of money");  
    document.frmCurrency.txtAmount.focus();  
    returnValue = false;  
}  
return returnValue;  
}
```

Here is the simple form to test this example:

```
<form name="myForm" onsubmit="return validate(this);"  
      action="money.aspx" method="get">  
  Enter an amount of money here $
```

```
<input type="text" name="txtAmount" id="txtAmount" size="7" />
<input type="submit" value="Check format" />
</form>
```

Figure 12-5 shows this form in action.



**Figure 12-5**

Regular Expressions are not the easiest thing to learn to write, and you should pick up a book that covers how to write them if you want to start writing your own. However, the table that follows lists some helpful ones that you can use to get you started.

Test for	Description	Regular Expression
White space	No white-space characters.	\S/;
Alphabetic characters	No characters of the alphabet nor the hyphen, period, or comma may appear in the string.	/[^a-zA-Z \-\.\,\.]/gi;
Alphanumeric characters	No letters or number may appear in the string.	/[^a-zA-Z0-9]/gi;
Credit card details	A 16-digit credit card number following the pattern XXXX XXXX XXXX XXXX.	/^\d{4}([ -]?\d{4}){3}\$/;
Decimal number	A number with a decimal place.	/^\d+(\.\d+)?\$/;
Currency	A group of one or more digits followed by an optional group consisting of a decimal point plus one or two digits.	/^\d+(\.\d\{1,2\})?\$/;
E-mail address	An e-mail address.	/^[\w(\.\?[\w-])*@\w(\.\?[\w-])*\.][a-zA-Z]{2,6}(\.[a-zA-Z]{2})?\$/i;

## Chapter 12: Working with JavaScript

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### Select Box Options

If you want to check whether a user has selected one of the items from a select box, you need to use the `selectedIndex` property of the `select` object that represents the select box. If the user selects the first option, then the `selectedIndex` property will be given a value of 0; if the user selects the second option, the `selectedIndex` property will be given a value of 1, the third will be given a value of 2, and so on.

By default, if the user does not change the value that the control has when the page loads, the value will be 0 for a standard select box (and the first option is automatically selected when the form loads), whereas for a multiple select box the value will be 1 if none of the options are selected (which indicates that the user has not selected any option).

Look at the following simple select box, which asks the user to select a suit of cards (`ch12_eg06.html`):

```
<form name="frmCards" action="cards.aspx" method="get">
    onsubmit="return validate(this)">
    <select name="selCards" id="selCards">
        <option>Select a suit of cards</option>
        <option value="hearts">Hearts</option>
        <option value="diamonds">Diamonds</option>
        <option value="spades">Spades</option>
        <option value="clubs">Clubs</option>
    </select>
    <input type="submit" value="Send selection" />
</form>
```

Now, to check that one of the suits of cards has been selected, you have the `validate()` function, which will have been passed the `form` object as a parameter. In the case of this example, if the value is 0, then you have to alert the user that he has not selected one of the suits of cards and ask him to do so.

```
function validate(form) {
    var returnValue = true;
    var selectedOption = form.selCards.selectedIndex;
    if (selectedOption==0)
    {
        returnValue = false
        alert("Please select a suit of cards.");
    }
    return returnValue;
}
```

In Figure 12-6, you can see the warning if the user has not selected a suit of cards.

Note that if you wanted to collect the value of the selected option from the drop-down box you would use the following syntax:

```
form.selCards.options[selected].value
```

This is because you need to look at which of the `[option]` elements was selected to get its value rather than just the index number of the selected element.

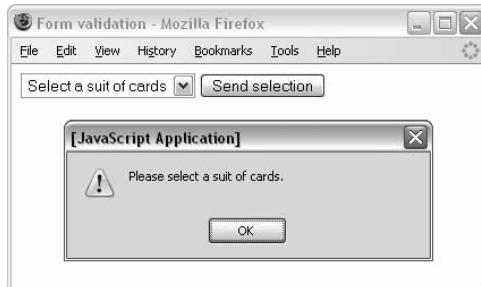


Figure 12-6

### Radio Buttons

A group of radio buttons is different from other form controls in that they share a value for the name attribute and only one of the radio buttons can be selected at a time.

If you want to ensure that a radio button has been selected you can either preselect one of the radio button values or you can loop through the RadioButton object's checked properties to see if one has been selected.

For example, the following is a form with four radio buttons (ch12\_eg07.html):

```
<form name="frmCards" action="cards.aspx" method="post"
      onsubmit="return validateForm(this) " >
    <p>Please select a suit of cards.</p>
    <p><input type="radio" name="radSuit" value="hearts" /> Hearts </p>
    <p><input type="radio" name="radSuit" value="diamonds" /> Diamonds </p>
    <p><input type="radio" name="radSuit" value="spades" /> Spades </p>
    <p><input type="radio" name="radSuit" value="clubs" /> Clubs </p>
    <p><input type="submit" value="Submit choice" /></p>
</form>
```

Remember that a group of radio buttons will share the same name, so you need to loop through each of the radio buttons in the collection and see if one has a checked property; to do this, you will use a for loop. This function uses a variable I will call radioChosen to indicate whether one of the radio buttons has been chosen. If a button has been chosen, its value is set to true. Then there is a test after each of the radio buttons has been looped through to check this value:

```
function validate(form) {
  var radioButtons = form.radSuit;
  var radioChosen = false;
  for (var i=0; i<radioButtons.length; i++) {
    if (radioButtons[i].checked)
    {
      radioChosen=true;
      returnValue=true;
    }
  }
}
```

## Chapter 12: Working with JavaScript

```
if (radioChosen == false) {  
    returnValue = false;  
    alert("You did not select a suit of cards");  
}  
return returnValue;  
}
```

Note that, while the order of attributes on an element should not matter in XHTML, there was a bug in Netscape 6 and some versions of Mozilla that means it will show a checked property of the radio button only if the type attribute is the first attribute given on the `<input />` element.

You can see the result in Figure 12-7.

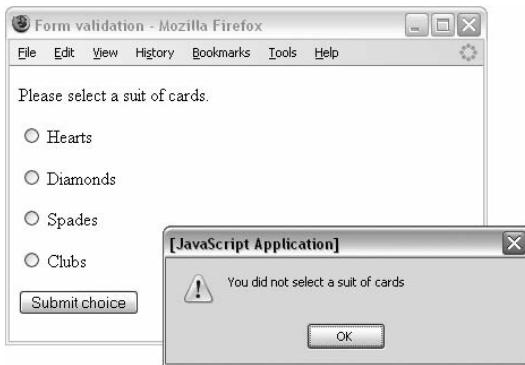


Figure 12-7

### Checkboxes

Checkboxes allow a user to select zero, one, or more items from a set of choices. While a group of checkboxes can share the same name, they are not mutually exclusive as radio buttons are, although they are made available in JavaScript as an array, just like the radio buttons.

The following is a slight change to the last example using checkboxes instead of radio buttons, and the user can select more than one suit of cards (ch12\_eg08.html):

```
<form name="frmCards" action="cards.aspx" method="post">  
    <p>Please select one or more suits of cards.</p>  
    <p><input type="checkbox" name="chkSuit" value="hearts" /> Hearts </p>  
    <p><input type="checkbox" name="chkSuit" value="diamonds" /> Diamonds </p>  
    <p><input type="checkbox" name="chkSuit" value="spades" /> Spades </p>  
    <p><input type="checkbox" name="chkSuit" value="clubs" /> Clubs </p>  
    <p><input type="button" value="Count checkboxes"  
        onclick="countCheckboxes(frmCards.chkSuit)" /></p>  
</form>
```

The following is the function that counts how many checkboxes have been selected and displays that number to the user. As with the last example, if no checkboxes have been selected, you can alert the user that she must enter a value.

```
function countCheckboxes(field) {
    var intCount = 0
    for (var i = 0; i < field.length; i++) {
        if (field[i].checked)
            intCount++;
    }
    alert("You selected " + intCount + " checkbox(es)");
}
```

You can see the form in Figure 12-8 where the user has selected two checkboxes.

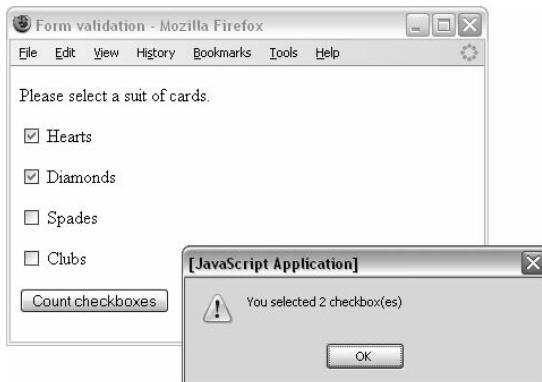


Figure 12-8

### **Preventing a Form Submission Until a Checkbox Has Been Selected**

If you want to ensure that a checkbox has been selected — for example, if you want a user to agree to certain terms and conditions — you can do so by adding a function to the `onsubmit` event handler similar to those you have seen already. The function checks whether the checkbox has been checked, and if the function returns `true` the form will be submitted. If the function returns `false`, the user would be prompted to check the box. The function might look like this (`ch12_eg09.html`):

```
function checkCheckBox(myForm) {
    if (myForm.agree.checked == false )
    {
        alert('You must agree to terms and conditions to continue');
        return false;
    } else
        return true;
}
```

Another common technique is to use script to simply disable the Submit button until users have clicked the box to say that they agree with the terms and conditions.

*If you use a script to re-enable a disabled form control, then you should disable the control in the script when the page loads rather than using the `disable` attribute on the element itself. This is important for those who do not have JavaScript enabled in their browsers. If you use the `disabled` attribute on a `<form>` element and users do not have JavaScript enabled, they will never be able to use that form*

## Chapter 12: Working with JavaScript

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*control. However, if you have used a script to disable it when the page loads, then you know that the script will be able to re-enable the form control when the user clicks the appropriate box. This is a great reminder that JavaScript should be used to enhance usability of pages and should not be required in order to use a page.*

The following is a very simple page with a form. When the page loads, the Submit button is disabled in the onload event. If the user clicks the chkAgree checkbox, then the Submit button will be re-enabled (ch12\_eg09.html):

```
<body onload="document.frmAgree.btnSubmit.disabled=true">
<form name="frmAgree" action="test.aspx" method="post">
I understand that this software has no liability:
<input type="checkbox" value="0" name="chkAgree" id="chkAgree"
       onclick="document.frmAgree.btnSubmit.disabled=false" />
<input type="submit" name="btnSubmit" value="Go to download" /><br />
<p>You will not be able to submit this form unless you agree to the
   <a href="terms.html">terms and conditions</a> and check the terms and
   conditions box.</p>
</form>
</body>
```

You can see this example in Figure 12-9. Note how there is an explanation of why the Submit button might be disabled. This helps users understand why they might not be able to click the Submit button.

This technique can also be used with other form controls — you will see an example that enables a text input later in the chapter.

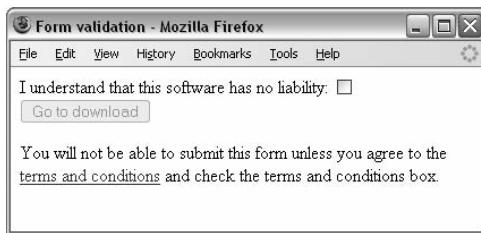


Figure 12-9

## Form Enhancements

The examples you are going to meet in this section do not actually help you validate a form; rather, they simply enhance the usability of a form.

### Focus on First Form Item

If your form starts with a text box, you can give focus to that text box so that users do not have to move their mouse, click the text input, and then move their hands back to the keyboard before they enter any text.

To give focus to the first text input on a form, simply add an `onload` event handler to the `<body>` element of the document. This handler selects the form control that you want to highlight and uses the `focus()` method of that control to give it focus, as follows (`ch12_eg10.html`):

```
<body onload="document.myForm.myTextBox.focus();">
```

When the page loads, the cursor should be flashing in the form control that you have selected, ready for the user to enter some text See Figure 12-10.

Note that the `onload` event fires when the complete page has loaded (not as soon as it is come across in the order of the page).



Figure 12-10

### Auto-Tabbing Between Fields

The `focus()` method can also be used to pass the focus of one control to another control. For example, if one of the controls on a form is to provide a date of birth in MM/DD/YYYY format, then you can move focus between the three boxes as soon as the user enters a month, and then again once the user has entered a day (`ch12_eg11.html`):

```
<form name="frmDOB">
    Enter your date of birth:<br />
    <input name="txtMonth" id="txtMonth" size="3" maxlength="2"
        onkeyup="if(this.value.length>=2)
            this.form.txtDay.focus();"/>
    <input name="txtDay" id="txtDay" size="3" maxlength="2"
        onkeyup="if(this.value.length>=2)
            this.form.txtYear.focus();"/>
    <input name="txtYear" id="txtYear" size="5" maxlength="4"
        onkeyup="if(this.value.length>=4)
            this.form.submit.focus();"/>
    <input type="submit" name="submit" value="Send" />
</form>
```

This example uses the `onkeyup` event handler to check that the length of the text the user has entered is equal to or greater than the required number of characters for that field. If the user has entered the required number of characters, the focus is moved to the next box.

Note how the length of the text input is discovered using `this.value.length`. The `this` keyword indicates the current form control, whereas the `value` property indicates the value entered for the control.

## Chapter 12: Working with JavaScript

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Then the `length` property returns the length of the value entered for the control. This is a quicker way of determining the length of the value in the current form control than the full path, which would be, as follows:

```
document.fromDOB.txtMonth.value.length
```

*The other advantage of using the `this` keyword rather than the full path is that the code would work if you copied and pasted these controls into a different form, as you have not hard-coded the name of the form in.*

You can see this example in Figure 12-11; the user has entered an appropriate number of digits in one field so the focus is moved on to the next.

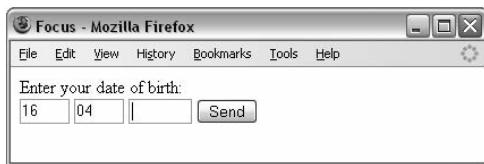


Figure 12-11

You might have noticed that the value of the `size` attribute is also one digit larger than the maximum length of the field to ensure that there is enough space for all of the characters (usually the width of the control will be slightly too small to see all of the characters at once).

*I have seen this technique used to allow users to enter their credit card details using four blocks of four codes. While 16 digits is the most common length for a credit card number, and they are often printed in blocks of four digits, some Visa cards, for example, contain 13 digits and some American Express cards use 15 digits.*

## **Disabling a Text Input**

Sometimes you will want to disable a text input until a certain condition has been met — just as the Submit button was disabled until the user clicked the checkbox to agree to terms and conditions in Figure 12-9.

This example features a form that asks users how they heard about the site; radio buttons are used for several options such as Friend, TV ad, magazine ad, and then an option of Other. If the user selects the Other option, the text input next to that option allows the user to indicate how they heard about the site. You can see the form in Figure 12-12.

In this example, it's not just a case of enabling the text box when the user selects the other radio button; you really need to check the value of each radio button as it is selected — after all, if the user selects Other as his or her first choice, but then changes her mind and selects TV or one of the other options, you will want to disable the text input and change its value again. Therefore, each time the user selects a radio button, a function in the head of the document is called that is responsible for enabling and disabling the control and setting values.



Figure 12-12

First, here is the form that gives users the options (`ch12_eg12.html`). Note how the text input is disabled using the `onload` event handler of the `<body>` element and that the text input does not use the `disabled` attribute (this is the same as the earlier example with the Submit button).

```
<body onload="document frmReferrer.txtOther.disabled=true;
            document frmReferrer.txtOther.value='not applicable' ">
<h2>How did you hear about us?</h2>
<form name="frmReferrer">
    <input type="radio" name="radHear" value="1"
           onclick="handleOther(this.value); " />From a friend<br />
    <input type="radio" name="radHear" value="2"
           onclick="handleOther(this.value); " />TV Ad<br />
    <input type="radio" name="radHear" value="3"
           onclick="handleOther(this.value); " />Magazine Ad<br />
    <input type="radio" name="radHear" value="4"
           onclick="handleOther(this.value); " />Newspaper Ad<br />
    <input type="radio" name="radHear" value="5"
           onclick="handleOther(this.value); " />Internet<br />
    <input type="radio" name="radHear" value="other"
           onclick="handleOther(this.value); " />Other... Please specify:
    <input type="text" name="txtOther" />
</form>
```

As you can see from this form, every time the user selects one of the options on this form, the `onclick` event calls a function called `handleOther()`. This function is passed the value of the form control as a parameter.

Looking at the function, you can see that it checks whether the value of the form control is equal to the text `other` (remember that checking whether one value is equal to another value uses two equal signs because the single equal sign is used to set a variable).

```
function handleOther(strRadio) {
    if (strRadio == "other") {
        document frmReferrer.txtOther.disabled = false;
        document frmReferrer.txtOther.value = "";
    }
    else {
```

## Chapter 12: Working with JavaScript

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```
        document frmReferrer.txtOther.disabled = true;
        document frmReferrer.txtOther.value = 'not applicable';
    }
}
```

Here you can see a simple `if...else` statement that looks at the value of the radio button, which has been passed in as an argument. If the value is `other`, the control is enabled, and the value set to nothing — otherwise it is disabled and the value is `not applicable`.

## Case Conversion

There are times when it is helpful to change the case of text a user has entered to make it all uppercase or all lowercase — in particular because JavaScript is case-sensitive. To change the case of text, there are two built-in methods of JavaScript's String object:

- ❑ `toLowerCase()`
- ❑ `toUpperCase()`

To demonstrate, here is an example of a text input that changes case as focus moves away from the text input (`ch12_eg13.html`):

```
<form>
  <input type="text" name="case" size="20"
         onblur="this.value=this.value.toLowerCase();" />
</form>
```

*If your form data is being sent to a server, it is generally considered better practice to make these changes on the server because they are less distracting for users — a form that changes letter case as you use it can appear a little odd to users.*

## Trimming Spaces from Beginning and End of Fields

You might want to remove spaces (white space) from the beginning or end of a form field for many reasons, even simply because the user did not intend to enter it there. The technique I will demonstrate here uses the `substring()` method of the String object, whose syntax is:

```
substring(startPosition, endPosition)
```

This method returns the string from the given points — if no end position is given, then the default is the end of the string. The start and end positions are zero-based, so the first character is 0. For example, if you have a string that says `Welcome`, then the method `substring(0, 1)` returns the letter `W`.

Looking first at removing leading white space from the start of a string, the `substring()` method will be called upon twice.

First you can use the `substring()` method to retrieve the value the user has entered into a text control and just return the first character. You check if this first character returned is a space:

```
this.value.substring(0,1) == ' '
```

If this character is a space, you call the `substring()` method a second time to remove the space. This time it selects the value of the control from the second character to the end of the string (ignoring the first character). This is set to be the new value for the form control; so you have removed the first character, which was a space.

```
this.value = this.value.substring(1, this.value.length);
```

This whole process of checking whether the first character is a blank, and then removing it if it is, will be called using the `onblur` event handler; so when focus moves away from the form control the process starts. You can see here that the process uses a `while` loop to indicate that for as long as the first character is a blank then it should be removed using the second call to the `substring()` method. This loop makes sure that the first character is removed if it is a blank until the `substring` no longer returns a blank as the first character (`ch12_eg14.html`).

```
<form>
  <input type="text" name="txtName" size="100"
    value=" Enter text leaving whitespace at start. Then change focus."
    onblur="while (this.value.substring(0,1) == ' ')
      this.value = this.value.substring(1, this.value.length); " /><br />
</form>
```

To trim any trailing spaces the process is similar but reversed. The first `substring()` method collects the last character of the string, and if it is blank removes it, as follows:

```
<form>
  <input type="text" name="txtName" size="100"
    value="Enter text leaving whitespace at end. Then change focus. "
    onblur="while (this.value.substring(
      (this.value.length-1, this.value.length) == ' '))
      this.value = this.value.substring(0, this.value.length-1); " /><br />
</form>
```

As long as you are not targeting browsers as old as Netscape 4 and IE4, you can alternatively use a Regular Expression to trim the spaces, as follows:

```
<form>
  <input type="text" name="removeLeadingAndTrailingSpace" size="100"
    value=" Enter text with white space, then change focus. "
    onblur = "this.value = this.value.replace(/^\s+/, "").replace(/\s+$/, "")";
  /><br />
</form>
```

This removes both trailing and leading spaces.

Regular Expressions are quite a large topic in themselves. If you want to learn more about them, then you can refer to *Beginning JavaScript 2nd Edition* by Paul Wilton (Wrox, 2000).

## Selecting All the Content of a Text Area

If you want to allow users to select the entire contents of a text area (so they don't have to manually select all the text with the mouse), you can use the `focus()` and `select()` methods.

## Chapter 12: Working with JavaScript

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In this example, the `selectAll()` function takes one parameter, the form control that you want to select the content of (`ch12_eg15.html`):

```
<html>
<head><title>Select whole text area</title>
<script language="JavaScript">
    function selectAll(strControl) {
        strControl.focus();
        strControl.select();
    }
</script>
</head>
<body>
    <form name="myForm">
        <textarea name="myTextArea" rows="5" cols="20">This is some text</textarea>
        <input type="button" name="btnSelectAll" value="Select all"
               onclick="selectAll(document.myForm.myTextArea);"/>
    </form>
</body>
</head>
</html>
```

The button that allows the user to select all has an `onclick` event handler to call the `selectAll()` function and tell it which control it is whose contents should be selected.

The `selectAll()` function first gives that form control focus using the `focus()` method and then selects its content using the `select()` method. The form control must gain focus before it can have its content selected. The same method would also work on a single-line text input and a password field.

## Check and Uncheck All Checkboxes

If there are several checkboxes in a group of checkboxes, it can be helpful to allow users to select or deselect a whole group of checkboxes at once. The following are two functions that allow precisely this:

```
function check(field) {
    for (var i = 0; i < field.length; i++) {
        field[i].checked = true;
    }
}
function uncheck(field) {
    for (var i = 0; i < field.length; i++) {
        field[i].checked = false;
    }
}
```

In order for these functions to work, more than one checkbox must be in the group. You then add two buttons that call the `check` or `uncheck` functions, passing in the array of checkbox elements that share the same name such as the following (`ch12_eg16.html`):

```
<form name="frmSnacks" action="">
    Your basket order<br />
```

```
<input type="checkbox" name="basketItem" value="1" />Chocolate  
cookies<br />  
<input type="checkbox" name="basketItem" value="2" />Potato chips<br />  
<input type="checkbox" name="basketItem" value="3" />Cola<br />  
<input type="checkbox" name="basketItem" value="4" />Cheese<br />  
<input type="checkbox" name="basketItem" value="5" />Candy bar<br /><br />  
<input type="button" value="Select All"  
onclick="check(document frmSnacks.basketItem); " />  
  
<input type="button" value="Deselect All"  
onclick="uncheck(document frmSnacks.basketItem); " />  
</form>
```

You can see how this form appears in Figure 12-13.



Figure 12-13

This could also be combined into a single function, which could be called from the same button such as the following:

```
function checkUncheckAll(field) {  
    var theForm = field.form, z = 0;  
    for(z=0; z<theForm.length;z++){  
        if(theForm[z].type == 'checkbox' && theForm[z].name != 'checkall') {  
            theForm[z].checked = field.checked;  
        }  
    }  
}
```

---

### Try It Out      An E-mail Form

In this exercise you are going to create an e-mail form that has a few interesting features. It uses a Regular Expression to check the structure of an e-mail address and also checks that all fields have an entry of some kind. The form includes a quick address book that contains addresses of potential recipients of the e-mail. Figure 12-14 shows you what the form is going to look like; it also shows the message that appears when the user tries to submit the e-mail without entering a message.

## Chapter 12: Working with JavaScript

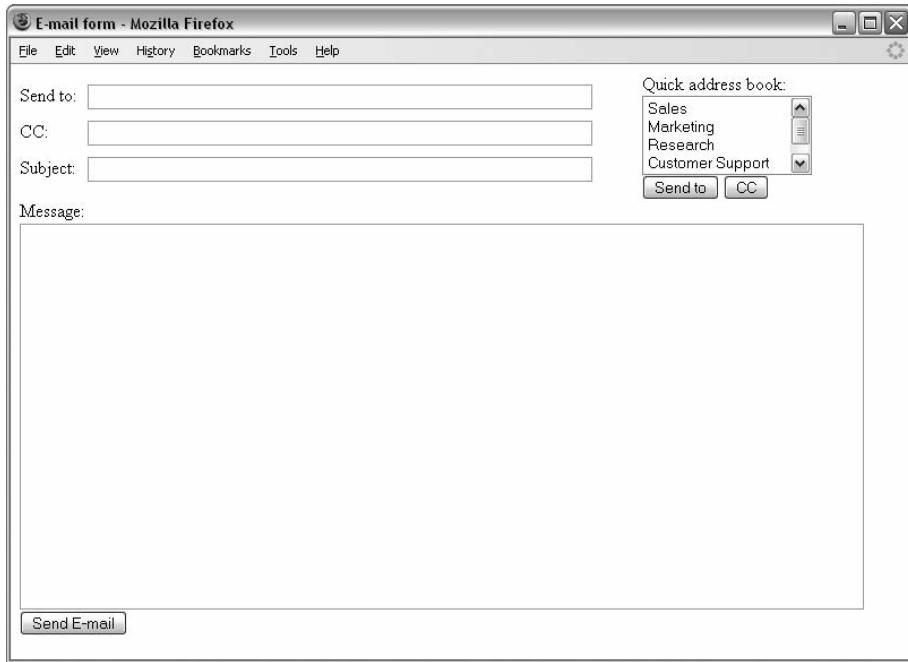


Figure 12-14

1. First create a skeleton XHTML document with `<head>`, `<title>`, and `<body>` elements.
2. In the body of the document, add the `<form>` element and two `<div>` elements. The first `<div>` holds the To, CC, and Subject fields, while the second holds the quick address.

```
<form name="frmEmail" onsubmit="return validate(this)" action="sendMail.aspx"
      method ="post">
  <div id="toCCsubject">
    <div class="label">Send to:</div>
    <div class="input"><input type="text" size="70" name="txtTo" /></div>

    <div class="label">CC:</div>
    <div class="input"><input type="text" size="70" name="txtCC" /></div>

    <div class="label">Subject:</div>
    <div class="input"><input type="text" size="70" name=
      "txtSubject" /></div>

  </div>
  <div id="addressBook">
    <!-- quick address book will go here --></td>
  </div>
```

3. Next you need to add the quick address book into the second `<div>` element. The address book uses a multiple select box. Underneath it are two buttons: one to add addresses to the `txtTo`

field and one to add addresses to the txtCC field. Both of these buttons call the add() function when clicked:

```
Quick address book:<br />
<select size="4" name="selectList1" style="width:150px">
    <option value="sales@example.org">Sales</option>
    <option value="marketing@example.org">Marketing</option>
    <option value="research@example.org">Research</option>
    <option value="support@example.org">Customer Support</option>
    <option value="it@example.org">IT</option>
</select><br />
<input type="button" onclick="add(textTo, document frmEmail.selectList1);"
       value="Send to" />
<input type="button" onclick="add(textCC, document frmEmail.selectList1);"
       value="CC" />
```

4. Add the message <textarea> element and a Send E-mail button:

```
Message:<br />
<textarea name="message" rows="20" cols="115"></textarea><br />
<input type="submit" value="Send E-mail" />
```

5. Now you need to add the validation function and the add() function. First, here is the add() function that adds e-mail addresses from the address book to the To or CC fields (if there is already an address in there, the semicolon is added to separate out multiple addresses):

```
function add(objInput, objList){\{}  
var strGroup = objList.options[objList.selectedIndex].value;  
if (objInput.value == "")  
{  
    objInput.value = strGroup  
}  
else  
{  
    objInput.value += ('; ' + strGroup)  
}  
}
```

6. Here is the validate() function, which you can see is quite long:

```
function validate(form) {  
    var returnValue = true;  
    var sendTo = form.txtTo.value;  
    var cc = form.txtCC.value;  
    var subject = form.txtSubject.value;  
    var message = form.txtMessage.value;  
    if (sendTo == "")  
{  
        returnValue = false;  
        alert("There are no email addresses in the To field");  
        form.txtTo.focus();  
    }
```

## Chapter 12: Working with JavaScript

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```
if (subject == "")  
{  
    returnValue = false;  
    alert("There is no subject line for this e-mail");  
    form.txtSubject.focus();  
}  
if (message=="")  
{  
    returnValue = false;  
    alert("There is no message to this e-mail");  
    form.txtMessage.focus();  
}  
var arrTo = sendTo.split("; ");  
var rxEmail=/^\w(\.?[\w-])*@\w(\.?[\w-])*\.[a-z]{2,6}(\.[a-z]{2})?$/i;  
for (var i=0; i<(arrTo.length); i++) {  
    if (!rxEmail.test(arrTo[i]))  
    {  
        returnValue = false;  
        alert("The e-mail address "+ arrTo[i] +" does not appear to be valid");  
    }  
}  
var arrCC = cc.split("; ");  
for (var i=0; i<(arrCC.length); i++) {  
    if (!rxEmail.test(arrCC[i]))  
    {  
        returnValue = false;  
        alert("The e-mail address "+ arrCC[i] +" does not appear to be valid");  
    }  
}  
return returnValue;  
}
```

7. Save the file as `emailform.html`, and when you open it up in the browser window it should resemble the example you saw in Figure 12-14.

### How It Works

The form in this example contains two functions. The first is the `add()` function, which passes the e-mail addresses from the select box to the To or CC fields. The `add()` function is very simple and takes two parameters:

- ❑ `objInput`: The field that the selected address is being sent to
- ❑ `objList`: The select list that contains the e-mail addresses

This function starts by collecting the value of the selected item, using the `selectedIndex` property of the select list and placing it in a variable called `strGroup`. Next it checks whether the form field the address is being added to is empty; if it is, the e-mail address stored in the `strGroup` attribute is added to the field. If the To or CC field is not empty, a semicolon and a space will be added before the e-mail address because this is the usual delimiter for multiple e-mail addresses:

```
function add(objInput, objList){  
var strGroup = objList.options[objList.selectedIndex].value;  
if (objInput.value == "")  
{
```

```
        objInput.value = strGroup
    }
} else
{
    objInput.value += ('; ' + strGroup)
}
}
```

The `validate()` function is slightly more complex, starting off by setting a `returnValue` variable to `true` and collecting the form's values into variables.

```
function validate(form) {
    var returnValue = true;
    var sendTo = form.txtTo.value;
    var cc = form.txtCC.value;
    var subject = form.txtSubject.value;
    var message = form.txtMessage.value;
```

It checks to see if the To, Subject line, and Message body fields are empty, and if so sets the `returnValue` attribute to `false`, and indicates to the user that something must be added for that field using an alert box — this is very similar to the examples you saw earlier in the chapter:

```
if (sendTo == "") {
    returnValue = false;
    alert("There are no e-mail addresses in the To field");
    form.txtTo.focus();
}
```

The `validate` function gets more interesting when it comes to checking that valid e-mail addresses have been entered into the form. First, the Regular Expression that's used to check the e-mail addresses needs to be stored in a variable — this time called `rxEmail`:

```
var rxEmail=/^\w(\.?[\w-])*@\w(\.?[\w-])*\.([a-z]{2,6}(\.[a-z]{2}))?$/i;
```

Next, the `To` field gets split into an array using the `split()` method of the String object. This function will take a string and split it into separate values whenever it comes across a specified character or set of characters. In this case, the method looks for any instances of a semicolon followed by a space, and wherever it finds these it creates a new item in the array.

```
var arrTo = sendTo.split("; ");
```

Imagine having the following e-mail addresses (note that this is just to illustrate the `split()` method; it is not part of the code):

```
sales@example.com; accounts@example.com; marketing@example.com
```

These would be split into the following array (again, this is not part of the code from the example):

```
arrTo[0] = "sales@example.com"
arrTo[1] = "accounts@example.com"
arrTo[2] = "marketing@example.com"
```

## Chapter 12: Working with JavaScript

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So now there has to be a `for` loop in the code that will go through each e-mail address in the array and check that it follows the pattern described in the Regular Expression. The `for` loop has three parameters; the first sets a counter called `i` to be 0, checks that the counter is less than the number of items in the array, and finally increments the counter. Inside the loop is an `if` statement that checks whether the e-mail address matches the Regular Expression using the `test()` method; if it does not, it will set the `returnValue` to `false` and alert the user that the value does not seem to be a valid e-mail address:

```
for (var i=0; i<(arrTo.length); i++) {  
    if (!rxEmail.test(arrTo[i]))  
    {  
        returnValue = false;  
        alert("The email address "+ arrTo[i] +" does not appear to be valid");  
    }  
}
```

After this you can see a similar setup for the CC field.

```
var arrCC = cc.split("; ");  
for (var i=0; i<(arrCC.length); i++) {  
    if (!rxEmail.test(arrCC[i]))  
    {  
        returnValue = false;  
        alert("The e-mail address "+ arrCC[i] +" does not appear to be valid");  
    }  
}  
return returnValue;
```

Now you have an example of a form that has more than one function. It uses JavaScript to create a quick address book and validates the entries to stop the user from trying to send an e-mail address that is not valid.

---

## Image Rollovers

You met a simple example of an image rollover in the last chapter, but in this chapter you will meet a function that allows you to change several images on the same page. This function can then be used with all pages rather than repeating the same script in several pages.

To create a rollover image you need two different versions of an image:

- The normal image that the user sees when the mouse is not hovering over the image.
- The other image that appears when the user rolls the mouse over the image.

In the last chapter, you saw a very simple image rollover script that was added to an `<a>` element that contained the image. When the user rolls the mouse over the link (containing the image) an `onmouseover` event fires and the `src` property of the image object is changed to the mouseover image. When the mouse moves off the image the `onmouseout` event changes the image's `src` property back to the original image.

(If only one of these events were monitored, the image would simply change, not go back to its initial state, so it's important to monitor both.)

You can see that this image's name attribute has a value of button, which is used to identify the image in the event handler:

```
<a href=""  
onmouseover="document.images.button.src='click_red.gif';"  
onmouseout="document.images.button.src='click_green.gif'>  
  <img src='click_green.gif' width="100" height="50" border="0" name="button" />  
</a>
```

Remember that each image in the document has its own corresponding object in the DOM, and one of the properties of the image object is the src property. The src property is the location for the image, which corresponds to the value specified in the src attribute on the <img> element in the document.

*When creating rollover images that contain text, you should generally use the same size and weight of text on both images. Text that suddenly appears larger or bold can be hard to read. Changing the background color slightly tends to be a better option.*

Creating an image rollover function is the logical next step when you want to use the same rollover images on several pages — for example if you are creating a navigation bar that changes color as users move their mouse over each item. Figure 12-15 shows you a navigation bar that does just that.



Figure 12-15

Each image in this navigation bar is contained in a link, and each image must have a different name. As with the last example, it is the <a> element that carries the event handlers. When the user places the mouse over the link, an onmouseover event calls the changeImages() function, and when the mouse moves off the link an onmouseout event calls the same function but passes in values to indicate that the original image should be shown again.

The changeImages() function has two arguments — the first is the name of the image, the second is the name of a variable that holds the URL of the image that will replace the current one. Note how the value of the image's name attribute corresponds with the parameters being passed when the onmouseover and onmouseout events fire (ch12\_eg17.html):

```
<a href="index.html"  
onmouseover="changeImages('image1', 'image1on')"  
onmouseout="changeImages('image1', 'image1off')">  
    
</a>
```

## Chapter 12: Working with JavaScript

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This script that does the real work lives in the `scripts` folder and is in a file called `rollover.js`. This script can be included in any page that is going to include a rollover.

Remember that there are two images for each rollover — when the mouse is over the image it is “on,” and when the mouse is off the image it is “off.”

Each image is assigned two variables, one for when the mouse is over it and one for when it is off it. The variables hold an image object whose `src` property is the URL for the image. First you see the images used when there are rollovers and then the images used in the normal state:

```
if (document.images) {  
    image1on = new Image();  
    image1on.src = "images/nav_home_on.gif";  
    image2on = new Image();  
    image2on.src = "images/nav_products_on.gif";  
    image3on = new Image();  
    image3on.src = "images/nav_services_on.gif";
```

Next come the variables holding the image objects that have the `src` property set for when the image is “off.”

```
image1off = new Image();  
image1off.src = "images/nav_home.gif";  
image2off = new Image();  
image2off.src = "images/nav_products.gif";  
image3off = new Image();  
image3off.src = "images/nav_services.gif";  
}
```

Now, here's the function; it loops through the images and takes the arguments passed into the function:

```
function changeImages() {  
    if (document.images) {  
        for (var i=0; i<changeImages.arguments.length; i+=2) {  
            document[changeImages.arguments[i]].src =  
                eval(changeImages.arguments[i+1] + ".src");  
        }  
    }  
}
```

The lines that are doing the real work here are the ones in the middle. If the user has moved his or her mouse over the first image, the function will be called like this:

```
onsubmit="changeImages(image1, image1on)"
```

The first value being passed in is the value of the `name` property on the image. So the following line in the function tells the browser to take the first argument of the `changeImages()` function (which is `image1`) and change the `src` property of this element:

```
document[changeImages.arguments[i]].src =
```

The last thing on this line is the equal (=) sign. This property still has to be set, and the code on the next line is the code that actually provides the value. This next line is saying the property should be given the value of the second argument in the function:

```
eval(changeImages.arguments[i+1] + ".src");
```

You may remember from the last chapter that the `for` loop takes the following three arguments:

- ❑ The first argument runs only once and in this case sets the value of the counter to be 0 (`i=0`).
- ❑ The second argument indicates whether the loop should run again. In this case, if the counter is less than the number of arguments passed to the `changeImages()` function, it should run again.
- ❑ The third argument increments the counter by two.

This means that the `changeImages()` function can be used to change more than one image, because you can call the function with different sets of parameters.

## Random Script Generator

There are times when it is helpful to use a script to select a random value. The following script can be used to select a random piece of content from a predefined array. You might like to use it to add random quotes or tips, or you could use it to rotate advertisements or images. The script contains a function called `randomContent()` that includes the content that will be selected at random.

The content is added to an array called `arrContent` and the array contains the data you want to appear randomly:

```
<script language="JavaScript">
function randomContent(){
    var arrContent=new Array()
    arrContent[0]='This is the first message.'
    arrContent[1]='This is the second message.'
    arrContent[2]='This is the third message.'
    arrContent[3]='This is the fourth message.'
    arrContent[4]='This is the fifth message.'
```

A variable called `i` is then set to a random value between 0 and the number of items in the array. In order to generate this random number, you need to call two methods of the `Math` object. The `random()` method generates a random number between 0 and 1 and this is multiplied by the number of elements in the array. The number is then rounded to the nearest integer (whole number) equal to or less than the number generated using the `floor()` method.

The `floor()` method is used rather than the `round()` method because you could end up with a number higher than the number of items in the array if you used the `round()` method.

```
var i=Math.floor(Math.random()*arrContent.length)
document.write(arrContent[i])
}
```

## Chapter 12: Working with JavaScript

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Wherever you want to include the random content, you just call that function:

```
<script type="text/JavaScript">
    randomContent();
</script>
```

You can see the result here in Figure 12-16.



Figure 12-16

If you wanted the random content to appear on several pages, then you could simply place the function in an external file.

## Pop-Up Windows

Pop-up windows have a bad name. People associate them with pop-up ads that appear when pages of a site load, and they often feature advertisements or unwanted information. There are, however, some very legitimate uses for pop-up windows. For example, you might just want to keep users on the current page while allowing them to provide some other information in a pop-up, or you might want to open something from your site (such as an image) in a new window without the user losing his or her place.

Of course, you can create a normal link and make the page open in a new window by adding the `target=_new` attribute, but when you create a pop-up in JavaScript you can control the dimensions of the window, indicate whether it can be resized or not, and whether it has scrollbars (`ch12_eg19.html`).

```
<a
    href="http://google.com/"
    onclick="window.open(this.href, 'search',
    'width=400,height=300,scrollbars,resizable');
    return false;"
>
Click here for the link to open in a popup window.
</a>
```

You can see that the `open()` method of the `window` object can take several parameters; the syntax is as follows:

```
open(url, 'windowname', 'features')
```

You can list several features after the window name, and the following table shows you those available. As you can see, they allow you to control several properties of the window including size and position and whether the screen has scrollbars or not — but remember that users with different resolution might require scrollbars even if you do not.

Feature	Value	Sets
width	Number	The width of the new window in pixels
height	Number	The height of the new window in pixels
left	Number	The location where the left side of the window should appear
top	Number	The location where the top of the window should appear
location	yes/no	Controls whether the browser should display the browser location toolbar
menubar	yes/no	Controls whether the browser should display the menu bar
resizable	yes/no	Allows the user to resize the browser window
scrollbars	yes/no	Controls whether horizontal or vertical scrollbars are shown
status	yes/no	Controls the display of the status bar (the area at the bottom of the browser)
toolbar	yes/no	Controls whether the browser should display the buttons toolbar

You should be aware that some pop-up blocking software might prevent functions like this from working. You should also avoid using words such as “pop-up” (or “popup”) in your filenames even when creating pop-up windows because some pop-up window blockers look for words like these in your filenames and will not open files containing them.

*You can create pop-up windows in JavaScript in several ways, but I strongly recommend that you use this approach if you choose to create them with JavaScript because many other methods prevent a user from right-clicking the link and opening it in a new window themselves. More experienced web browsers often enable you to open a link in a new window with the right mouse button, and some methods of creating pop-ups mean that users who take this approach (choosing to open the link in a new window themselves) will just get a blank window. This approach solves the problem.*

## JavaScript Libraries

The examples you have seen so far in this chapter have been designed to give you a better understanding of how JavaScript works with your XHTML documents. Now you are going to take a look at some examples that work with some of the popular free JavaScript libraries that you can download via the Web.

## Chapter 12: Working with JavaScript

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JavaScript libraries are simply JavaScript files that contain code that helps programmers perform tasks commonly used in web pages with just a few lines of code. You will be looking at examples that allow you to do the following:

- Create animated effects, such as fading out text, or shrinking boxes
- Re-order items in a bulleted list
- Sort tables
- Create calendars
- Auto-complete text fields

There are many JavaScript libraries that you can download from the Web; however, in this chapter you will be looking at Scriptaculous (which is actually built on top of another JavaScript library called Prototype), MochiKit, and Yahoo User Interface (also known as YUI).

I have included versions of each of these libraries with the code download for this chapter. If you look in the code folder for Chapter 12, you will see inside the scripts folder that there are folders called scriptaculous, mochikit, and yui (each folder corresponding to the three libraries you will be using).

### ***Animated Effects using Scriptaculous***

Scriptaculous can help you with many kinds of tasks: animation, drag-and-drop functionality, editing tools, and autocompleting of text inputs, as well as utilities to help create DOM fragments. In this section, you look at some of the animation effects.

As I've already mentioned, Scriptaculous was built on top of another JavaScript library called Prototype. I have included a copy of Scriptaculous 1.8.0 and Prototype 1.6.0 with the code download for this chapter; however, you can check for more recent versions and download your own copy of these files from <http://script.aculo.us/>.

Scriptaculous contains functions that help you create several different types of animations. This example is going to demonstrate just four of the animated effects you can achieve with Scriptaculous, but this will be enough to demonstrate the flexibility of these effects, and how easily you can integrate them into your pages. You can see what this page will look like in Figure 12-17, although you really need to try the example out to see the animation effects in ch12\_eg20.html.

In order to use the Scriptaculous library, you need to create references to both `prototype.js` library, which is in the `lib` folder inside the `scriptaculous` folder, and the `scriptaculous.js` library, which is in the `src` folder inside the `scriptaculous` folder (if you look in the `src` folder there are several other scripts that this JavaScript file loads).

```
<script src="scripts/scriptaculous/lib/prototype.js"
       type="text/javascript"></script>
<script src="scripts/scriptaculous/src/scriptaculous.js"
       type="text/javascript"></script>
```

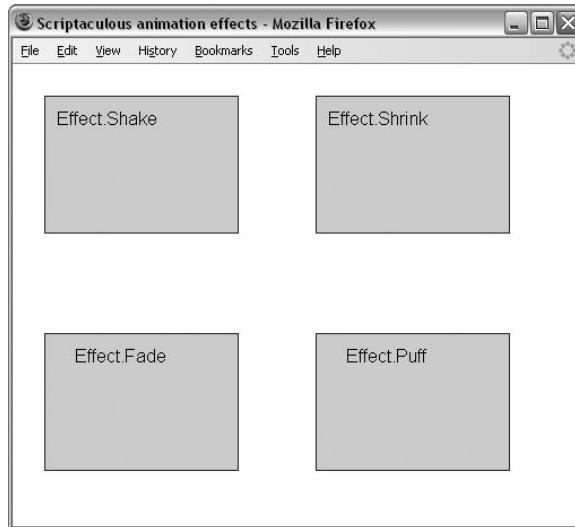


Figure 12-17

You then have four `<div>` elements to demonstrate the four effects you will be looking at. The outer `<div>` element is used to separate each of the four effects you will be looking at; inside the second `<div>` element is the name of the function you are demonstrating:

```
<div class="container">
    <div class="demo">
        Effect.Fade
    </div>
</div>
```

It is the second line of each of these elements that you need to look at. Each `<div>` element whose `class` attribute has a value of `demo` creates one of the boxes, and on this element you add an `id` attribute that will be used to identify this element within the script, while the `onclick` attribute calls the Scriptaculous library to create the effect:

```
<div class="container">
    <div class="demo" id="demo-effect-shake" onclick="new Effect.Shake(this)">
        Effect.Shake
    </div>
</div>
<div class="container">
    <div class="demo" id="demo-effect-shrink" onclick="new Effect.Shrink(this);
        window.setTimeout('Effect.Appear(\'demo-effect-shrink\',
        {duration:.3})',2500);">
        Effect.Shrink
    </div>
</div>
<div class="clear"></div>
<div class="container">
```

## Chapter 12: Working with JavaScript

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```
<div class="demo" id="demo-effect-fade" onclick="new Effect.Fade(this);  
    window.setTimeout('Effect.Appear(\'demo-effect-fade\', {duration:.3})',2500);">  
    Effect.Fade  
</div>  
</div>  
<div class="container">  
    <div class="demo" id="demo-effect-puff" onclick="new Effect.Puff(this);  
        window.setTimeout('Effect.Appear(\'demo-effect-puff\', {duration:.3})',2500);">  
        Effect.Puff  
</div>  
</div>
```

You do not need to know *how* the Script creates these effects; all you need to know is that to access the effects you create an Effect object (using new Effect), and then the syntax of the method that calls each effect.

Let's start by looking at the first box, which uses a shake effect to move it left and right:

```
<div class="container">  
    <div class="demo" id="demo-effect-shake" onclick="new Effect.Shake(this)">  
        Effect.Shake  
</div>  
</div>
```

All you need to do with this element is add the onclick attribute, and in here you create a new Effect object, and call its Shake() method. As you have seen when validating a form using the onsubmit property of the <form> element, you can tell a method that you are passing the current element (and any contents) using the this keyword. So, the onclick attribute in this example is simply telling the Scriptaculous library to create a new Effect object to shake this element when the element is clicked.

You might have noticed that the next three elements contain a second line after the effect has been called. This is because each of the other effects makes the box disappear. So the Appear() method is called after a fixed duration so you can try the example again (and it is the Appear() method that is using the value of the id attribute to indicate which element needs to re-appear); but the other effects are still called using Effect.methodname(this).

```
<div class="container">  
    <div class="demo" id="demo-effect-shrink" onclick="new Effect.Shrink(this);  
        window.setTimeout('Effect.Appear(\'demo-effect-shrink\',  
        {duration:.3})',2500);">  
        Effect.Shrink  
</div>  
</div>
```

As you can see, this is a very simple way of creating animated effects using JavaScript.

## **Drag-and-Drop Sortable Lists Using Scriptaculous**

The second of the two tasks you will look at using Scriptaculous is creating drag-and-drop lists. You may have seen some sites where you can re-order lists (such as to do lists or top 10 lists) just by dragging and dropping the elements.

You can see the example you are going to build in Figure 12-18; when the page loaded, the boxes were in numerical order. However, they have now been dragged and dropped to a different order.



Figure 12-18

In this example (`ch12_eg21.html`), you need to include the Scriptaculous and Prototype libraries again. Then you have a simple unordered list (there are some CSS rules in the head of the document that control the presentation of the list to make it appear like boxes).

```
<script src="scripts/prototype.js" type="text/javascript"></script>
<script src="scripts/scriptaculous.js" type="text/javascript"></script>
<style type="text/css">
    li {border:1px solid #000000; padding:10px; margin-top:10px;
        font-family:arial, verdana, sans-serif; background-color:#d6d6d6;
        list-style-type:none; width:150px;}
</style>
</head>
<body>
<ul id="items_list">
    <li id="item_1">Item 1</li>
    <li id="item_2">Item 2</li>
    <li id="item_3">Item 3</li>
    <li id="item_4">Item 4</li>
</ul>
```

Then you just need to add one `<script>` element after the list so that it can be re-ordered:

```
<script type="text/javascript" language="javascript">
    Sortable.create("items_list", { dropOnEmpty:true, constraint:false });
</script>
```

Here you are creating a Sortable object using the `create()` method of the Sortable object. This takes the following two parameters:

- ❑ The first is the value for the `id` attribute of the unordered list element.

## Chapter 12: Working with JavaScript

- The second are options that describe how the sortable list should work. The first is `dropOnEmpty` with a value of `true` to indicate that element should only be dropped between elements, not on top of another one, and the `constraint` property which is set to `false` (if this were left off or `true`, it would only allow items to be moved along a vertical axis).

In order for this kind of drag-and-drop list to be of use to people, such lists are often tied into some code that will update a database, such as ASP.Net, PHP, JSP, or Ruby on Rails code. However, this example does demonstrate something that is achieved very easily with just a few lines of code, thanks to the Scriptaculous library.

### Sortable Tables with MochiKit

In this example, you are going to look at another JavaScript library — MochiKit. By looking at a few different examples, you can see how easy different libraries (which offer different functionality) are to plug into your pages. You can download the latest version of MochiKit from [www.mochikit.com/](http://www.mochikit.com/), although I have included version 1.3.1 with the download code for this chapter.

In this example you will create a table, whereby you can sort the contents of the table by clicking on the header of any of the columns of the table in order to sort the data by that column. You can see in Figure 12-19 how the table heading Date Started has an up arrow next to it, indicating that the table's contents are being ordered by the date the employee started (in ascending order).

Name	Department	Date started↑	Employee ID
Mark Whitehouse	Sales	2007-03-28	09
Tim Smith	IT	2007-02-10	12
Claire Waters	Finance	2006-09-24	24
Hetal Patel	HR	2006-01-10	05

Figure 12-19

In order to create a sortable table, you again need to include two scripts; the first is for the `MochiKit.js` JavaScript library, and the second is for the `sortable_tables.js` file that comes with the MochiKit download (`ch12_eg22.html`).

```
<script type="text/javascript">
  src="scripts/MochiKit/lib/MochiKit/MochiKit.js"></script>
<script type="text/javascript">
  src="scripts/MochiKit/examples/sortable_tables/sortable_tables.js"></script>
```

Next I have added a couple of CSS styles to distinguish the headers from the columns and to set the font used:

```
<style type="text/css">
  th, td {font-family:arial, verdana, sans-serif;}
  th {background-color:#000000; width:200px; color:#ffffff;}
```

The interesting part for you is the table, and how you make that integrate with the MochiKit scripts. Three parts of the page need to be identified to work with the scripts:

The `<table>` element needs an `id` attribute whose value is `sortable_table`.

The `<th>` (table heading) elements need to have an attribute called `mochi:sortcolumn`, whose value is a unique id for that column, followed by a space, followed by the datatype for that column (which can be a `str` for a string or `isoDate` for a date in the format shown).

The first row of `<td>` elements needs to have `mochi:content` attributes whose value is the keyword `item`, followed by a period, followed by the unique id for the column that was specified in the `mochi:sortcolumn` attribute in the corresponding header.

```
<table id="sortable_table" class="datagrid">
<thead>
<tr>
    <th mochi:sortcolumn="name str">Name</th>
    <th mochi:sortcolumn="department str">Department</th>
    <th mochi:sortcolumn="datestarted isoDate">Date started</th>
    <th mochi:sortcolumn="extension str">Employee ID</th>
</tr>
</thead>
<tbody>
<tr mochi:repeat="item domains">
    <td mochi:content="item.name">Tim Smith</td>
    <td mochi:content="item.department">IT</td>
    <td mochi:content="item.datestarted">2007-02-10</td>
    <td mochi:content="item.extension">12</td>
</tr>
<tr>
    <td>Claire Waters</td>
    <td>Finance</td>
    <td>2006-09-24</td>
    <td>24</td>
</tr>
<tr>
    <td>Hetal Patel</td>
    <td>HR</td>
    <td>2006-01-10</td>
    <td>05</td>
</tr>
<tr>
    <td>Mark Whitehouse</td>
    <td>Sales</td>
    <td>2007-03-28</td>
    <td>09</td>
</tr>
</tbody>
</table>
```

As you can see, this is another example of how easy it can be to add quite complex functionality to a table — creating an effect similar to the Sort Data options in Excel, which are useful when dealing with large amounts of data.

### ***Creating Calendars with YUI***

The third and final JavaScript library you will be looking at is the Yahoo User Interface library. This is created by Yahoo, and is the largest of the three libraries, with all kinds of functionality. I have included version 2.4.0 with the code download for this chapter; however, you can download the latest example from <http://developer.yahoo.com/yui/>.

You will start by looking at how you can easily drop a calendar onto a web page using this framework. You can see what the calendar will look like in Figure 12-20.



**Figure 12-20**

To start, you have to include two JavaScript files from the YUI library — first the `yahoo-dom-event.js` script, and secondly the `calendar.js` script which is specific to the calendar (`ch12_eg23.html`).

```
<script type="text/javascript"
       src="scripts/yui/build/yahoo-dom-event/yahoo-dom-event.js"></script>

<script type="text/javascript"
       src="scripts/yui/build/calendar/calendar.js"></script>
```

For this example, you will also include a couple of CSS files that are included with the YUI download:

```
<link rel="stylesheet" type="text/css"
      href="scripts/yui/build/fonts/fonts-min.css" />
<link rel="stylesheet" type="text/css"
      href="scripts/yui/build/calendar/assets/calendar.css" />
```

Next you add a `<div>` element, which will be populated by the calendar.

```
<div id="callContainer"></div>
```

Finally, you add in the script which calls the YUI library, and fills the `<div>` element with the calendar.

```
<script type="text/javascript">
YAHOO.namespace("example.calendar");
YAHOO.example.calendar.init = function() {
```

```
YAHOO.example.calendar.cal1 = new YAHOO.widget.Calendar("cal1","cal1Container");
YAHOO.example.calendar.cal1.render();
}
YAHOO.util.Event.onDOMReady(YAHOO.example.calendar.init);
</script>
```

Rather like some of the other examples in this section, this is likely to be tied into some other kind of functionality, such as a holiday booking form where you are specifying dates you want to travel or an events list where you are looking at what is happening on a particular date. But this does demonstrate how libraries can be used to add significant functionality to your pages with ease.

### Auto-Completing Text Inputs with YUI

The final example you will look at in this section is the ability to create text inputs where you make suggestions as to what the users are trying to type. The example allows you to enter the name of a U.S. state, and will make suggestions as to which state you are trying to enter.

You can see what the input will look like in Figure 12-21.



Figure 12-21

To start with in this example (ch12\_eg24.html), you include three JavaScript files:

```
<script type="text/javascript"
src="scripts/yui/build/yahoo-dom-event/yahoo-dom-event.js"></script>
<script type="text/javascript"
src="scripts/yui/build/animation/animation.js"></script>
<script type="text/javascript"
src="scripts/yui/build/autocomplete/autocomplete.js"></script>
```

Then, in the body of the page, you add the text input and a <div> that will contain the suggestions of what you are trying to type in.

```
Select a US state:
<input id="statesinput" type="text">
<div id="statescontainer"></div>
```

## Chapter 12: Working with JavaScript

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Next, a JavaScript array is created with all of the possibilities that someone might be trying to enter.

```
<script type="text/javascript">
YAHOO.example.statesArray = [
    "Alabama",
    "Alaska",
    "Arizona",
    "Arkansas",
    "California",
    "Colorado",
    // other states go here
];
</script>
```

Finally, the JavaScript is added to the page that ties the text input form control to the array, and calls the Auto-Complete function so that the suggestions are made as users enter their cursors into the text input.

```
<script type="text/javascript">
YAHOO.example.ACJSArray = new function() {
    // Instantiate first JS Array DataSource
    this.oACDS = new YAHOO.widget.DS_JSArray(YAHOO.example.statesArray);
    // Instantiate first AutoComplete
    this.oAutoComp = new YAHOO.widget.AutoComplete('statesinput', 'statescontainer',
        this.oACDS);
    this.oAutoComp.prehighlightClassName = "yui-ac-prehighlight";
    this.oAutoComp.typeAhead = true;
    this.oAutoComp.useShadow = true;
    this.oAutoComp.minQueryLength = 0;
    this.oAutoComp.textboxFocusEvent.subscribe(function(){
        var sInputValue = YAHOO.util.Dom.get('statesinput').value;
        if(sInputValue.length === 0) {
            var oSelf = this;
            setTimeout(function(){oSelf.sendQuery(sInputValue);},0);
        }
    });
}
</script>
```

Again, you can see that by following a simple example made available with a JavaScript toolkit, you can significantly enhance the usability or functionality of your page (without the need to write all of the code to do the job from scratch).

There are many more JavaScript libraries on the Web, each of which has different functionality, and each of which is continually being developed and refined, so it is worthwhile taking some time to look at the different libraries that are available, and checking in with your favorites every so often to see how they have been updated.

## When Not to Use JavaScript

You've seen some great examples of when you should be using JavaScript, but I should warn you about some uses of it that are best avoided, so let's have a quick look at these before you finish the chapter.

### Drop-Down Navigation Menus

Some clients I've worked with have asked about creating effects that require JavaScript for navigation purposes. One of the more common requests is for drop-down navigation menus where subpages drop down from the main items on the menu. These rely on JavaScript, and I discourage clients from using them for three reasons:

- ❑ The technique simply will not work for those who have JavaScript turned off on their browser. While this is quite a small percentage, it does mean that those users simply cannot access those pages.
- ❑ The technique tends to perform slightly differently on different browsers, and it's hard to get a script to work on all browsers.
- ❑ Users can find it difficult to click the appropriate part of a menu that moves (especially if they have a disability or a sticky mouse).

### Hiding Your E-mail Address

I have seen several articles on the Web that suggest you can use JavaScript to write your e-mail address to pages (using the `write()` method of the document object to write out the e-mail address, rather than a normal `<a>` link and XHTML). The goal is to avoid getting so much spam. Among sources for spam are little programs (that often go under the name of bots, spiders, or crawlers) that crawl through web sites looking for e-mail addresses. These e-mail addresses are then used as a target for spam. The problem with this idea is that anyone without JavaScript turned on in their browser will not be able to see your e-mail address. A better alternative is to provide an e-mail form that sends inquiries to you — then once you have received an inquiry you can be fairly sure the user will not be doing this just to get an e-mail address and that you are safe giving your e-mail address to this user.

### Quick Jump Select Boxes

Some sites offer select boxes in forms (just like the select boxes you saw in Chapter 5) as a navigation menu — often referred to as a *quick jump menu* that takes you directly to different pages or sections of the site when you select that item from the drop-down list box. Some of these use scripts to automatically take the user to the selected page without the user's actually pressing a GO or Submit button. Rather, the script is set up to detect a change in the select box and then to take the user to that page. This is bad practice for two reasons:

- ❑ You can use the up and down arrow keys to select items from a select box, and any user who tried to do this would automatically get taken to the first selection as soon as he or she pressed the down arrow the first time. Users would never be able to get further than this option using keys. While a savvy user might pick this up quickly, those with disabilities who are using keys rather than a mouse to navigate the site might be a lot more frustrated.
- ❑ And again, if the user has JavaScript disabled, it simply won't work.

### Anything the User Requires from Your Site

The bottom line in the decision on using JavaScript is whether it will simply enhance the user experience or whether it is required for the user to perform an action or see some vital information. You should never design anything that requires JavaScript in order to function — remember the lesson from the "Disabling a Submit Button Until a Checkbox Has Been Selected" section.

# Summary

In this chapter you have seen many uses for JavaScript, and you should now have a better understanding of how to apply this language that you started to learn in the last chapter. With the help of these scripts you should now be able to use these and other scripts in your page. You should also have an idea of how you can tailor or even write your own scripts.

You have seen how you can help a user fill in a form correctly by providing validation. For example, you might check to make sure required fields have something in them or that an e-mail address follows the expected pattern. This saves users time by telling them what they have to do before a page gets sent to a server, processed, and then returned with errors. The validation examples highlight the access the DOM gives to document content, so that you can perform operations on the values users provide. This is a great example of interactivity — the document not only provides the form, but also helps in filling it out. And, of course, forms are a vital part of any web site that wants to gather information from its visitors.

You also saw how the DOM can help make a form generally more usable by putting the focus on appropriate parts of the form and manipulating the text users have entered, by removing or replacing certain characters.

You went on to see several other JavaScript techniques, such as image rollovers, random content, and pop-up windows. These examples will all help you understand what you can do with JavaScript and how to integrate scripts into your pages.

Finally, you took a look at three popular JavaScript libraries, Scriptaculous, MochiKit, and the Yahoo User Interface Library. JavaScript libraries offer sophisticated functionality that you can easily drop into your pages with just a few lines of code (simply by learning how to integrate the script with your page).

One of the key things to remember, however, is that you should use JavaScript to enhance a page, rather than relying on it to display content or offer some functionality.

# Exercises

There is only one exercise for this chapter because it is quite a long one. The answers to all the exercises are in Appendix A.

1. Your task is to create a validation function for the competition form in Figure 12-22.

The function should check that the user has done the following things:

- Entered his or her name
- Provided a valid e-mail address
- Selected one of the radio buttons as an answer to the question
- Given an answer for the tiebreaker question, which is no more than 20 words

These should be in the order that the controls appear on the form.

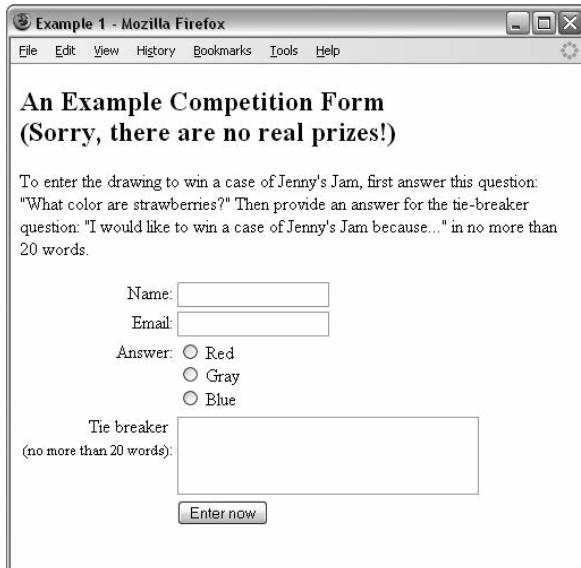


Figure 12-22

Here is the code for the form:

```
<form name="frmCompetition" action="competition.aspx" method="post"
onsubmit="return validate(this);">
<h2>An Example Competition Form <br />(Sorry, there are no real prizes!)</h2>
<p> To enter the drawing to win a case of Jenny's Jam, first answer
this question: "What color are strawberries?" Then provide an answer for
the tie-breaker question: "I would like to win a case of Jenny's Jam
because..." in no more than 20 words.</p>
<table>
  <tr>
    <td class="formTitle">Name: </td>
    <td><input type="text" name="txtName" size="18" /></td>
  </tr>
  <tr>
    <td class="formTitle">Email: </td>
    <td><input type="text" name="txtEmail" size="18" /></td>
  </tr>
  <tr>
    <td class="formTitle">Answer: </td>
    <td><input type="radio" name="radAnswer" value="Red" /> Red<br />
      <input type="radio" name="radAnswer" value="Gray" /> Gray<br />
      <input type="radio" name="radAnswer" value="Blue" /> Blue
    </td>
  </tr>
  <tr>
    <td class="formTitle">Tie breaker <br /><small>(no more than 20 words)</small>
    <td><input type="text" name="txtTieBreaker" size="40" /></td>
  </tr>
</table>
```

## Chapter 12: Working with JavaScript

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```
</small>: </td>
    <td><textarea name="txtTieBreaker" cols="30" rows="3" /></textarea></td>
</tr>
<tr>
    <td class="formTitle"></td>
    <td><input type="submit" value="Enter now" /></td>
</tr>
</table>
</form>
```

# 13

## Putting Your Site on the Web

Once you've created your web site, you'll want to make it available for everyone to see. In this final chapter, you are going to look at how you prepare your site for, and move it onto, the Web. You will also look at how you can help encourage visitors to come to your site.

Web sites live on special computers called web servers that are constantly connected to the Internet. Rather than buying and running your own web server, it's generally far more economical to rent space on a web server owned by a *hosting company*. And in order to help you choose the right hosting company and, indeed, the right package from a hosting company, you need to learn the key terminology used by these companies. In this chapter, you will find out what things like shared and dedicated hosting are, how to decide how much space or bandwidth you need, and so on.

But before you put your site on a web server, you should perform some checks and tests, from validating your documents and checking links to making sure the site works in different screen resolutions, and that the text is readable. Putting a site on the Web only to have customers tell you that the link to the products page does not work or that they cannot see the site on their computer will not enhance your reputation. So you must learn how to test your site before it goes live. And then once you have put your site on a web server, you can perform other kinds of checks and tests — after all, while a site can seem to work fine on your computer, there may be issues with the way it is set up on your new server when you move it there.

Once your site is ready for the public to see, you will then want to ensure they know about it! You will want to make sure it gets indexed by the major search engines, such as Google and Yahoo; this can be quite a complex process with lots of trial and error to get your site as near to the top of the rankings as possible. You might also consider a number of other strategies to let people know you are out there, such as Pay Per Click advertising (from the likes of Google's AdWords or Yahoo's Overture). After putting all the hard work into creating a site, you want it to be a success.

You'll also take a quick look at some other technologies that you might like to start examining once you are comfortable with what you have learned in this book.

## Chapter 13: Putting Your Site on the Web

But before you look at all of this, let's take a look at one final element you have not yet seen in this book, and which provides information about documents and their content — the `<meta>` element.

In this chapter you learn how to do the following:

- Use the `<meta>` element
- Perform tests to ensure your site will work as you intended
- Check that your site is accessible
- Find a *host* to make your site available to everyone on the Web
- Move your site from your computer to your host's web server using FTP
- Submit your site to search engines
- Increase visitor numbers
- Use Pay Per Click advertising
- Discover other technologies you might like to look at next
- Control different versions of your site so that you can make changes without making mistakes

## **Meta Tags**

Before you start looking at how to test your site, you need to learn about one last tag: the `<meta>` tag. Meta tags live in the `<head>` of a document and contain information *about* a document. They live in the `<head>` rather than in the `<body>` of the document because the `<body>` is reserved for actual content, while the `<meta>` tag is used to give information about what is in the body of the document. The information can be used for a number of purposes including helping search engines index your site, specifying the author of a document, and, if the document is time-sensitive, specifying when the page should expire.

The `<meta>` element is an empty element and so does not have a closing tag; rather, `<meta>` elements carry information within attributes, so you need a forward slash character at the end of the element. For example, here is a `<meta>` element that provides a description of a computer bookshop web site:

```
<meta name="description" content="Buy computer programming books to learn HTML,  
XHTML, JavaScript, ASP.Net, PHP, Ruby" />
```

The `<meta>` element can take eight attributes, four of which are universal attributes — `dir`, `lang`, `xml:lang`, and `title`. The other four, however, are specific to the `<meta>` element:

- `schema`
- `name`
- `content`
- `http-equiv`

The `name` and `content` attributes tend to be used together as do the `http-equiv` and `content` attributes. These pairings will be addressed next.

### ***name and content Attributes***

The name and content attributes specify properties of the document. The value of the name attribute is the property you are setting, and the value of the content attribute is the setting that you want to give for the property you set in the name attribute. In the example you just saw a moment ago, the `<meta>` element was setting a description property for the content of the document or site. As you can see, the name attribute had a value of `description`, and the value of the content attribute is a description of what the site is about:

```
<meta name="description" content="Buy computer programming books to learn HTML,  
XHTML, JavaScript, ASP.Net, PHP, Ruby" />
```

The value of the name attribute can be anything; no restrictions are published in any standards. Therefore, if you need to add your own information about a document and its content, this can be a handy technique. There are, however, some predefined values you will regularly see used this way. These are as follows:

- ❑ `description`: Specifies a description of the page
- ❑ `keywords`: Contains a list of comma-separated keywords that a user might search on to find the page
- ❑ `robots`: Indicates how search engines should index the page

The `description` and `keywords` properties can be used by programs called crawlers, bots, or spiders, which most search engines use to help index web sites, and are therefore worth adding to any web page. These programs go through web sites adding information to the databases used by the search engines, following links as they come across them, indexing those pages, and so on — this is how search engines manage to index so many sites.

### ***Using name with a Value of description***

You have already seen an example of giving the `name` property a value of `description`, and using the `content` property to specify a sentence that describes the site. Sometimes search engines will display the `description` property when your site is returned in response to a user's search.

A description should be a maximum of 200 characters long, although some search engines, such as Google, display only the first 100 characters, so you should try to get across the main content in the first 100 characters.

### ***Using name with a Value of keywords***

The `keywords` property supplies a list of keywords that a search engine can use to index the site. If someone types in one of the words or a combination of the words you use as your `keywords`, then a search engine may have a better chance of returning your site. For example, an online computer bookstore might use keywords such as this:

```
<meta name="keywords" content="computer, programming, books, web, asp,  
asp.net, C#, vb, visual basic, c++, Java, Linux, XML, professional, developer,  
html, html, css, xslt, access, sql, php, mysql" />
```

The more words you supply, the better the chance your page will show up in a search engine; however, you should never use words that do not directly relate to the content of the site, and ideally the keywords will also appear in the text for that page.

## Chapter 13: Putting Your Site on the Web

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*It is generally considered that, while keywords used to have a large impact on how search engines indexed your site, they have very little effect these days. However, if you use all of the strategies available to get your site recognized by search engines, the more likely people will be to find your site.*

Most search engines create their own limit for the number of keywords they will index, and this number varies between search engines, but you should generally keep your keywords to less than 1,000 characters.

You could also use the `lang` attribute in conjunction with the description and keywords to indicate the language they are using, or to offer them in multiple languages. For example, here are the keywords in U.S. English:

```
<meta name="keywords" content="computer, programming, books" lang="en-us" />
```

And again in French:

```
<meta name="keywords" content="livres, ordinateur, programmation"
      lang="fr" />
```

And finally in German:

```
<meta name="keywords" content="" lang="programmieren, bucher, computers" lang="de" />
```

### **Using name with a Value of robots**

As I mentioned earlier, many search engines use little programs to index web pages on their behalf. You can use the `name` attribute with a value of `robots` to prevent one of these programs from indexing a page or links from the page (because many of these programs follow the links they find on your site and index those, too). For example, you probably would not want a search engine to index any pages that you are still developing, or which you use to administer the site — because you do not want people to just happen across them.

Here you can see that the `<meta>` element tells search engines not to index this page or to follow any of the links on it to index those.

```
<meta name="robots" content="noindex,nofollow" />
```

The content attribute can have the values shown in the table that follows.

Value	Meaning
all	Index all pages.
none	Index no pages.
index	Index this page.
noindex	Do not index this page.
follow	Follow links from this page.
nofollow	Do not follow links from this page.

By default the values would be `all`, `index`, and `follow`, allowing web crawlers to follow any link and index all pages.

You should use this technique in conjunction with a file called `robots.txt`, which is discussed in the “`robots.txt`” section later in this chapter if you want to prevent pages from being indexed.

### ***http-equiv and content***

The `http-equiv` and `content` attributes are paired together to set HTTP header values. Every time a web browser requests a page, *HTTP headers* are sent with the request, and each time the server responds sending a page back to the client, it adds HTTP headers back to the client:

- ❑ The headers sent from a browser to a server when it requests a page contain information such as the formats the browser will accept, the type of browser, the operating system, the screen resolution, the date, and other information about the user’s configuration.
- ❑ The headers returned from a server to a web browser contain information such as the server type, the date and time the page was sent, and the date and time the page was last modified.

Of course, the headers *can* contain much more information, and using the `<meta>` tags is one way of adding new headers to be sent with the document. For example, you might want to add a header to indicate when the page should expire (no longer be valid) — which is especially helpful if the document contains things such as special offer prices which you know will expire — or to refresh a page after a period of time.

### ***Expiring Pages***

It can be important to expire pages because browsers have something known as a *cache*, a space on the hard drive where they store pages of web sites you have visited. If you go back to a site you have already visited, the browser can load some or all of the page from the cache rather than having to retrieve the whole page again.

Here you can see a `<meta>` tag that will cause the page to expire on Friday, April 16, 2010, at 11:59 (and 59 seconds) p.m. Note that the date must follow the format shown.

```
<meta http-equiv="expires" content="Fri, 16 April 2010 23:59:59 GMT" />
```

If this were included in a document and the user tried to load the page after the expiry date, then the browser would not use the cached version; rather it would try to find a fresh copy from the server. This helps ensure that users get the latest copies of documents and thereby prevents people from using out-of-date information.

### ***Preventing a Browser from Caching a Page***

You can prevent some browsers from caching a page altogether using the value `pragma` for the `http-equiv` attribute and a value of `no-cache` for the `content` attribute like so:

```
<meta http-equiv="pragma" content="no-cache" />
```

Unfortunately, Internet Explorer 4 and later versions ignore this rule and cache the page anyway.

### Refreshing and Redirecting Pages

You can set a page to refresh after a certain number of seconds using the following `<meta>` tag, which gives the `http-equiv` attribute a value of `refresh`:

```
<meta http-equiv="refresh" content="10;URL=http://www.wrox.com/latest.aspx" />
```

This will cause the page to refresh itself after 10 seconds. You can see the number of seconds given as the first part of the value for the `content` attribute. This is followed by a semicolon, the keyword `URL`, an equal sign, and the address of the page to be refreshed.

You can even refresh to a different page. For example, if your site moves from one domain to another, you can leave a page up for visitors who go to the old domain saying that you have moved and that the user will be redirected automatically in five seconds.

When you use this technique to reload the same page it is referred to as *refreshing* the page, while sending the user to a new page or site is called *redirecting* the user.

*You should avoid refreshing a page too often, as it will distract users, especially if they are trying to read a document. You should also be aware that regularly refreshing a document places an extra load on your web server.*

### Specifying Ratings

You can specify ratings regarding the content of your page. Without a rating it would be possible for some browsers (or programs designed to control what can be viewed) to prevent access to your site. As with all of the `<meta>` tags, the user will not see the rating, but the browser can process it. If you do provide a rating, the browser is more likely to show it to those who have agreed to view that sort of content.

Initially, Internet ratings were introduced to help parents and schools block certain content from children, although the main technology in this area, PICS (the Platform for Internet Content Selection), has developed to allow lots of other uses.

In order to specify a rating value for a page, the value of the `http-equiv` attribute needs to be `pics-label`. The part that actually indicates what the content is is known as a *rating label*. The label must be created according to the Internet Content Ratings Association (ICRA).

The rating label is made up of four parts:

- An ICRA identifier
- The ICRA label
- The RSACi identifier (the old name for the ICRA)
- The RSACi ratings

As you will see, the label can look quite complicated, but a form on the ICRA web site ([www.icra.org/label/](http://www.icra.org/)) helps you create a label for your site. The RSACi rating is also generated on the same site as part of the process.

Once you have your label, the `<meta>` tag should look something like this one, which was created for the `www.wrox.com` site:

```
<meta http-equiv="pics-label" content='(pics-1.1 "http://www.icra.org/
ratingsv02.html"
comment "ICRAonline EN v2.0" l gen true for
"http://www.wrox.com/" r (nz 1 vz 1 lz 1 oz 1 cz 1)
"http://www.rsac.org/ratingsv01.html" l gen true for "http://www.wrox.com/"
r (n 0 s 0 v 0 l 0))' />
```

While this may look complicated, the form on the ICRA site makes generation of a rating simple, and it shouldn't take longer than a couple of minutes.

## **Setting Cookies**

Cookies are small text files that the browser can store on your computer. You can create them in a scripting language that runs in the browser such as JavaScript or using technologies on the server such as ASP.NET, PHP, or JSP.

*You are not likely to use cookies until you start working in depth with JavaScript or a server-side language, but they are mentioned here for future reference.*

You can use the `<meta>` element to set cookies by giving the `http-equiv` attribute a value of `set-cookie` and then using the `content` attribute to specify a cookie name, value, and expiration date, like so:

```
<meta http-equiv="Set-Cookie" content="cookie_name=myCookie;
expires="Fri 16 April 2009 23:59:59 GMT" />
```

If you do not provide an expiry date, then the cookie will expire when the user shuts his or her browser window.

## **Specifying the Author Name**

You can set the name of the author of the document using a value of `author` for the `http-equiv` attribute and then using the author's name as the value of the `content` attribute, like so:

```
<meta http-equiv="author" content="Jon Duckett" />
```

## **Setting the Character Encoding**

Character encodings indicate the character encoding that was used to store the characters within a file. You can specify the encoding used in a document with a `<meta>` tag whose `http-equiv` attribute has a value of `Content-Type`. The value of the `content` attribute should then be the character encoding used to save the document; for example:

```
<meta http-equiv="Content-Type" content="ISO-8859-1" />
```

Here you can see that the document was written using the ISO-8859-1 encoding. You will see more about character encodings in Appendix E.

### Setting a Default Style Sheet Language

You can specify the type of style sheet language you will be using in a document by setting the `http-equiv` attribute to have a value of `content-style-type`, and specifying the MIME type of style sheet language in the `content` attribute.

```
<meta http-equiv="content-style-type" content="text/css" />
```

When style sheet rules are inside a `<style>` element, the `type` attribute indicates the style sheet language used inside that element; but when you have inline style sheet rules using the `style` attribute on an element, there is no explicit indication of the language used. Therefore, setting the default to CSS removes any doubt. While CSS is the most popular language for styling HTML and XHTML documents, some applications support other languages such as XSLT and DSSSL (although these languages are rarely used with web pages, so it would be extremely rare for you to see the `content-style-type` used in web pages).

### Setting a Default Scripting Language

If you are going to use scripts throughout your page, you can use the `<meta>` element to indicate the language your scripts are in. While you should still be using the `type` attribute on any `<script>` element, you can often use scripts in event handlers, and setting this `<meta>` tag indicates the language used in those attributes.

```
<meta http-equiv="content-script-type" content="text/JavaScript" />
```

### The scheme Attribute

The `scheme` attribute can be used to specify a scheme or format for a property value. For example, if you are working with dates, you can write them in several ways. In the U.S., the date format is written `mm-dd-yyyy`, whereas in Europe it is written `dd-mm-yyyy`. So, you might use the `scheme` attribute to indicate a date format. In the U.S., you could use the following:

```
<meta scheme="usa" name="date" content="04-16-1975" />
```

In Europe, you might use the following:

```
<meta scheme="Europe" name="date" content="16-04-75" />
```

The use of the `scheme` attribute does assume that the processing application understands the value of the `scheme` attribute and `name` attribute — and given that the mainstream browsers would not understand this, it would fall upon either a script or a custom application to interpret the use of this element.

## Testing Your Site

Before you set your site loose for everyone to look at, you should perform some tests. Even if your site seems to work fine on your computer, it is not so easy to ensure that it will work as well on other people's computers. After all, different people have different makes and versions of browsers, different speed Internet

connections, and different screen sizes and resolution, so what worked on your computer might not work as well for other people on their machines.

So, the two stages of testing are as follows:

- ❑ **Pre-publishing tests:** These are performed on your computer before asking anyone else to look at the site.
- ❑ **Pre-release tests:** Performed on the site exactly as it will be published on the Web (on a web server).

In this section you will learn about several tests that can help make sure your site is available to as many people as possible.

### ***The Importance of Directory Structure and Relative URLs***

Let's just take a moment to revisit how to best write URLs to other pages in your site, as well as the images, style sheets, and external scripts that each page uses. This demonstrates how valuable good relative URLs can be. Say you have already built a site and you want to create a new version of it. You might want to test the new site on the web server, but it will have to be in a separate folder, and therefore it will have a different URL than your current site if that is to remain live. For example, you might test the new site in a folder called `newsite`, so the home page might have the following URL:

```
http://www.example.com/newsite/index.html
```

But when you are ready to make the switch to the new site, you are going to want it to appear here:

```
http://www.example.com/index.html
```

If you are using relative URLs to link to all of your other pages, images, script files, and so on, then moving a site to a new folder or even a new URL will not be a problem. However, if you hard code your links using items such as your logo onto your front page using an `<img>` tag like this:

```

```

this image would not be loaded when you move the site to a new domain or a different folder. It is better to use something like this:

```

```

Now, as long as the `images` folder is within the directory that this page lives in, the image will be loaded, no matter where the site is moved.

### ***Validating HTML, XHTML, and CSS***

One of your best guards for making your site work on the majority of browsers is to validate your code and make sure that you have stuck to the rules of the language. A *validator* will check things such as whether you have closed all tags correctly, that the attributes you have used are actually allowed on that element,

## Chapter 13: Putting Your Site on the Web

and so on. All it takes is for you to miss something as simple as one closing `</td>` tag and, while the page may look fine on your browser, it will not necessarily work on someone else's computer.

*It is helpful to validate a design after you have built the first page, as it is quite tempting to copy and paste parts of your code from one file to the other and use your first page as a template. If you have an error in the page you use as a template and you use it to create all the other sites before you test it, you might have to rewrite every page.*

As discussed in Chapter 1, each version of HTML and XHTML has at least one document containing the rules for that version of the language, known as a DTD or schema. Any web page can be validated against this document to make sure it follows the rules. Therefore, by validating your pages you will know if you have left out a tag or other important part of the markup. The DOCTYPE declaration at the start of your page will tell a validation tool which DTD or schema your page should match the rules of.

Many authoring tools, such as Dreamweaver, contain tools that allow you to validate your site. But if you are not using such a tool, or if you want to check your site with more than one validation tool, you can use the W3C's free web page validator at <http://validator.w3.org/>.

You can see the W3C's markup validator in Figure 13-1; it allows you to enter a URL for a site or upload a page from your computer.

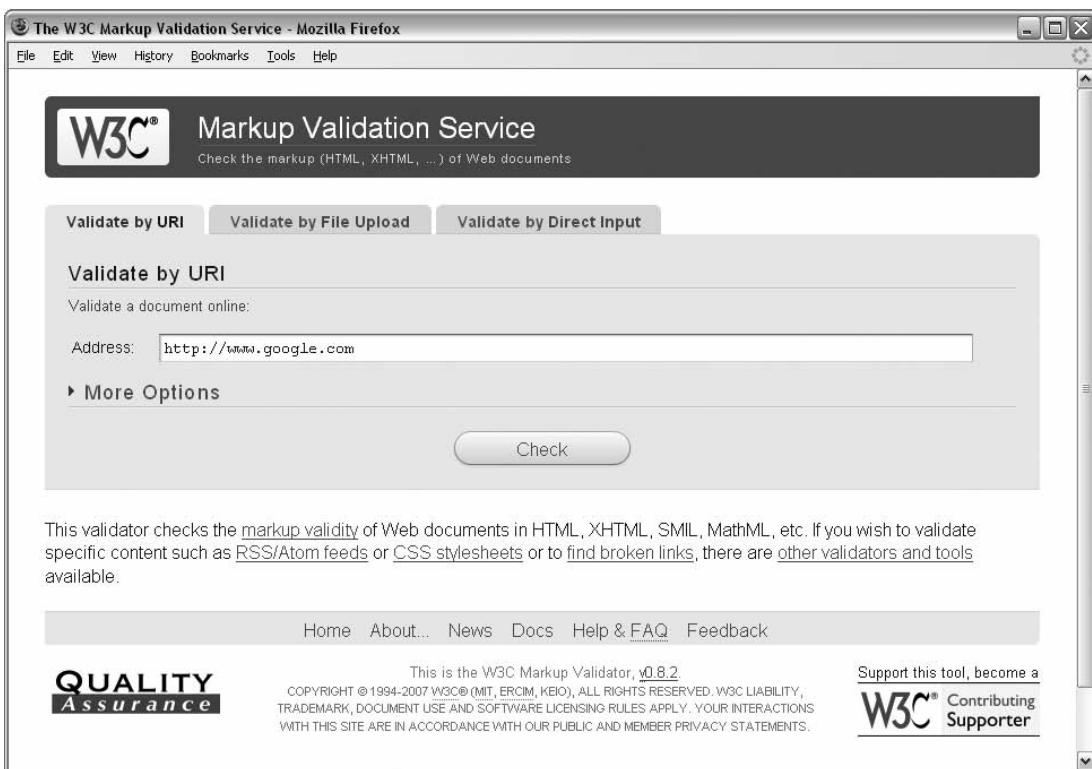


Figure 13-1

## Chapter 13: Putting Your Site on the Web

It will then tell you if errors are in your document. In Figure 13-2, you can see errors for a page.

The screenshot shows the W3C Markup Validation Service interface. At the top, it says "[Invalid] Markup Validation of http://www.google.com/ - W3C Markup Validator - Mozilla Firefox". Below that is a menu bar with File, Edit, View, History, Bookmarks, Tools, and Help. The main content area has a header "Markup Validation Service" with the sub-instruction "Check the markup (HTML, XHTML, ...) of Web documents". A navigation bar below the header includes "Jump To:" with links to Potential Issues and Validation Output. The main result area has a title "This page is not Valid (no Doctype found!)". It contains several input fields: "Result" (Failed validation, 30 Errors), "Address" (http://www.google.com/), "Encoding" (iso-8859-1), "Doctype" (no Doctype found), and "Root Element" (html). Below this is an "Options" section with checkboxes for Show Source, Validate error pages, Show Outline, Verbose Output, List Messages Sequentially, Group Error Messages by type, Clean up Markup with HTML Tidy, and a "Revalidate" button. A "Potential Issues" section follows, containing a note about missing or conflicting information and a warning about parse mode. It also lists a bullet point about the MIME Media Type being used for XML or SGML document types.

Figure 13-2

While the W3C validation tool is very helpful — and free — having to validate each page individually can be a bit of a nuisance. Dreamweaver (which certainly appears to be by far the most popular XHTML authoring tool among web professionals) introduced excellent validation features for XHTML pages in its Dreamweaver MX version (far better than validation offered by earlier versions of Dreamweaver). Validating a page is as simple as saving it and then pressing Shift+F6; you should see errors appear in the results panel, as in Figure 13-3.

## Chapter 13: Putting Your Site on the Web

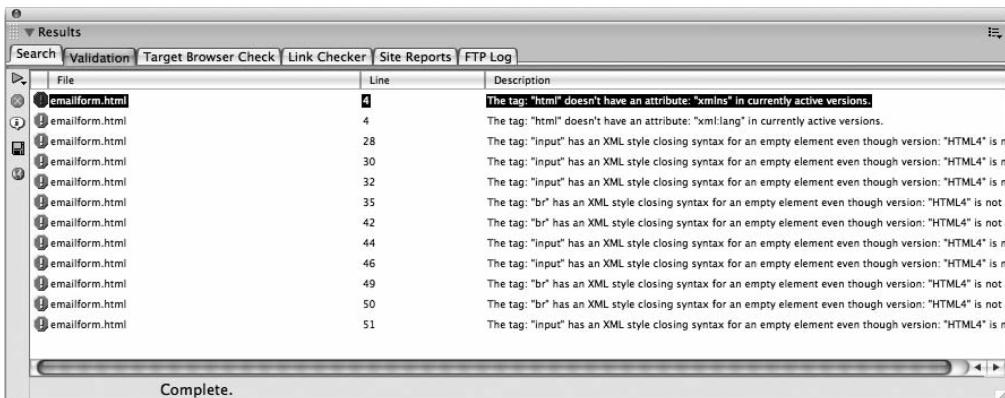


Figure 13-3

Note that for this to work properly you must have the correct settings in Dreamweaver. To get the settings you can right-click in the results panel and choose the setting dialog box (or Option-click on a Mac). You will then see a whole range of document standards appear in the new Preferences dialog box. You want to make sure that each option is unchecked except the version you want to check against. So, if you are trying to validate Transitional XHTML 1.0, you must have only that box checked, as shown in Figure 13-4.

Now revalidate the page.

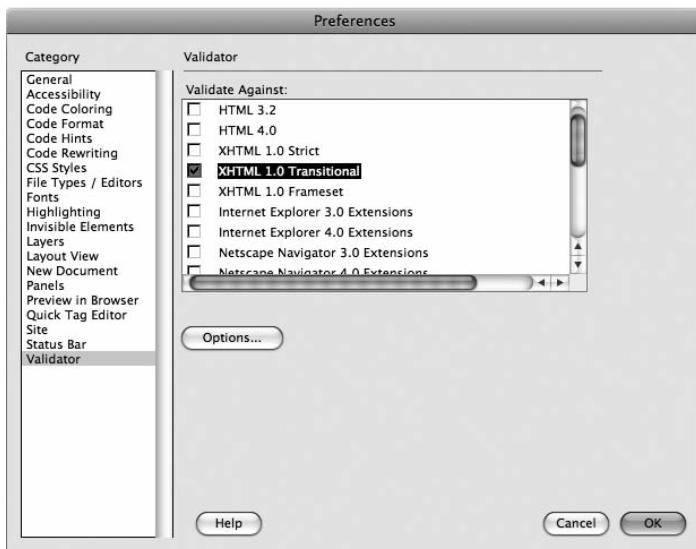


Figure 13-4

### Link Checking

It is important to check your links both before your site goes live and after you have published it on the Web. There are some tools that will help you check links. If you search for link-checking tools you will find several sites that charge for the service. However, there are some free link-checking services such as:

- The W3C's validation at <http://validator.w3.org/checklink>
- HTMLHELP's Link Valet at [www.htmlhelp.com/tools/valet/](http://www.htmlhelp.com/tools/valet/)

You can also use the Link Valet tool to check whether any site you link to has been changed since a specified date. This can be very helpful because an external site might restructure its pages, and the old URL will no longer be valid, or it might start publishing content you no longer wish to link to.

In Figure 13-5, you can see the results of a single page validated with the W3C's link validator.

The results from these services might appear quite verbose, but you should be able to tell which links are bad by looking for some kind of highlighting — which tends to be in red for broken or questionable links.

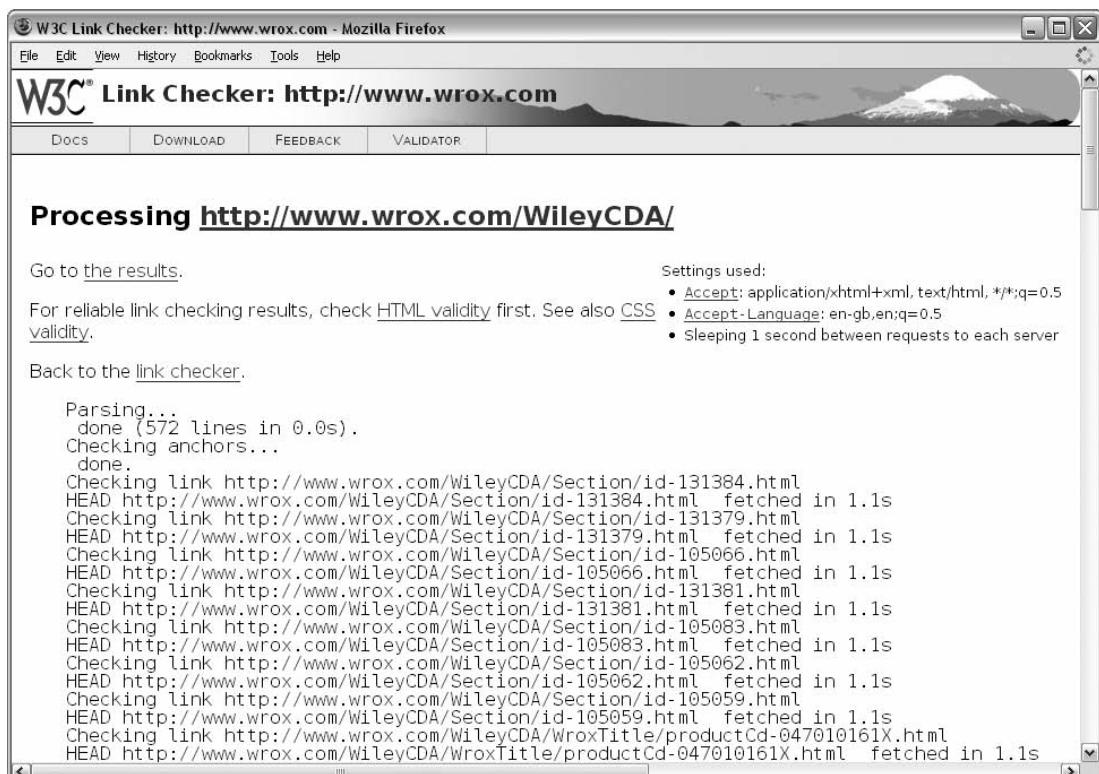


Figure 13-5

## Chapter 13: Putting Your Site on the Web

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Macromedia's Dreamweaver also contains its own link-checking tool. You can access this from the results menu or by pressing Control+Shift+F9.

There are options to check a page, a folder, or a whole site. Once Dreamweaver has found your broken links you can fix them in either the Results window or the Properties window as shown in Figure 13-6 (or by going into the code for the relevant page).

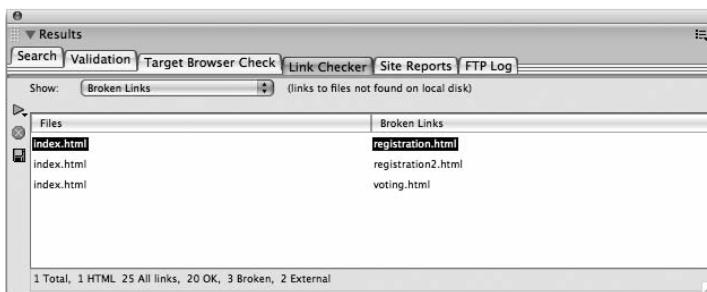


Figure 13-6

## ***Checking Different Screen Resolutions and Color Depths***

As you learned in Chapter 9, not everyone will have the same screen resolution as you; you should check your site with different screen resolutions to ensure that all the text is still readable and that the information fits on the page adequately.

In most operating systems, you can change the resolution of your screen (usually through the display properties dialog boxes). This enables you to see what the picture would look like on different monitors.

You can also change the colors from millions of colors to 256 colors and ensure that the text can still be read (even if the images don't look as good as you hoped). This is a good way to check that your text is readable.

## ***Accessibility Checkers***

It's becoming ever more important to create accessible web sites; often people think of this as making your site available to visitors with visual or physical disabilities, although it really simply means making the site accessible to as many people as possible.

You have learned about lots of accessibility issues throughout the book, such as providing alternative text for all images, providing a link for users to skip navigation that is repeated, and more. You have learned that it's important to make sure that the colors you choose have enough contrast to be able to read any text, that tables linearize well, and that you don't use color alone to convey information.

Many tools are available to help you check some of the main points of accessibility; some popular tools are:

- ❑ WebExact from Watchfire <http://webexact.watchfire.com/>
- ❑ Wave from WebAim at [www.webaim.org/resources/wave/](http://www.webaim.org/resources/wave/)
- ❑ LIFT from UsableNet at [www.usablenet.com/usablenet\\_liftmachine.html](http://www.usablenet.com/usablenet_liftmachine.html)

All of these tools are based on rules, and none is a substitute for understanding the issues surrounding accessibility. While a tool can check whether you have used `alt` attributes on each image, it cannot check that the alternative text used will make sense to someone who cannot see the image within the context of the page. A very good reference on the topic of accessibility is *Constructing Accessible Web Sites* by Jim Thatcher, et al. (Glasshauss, 2002).

### **Development Server or Live Server**

Once you have performed the checks mentioned so far, you will be ready to move your site somewhere where other people can test it. We'll be looking at web hosting shortly, but you probably want to put your site in a place where the public will not start looking yet; you will want to perform a second phase of tests first.

If you have a version of your site already live and you are working on an update, then you will need to have a different place for the new site to be tested — this could be as simple as a different folder on your computer or it could be a separate server altogether.

*If you are making changes to an existing site, you should always work on a separate copy of the site rather than the version the public will be looking at. It is also good practice to have a backup copy of each version of the site.*

Once you have finished the following tests, you can then make the site live, ready for the public.

### **Checking in Different Versions of Browsers**

Even if you write your pages to the letter as far as the recommendations go and your pages validate perfectly, different versions of browsers on different operating systems behave differently. The page that looked perfect on your monitor just doesn't look the same on a friend's or colleague's monitor. So, you should always try to test your web page on as many different browsers and platforms as possible. You should, at the very least, have the latest versions of Internet Explorer and Firefox on your computer.

Unfortunately, you are able to install only one version of Internet Explorer on a single computer (unless you have a partition running a second version of Windows or run a Windows emulator), and you are likely to want the latest version for day-to-day use. So if you have an old PC lying around, you can keep older versions of browsers on that and use it to test your pages once you have built them.

If you need to download an old version of a browser, try <http://browsers.evolt.org/>.

*Some web sites and services offer to take screenshots of each page of your web site on many different versions of several makes of browser for you, so that you can check how the pages appear on different browsers; however this can be quite expensive and time consuming. A good example is [www.browsercam.com/](http://www.browsercam.com/).*

Another great way to check that a site is working as you want it to is to ask all your friends to check it before it goes live. The hope is that among them you will find at least one or two users who have older browsers or different operating systems. Ask them to check what it looks like and send you a screenshot of a couple of pages in their browser. If you want to, you can even offer a small prize in return. A colleague of mine recently asked all of the client's staff to ask their friends to test the new web site, and one lucky person who responded to the related questionnaire won an iPod.

### Pilot Testing

If you are able to, get people who have not been involved in the project to test your site before it is released to the public. This is important because what might seem perfectly obvious to you is not always so clear to someone who is coming to the site for the first time. By the time you have built the site, you will be so close to the designs and workings that it will be very difficult to look at it with the same objectivity as someone who has never seen it.

Ideally, the people performing this kind of test on your site would be your target audience.

The first thing you can do is ask your participant to sit down in front of the site and then just watch what they do. You must resist all temptation to intervene at any point, whether you want to ask what someone is trying to do or whether you want to tell them how to get to something you think they are trying to find. As soon as you start talking to them, you will affect what is their normal behavior — and you won't learn as much.

Watching where people go first, how long they spend on each page, and how they navigate can teach you a lot about your site.

You can also sit people in front of the site and give them a set of imaginary scenarios; for example, you might have a site that sells bikes and you could ask users to:

- Find a bike they think would be suitable for their son or daughter
- Work out how much a certain model of bike costs
- Find out how to visit the store and when it's open
- Check whether a helmet meets a certain safety standard

Any more than five tasks and the user will be getting used to the layout and operation of the site. Some people prefer to watch silently while participants perform these tasks. Others prefer to ask participants to talk their way through what they are doing. In this second scenario (sometimes known as the talking-aloud protocol), you need to make sure that users talk their way through every thought process that goes through their heads. You often get broken sentences, but you can get an idea of what you expect of them by performing the task first yourself on a different site. Here is an example of a transcript you might end up with:

1. "I'm supposed to look for a bike for Julia."
2. "Looking at menu . . . home, store . . ."
3. "Clicking on store . . ."
4. "List of brands appears on the left, not heard of many of these."
5. "Pictures on right saying men's bikes, women's bikes, boys' bikes, girls' bikes . . .?"
6. "Click on picture for girls' bikes . . ."
7. "Shows ages, so click on 'first bikes' . . ."
8. "Looking at pictures . . ."
9. "This one looks good; click on that picture . . ."

- 10.** “Doesn’t do anything . . . thought it would show more information about it . . .”
- 11.** “Click on ‘Raleigh Butterfly.’”
- 12.** “There, that one looks fine.”

You are best off recording the voice if you can, as long as it doesn’t put the user off too much. Again you must resist the temptation to interrupt if users are doing something that is not what you think they should be doing in order to achieve the task — after all, in this example you learned that the user expected to be able to click on the image of the bike to see more details, but couldn’t.

### **Proofreading**

If you are working on a commercial site, it can often help to hire a proofreader to check all your text. Silly typos can affect people’s impression of the site you built and make both you and the client you are developing the site for look less professional.

If your client finds errors throughout the site, you appear careless — even if the client supplied the error-ridden copy for the site.

Proofreaders need not be expensive, and as far as your reputation goes, they can certainly be worth their fee (as you avoid possible embarrassment and potentially win additional contracts).

## **Taking the Leap to Live**

Now your site should be ready for the public to view it. So it’s time to look at how you get your site on the Web. In order to do this you will need to get a domain name, find some hosting space, and transfer the site to the new server using an FTP program. You will learn about each of these in the following section. In particular you will be learning what to look for when deciding with whom to host your site.

### **Getting a Domain Name**

If you are creating a personal site, you do not necessarily need your own domain name, but it is always a good idea if you’re creating a site for a business. The *domain name* is the part of the name you commonly see after the `www` in a site address. For example, Wrox Press uses the domain name `wrox.com`, whereas Amazon uses the domain name `amazon.com` in the U.S., `amazon.co.uk` in the U.K., `amazon.de` in Germany, and so on (although, as you might have noticed, some sites do not use the `www` in their name).

You can register your domain name with a domain registration company, of which there are hundreds; just search on your favorite search engine and you will find plenty. Most companies go for the suffix `.com`, but several other suffixes are available. For example, there are country-specific domain suffixes (also known as *top-level domains*) such as `.co.uk` for the UK, `.de` for Germany, `.com.au` for Australia, and `.ru` for Russia. You should choose a country-specific domain only if you are based in that country. Indeed, some domain names (such as `.com.au` domains) can be bought only by people with registered companies or companies with products by that name being sold in that country. Then there are also suffixes such as `.me.uk`, which is for personal sites; `.info`, which is for information-based sites; and `.org`, which is for registered organizations.

## Chapter 13: Putting Your Site on the Web

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*You do not need all available suffixes for your domain name, although you should make sure that your site is not very similar in name to someone you would not want to be associated with, just in case the user mistypes. For example, you would not want a children's site to have a very similar URL to an adult-content site.*

Before you register your name, you need to see if it is available; all domain name registration companies should have a form that allows you to search to see if your domain name is available. You might find this a frustrating process, as an incredibly high proportion of the .com domain names you might think of have been taken already, as well as most popular words (even combinations of popular words). Many numbers have also been taken.

You can order a domain name without actually having a site ready; this is sometimes known as *domain parking*. You order the name as soon as you know you are going to create the site (after all, you will probably want to use the URL in the site design, and will therefore need to order it before you start designing the site), but you do not put anything up there until you have built the site.

Several domain-name registration companies also offer hosting, but there is no need to order your domain name from the same people that host your site; you can get the domain name registration company to point the domain to your hosting company's servers (usually there is a simple control panel on the site you registered the name with where you control where your domain name actually points).

Your domain name should be easy to remember. Avoid names that are so long that users will find it hard to remember or too long to type in. For example, if you were called the Sydney Slate Roofing Services Limited, you might choose a domain such as [www.SydneySlate.com](http://www.SydneySlate.com) rather than [www.SydneySlateRoofingServicesLimited.com](http://www.SydneySlateRoofingServicesLimited.com).

When you register the domain name, you will also likely be able to use this for your e-mail addresses. For example, if you choose the domain [www.example.com](http://www.example.com), then no one else will be able to use the e-mail address [bob@example.com](mailto:bob@example.com) without your permission (although it is possible for spammers to make e-mails appear as if they come from your domain, simply by changing the "from" address in their e-mail programs).

## **Hosting**

You already know that in order to view a web page, a browser requests a page from a web server. The web server is a special computer that is constantly connected to the Internet.

When you access a page using a domain name, such as <http://www.example.com/>, something called a name server changes the name into a number. The number (known as an IP address) uniquely identifies a machine on the web and this machine holds your web site.

So when you are ready to put your site out on the Web, you are going to need some space on a web server. Hundreds of companies will allow you to put your web site on their servers and will, of course, charge you for the service. The service is known as *web hosting* because the company hosts your site for you.

Many ISPs will give you a small amount of web space free when you choose them to access the Internet. There are also other sites that offer free hosting (these are often paid for by the use of pop-up advertisements that appear when your pages load). For a personal site you may need only a small amount of web space and you might be prepared to put up with any pop-up ads that come with the free service. For commercial sites, however, it is better to choose some paid hosting — which can still be very cheap but will not serve advertisements.

### Key Considerations for Choosing a Host

As I said, literally hundreds of companies offer web hosting, and it can seem like a minefield deciding which to go with. Following is a discussion of the key points you need to understand and consider when choosing a site (these points are listed here in alphabetical order, rather than in order of importance):

- ❑ **Backups:** You should check whether your host performs backups on your sites and, if so, how often. A backup is simply a copy of the site taken in case there is a problem with the computer it is on. While the types of sites you are creating when you start working on web sites probably will not require regular backups, it is good to know whether the hosting company keeps a copy of the site in case something should go wrong with its servers (as this will allow the host to fix the problem without getting a copy of the site from you). When you start developing sites that change frequently and can be updated by several people, you will need to look at the issue of backups more closely.
- ❑ **Bandwidth:** This is the amount of data you are allowed to send from your site. It can be given as a rate per day, month, or year. If the average size of one of your web pages is 75KB including images, then if you get 100 visitors to your site per month and each visitor looks at 10 pages, you will need at least 75000kb (or 75MB) of bandwidth per month. In reality, you will find that hosts often allow a lot more than this, but it helps you get an idea of how to calculate bandwidth.

The tricky part of deciding how much bandwidth you will need is to judge how successful your site will be. You can never predict how popular your site will be, and if it is mentioned in a popular newspaper or magazine, it can suddenly get a lot more traffic. One way around the problem of how much bandwidth you need is simply to choose a hosting service that will just charge you extra if you exceed the bandwidth you are allowed on your account. You should check regularly whether you have exceeded your level because you do not want to end up with a large surprise bill at the end of the month. You should also ensure you have enough money to pay for it if you go over the limit, or you may get cut off.

- ❑ **Country:** You might want to consider which country your site is hosted in. It is best to host the site in the same country where you expect the majority of your customers to be because the data has less distance to travel, which should make your site appear to those users more quickly. If you are setting up a site for an Australian market, for example, you would ideally host the site in Australia as it would be quicker for Australian visitors to load the pages than if it were hosted in Europe. In practice, however, you are rarely likely to see *much* of a performance difference.
- ❑ **Data centers:** A lot of companies say that they have multimillion-dollar data centers. This is because most hosting companies hire space in a large data center and put their services in these facilities (it does not necessarily mean your hosting company is a multimillion-dollar operation).
- ❑ **Disk space:** You will usually see a figure given in MB (megabytes) or GB (gigabytes) for the amount of space you get on the computer that serves your site. The disk space governs how large your site can be and needs to be larger than the total of all of the XHTML, CSS, script files, and images that make up your site. You can check how large your web site is by simply looking at the size of the folder that it is in (as long as you do not have any other files in that folder).
- ❑ **E-mail accounts:** Hosting companies generally provide e-mail services with web hosting. You need to consider two factors here: the size of mailbox you are allowed, and the number of mailboxes you are given. Some hosts give you unlimited mailboxes but set a maximum amount of storage space across all of them, so if you have five mailboxes and only 10 megabytes of space to share among them, each account can hold only 2MB at capacity. Some hosting companies allow you only a few mailboxes, but will allow a fixed amount for each mailbox (say 10MB each). Finally, some hosting companies allow you to take up the amount of space you have allocated for your domain with mail, so the only limit is your storage limit.

## Chapter 13: Putting Your Site on the Web

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- **Shared versus dedicated hosting:** The cheaper web hosting is nearly always provided on what is known as a *shared host*. This means that your web site is on the same physical computer as many other sites. Because the smaller sites do not have as many visitors, the computer can easily cope with hosting several sites. However, larger sites that have many thousands of visitors a day or that serve large files (such as music downloads or a lot of heavy graphics) require extra bandwidth and take up more resources on that server. This is when your site is likely to start to exceed the bandwidth limit set and your charges will start to increase. Therefore, if your site becomes extremely popular, you might find it cheaper to get your own server (or indeed your host might insist you get your own server), which is known as a *dedicated server* because it is dedicated to your use.

Some of the very popular sites on the Web are actually hosted across several servers — the site may be so busy that one computer alone cannot handle the traffic, or one machine may require maintenance so there are others to take the strain. Banks, large online stores, and multinational corporations are examples of sites that would use this kind of setup — known as a *load-balanced server* or *cluster of servers*.

Don't be put off by this talk about dedicated or load-balanced servers. Generally, if your site is so popular that you require your own dedicated server, you should be making enough money from it to warrant the extra cost.

- **Statistics packages:** Every time a user requests a file from your site, the web server can log certain details about the user — for example, the IP address, browser version, language of the operating system, and so on. This information comes in the HTTP headers from the browser. Statistics packages can look at the log files that contain this information and interpret some very useful information from them. For example, you can see how many pages you have served to visitors, what users typed into search engines to find you, and what the most common page people leave your site from is. All this information helps you understand what users are doing on your site and can help you improve the site and the number of visitors it receives. You learn more about statistics packages later in the chapter.
- **Uptime:** *Uptime* refers to the percentage of time your web server is working and available for people to look at your site. You will generally see figures such as 99 percent uptime, which means that, on average, 99 out of every 100 minutes your site will be available. But then that also means that your site might be down for 1 percent of the time, which could be 87.6 hours per year, or *four days*. If your site is your main source of income, you should find an alternative with more uptime.

Unless you are a running a *very* large company, it is rarely worth the investment of running your own servers, because you are likely to need someone capable of administering the machines and taking care of them on a regular basis. If you decide that you do need your own dedicated servers, several hosting companies will manage a server on your behalf, updating it with new patches for the operating system to fix security holes when needed — this is known as a *managed dedicated server*. While this is still expensive, you will generally find it cheaper than hiring someone yourself to manage your servers.

### **Putting Your Site on a Server Using FTP**

Once you have paid for some space on a web server, you need to be able to get the files that make up your web site onto this computer — which can be on the other side of the world. The most efficient way to do this is using *FTP*.

FTP stands for File Transfer Protocol. The Internet uses a number of different protocols for sending different types of information. For example, HTTP (Hypertext Transfer Protocol) is used for transmitting hypertext files, which are better known as web pages. FTP is a protocol used to transfer binary files across the Internet and is much quicker at sending whole web sites to a server than HTTP.

## Chapter 13: Putting Your Site on the Web

Most hosting providers actually require that you use FTP to transfer your pages onto their servers, which means that you need an FTP program (sometimes referred to as an FTP client) to put your files on a server.

Most FTP programs have two windows, each with a file explorer. One represents the files and folders on your computer; the other represents the folders on the web server. In Figure 13-7, you can see the folders on my computer, and on the right you can see those on a web server.

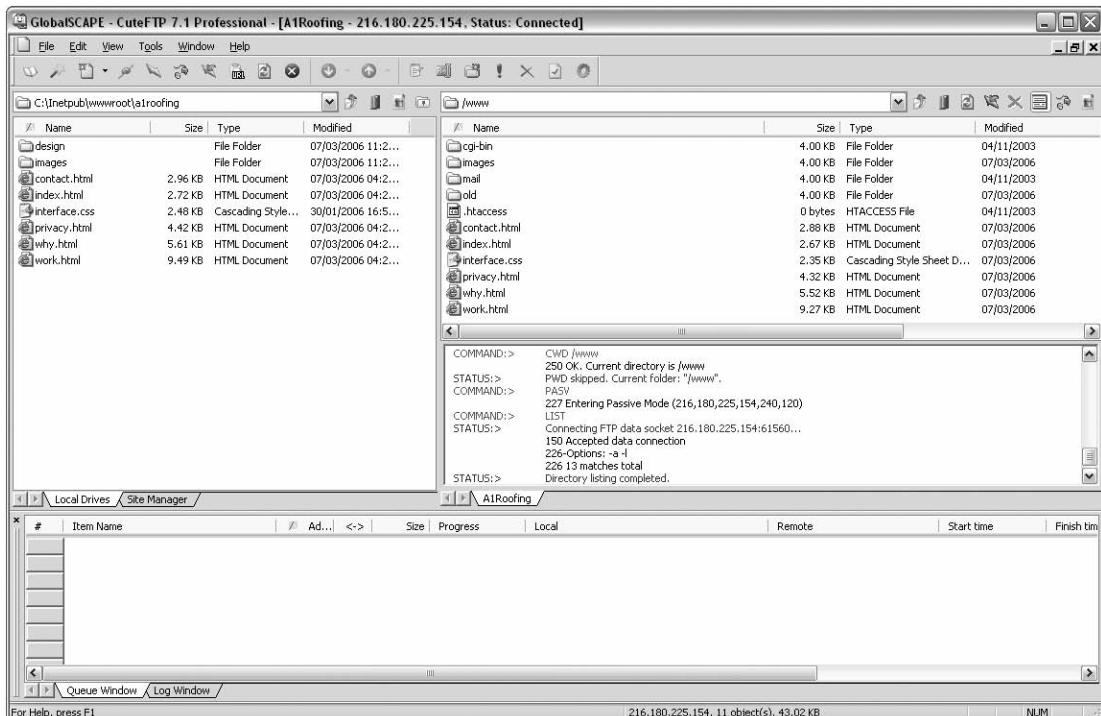


Figure 13-7

The table that follows shows some of the most popular FTP programs.

Product Name	URL	OS
FireFTP	<a href="http://fireftp.mozdev.org/">http://fireftp.mozdev.org/</a>	Windows and Mac OS X
Cute FTP	<a href="http://www.cuteftp.com/">www.cuteftp.com/</a>	Windows and Mac OS X
FTPX	<a href="http://www.ftpx.com/">www.ftpx.com/</a>	Windows
Fetch	<a href="http://www.fetchsoftworks.com/">www.fetchsoftworks.com/</a>	Mac
Transmit	<a href="http://www.panic.com/transmit/">www.panic.com/transmit/</a>	Mac

Each of the programs is slightly different, but they all follow similar principles.

## Chapter 13: Putting Your Site on the Web

When you register with a host, this host will send you details of how to FTP your site to its servers. This will include:

- An FTP address (such as `ftp.example.com`)
- An FTP username (usually the same as your username for the domain)
- An FTP password (usually the same as your password for the domain)

Figure 13-8 shows you how these are entered into the FTP program called Transmit on a Mac.

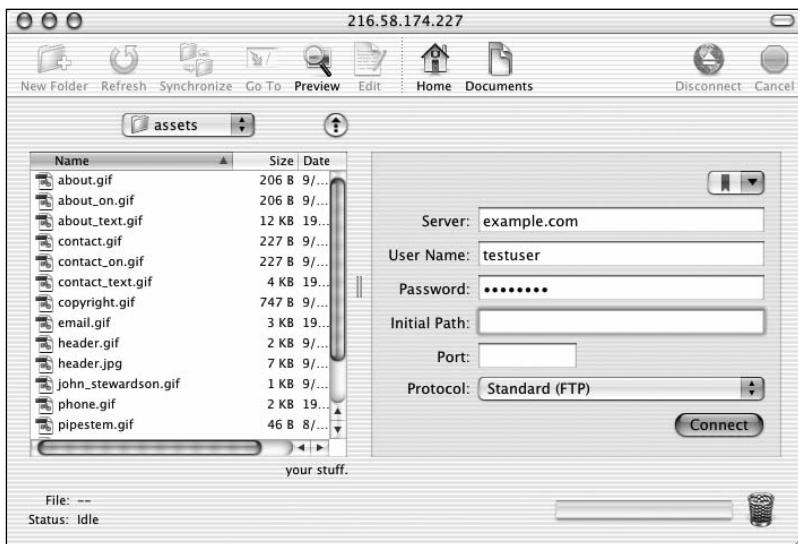


Figure 13-8

While you can download trial versions of several of these programs before you buy them to find out which one you are most comfortable using, most of these programs have graphical user interfaces that are very similar.

## Search Engine Strategies

Now that you have your site on the server, you want people to come and visit it. One of the best ways to get visitors to your site is to ensure that users can find your site in a search engine when they enter words that are relevant to the content of your site. Preferably they find you in the top ten values returned.

## Beyond meta Tags

You have already seen how search engines can use the `<meta>` tag's `description` and `keywords` properties to help search a site, but search engines are becoming much more complex in the way in which they address the task of indexing all the sites on the Web. You, too, therefore need to continue to work on your search engine strategies a lot more than just adding in `<meta>` tags.

*Staying on top of your search engine rankings is an ongoing exercise and should form part of your standard marketing practice. It's good to review your search engine ranking at least once a quarter — or once a month if possible.*

You should never just rely upon the search engine sites to find your site and index it. For example, sites such as `dir.yahoo.com` and `dmoz.org` are Internet directory sites based upon categories, and you have to navigate through the categories to find the site you want. This manual categorization of sites requires that you submit the URL of your site to them; it can then take anywhere from a couple of weeks to a few months for your site to appear on theirs.

Some sites charge for the privilege of being listed on their site, and in such cases you should carefully consider whether it's worth the money. While it may be worthwhile to pay to be featured on large popular sites, unless you personally know the site, you may find it does not provide many referrals. This is discussed more in the next section.

Once you have manually notified a search engine, you should wait at least a month before submitting the URL again. If you over-list a site it's considered spamming, and you might not get listed at all. If you have made significant changes to your site, it is always worth re-submitting it (not too frequently) so that the changes get identified.

*Personally, I ignore programs that promise to submit my site to thousands of Internet directories and would rather do the work myself. Spending just an hour a day for a couple of weeks, first submitting the site manually to major search engines and then looking for other relevant web sites and asking them to list my new site. I do this because some of the programs used generate so many submissions to web search engines that they are considered spam (and as a result are ignored). Remember that if the offer of results sounds too good (guaranteeing you top ten placements on thousands of search engines), the offer may well be too good to be true!*

### Designing Your Page to Maximize Rankings

Search engines that use programs to automatically index sites are using increasingly sophisticated rules to determine who gets the highest ranking (top) results in a web page. Following are some points to consider when designing your pages to help ensure that your site gets the highest ranking it can:

- ❑ The titles of your pages are among the most important words in your site and are one of the most important things indexed. So avoid using titles that just contain words such as "Home Page" and instead go for descriptive titles such as "Wrox Press — Computer Programming Book Publishers." Then on specific pages the title could change to something like "XHTML Programming Books, learn to code and build web sites." If the words the user types into the search engine are found in your title, the engine will consider your site more relevant. But don't make the title longer than one sentence or the program will realize you are trying to fool it and count this against you.
- ❑ Most search engines look through the text content of a page and will index that, too. The first words tend to be considered the most relevant. So you should try to strategically place the keywords for your site in the text near the start of the page as well as in the title. You can also expand on that list of keywords here.
- ❑ If the keywords a user searches on appear in the page with more frequency than other words, then they are considered to be more relevant. However, do not make them appear too frequently — again, the search engine will count this against you.

## Chapter 13: Putting Your Site on the Web

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- ❑ If your site uses images instead of text, the site can index only your `alt` text; so try to make sure any information conveyed with images is also conveyed in text.
- ❑ If you try to fool the search engines by repeating keywords in text that is the same color as the background (so that the repetitive text is invisible to your users), then the search engines can penalize you for this.
- ❑ Using keywords that are not related to the subject matter or the content of the site can count against you.
- ❑ The more sites that link to yours the better. Some search engines will give you higher priority if you are linked to by lots of other sites. But note that they will also consider which site is linking to you. The site should be relevant to your business — a search engine would not consider a used-car dealers linking to a pet shop as being a relevant link.
- ❑ The more users who click on links to your site when it comes up in the search engine, the better your rating should be. While things such as the title, keywords in the text, `<meta>` tags, and the number of links may help you appear nearer the top of the search engines, if nobody clicks on the links to visit your site, your ranking will soon fall.

It can take a long time to build up your search engine rankings, but constant attention will help you get better and better. See the section “Other Web Marketing Possibilities” a bit later in this chapter for additional marketing tips to help you build traffic on your site. But first I’ll show you what to do if you do *not* want your pages indexed.

### ***robots.txt***

On some web sites, there will be pages that you do not want to be indexed — for example administration pages and test pages. To prevent pages from being indexed by a search engine, you can include a simple text file on your site called `robots.txt` (which you write in a simple text editor such as Notepad on Windows or SimpleText orTextEdit on a Mac).

The `robots.txt` file can contain simple commands that prevent parts of the site from being indexed by the web crawlers (the little programs that index sites), which are often programmed to read these files.

You should have only one `robots.txt` file for your site, and it should be placed in a folder called `htdocs` in the root folder of your web server. Some web hosting companies create the `htdocs` folder for you; other hosts require you do this yourself if you need one.

The first line of this simple text file should be:

```
USER_AGENT: web_crawler_name
```

Given that you are likely to want all crawlers to obey the rules, you can simply use an asterisk instead of the names of any web crawlers — the asterisk is also sometimes referred to as a wildcard character, and it indicates that all crawlers should obey the rules.

Next, you can specify which folders you want to disallow the crawler from indexing (another reason why a well-organized site is important) by using the `DISALLOW` command. This command may be repeated for each folder you do not want indexed:

```
USER-AGENT: *
DISALLOW: /admin/
DISALLOW: /scripts/
```

This simply indicates that no crawler should attempt to index the admin or scripts folders (or any of their child folders).

While there is no requirement for the crawlers to obey the rules in this file, it is in their interest not to index pages people don't want displayed (usually because they will not allow the user to do something), so the main search engines will usually obey the rules.

## **Other Web Marketing Possibilities**

Search engines are just one way to get people to visit your site — and it is definitely worth allotting time for other types of marketing of your site both on and off the Internet. Here are just some of the tactics you can use to attract visitors to your site:

- Search for other web sites that are related to your industry. Some of these sites will have links to sites of interest, and you can ask to be added to the page featuring those links.
- A lot of industries have industry-specific directory web sites listing products and services for that particular field. However, many of these charge to advertise on their sites. You will have to decide whether the cost is justified by the amount of traffic it will bring you. You could always ask some people in your industry if they use the site and thus gauge whether you are likely to get many referrals from it.
- Many sites offer reciprocal links; that is, they will link to you in return for your linking to them. It is a way for everyone to boost traffic. But make sure that you are not putting someone on the front page of your site when they are going to put a link to you tucked away on a page that few people will come across — the term is *reciprocal linking*, after all.
- Use a few search engines to search for related companies and find out who is linking to them — the sites that link to related sites may well link to you, too, if you ask. You may find sites that you have never heard of before but would be happy to have link to you.
- You can provide buttons or banners on your site so that people can integrate them into their sites. This is more likely to happen with community sites than with commercial sites, but hobbyists will often link to special-interest sites, and it is a lot easier for them to do this if you have already provided links for them. If the links look great, too, they are more likely to want to add them.
- Take a look at Pay Per Click (PPC) advertising. Google has a PPC system called AdWords, for which you specify keywords, and when a user searches using those words, the ads appear on the right side of the page. These ads can also appear on other special-interest sites. AdWords works in a very clever way. You pay for an advertisement only when the user clicks it. The ranking of which ads appear first is based upon the amount you are prepared to pay each time someone clicks the ad, and the number of people who actually click on your ad. If users do not click the ad, it slips down in position, no matter how much you pay (after all, Google stands to make more money if 10 people click a cheaper link than if one person clicks a slightly more expensive link, and more users are getting value from their service). Generally speaking, this is a very cost-effective way to generate traffic to your site. Yahoo offers a similar service called Overture, and Microsoft has a system called adCenter.
- There are many other forms of paid advertising you can take out on the Web. Lots of sites take out banner advertising, and lots of sites allow you to pay to be listed. You will have to judge each of these on whether you think you will get enough traffic to justify the money. Remember that a lot of web users are immune to advertising and just scan pages to find what they really want — so if you are going to create a banner, make sure it's visually attractive and that people will want to click on it in order to make it worth the money you are spending to have it appear on other sites.

## Chapter 13: Putting Your Site on the Web

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- ❑ If there are any newsgroups, bulletin boards, or forums for your particular industry, answer questions on them and add your web-site address as a signature beneath your name when you sign the posts. But be careful to do this only when you can be helpful to someone — do not start posting to newsgroups unless it is relevant; you are likely to annoy people rather than attract any visitors if you do so.
- ❑ If you have regularly changing content, consider adding a newsletter feature to your site so that people can sign up to receive regular updates. This is discussed more later in the chapter, but it is a great way to keep people up-to-date with your site and let them know about new content.
- ❑ Of course, you should not just use the Web to market your site; a good site should generate traffic by word of mouth. You can also use printed leaflets, place ads in related magazines, put your site address on your letterhead or the side of your car. You could even find a conference or event that relates to the area you cover and use that as a way to make people in your industry more aware of what you do.

## Statistical Analysis

If your hosting provider has a statistics analysis package on its servers, you can find out lots of helpful information about your visitors once your site is live. These packages analyze the log files of your web server; log files contain information about files they send out and to whom they send them.

The terms used in site analysis can be confusing; for example, you may have heard people say that a site gets 10,000 *hits*, but this can be quite misleading. The term “hit” refers to the number of files that have been downloaded from the site — and an image counts as a file in this total as well as the XHTML pages, so a single web page with nine images will equal ten hits (and some graphics-intensive pages can have over 30 images for each page that is served). Therefore, it is often more helpful to look at *page views* rather than hits, as this represents the number of pages that have been viewed on your site.

You may also come across the term “visits.” You should be aware, however, that different statistics packages calculate visits in different ways. Some count everyone using the same IP address as the same visitor — so if there are ten people, all of whom work in the same building, looking at the same site at once, then that might look like only one user instead of ten. Different packages also tend to count visits as different lengths of times; some packages remember an IP address for a whole day, so if the same person comes to the site in the morning and then again in the evening it is counted as just one visit. Others will remember the IP address for only 15 minutes.

You will also find that some advertisers will ask for the number of unique visitors you receive each month — again different statistics packages can count unique users in different ways, so this figure can be a little misleading.

Most statistics packages will actually offer you a lot more information than I have mentioned here. For example, it is quite common for these packages to tell you how people arrived at your site — what pages and sites people came from and how many came from each. This helps you learn how people are finding out about and coming to your site, which then helps you determine good places to market your site.

Statistics packages also frequently tell you what terms people were searching on in order to find your site — so you can tell what keywords have been entered into search engines for users to find you, and then work on enhancing the frequency of these words in pages and enhancing your search engine position. Figure 13-9 shows you some of the terms used to find a site about printing equipment and services.

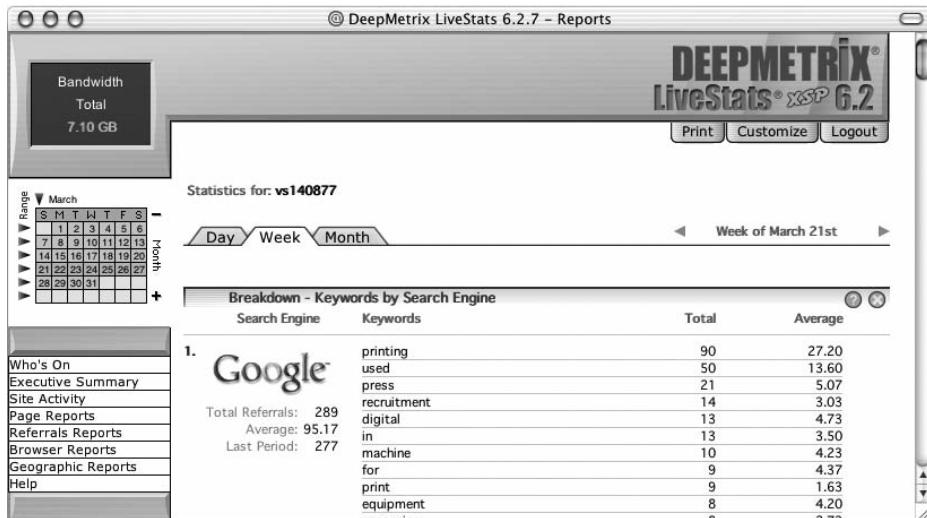


Figure 13-9

Some other information you might be able to find out includes:

- Which page users arrived at on your site and which they left from. This is very helpful because you can get an idea what people are coming to the site for and where they leave from. If there is one page that makes a lot of people leave, you can do something about improving the design of that page to try to make visitors stay on your site longer.
- Which country users are from
- What browsers users were using
- The language that users' operating systems are set to, and therefore which language they are likely to speak
- How long individual users spent on the site

*Be aware that all these figures are approximate and there can be differences between figures given by different reporting packages, but the figures are nevertheless very helpful tools in analyzing how people found out about you and what people are doing on your site.*

In addition to using the built-in statistics system of your web server, you can also use systems that use JavaScript to call a file on the server, and create analytical information for you. A very popular (and free) example of this is offered by Google and is called Google Analytics. In order to run this system you just need to place a piece of code at the bottom of each page; Google then will create all kinds of reports about your visitors, which can complement the statistics package offered by your web hosts very well.

## Version Control

In time, you are likely to want to make changes to your site. As mentioned already, you should not make changes on your live server. Rather, you should have another copy of the site, which you can use for testing, both on your local machine and the web server, before you make the changes active.

## Chapter 13: Putting Your Site on the Web

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When you are working on any kind of file, it's easy just to work on one version of a document and save changes as you go. However, this opens you up to problems:

- ❑ You might save over the file when you did not mean to, or make an error and want to go back to the original.
- ❑ You might open a file, make some changes, and save it. Then while you are editing your version, a colleague might come along and open the same file, make their changes, and then save their version after yours — saving over all your changes.
- ❑ You might be working on a site for a client and decide that you want to go back to an earlier version of a design or some earlier content.
- ❑ You might need a copy of something your site contained at an earlier date — but if you don't have these files, you won't be able to.

When more than one person is working on the same files or if you are updating your own files, it can be a good idea to come up with a naming convention to save all older files before saving new documents with the same name. For example, you can simply add a date and time to any file before saving over it. If you want to change your home page `index.html`, you can save a copy with the date you change it. The advantage to this is that you also know when it was last changed.

This does take up more space on your hard drive, but if you regularly make an archive copy of your sites and remove older files that are never used, you can regularly clear up the space they take and maintain a manageable set of files.

You can also use your own `<meta>` tags to indicate a version as well as the name of the last person to update the file. You might remember from the beginning of the chapter that I said you can use anything you like as the value of the `name` attribute of the `<meta>` tag; this is a good example of doing exactly that. For example, here are `<meta>` tags to indicate the last modified date and who made the last changes:

```
<meta type="last-modified" content="16-04-04:12:34:00 GMT" />
<meta type="last-changes-by" content="Jon Duckett" />
```

*Remember that you also have the `<ins>` and `<del>` elements, although these are not likely to be as much use when simply making updates to a site — they are more useful for tracking versions of documents.*

It is also good practice to add comments into code when you change something that other people have done. For example, if you are working on a site and want to add in a new script, you might do something like the following:

```
<!-- start of new section added 12/12/03 by Bob Stewart -->
<b><a href="specials.html">Click here for special offers on end of stock
items.</a>
<!-- end of new section added 12/12/03 by Bob Stewart -->
```

You are not likely to do this for large changes to sites, but for small changes (especially ones in script or programming languages), the comment will help someone coming back to the site later see what changes have been made.

You can buy software to handle version control for you. This software allows you to book out files, as if they were library books — preventing two people from working on the same file at the same time. Some of these applications can be quite expensive, although free tools are available such as CVS (Concurrent Versions System) at [www.cvshome.org/](http://www.cvshome.org/).

If you use Macromedia Dreamweaver, a function when you create a site allows you to indicate whether only one person at a time should be allowed to use a file. This is handy for preventing someone from opening a file while you are working on the same page and then saving over changes you have made and saved since this second person opened the file.

## What Next?

You've learned all about XHTML and CSS, made a good start at learning JavaScript, and learned how to put your site live on the Web. You might wonder why there is a section entitled "What Next?" This section covers two topics:

- Tools you can use to add powerful features to your site, using knowledge you already have
- What technologies might be appropriate to learn next

So, the first part of this final section will look at services provided on the Web that you can use to enhance your site. You learn how to create a blog, how to add discussion groups or forums to your sites, and how to add search features. While these might all sound complicated — and they certainly are advanced features — they can be remarkably easy to implement and you will see how they can be powerful and impressive features on any site.

Much like Hotmail offers e-mail over the Web, most of these services are implemented using other companies' servers and code — all you have to do is customize them to make them appear like part of your site.

## Blogs

The word "blog" is short for *weblog*. Blogs were initially devised as a way to add online journals or diaries to a personal web site. The idea behind blogs was to allow users to easily add new entries or *posts* to their web site without having to manually re-code the page (often called *one-click publishing*). The user goes to the web site of the company who made the blog, writes a post into a form, and the entry then appears on the web site.

The posts are added to the site in a chronological order, and while they are often used for online diaries or journals, they have been used for a wide variety of other purposes, such as a way for people to add news, posts about a topic of shared interest, links, and so on.

Indeed, while blogs started as a way for anyone to share thoughts with the rest of the Web, they soon started to appear on company intranets (as a way to share information), and on public web sites as a news feature (rather than just being used as a diary).

## Chapter 13: Putting Your Site on the Web

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Several different companies and web sites give you the tools to add a blog to your web site. Two of the more popular ones are:

- [www.blogger.com/](http://www.blogger.com/)
- [www.movabletype.org/](http://www.movabletype.org/)

Both of these sites give you the tools to add posts to your blog without having to manually update your page each time you want to write something new. Nor do you have to install software or scripts on your server (although both have applications where you *can* do so). Furthermore, they can look like they are part of your site under your domain name (rather than that of the company you use for your blog), and they often feature other functionality — such as allowing users to post comments about your posts, or adding keywords to help people find related posts.

## ***Discussion Boards or Forums***

Discussion boards allow users to post questions or comments and then have other users reply to those questions, and are a great way to add a community feeling to your site. They also provide new content without your having to add it yourself and can attract visitors back to your site at regular intervals. For example, if you were running a site about a particular type of car, you might have one discussion group for technical questions and answers about fixing problems with that model of car, and you might have another forum that allows users to indicate when they are buying or selling parts for that car.

One of the great things about discussion boards is that, if your site gets known for answering questions, people will come to that site whenever they have a problem. You may well have to start the community off by answering all the questions yourself, but with luck, other members will soon start adding their thoughts.

As with blogs, there are companies that create software and offer it on their servers so that functionality-wise it looks as though your site has a discussion group (even though it runs on their servers). One of the best is [www.ezboard.com/](http://www.ezboard.com/). And, as with blogs, you can usually customize the look of the discussion board by using CSS.

You should note, however, that you may be held legally responsible for what people write on your discussion board. If someone takes offense to something written on a board or forum on your site, you can be held accountable as the publisher of the content on the Web — even if you do not share the opinion of the person who wrote the item.

Some discussion boards get around this by allowing the owner to moderate each post (read it before allowing it to go on the site); others simply regularly check the site for offensive material and remove any posts they consider offensive as soon as possible.

## ***Adding a Search Utility***

As mentioned in Chapter 10, you might want to add a search utility to your site. In Chapter 10, you saw that you can add a Google search utility to your site, and you can even customize the search by going to [www.google.com/coop/cse/](http://www.google.com/coop/cse/). Another site that offers a free customizable search service on sites of up to 500 pages is the Atomz Express service at [www.Atomz.com/](http://www.Atomz.com/) (you may need to follow the links for the trial service).

The addition of a search facility to your site can mean the difference between users' finding what they hoped to find or simply giving up and leaving; after all, many visitors will not hang around long enough to browse through lots of pages if the information they want is not easily accessible.

With both the Google and Atomz services, you are given the code for a form that will allow users to send queries to the respective company's web site. The company's servers will then return a page to your users with the results of the search. Both services allow you to create custom headers for the page so that it contains your branding, although the results are generated by the company's servers.

## Introducing Other Technologies

This section provides an introduction to some other technologies, what they can do, and how you can make use of them on web sites. I hope this helps you decide what technology you might want to start learning next when you have gained experience with everything you've learned in this book.

### **Server-Side Web Programming: ASP.NET, and PHP**

You've already seen the very basics of what a programming language such as JavaScript can do in a browser, but when a programming language is used on a web server, it becomes even more powerful.

Any time you want to collect information from a visitor to your site and return a page that is customized for that visitor, you will want to look at server-side programming. Here are some examples of applications where different users will need different pages:

- ❑ **Searching for content on a site:** The user enters a term that he or she wants to search for into a form that is sent to the application on the server. The application then creates a page that contains results the user enquired about.
- ❑ **Checking train times:** The user enters the point he or she is traveling from and the destination, along with preferred travel times. The application then creates a page that contains the requested journey times.
- ❑ **Shopping online:** Users browse through a catalog of products and select which ones they want. Their choices are often reflected in a shopping basket displayed on each page. After they have chosen what they want, they provide their payment details and contact/delivery details. At the same time, the people running the store are likely to have a browser-based interface that allows them to add new products to the site (rather than having to create each new page and link to it individually).
- ❑ **Discussion boards and forums:** The examples you have already seen mentioned in this chapter of discussion boards and forums rely on another company's server-side programming and code to handle all of the posts.

The term "server-side application" can be something as simple as one page that contains a script executed on the server. However, it can be much more complex; it may be made up of hundreds of pages of code that use databases, things called components, even other programs running on the server. The complexity of the application usually depends upon the features it has.

## Chapter 13: Putting Your Site on the Web

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Indeed, most sites with content that changes regularly will use a server-side programming language because the content of the site will be in a database. You will learn more about this shortly in the section "Content Management."

### **Choosing a Server-Side Language**

You can work in several different server-side languages and environments, such as ASP.NET and PHP, both of which offer very similar capabilities. Generally speaking (although there are exceptions to the rule):

- ❑ ASP.NET runs on Microsoft IIS and Windows servers.
- ❑ PHP and JSP run on UNIX servers.

You can code these pages on your desktop computer with the right software installed, but you will want to host the finished web site on a web server.

*The first applications created using a script on a server were known as CGI scripts. You may still see CGI or CGI-bin in the URL of some applications. However, the languages discussed here are in far higher demand and are more powerful.*

Different developers will have different opinions about which language to choose. But most people learn one environment and stick to it (although to a certain degree it is much simpler to learn a second language and environment when you already understand one and know what can be done with server-side scripting languages).

If you are learning any technology in order to get a job, then it's a good idea to keep an eye on job advertisements. You will be able to track the technologies required and also (if you look regularly) you will be able to see the emerging technologies early on — first there will be only one or two mentions of these technologies, and then the mentions will come more regularly. Job ads can therefore be quite a good barometer for technologies you should consider learning. (And if your boss catches you looking at job ads, you've got a great excuse — you're just researching which technologies are going to be more popular in the near future.)

### **Content Management**

One of the key aspects of many sites is a *content management system*. This is actually a fancy name for something that will allow you to easily update the content of your web site without actually having to create a new page for each new article, posting, or product for sale.

Content management systems tend to be based on a relational database. Relational databases contain one or more tables, each of which is like a spreadsheet. Figure 13-10 shows you a database used in a site about music.

You can see that there are several rows in this table, each containing the details of a different advertisement. The columns each contain different information about the article in that row:

- ❑ `articleid` is a number used to uniquely identify each article in the system.
- ❑ `posted` is the date the article was posted.

## Chapter 13: Putting Your Site on the Web

- ❑ `lastupdate` is the date that the article was last updated.
- ❑ `headline` is the headline for the article.
- ❑ `headlinedate` is the date that the article says it was written on.
- ❑ `startdate` is the date the article should be published on.
- ❑ `enddate` is the date that the article should stop being available on the site (several of the articles have the date set to the 31 December 9999 — so if the site is still around then, the managers will have to do something about the dates, but until then the article will remain published).

This table actually contains a lot more fields, but this gives you an idea of how the information is stored. When users come to the site that uses this database, they will navigate through categories to find the items they are interested in. Rather than having a page containing the details of each article, the site contains only one page that displays all news articles, called `article.aspx`. This is like a template for all the articles, and the title, headline date, and article are added into the page at the same place in each article. You can see an example of an article in Figure 13-11.

Look at the structure of the URL for this ad; it is the key to how this template-based system works:

<http://www.musictowers.com/news/features/article.aspx?a=1496>

Data in Table 'articles' in 'musictowers'											
articleid	posted	lastupdate	headline	headlinedate	startdate	enddate	source	summary	articleurl	article	priority
3	2005/08/17	2005/08/17	HelpFAQ	2005/08/17 00:00:00	9999/12/31 00:00:00			Here are the answers to your frequently asked questions.	<Long Text>	9	
4	2005/08/17	2005/08/17	Hov2	2005/08/17 00:00:00	9999/12/31 00:00:00			Not entirely sure who he is, but he's here.	<Long Text>	9	
5	2005/08/17	2005/08/17	Jargon Buster	2005/08/17 00:00:00	9999/12/31 00:00:00			Slang which the young people use.	<Long Text>	9	
6	2005/08/17	2005/08/17	Affiliates	2005/08/17 00:00:00	9999/12/31 00:00:00			Welcome there afflites!	<Long Text>	9	
7	2005/08/17	2005/08/17	About Us & Meet the Team	2005/08/17 00:00:00	9999/12/31 00:00:00			So, who are the M&T?	<Long Text>	9	
8	2005/08/17	2005/08/17	Terms and Condition	2005/08/17 00:00:00	9999/12/31 00:00:00			  	<Long Text>	9	
9	2005/08/17	2005/08/17	Prius Draw Rules	Thursday, November 2005/08/17 00:00:00	9999/12/31 00:00:00			Here are the rules I made up.	<Long Text>	9	
10	2005/08/17	2005/08/17	Privacy Policy	2005/08/17 00:00:00	9999/12/31 00:00:00			So, you want to know what we do with your information.	<Long Text>	9	
11	2005/08/17	2005/08/17	Advertise on our site	2005/08/17 00:00:00	9999/12/31 00:00:00			Here's an overview of how to do it.	<Long Text>	9	
1001	2005/11/08	2005/11/08	INTERVIEW: Robbie Williams first P Sunday, November 2005/11/08 16:37	9999/12/31 00:00:00				Everyone's talking about him, so let's take a look.	<Long Text>	3	
1002	2005/11/09	2005/11/09	John Lennon Cabell Tuesday, November 2005/11/09 16:37	9999/12/31 00:00:00				FIRST DIGITAL REL	<Long Text>	1	
1003	2005/11/24	2005/11/24	Bestival, Isle of Wk Thursday, November 2005/11/24 04:55	9999/12/31 00:00:00				Ben Osborne runs the festival.	<Long Text>	1	
1004	2005/11/25	2005/11/25	PREVIEW: A ROCK Friday, November 2005/11/25 05:00	2006/02/25 05:00				A new exhibition of rock memorabilia.	<Long Text>	1	
1005	2005/11/28	2005/11/28	Robbie spurns Cou Monday, November 2005/11/28 07:38	9999/12/31 00:00:00				Courtney Love's son.	<Long Text>	1	
1006	2005/08/18	2005/08/18	Leonard Cohen Bar Thursday, August 2005/08/18 00:00:00	2005/12/18 00:00:00				Singer Leonard Cohen.	<Long Text>	9	
1007	2005/08/18	2005/08/18	Madonna Album De Thursday, August 2005/08/18 00:00:00	2005/12/18 00:00:00				Press for Madonna's new album.	<Long Text>	9	
1008	2005/08/18	2005/08/18	EU Online Deal Nea Thursday, August 2005/08/18 00:00:00	2005/12/18 00:00:00				Belgium and the Netherlands.	<Long Text>	9	
1018	2005/10/25	2005/10/25	The Game Fights TI Wednesday, November 2005/10/25 00:00:00	2005/12/26 00:00:00				Just when you thought you had enough...	<Long Text>	1	
1019	2005/11/02	2005/11/02	Depeche Mode Car Wednesday, November 2005/11/02 14:59	9999/12/31 00:00:00				Depeche Mode have a new album.	<Long Text>	9	
1020	2005/11/28	2005/11/28	Gitter Faces Death Monday, November 2005/11/28 15:45	9999/12/31 00:00:00				Gary Gitter has been found guilty of谋杀.	<Long Text>	9	
1021	2005/11/28	2005/11/28	Jessica Simpson an Monday, November 2005/11/28 15:45	9999/12/31 00:00:00				3 years of Knox.	<Long Text>	9	
1022	2005/11/28	2005/11/28	Ozzie's are Back Monday, November 2005/11/28 17:00	9999/12/31 00:00:00				Daniel Radcliffe has returned.	<Long Text>	9	
1023	2005/11/28	2005/11/28	Sony BMG Launch in Monday, November 2005/11/28 17:23	9999/12/31 00:00:00				Sony BMG is back.	<Long Text>	9	
1024	2005/11/28	2005/11/28	Sony BMG Disney Monday, November 2005/11/28 17:35	9999/12/31 00:00:00				Music industry seek.	<Long Text>	9	
1025	2005/11/28	2005/11/28	Madonna owns Eur Monday, November 2005/11/28 17:40	9999/12/31 00:00:00				Madonna is the first.	<Long Text>	9	
1026	2005/11/28	2005/11/28	Jonathan Ross For Monday, November 2005/11/28 17:44	9999/12/31 00:00:00				Jonathan Ross is here.	<Long Text>	9	
1027	2005/12/06	2005/12/06	MTV revamp Tuesday, December 2005/12/06 03:47	9999/12/31 00:00:00				MTV launches new channel.	<Long Text>	9	
1028	2005/12/06	2005/12/06	Doherty Vs Gallagher Tuesday, December 2005/12/06 03:56	9999/12/31 00:00:00				Lisa Moirish has died.	<Long Text>	2	
1029	2005/12/06	2005/12/06	The hits are alive w Tuesday, December 2005/12/06 04:04	9999/12/31 00:00:00				Tesco plans a launch.	<Long Text>	9	
1030	2005/12/06	2005/12/06	Eptaph F Hell is Tuesday, December 2005/12/06 04:37	9999/12/31 00:00:00				UK's Hell is for Herc.	<Long Text>	9	
1031	2005/12/06	2005/12/06	Daddy Fresh Launc Tuesday, December 2005/12/06 05:18	2006/12/06 05:18				Daddy Fresh Launc.	<Long Text>	9	
1032	2005/12/06	2005/12/06	PRESS RELEASE: K Tuesday, December 2005/12/06 05:27	2006/12/06 05:27				PRESS RELEASE: K...	<Long Text>	9	
1033	2005/12/06	2005/12/06	Peter Andre Nod Wednesday, December 2005/12/06 05:30	2006/12/06 05:30				The Nodding Peter Andre.	<Long Text>	9	
1034	2005/12/06	2005/12/06	Feeder postcard of Tuesday, December 2005/12/06 05:38	2006/12/06 05:38				Great art from Feeder.	<Long Text>	9	
1035	2005/12/06	2005/12/06	Grassroots gig pren Tuesday, December 2005/12/06 11:00	2005/12/09 11:00				GRASSROOTS XMAS.	<Long Text>	9	
1036	2005/12/06	2005/12/06	Elton to replace Mo Tuesday, December 2005/12/06 11:10	9999/12/31 00:00:00				Elton John and David.	<Long Text>	9	
1037	2005/12/07	2005/12/07	Robbie is Not Gay Wednesday, Decer 2005/12/07 03:52	2006/12/07 03:52				ROBBIE IS NOT GAY.	<Long Text>	9	
1038	2005/12/07	2005/12/07	My Space turns to i Wednesday, Decer 2005/12/07 03:56	9999/12/31 00:00:00				According to the F1.	<Long Text>	9	
1039	2005/12/07	2005/12/07	Please rise Sir Terry Wednesday, Decer 2005/12/07 04:03	9999/12/31 00:00:00				Terry Wogan has died.	<Long Text>	9	
1040	2005/12/07	2005/12/07	PODCAST is voted Wednesday, Decer 2005/12/07 04:10	9999/12/31 00:00:00				Podcast has been voted.	<Long Text>	9	
1041	2005/12/07	2005/12/07	Indie Licence for PC Wednesday, Decer 2005/12/07 04:16	9999/12/31 00:00:00				Podcasts get licensed.	<Long Text>	9	
1042	2005/12/07	2005/12/07	Lyrics sites get Cesar Wednesday, Decer 2005/12/07 06:19	9999/12/31 00:00:00				Warner/Chappell has.	<Long Text>	9	
1043	2005/12/07	2005/12/07	MP3 toilet seat Wednesday, Decer 2005/12/07 06:26	9999/12/31 00:00:00				Upon reporting.	<Long Text>	9	
1071	2005/12/12	2005/12/12	Williams - Piranha Monday, December 2005/12/12 03:18	9999/12/31 00:00:00				Those crazy Japanese.	<Long Text>	4	
1072	2005/12/12	2005/12/12	Fink - Pretty Little Monday, December 2005/12/12 04:43	9999/12/31 00:00:00				FINK - Pretty Little.	<Long Text>	9	
1073	2005/12/12	2005/12/12	Scubs - Words! Th Monday, December 2005/12/12 06:55	9999/12/31 00:00:00				Scubs - Words! Th.	<Long Text>	9	
1074	2005/12/12	2005/12/12	Parker Frisby/Hilti Monday, December 2005/12/12 07:07	9999/12/31 00:00:00				Parker Frisby/Hilti.	<Long Text>	1	
1075	2005/12/12	2005/12/12	Yurka - Interview Monday, December 2005/12/12 07:44	9999/12/31 00:00:00				Ron Osborne interview.	<Long Text>	9	
1076	2005/12/12	2005/12/12	Yurka - Interview Monday, December 2005/12/12 07:44	9999/12/31 00:00:00					<Long Text>	9	

Figure 13-10

## Chapter 13: Putting Your Site on the Web



Figure 13-11

The `article.aspx` page is requested, and when it is requested, the article identifier 1496 is also requested. This corresponds with the number in the first column of the table in Figure 13-11. All the details of this article are then placed into the template. So, where the text says “Thursday December 6, 2007” this is the headline date field from the database.

This approach is also what makes it possible for many authors to update the same site without having to know how to code each individual page. Rather, they log into a simple administration tool that allows them to submit articles using a simple form. Figure 13-12 shows one of the pages that allows users to enter new articles.

The screenshot shows a web browser window for 'MusicTowers.com CMS - Mozilla Firefox'. The main content area is titled 'Edit Article Properties' and contains a form for editing article details. The form fields include:

- Article ID #:** 2590
- Headline:** Interview: Duffy (no, not the bass player in GnR...)
- Headline Date:** Thursday, December 06, 2007 [Insert Current Date]
- Description:** Wales doesn't half produce lovely voices - what is that
- Band/Artist Name:** Duffy
- Keywords:** Duffy, rough Trade, Bernard Butler, soul, Motown
- Pull Quote:** \*
- Priority:** 9
- Summary:** Wales doesn't half produce lovely voices - what is that about?
- Start Date:** December 6 2007 - Time 10:16 (HH:MM)
- End Date:** January 5 2008 - Time 10:16 (HH:MM)  Never Expires
- Members only:**  Check this option to make this a members only article
- Assigned Zones:**
  - Allegedly Gossip section
  - Charts
  - Classical

At the top right of the form is a 'DELETE ARTICLE' button. The browser's menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The toolbar includes icons for SEARCH, ARTICLE, ZONES, USERS, ASSETS, CHARTS, and LOGOUT.

Figure 13-12

This approach of storing content in a database is employed in many different types of sites. For example, auction sites such as eBay store each item for sale in a row of a database; likewise, e-commerce stores tend to store product details in a database, with each product stored in a row of one of the tables. When these sites use a row of a table for each article or product, new articles or products can be added using XHTML forms (rather than having to hand-code pages), and contents pages can list all the articles or products without having to be modified each time a new one is added.

## Flash

Flash is written using a special program (called Flash). Users need the Flash plug-in — known as the Flash Player — installed on their computers in order to see the Flash files, but statistics from several sources suggest that over 90 percent of the computers connected to the Web already have this installed and it is very popular.

Flash started off as a way to create animations on the Web — from cartoons to animated logos or text. It is a very powerful tool, and you can see lots of examples of it at the following sites:

- [www.adobe.com/products/flash/](http://www.adobe.com/products/flash/)
- [www.flashkit.com/gallery/](http://www.flashkit.com/gallery/)

## Chapter 13: Putting Your Site on the Web

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It is also increasingly being used as a way to show audio and video content on the Web with sites such as YouTube relying on Flash to stream their video.

Very few sites need to be designed completely in Flash; it is much more common to see parts of pages created in Flash (such as banner ads and animations). This is partly because it is much quicker to develop a site in XHTML and partly because fewer people have the skills to integrate Flash well with databases than do with XHTML.

The Flash movie creation software does cost money, but the plug-in is free. If you are not sure whether Flash is the right thing for you to learn next, you can download a free trial version from the Adobe web site.

## **Learning Graphics Packages**

Learning how to deal with text, illustrations, photos, and images correctly is very important if you are going to be involved with designing pages as well as coding them. The difference between an okay-looking site and a visually great one is often its use of graphics.

There are two key types of graphics package you might want to learn:

- A photo editing and manipulation package such as Adobe Photoshop or the “lite” version, Photoshop Elements. These work with bitmapped graphics.
- A vector art package such as Adobe Illustrator or Macromedia Freehand. These work with vector graphics (line drawings created using coordinates), which are then filled in with colors.

You learned a bit about the difference between bitmapped graphics and vector graphics in Chapter 3.

Adobe Photoshop is by far the most popular graphics program used for developing web graphics. You need only look at job ads for web designers and you’ll see that knowing Photoshop is often a prerequisite. Photoshop not only allows you to work with photos, but it can also be used to create text and logos (although an experienced designer would usually favor a vector program when it comes to creating logos and diagrams from scratch).

Photoshop is a valuable tool to know because it not only allows you to edit photos, but also lets you create all kinds of images, such as navigation images and logos. It will then take these images and create optimized versions of them ready for the Web with smaller file sizes for quicker downloads.

When working in Photoshop, you can create an image built up from many layers — each layer is like a piece of clear film over the first image you start with, allowing you to make changes on top of the image.

When you have experience with a photo package you might want to learn a vector image package, especially if you are going to be creating lots of logos or diagrams. Vector packages are of little use if you are working with photos, but they are great for doing line-based work. By their nature, vector graphics scale very well, and logos are often created in a vector format because they allow you to scale an image to a large size for a poster or shrink it down for a small web graphic. By contrast, if you blow up a bitmapped image to a very large size it will look grainy — you will be able to see all of the pixels that make up the image.

Of course, there are many other technologies you could learn, but the ones you have learned about in this section offer you the next logical steps in your web development career. If you want to work more with graphics I advise you to start with Photoshop or Flash, whereas if you want to work more on programming, start learning a server-side programming language.

# Summary

In this chapter, you have seen how to prepare your web site for a waiting world. You started off learning about the `<meta>` tags that you can use to add content *about* your documents (such as the author, expiry date, or default scripting language) — hence the name `<meta> tags`; they contain information about the document rather than being part of the document themselves.

You then learned about different sorts of tests that you should perform on your pages before you put them on a server, or after they are on the server but before you want the world to see them. These tests included validating your pages (to make sure that your markup is written according to the relevant recommendation and that you are following the rules you should), checking links to make sure all of them work and are not pointing to the wrong place, and checking that your site meets accessibility guidelines.

Next, you looked at the potential minefield of choosing a host on whose web servers you can put your web site. This ever-changing market is hard to keep up with, but it can be well worth checking on a few hosts rather than going with the first one you find. New deals with more storage, greater bandwidth, larger mailboxes, and newer features are coming out all the time, so it pays to shop around.

Once your site is live, you will want people to come and look at it. One of the major ways to attract new visitors is through a combination of techniques such as carefully chosen titles, keywords, content on your pages, and manual submission to sites. This is an ongoing process that requires regular attention. Of course, online is not the only way to market your site — there are plenty of other ways you can attract visitors.

You can also gain valuable information about your visitors by using statistics packages that analyze your log files, working out how people came across your site, how many pages they looked at, what terms they searched on in search engines to arrive at your site, and so on.

This chapter also covered version control, so that when you come to make updates to your site you do not end up losing important files, or having someone else save over your work. The keywords here are to play safe, and keep a copy of everything you change, at least until you have finished the job. Then you can archive that version of the site and delete older files.

The final part of the chapter looked at where you can go next with your site. You saw that there are services such as blogs, discussion boards, and search features that have already been developed by companies that allow you to integrate these services into your site. If you are interested in programming, you should consider learning a server-side language such as ASP.NET or PHP. Alternatively, if you are more interested in the visual appearance and design of sites you should consider learning a graphics program such as Adobe Photoshop, and possibly some animation software such as Flash.

This book has covered a lot, and the best way to make sure you have understood it properly is to get out there and build some sites. Perhaps you can create a site about a hobby or interest of yours, or maybe you can create a site for friends who run their own small business.

Remember that if you like the way someone has done something on a site (perhaps you like the layout, or the size and type of font used) you can simply go to the View menu on your browser and select the option to display the source for the page. While you should never copy someone else's design or layout, you can learn a lot from looking at how other people have built their sites. But remember that they might not be using XHTML; a lot of pages are out there that were built using earlier versions of HTML. HTML is not strict about how you write your pages, and there are a lot of coders out there who are not as aware of

## Chapter 13: Putting Your Site on the Web

such things as which elements require closing brackets, when to use quotes for attributes, or how to use CSS well.

While older, more relaxed ways of coding may seem easier, by being strict with how you use markup, separating as much of your markup from styling as possible, and using JavaScript only to enhance pages, you end up with pages that will be available to more browsers and more people for a longer time.

So, thank you for choosing this book, and congratulations on making it to the end. I wish you all the best in creating your first web site and hope that it is the first of many!

# A

## Answers to Exercises

### Chapter 1

1. Mark up the following sentence with the relevant presentational elements.

The 1<sup>st</sup> time the **bold** man wrote in *italics*, he underlined several key words.

- A. The sentence uses superscript, bold, italic, and underlined presentational elements.

<p>The 1<sup>st</sup> time the <b>bold</b> man wrote in <i>italics</i>, he <u>underlined</u> several key words.</p>

2. Mark up the following list, with inserted and deleted content:

Ricotta pancake ingredients:

- 1 ~~1/2~~3/4 cups ricotta
- 3/4 cup milk
- 4 eggs
- 1 cup plain white flour
- 1 teaspoon baking powder
- ~~75g~~ 50g butter
- pinch of salt

- A. Here is the bulleted list with the editing elements added:

```
<h1>Ricotta pancake ingredients:</h1>
<ul>
  <li>1 <del>1/2</del><ins>3/4</ins> cups ricotta</li>
  <li>3/4 cup milk</li>
  <li>4 eggs</li>
```

## Appendix A: Answers to Exercises

---

```
<li>1 cup plain <ins>white</ins> flour</li>
<li>1 teaspoon baking powder</li>
<li><del>75g</del><ins>50g</ins> butter</li>
<li>pinch of salt</li>
</ul>
```

## Chapter 2

1. Look back at the Try It Out example where you created a menu, and create a new page that has links, like those at the top of the menu page, to each of the courses in the menu example. Then add a link to the main Wrox Press Web site ([www.wrox.com](http://www.wrox.com)).  
**A.** Your code should look something like this:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
  <title>Links to menu</title>
</head>
<body>
<h1>Links to the Wrox Cafe Menu</h1>
<div id="links">
  <a href="menu.html#starters">Starters</a> | 
  <a href="menu.html#mains">Main courses</a> | 
  <a href="menu.html#deserts">Deserts</a>
</div>
<p>Wrox Cafe is a fictional cafe brought to you from <a
href="http://www.wrox.com">Wrox Press</a></p>
</body>
</head>
```

In order for it to be a Strict XHTML 1.0 document, the links that form the menu have been placed inside a `<div>` element (because all inline elements should be contained by a block-level element), and each link uses the pound or hash sign (#) after the filename followed by the value of the `id` attribute to indicate the part of the page the link should go to.

The link to the Wrox Web site, meanwhile, uses the full URL you would type into a browser window as the value of the `href` attribute.

2. Take the following sentence and place `<a>` elements around the parts that should have the link.

```
<p>To find out why advertising on our site works, visit the testimonials
page.</p>
```

- A.** The link is well placed around the word “testimonials.” Remember that when a link is in the middle of text, the actual content of the link should be short and to the point so that users can scan the page for key items they are interested in.

```
<p>To find out why advertising on our site works, visit the
<a>testimonials</a> page.</p>
```

3. What is wrong with the positioning of the `<a>` element here?

```
<p>You can read the full article <a>here</a>.</p>
```

- A. This link is not very descriptive for someone who is scanning the page. The word `here` will stick out when you probably want to draw people's attention to the words `full article`.

```
<p>Click on the link to read the <a>full article</a>.</p>
```

## Chapter 3

1. Add the images of icons that represent a diary, a camera, and a newspaper to the following example. All of the images are provided in the `images` folder in the download code for Chapter 3.

```
<h1>Icons</h1>
<p>Here is an icon used to represent a diary.</p>
<br />
<p>Here is an icon used to represent a picture.</p>
Camera image goes here<br />
<p>Here is an icon used to represent a news item.</p>
Newspaper image goes here
```

Your finished page should look like Figure 3-16.

- A. Here you can see the body of the page that contains the new images; the lines with the images have been shaded:

```
<?xml version="1.0" ?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
  <title>Exercise 1</title>
</head>
<body>
<h1>Icons</h1>
<p>Here is an icon used to represent a diary.</p>
<br />
<p>Here is an icon used to represent a picture.</p>
<br />
<p>Here is an icon used to represent a news item.</p>
<br />
</body>
</html>
```

2. Look at the four images shown in Figures 3-17 and 3-18 and decide whether you are more likely to get smaller file sizes if you save them as JPEGs or GIFs.

- A. You should save the images in the following formats:

- Image 1: JPEG
- Image 2: GIF

## Appendix A: Answers to Exercises

---

As discussed in Chapter 3, images with large flat areas of color, such as image 1 where you see only the silhouette of the people, compress better as GIFs than as JPEGs, whereas JPEGs are better for saving photographic images. You could also have suggested PNGs instead of GIFs, as PNGs are a replacement for GIFs.

## Chapter 4

1. Where should the `<caption>` element for a table be placed in the document, and by default where is it displayed?  
**A.** The `<caption>` element should appear after the opening `<table>` element but before the first `<tr>` element.
2. In what order would the cells in Figure 4-11 be read out by a screen reader?  
**A.** The names would be read in the following order: Emily, Jack, Frank, Mary, Dominic, Amy, Thomas, Angela, and David.
3. Create a table to hold the data shown in Figure 4-12. To give you a couple of clues, the document must be Transitional XHTML 1.0 because the `width` attribute is used on the cells of the first row of the table. You should also have seen examples of how the border is generated in this chapter, using another deprecated attribute, but on the `<table>` element rather than the cells.  
**A.** Here is the example for the cinema timetable (`cinema.html`).

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
  <title>Classic Movies Times</title>
</head>
<body>
<table border="1" width="500">
<caption>Classic Movie Day</caption>
<tr>
  <th></th>
  <th width="200">5 pm</th>
  <th width="200">7 pm</th>
  <th width="200">9 pm</th>
  <th width="200">11 pm</th>
</tr>
<tr>
  <th>Screen one</th>
  <td>Star Wars</td>
  <td>Empire Strikes Back</td>
  <td>Return of the Jedi</td>
  <td>The Exorcist</td>
</tr>
<tr>
  <th>Screen two</th>
  <td colspan="2">Dances with Wolves</td>
  <td colspan="2">Gone With the Wind</td>
</tr>
</table>
</body>
</html>
```

```

</tr>
<tr>
    <th>Screen three</th>
    <td colspan="2">2001: A Space Odyssey</td>
    <td>The Conversation</td>
    <td>5 Easy Pieces</td>
</tr>
</table>
</body>
</html>

```

## Chapter 5

- 1.** Create an e-mail feedback form that looks like the one shown in Figure 5-25.

Note that the first text box is a `readonly` text box so that the user cannot alter the name of the person the mail is being sent to.

- A.** Here is the code for the e-mail feedback form:

```

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
    <title>Reply to ad</title>
</head>
<body>
    <h2>Reply to ad</h2>
    <p>Use the following form to respond to the ad:</p>
    <form action="http://www.example.com/ads/respond.aspx" method="post"
        name="frmRespondToAd">
        <table>
            <tr>
                <td><label for="emailTo">To</label></td>
                <td><input type="text" name="txtTo" readonly="readonly" id="emailTo"
                    size="20" value="Star Seller" /></td>
            </tr>
            <tr>
                <td><label for="emailFrom">To</label></td>
                <td><input type="text" name="txtFrom" id="emailFrom" size="20" /></td>
            </tr>
            <tr>
                <td><label for="emailSubject">Subject</label></td>
                <td><input type="text" name="txtSubject" id="emailSubject" size="50"
                    /></td>
            </tr>
            <tr>
                <td><label for="emailBody">Body</label></td>
                <td><textarea name="txtBody" id="emailBody" cols="50" rows="10">
                    </textarea></td>
            </tr>
        </table>
    </form>

```

## Appendix A: Answers to Exercises

---

```
<input type="submit" value="Send email" />
</form>
</body>
</html>
```

- 2.** Create a voting or ranking form that looks like the one shown in Figure 5-26.

Note that the following `<style>` element was added to the `<head>` of the document to make each column of the table the same fixed width, with text aligned in the center (you see more about this in Chapter 7).

```
<head>
    <title>Voting</title>
    <style type="text/css">td {width:100; text-align:center;}</style>
</head>
```

- A.** Here is the code for the voting form. Note how the checked attribute is used on the middle value for this form so that it loads with an average score (in case the form is submitted without a value selected):

```
<?xml version="1.0" ?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
    <title>Voting</title>
    <style type="text/css">td {width:100; text-align:center;}</style>
</head>
<body>
<h2>Register your opinion</h2>
<p>How well do you rate the information on this site (where 1 is very poor and 5 is very good)?</p>
<form action="http://www.example.com/ads/respond.aspx" method="get"
    name="frmRespondToAd">
<table>
    <tr>
        <td><input type="radio" name="radVote" value="1" id="vpoor" /></td>
        <td><input type="radio" name="radVote" value="2" id="poor" /></td>
        <td><input type="radio" name="radVote" value="3" id="average"
            checked="checked" /></td>
        <td><input type="radio" name="radVote" value="4" id="good" /></td>
        <td><input type="radio" name="radVote" value="5" id="vgood" /></td>
    </tr>
    <tr>
        <td><label for="vpoor">1 <br />Very Poor</label></td>
        <td><label for="poor">2 <br />Poor</label></td>
        <td><label for="average">3 <br />Average</label></td>
        <td><label for="good">4 <br />Good</label></td>
        <td><label for="vgood">5 <br />Very Good</label></td>
    </tr>
</table>
<input type="submit" value="Vote now" />
</form>
</body>
</html>
```

# Chapter 6

- 1.** Re-create the frameset document shown in Figure 6-11, where clicking a fruit loads a new page in the main window. When the page loads, it will carry the details for the appropriate fruit.

- A.** The first example required five files:

- A frameset document
- A navigation document
- The apple page
- The orange page
- The banana page

Here is the frameset document (example1.html):

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Frameset//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-frameset.dtd">
<html>
<head>
  <title>Fruit example</title>
</head>
<frameset cols="200, 450, *">
  <frame src="frames/fruitNav.html" />
  <frame name="main_frame" src="frames/apple.html" />
  <noframes><body>This site makes uses of a technology called frames.
  Unfortunately the browser you are using does not support this technology.
  We recommend that you update your browser. We apologize for any inconvenience
  this causes.
  </body></noframes>
</frameset>
</html>
```

This is a frameset document type that contains two columns that are a fixed size, and then the remainder of the window is left blank (hence there are only `<frame>` elements for the first two columns). Note how the second `<frame>` element carries the `name` attribute so that the links in the navigation frame can load in that part of the page.

The following is the navigation pane (fruitNav.html):

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
  <title>Navigation</title>
  <style type="text/css">img {border-style:none; border-width:0px;}</style>
</head>
<body>
  <h1> Navigation </h1>
  <p>Click on the fruit to find out more about it.</p>
  <a href="..../frames/apple.html" target="main_frame"></a>
<a href="../frames/orange.html" target="main_frame"></a>
<a href="../frames/banana.html" target="main_frame"></a>
</body>
</html>
```

This is a normal XHTML document; the only things of note in this document are the `target` attributes on the links to indicate that the link should open in the other frame, and the `<style>` element in the `<head>` (which you learn about in Chapter 7).

The pages about the fruit (`apple.html`, `orange.html`, and `banana.html`) are all the same except for their text content. This is `apple.html`:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>Apple</title>
</head>
<body>
<h1>Apples</h1>
<p>Apples come in different colors, and there are over 7500 varieties of
apples.</p>
<p>An apple contains about 5g of fiber (1/5 recommended daily average).</p>
</body>
</html>
```

- 2.** Re-create the `<iframe>` element shown in Figure 6-12.

Here is the new exercise code; the only change from the iFrame example in the chapter is to the text:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <title>Football focus</title>
</head>
<body>
<h1>Quarter Final - Wintertons Cup</h1>
<h3>
    <a href="frames/teamA.html" target="iframe">Manchester Rangers</a>
    vs
    <a href="frames/teamB.html" target="iframe">Birmingham United</a>
</h3>
<p><iframe name="iframe" width="300" height="150"
src="frames/clickForTeams.html" align="left"></iframe>
Today's big soccer game is between Manchester Rangers and Birmingham
United.
<br />The match will be played at Highgate Fields stadium, and
is sure to be the big game of the week. <br /> All eyes on the underdogs
```

```
Birmingham United who did not expect to get this far in the competition.  
</p>  
</body>  
</html>
```

**A.** The inline frame example requires four files:

- example2.html contains the page that you load.
- teamA.html contains the names of players in Team A.
- teamB.html contains the names of players in Team B.
- clickForTeam.html loads in the iframe before the user clicks either team.

First is example2.html, which contains the `<iframe>` element. It is a normal XHTML document, with two links that carry the `target` attribute so that they can indicate which frame the document should go into.

```
<?xml version="1.0" encoding="iso-8859-1"?>  
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">  
<html xmlns="http://www.w3.org/1999/xhtml">  
<head>  
    <title>Football focus</title>  
</head>  
<body>  
    <h1>Quarter Final - Wintertons Cup</h1>  
    <h3>  
        <a href="frames/teamA.html" target="iframe">Manchester Rangers</a>  
        vs  
        <a href="frames/teamB.html" target="iframe">Birmingham United</a>  
    </h3>  
    <p>  
        <iframe name="iframe" width="300" height="150"  
src="frames/clickForTeams.html"  
align="left" />  
        Today's big soccer game with Manchester Rangers playing Birmingham  
        United. The match will be played at Highgate Fields stadium, and is sure  
        to be the big game of the week, with all eyes on the underdogs Birmingham  
        United who did not expect to get this far in the competition, although the  
        gate receipts will be a welcome relief for the team that has been  
        facing financial difficulties.  
    </p>  
</body>  
</html>
```

As you can see from the `<iframe>` element, it carries an `src` attribute that indicates that a page called `clickForTeams.html` should load into the iframe when the page loads. This is just a plain XHTML page:

```
<?xml version="1.0" encoding="iso-8859-1"?>  
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">  
<html xmlns="http://www.w3.org/1999/xhtml">
```

## Appendix A: Answers to Exercises

---

```
<head>
  <title>Teams</title>
</head>
<body>
<h3>Click on a team name to load their players here</h3>
</body>
</html>
```

The `teamB.html` page contains a table for the players in the starting lineup of the team. The `teamB.html` page is exactly the same, just with different players.

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
  <title>Team B</title>
</head>
<body>
<h3>Birmingham United</h3>
<p>The players of Birmingham United are</p>:
<table>
  <tr><th>Number</th><th>Name</th></tr>
  <tr><td>1</td><td>Chris Warner</td></tr>
  <tr><td>2</td><td>Felix Thomlinson</td></tr>
  <tr><td>3</td><td>Barry Carr</td></tr>
  <tr><td>4</td><td>Mike Patterson</td></tr>
  <tr><td>5</td><td>Richard Neilson</td></tr>
  <tr><td>6</td><td>Brian Childer</td></tr>
  <tr><td>7</td><td>Micky Stephens</td></tr>
  <tr><td>8</td><td>Richard Brooks</td></tr>
  <tr><td>9</td><td>Nick Evans</td></tr>
  <tr><td>10</td><td>Joseph Barton</td></tr>
  <tr><td>11</td><td>Rob Bishop</td></tr>
</table>
</body>
</html>
```

## Chapter 7

1. Go back to the first Try It Out example in this chapter and add styles to show what bold and italic versions of each font would look like. You should end up with something like Figure 7-36.

You are allowed to use only `<span>` and `<br />` elements in the source document and class selectors in the style sheet. You also need to add a top margin to the content of the `<div>` elements to separate them from each other.

- A. The following XHTML shows the new structure of the document. I have used the `<span>` elements to repeat the line about the quick brown fox. Each `<span>` element has a `class` attribute whose value is either `bold` or `italic`. After each line of text there is a line break element. The `<link />` element's `href` attribute also points to the new style sheet.

## Appendix A: Answers to Exercises

Here is the new font-test2.html file:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">
<head>
  <title>Font test</title>
  <link rel="stylesheet" type="text/css" href="font-test2.css" />
</head>
<body>
  <div class="arial">
    Arial The quick brown fox jumped over the lazy dog.<br />
    <span class="bold">Arial The quick brown fox jumped over the lazy
    dog.</span>
    <br />
    <span class="italic">Arial The quick brown fox jumped over the lazy
    dog.</span><br />
  </div>
  <div class="helvetica">
    Helvetica The quick brown fox jumped over the lazy dog.<br />
    <span class="bold">Helvetica The quick brown fox jumped over the lazy
    dog.</span><br />
    <span class="italic">Helvetica The quick brown fox jumped over the lazy
    dog.</span><br />
  </div>
  <div class="TimesNewRoman">
    Times New Roman The quick brown fox jumped over the lazy dog.<br />
    <span class="bold">Times New Roman The quick brown fox jumped over the lazy
    dog.</span><br />
    <span class="italic">Times New Roman The quick brown fox jumped over the lazy
    dog.</span><br />
  </div>
  <div class="MrsEaves">
    Mrs Eaves The quick brown fox jumped over the lazy dog.<br />
    <span class="bold">Mrs Eaves Bold The quick brown fox jumped over the lazy
    dog.</span><br />
    <span class="italic">Mrs Eaves Italic The quick brown fox jumped over the lazy
    dog.</span><br />
  </div>
</body>
</html>
```

Now it's time to look at the font-test2.css style sheet. The first new property is `margin-top`, which divides up the examples for each font. Next are the new class selectors for the bold style, which uses the `font-weight` property, and the italic style, which uses the `font-style` property.

```
/* CSS Style sheet for font-test.html */
body {background-color:#ffffff;}
div {line-height:28px;
margin-top:20px;}
div.arial {font-family:arial, courier;}
div.helvetica {font-family:Helvetica, courier;}
```

## Appendix A: Answers to Exercises

---

```
div.TimesNewRoman {font-family:"Times New Roman", courier;}  
div.MrsEaves {font-family:"Mrs Eaves", courier;}  
.bold {font-weight:bold;}  
.italic {font-style:italic;}
```

- 2.** Take a look at the following XHTML page:

```
<?xml version="1.0" encoding="iso-8859-1"?>  
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">  
<html xmlns="http://www.w3.org/1999/xhtml" lang="en">  
<head>  
  <title>Font test</title>  
  <link rel="stylesheet" type="text/css" href="tableStyles.css" />  
</head>  
<body>  
<table>  
  <tr>  
    <th>Quantity</th>  
    <th>Ingredient</th>  
  </tr>  
  <tr class="odd">  
    <td>3</td>  
    <td>Eggs</td>  
  </tr>  
  <tr>  
    <td>100ml</td>  
    <td>Milk</td>  
  </tr>  
  <tr class="odd">  
    <td>200g</td>  
    <td>Spinach</td>  
  </tr>  
  <tr>  
    <td>1 pinch</td>  
    <td>Cinnamon</td>  
  </tr>  
</table>  
</body>  
</html>
```

Now create the `tableStyles.css` style sheet that makes this example resemble Figure 7-37.

Don't worry about getting the sizes exactly the same as the screenshot, but do make sure you have padding in the cells and a border around the outside.

- A.** You can create this style sheet in several ways. Here is one way:

```
/* CSS Style sheet for tableStyles.html */  
body {  
  background-color:#ffffff;  
  font-family:arial, verdana, sans-serif;  
  font-size:14px;}  
table {  
  border-style:solid;  
  border-width:1px;
```

```
border-color:#666666; }
th {
    color:#ffffff;
    background-color:#999999;
    font-weight:bold;
    border:none;
    padding:4px; }
tr {background-color:#cccccc; }
tr.odd {background-color:#efefef; }
td {
    color:#000000;
    padding:2px; }
```

# Chapter 8

1. In this exercise you create a linked table of contents that will sit at the top of a long document in an ordered list and link to the headings in the main part of the document.

The XHTML file `exercise1.html` is provided with the download code for this book, ready for you to create the style sheet. Your style sheet should do the following:

- Set the styles of all links including active and visited links
- Make the contents of the list bold
- Make the background of the list light gray and use padding to ensure the bullet points show
- Make the width of the links box 250 pixels wide
- Change the styles of heading bullet points to empty circles
- Change the style of link bullet points to squares

- A. Here is the style sheet for the linked table of contents, starting with the style for the `<body>` element:

```
body {
    background-color:#ffffff;
    font-family:arial, verdana, sans-serif;
    font-size:12px; }
```

The selector for the first `<ul>` element should have rules for the `list-style` property to be a circle and the `font-weight` property to be bold.

```
ul {
    list-style:circle;
    font-weight:bold;
```

It is also on this first `<ul>` selector that you place the rules for the background of the links, so you should have rules like these in the same declaration. Note how the `padding-left` property ensures that the bullets remain visible:

```
background-color:#efefef;
padding-left:30px;
width:250px; }
```

## Appendix A: Answers to Exercises

---

A second selector should then indicate that a `<ul>` element inside another `<ul>` element should have a `list-style` property with a value of `square` so that the nested linking elements are preceded by squares:

```
ul ul {list-style:square;}
```

Finally, the rest of the rules indicate how the links should appear:

```
a:link {  
    color:#0033ff;  
    text-decoration:none;}  
a:visited {  
    color:#0066ff;  
    text-decoration:none;}  
a:active {  
    text-decoration:underline;}  
a:link:hover {  
    color:#003399;  
    background-color:#e9e9e9;  
    text-decoration:underline;}
```

- 2.** In this exercise, you test your CSS positioning skills. You should create a page that represents the links to the different sections of the chapter in a very different way. Each of the sections will be shown in a different block, and each block will be absolutely positioned in a diagonal top left to bottom right direction. The middle box should appear on top, as shown in Figure 8-37.

You can find the source XHTML file (`exercise2.html`) with the download code for this chapter.

- A.** First you need to set up some background properties for the `<body>` element:

```
body {  
    background-color:#ffffff;  
    font-family:arial, verdana, sans-serif;  
    font-size:12px;}
```

In order to give each `<div>` element a border, fixed width, and padding, the rules should be placed on a selector for all `<div>` elements. These should also have a `background-color` property (in this case with a value setting it to white) to prevent the text from becoming a mess (because, otherwise, boxes are transparent):

```
div {  
    background-color:#ffffff;  
    padding:10px;  
    border-style:groove; border-width:4px; border-color:#999999;  
    width:300px;}
```

Individual `<div>` elements then need different positioning properties to ensure they appear in diagonal positions. The `z-index` property must also be set to present the chosen boxes in the correct order.

```
div.page1 {  
    position:absolute;
```

```
top:70px;  
z-index:2;  
background-color:#f2f2f2;}  
div.page2 {  
    position:absolute;  
    top:170px; left:100px;  
    z-index:3;}  
div.page3 {  
    position:absolute;  
    top:270px; left:200px;  
    z-index:1;  
    background-color:#efefef;}
```

# Chapter 9

1. Take a look at the page shown in Figure 9-18. List all of the different elements on the page that would have been listed in the design stage, and put them together in their relevant grouping or categories.

For example, for the search box you might list the following:

```
Title  
Navigation  
Main News Article
```

- A. Exactly how you write down your list of elements for a page is up to you, but when I created this design, I decided to fit the following elements on the page:

```
Title  
Navigation  
    Local News  
    National News  
    World News  
    Politics  
    Science  
    Technology  
    Travel  
    Business  
    Education  
    Entertainment  
Main Article  
    Heading  
    Text  
    Image  
    Read more link  
Second and third articles  
Heading  
    Text  
    Image  
    Read more link  
Text to explain that it is a fixed-width layout example
```

## Appendix A: Answers to Exercises

---

- 2.** Look again at Figure 9-18 and use CSS to create a fixed-width page like this. In order to help you, start with the example code for the fixed-width page.
- A.** This page is built entirely in one fixed-width table. The search bar, logo, navigation bar, main body of the page, and footer all live in separate rows of the table.

The main body of the page is held within one containing element, which is used to control the width of the page. Inside this is one heading, which takes up the full width of the page, and two columns, each of which live inside their own containing `<div>` elements.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
<head>
    <meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
    <title>Fixed width page design</title>
    <link rel="stylesheet" type="text/css" href="exercise.css">
</head>
<body>
    <div id="maincontainer">
        <div id="topsection"><h1>The London News</h1></div>
        <div id="leftcolumn">
            <a class="nav1" href="">Local News</a>
            <a class="nav2" href="">National News</a>
            <a class="nav3" href="">World News</a>
            <a class="nav4" href="">Politics</a>
            <a class="nav5" href="">Science</a>
            <a class="nav6" href="">Technology</a>
            <a class="nav7" href="">Travel</a>
            <a class="nav8" href="">Business</a>
            <a class="nav9" href="">Education</a>
            <a class="nav10" href="">Entertainment</a>
        </div>
        <div id="contentwrapper">
            <div id="contentcolumn">
                
                <h2>The Big Freeze</h2>
                <p>London braces itself for a big freeze as forecasters predict a
                severe drop
                in temperature across the capital. The Met Office weather team
                indicated
                that temperatures would remain in negative figures until Wednesday
                with
                winds making it feel even colder.</p>
            <div class="readmore"><a href="">Read more</a></div>
            <div class="clear"><br /></div>
            <div class="secondaryStory">
                
                <h3>Farms Cleared</h3>
                <p>The three farms at the centre of the latest scare to hit the
                agricultural community have been given the all clear.</p>
            </div>
        </div>
    </div>
</body>
```

```
<div class="readmore"><a href="">Read more</a></div>
</div>
<div class="secondaryStory">
    
    <h3>Interest Rate Rises</h3>
    <p>The Bank of England has raised the base interest rate another half
percent - the fourth consecutive rise in interest rates in as many
quarters.</p>
    <div class="readmore"><a href="">Read more</a></div>
    </div>
    <div class="clear"></div>
</div>
<div id="footer">Fixed width page design</div>
</div>
</body>
</html>
```

The following is the CSS that is used to style the page:

```
body{
    margin:0;
    padding:0;
    font-family:arial, verdana, sans-serif;
    background-color:#ffffff;
}
#maincontainer{width:800px;}
#topsection{
    color:#ffffff;
    background-color: #000000;
    height: 100px;
}
#topsection h1{
    margin: 0;
    padding-top: 15px;
}
#contentwrapper{
    float: left;
    width:600px;
}
#contentcolumn{
    padding:10px;
}
#contentcolumn img {
    margin: 0px 10px 10px 0px;
}
#leftcolumn{
    float: left;
    width: 200px; /*Width of left column*/
    color:#333333;
}
#leftcolumn a{
    display:block;
    color:#333333;
    background-color:#d6d6d6;
    margin-bottom:2px;
    padding:2px;
    text-decoration:none;
    font-weight:bold;
}
```

## Appendix A: Answers to Exercises

---

```
#leftcolumn .nav1 {border-left: 5px solid #3366FF; }
#leftcolumn .nav2 {border-left: 5px solid #6633FF; }
#leftcolumn .nav3 {border-left: 5px solid #CC33FF; }
#leftcolumn .nav4 {border-left: 5px solid #FF33CC; }
#leftcolumn .nav5 {border-left: 5px solid #FF3366; }
#leftcolumn .nav6 {border-left: 5px solid #FF6633; }
#leftcolumn .nav7 {border-left: 5px solid #FFCC33; }
#leftcolumn .nav8 {border-left: 5px solid #66FF33; }
#leftcolumn .nav9 {border-left: 5px solid #33FF66; }
#leftcolumn .nav10 {border-left: 5px solid #33FFCC; }

#footer{
    clear: left;
    width: 800px;
    color: #ffffff;
    background-color:#000000;
    text-align:center;
    padding: 4px; }

.clear {clear:both; }

.secondaryStory {
    float:left;
    width:50%; }

h1 {padding:0px 0px 0px 20px;margin:0px; }
h2, h3 {margin:0px; }

img {border:1px solid #000000; }
```

## Chapter 10

1. In this exercise you should add a second page to the Try It Out form at the end of the chapter (`registration.html`). The table that follows shows the new items you must add to the form.

Information	Form Control	Required
Address 1	Text input	Yes
Address 2	Text input	No
Town/Suburb	Text input	No
City/State	Text input	Yes
ZIP Code	Text input	Yes

You should also add the following:

- An indication at the top of the page as to how much of the form the user has completed
- A Back button and a Proceed button at the bottom (instead of the Submit button)

When you have finished, the page should look something like Figure 10-27 (`registration2.html`).

- A. The following is the code for the registration2.html file. It starts off like many of the other examples that use an external CSS style sheet:

```
<html>
  <head>
    <title>Try it out</title>
    <link rel="stylesheet" type="text/css" href="registration.css" />
  </head>
  <body>
```

Next is a table that indicates that the form has three pages. These use different styles to indicate whether the user is currently on that step (indicated with the class `stepOn`):

```
<table class="steps">
  <tr>
    <td class="stepOff">Login details</td>
    <td class="stepOn">Contact details</td>
    <td class="stepOff">Confirm details</td>
  </tr>
</table>
```

Then comes the actual form itself. The form is laid out inside a table so that the labels and form elements align neatly. Each of the form elements has a `<label>` element whose `for` attribute has a value that corresponds with the `id` of the form control:

```
<form name="frmExample" action="" method="post">
  <fieldset>
    <legend>Contact details:</legend>
    <table>
      <tr>
        <td class="label"><label for="address1">Address 1:</label></td>
        <td class="form">
          <input type="text" name="txtAddress1" id="address1" size="30" />
        </td>
      </tr>
      <tr>
        <td class="label"><label for="address2">Address 2:</label></td>
        <td class="form">
          <input type="text" name="txtAddress2" id="address2" size="30" />
        </td>
      </tr>
      <tr>
        <td class="label"><label for="town">Town/Suburb:</label></td>
        <td class="form">
          <input type="text" name="txtTown" id="town" size="12" />
        </td>
      </tr>
      <tr>
        <td class="label"><label for="city">City/State:</label></td>
        <td class="form">
          <input type="text" name="txtState" id="city" size="12" />
        </td>
      </tr>
    </table>
  </fieldset>
</form>
```

## Appendix A: Answers to Exercises

---

```
<tr>
  <td class="label"><label for="postcode">Postal/Zip Code:</label></td>
  <td class="form">
    <input type="text" name="txtPostCode" id="postcode" size="12" />
  </td>
</tr>
</table><br />
```

Finally, a Back button is on the left side of the page and a Proceed button is on the right side. These are again positioned using a table. A key shows that the asterisk indicates a form field must be filled in:

```
<table class="steps">
  <tr>
    <td class="back"><input type="submit" value="Back" /></td>
    <td class="proceed"><input type="submit" value="Proceed" /></td>
  </tr>
</table>
</fieldset>
<br /><span class="required">*</span> = required
</form>
</body>
</html>
```

## Chapter 11

1. Create a script to write out the multiplication table for the number 5 from 1 to 20 using a `while` loop.
- A. This exercise uses code very similar to `ch11_eg09.html`; in fact, you need only to change the appropriate numbers from the example — otherwise it is identical. The file `ch11_eg09.html` calculated the 3 multiplication table up to 10. This example calculates the 5 multiplication table up to 20.

The example is based around a counter (to work out where you are in your tables); each time the code is run, the counter increments by 1. So, you need to make sure the counter can go up to 20, rather than 10. This goes in the condition of the `while` loop:

```
while (i < 21) {
```

Then you need to change the multiplier, which is both written out and used in the calculation. The following code shows the change to 5 as the multiplier:

```
document.write(i + " x 5 = " + (i * 5) + "<br />" );
```

The final code should look like this:

```
<script type="text/JavaScript">
i = 1
while (i < 21) {
```

```
document.write(i + " x 5 = " + (i * 5) + "<br />" );
    i ++
}
</script>
```

As you can see, this code is no longer than the loop in ch11\_eg09.html, but it writes out twice the numbers, which demonstrates the power of using loops in your code.

- 2.** Modify ch11\_eg06.html so that it can say one of three things:
- “Good Morning” to visitors coming to the page before 12 noon (using an if statement).
  - “Good Afternoon” to visitors coming to the page between 12 and 6 p.m. (again using an if statement). (Hint: You might need to use a logical operator.)
  - “Good Evening” to visitors coming to the page after 6 p.m. up until midnight (again using an if statement).

- A.** The following simple script modified from ch11\_eg06.html will greet the user with the words “Good Morning” in the morning, “Good Afternoon” in the afternoon, and “Good Evening” in the evening.

It uses the `getHours()` method of the date object to determine the time and then uses if statements to check the appropriate time for each statement presented to the user.

Note how the afternoon uses a logical operator to check that it is after 12 but before 6 p.m.

```
<script type="text/JavaScript">
    date = new Date();
    time = date.getHours();

    if (time < 12)
        document.write('Good Morning');
    if (time > 12 && time < 18)
        document.write('Good Afternoon')
    if (time > 18)
        document.write('Good Evening');
</script>
```

## Chapter 12

- 1.** Your task is to create a validation function for the competition form in Figure 12-22.

The function should check that the user has done the following things:

- Entered his or her name
- Provided a valid e-mail address
- Selected one of the radio buttons as an answer to the question
- Given an answer for the tiebreaker question and that it is no more than 20 words

These should be in the order that the controls appear on the form.

## Appendix A: Answers to Exercises

---

Here is the code for the form:

```
<form name="frmCompetition" action="competition.asp" method="post" onsubmit="return validate(this);">
<h2>An Example Competition Form <br />(Sorry, there are no real prizes!)</h2>
<p> To enter the drawing to win a case of Jenny's Jam, first answer
this question: "What color are strawberries?" Then provide an answer for
the tie-breaker question: "I would like to win a case of Jenny's Jam
because..." in no more than 20 words.</p>
<table>
<tr>
    <td class="formTitle">Name: </td>
    <td><input type="text" name="txtName" size="18" /></td>
</tr>
<tr>
    <td class="formTitle">Email: </td>
    <td><input type="text" name="txtEmail" size="18" /></td>
</tr>
<tr>
    <td class="formTitle">Answer: </td>
    <td><input type="radio" name="radAnswer" value="Red" /> Red<br />
        <input type="radio" name="radAnswer" value="Gray" /> Gray<br />
        <input type="radio" name="radAnswer" value="Blue" /> Blue
    </td>
</tr>
<tr>
    <td class="formTitle">Tie breaker <br/><small>(no more than 20 words)
        </small>:
    </td>
    <td><textarea name="txtTieBreaker" cols="30" rows="3" /></textarea></td>
</tr>
<tr>
    <td class="formTitle"></td>
    <td><input type="submit" value="Enter now" /></td>
</tr>
</table>
</form>
```

- A. The `validate()` function for this example uses techniques you learned about in Chapter 12. It starts by setting a variable called `returnValue` that will either be `true` or `false` when the function finishes running. It starts off with a value of `true`, which is switched to `false` if any of the form fields fail to meet the requirements.

```
<script type="text/JavaScript">
function validate(form) {
    var returnValue = true
```

First you have to check whether the value of the `txtName` field has a value in it:

```
var name=form.txtName.value
if (name=="")
{
    returnValue = false;
```

```
    alert("You must enter a name")
    document frmCompetition.txtName.focus()
}
```

Next you have to check whether the e-mail address follows the format it is supposed to. If the address is empty, it will not match the Regular Expression; therefore, you do not need to check if the control is empty first:

```
var email=form.txtEmail.value
var rxEmail = /^[ \w(\.?\[\w-\])*@\w(\.?\[\w-\])*\. [a-z]{2,6}(\. [a-z]{2})?$/i;
if (!rxEmail.test(email))
{
    returnValue = false;
    alert("You must enter a valid email address")
    document frmCompetition.txtEmail.focus()
}
```

Next, you must loop through the radio buttons to see if an answer was provided. This involves looping through the buttons and testing whether each button has the `checked` property. If a radio button has been checked, then a variable (in this case called `radioChosen`) is changed to have a value of `true`. Once all of the radio buttons have been looped through, a conditional `if` statement checks whether the value of this attribute is `true` or `false`.

```
var radioChosen = false;
var radioButtons = form.radAnswer;
for (var i=0; i<radioButtons.length; i++) {
    if (radioButtons[i].checked)
    {
        radioChosen=true;
    }
}
if (radioChosen == false) {
    returnValue = false;
    alert("You did not answer the question");
}
```

Finally you come to the `<textarea>` element and the tiebreaker. This one needs to have a value, but must not be longer than 20 words. To start then, it is checked to see if it has any value at all:

```
var tieBreaker=form.txtTieBreaker.value
if (tieBreaker=="")
{
    returnValue = false;
    alert("You must enter an answer for the tie breaker")
    document frmCompetition.txtTieBreaker.focus();
}
```

Then the value entered is split into separate words using the `split()` function of the string object and a Regular Expression. Because the `split()` function splits the string after spaces, you can check how many words were entered simply by finding out the length of the array created by the `split()` function. Because the array is zero-based, you need to find out whether the number of

## Appendix A: Answers to Exercises

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items in the array is less than or equal to 20. If there are too many words, the user is warned and told how many words she entered in order to help her make the response shorter.

```
var tieBreakerWords = tieBreaker.split(/\s+/g);
wordCount = tieBreakerWords.length;
if (wordCount > 20) {
    returnValue = false;
    alert("Your tie breaker answer must be no more than 20 words. You entered
"+ 
    wordCount+ "words.");
    document frmCompetition.txtTieBreaker.focus();
}
```

That is the final test and the `returnValue` (either `true` or `false`) indicates whether the form will be submitted or not.

```
return returnValue
}
</script>
```

# B

## XHTML Element Reference

This appendix is a quick reference to the elements that are in the HTML and XHTML recommendations. They are listed with the attributes each element can carry and a brief description of their purpose.

Deprecated elements are marked with the word “deprecated” next to them. You should avoid using these elements where possible. I also recommend that stylistic markup and elements be replaced with CSS rules.

The first version of Internet Explorer (IE), Netscape (N), and Firefox (FF) that supported the element are given next to the element’s name, starting with IE3, N3, and FF1. Elements that were supported in Netscape will also be supported in Firefox. The notation “all,” identifies elements that are supported in all browsers from IE3, N3, FF1, and later. Note, however, that not all the attributes will work with the same versions of the browsers — some attributes were introduced in later versions.

Consider the following notes on syntax:

- ❑ All element names should be given in lowercase.
- ❑ Any attribute listed without a value should have the name of the attribute repeated as its value in order to be XHTML-compliant; for example: `disabled = "disabled"`.
- ❑ All attribute values should also be given inside double quotation marks.

### Core Attributes

Unless otherwise stated, the core attributes can be used with all of the elements in this appendix.

## Appendix B: XHTML Element Reference

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<code>class = name</code>	Specifies a class for the element to associate it with rules in a style sheet
<code>dir = ltr   rtl</code>	Specifies the direction for rendering text (left to right or right to left)
<code>id = name</code>	Defines a unique identification value for that element within the document
<code>lang = language</code>	Specifies the (human) language for the content of the element
<code>onclick = script</code>	Specifies a script to be called when the user clicks the mouse over this element
<code>ondblclick = script</code>	Specifies a script to be called when the user double-clicks the mouse over this element
<code>onkeydown = script</code>	Specifies a script to be called when the user presses a key while this element has focus
<code>onkeypress = script</code>	Specifies a script to be called when the user presses and releases a key while this element has focus
<code>onkeyup = script</code>	Specifies a script to be called when the user releases a key while this element has focus
<code>onmousedown = script</code>	Specifies a script to be called when the user presses the mouse button while the cursor is over this element's content
<code>onmousemove = script</code>	Specifies a script to be called when the user moves the mouse cursor while over this element's content
<code>onmouseout = script</code>	Specifies a script to be called when the mouse has been over an element, and has moved outside of its border so that it is no longer over the element
<code>onmouseover = script</code>	Specifies a script to be called when the mouse is moved over this element's content
<code>onmouseup = script</code>	Specifies a script to be called when the user releases a mouse button while the cursor is over this element's content
<code>style = style</code>	Specifies an inline CSS style rule for the element
<code>title = string</code>	Specifies a title for the element
<code>xml:lang</code>	Specifies the (human) language for the content of the element

## **<a> (all)**

Defines a link. The href or name attribute must be specified.

accesskey = key_character	Defines a hotkey/keyboard shortcut for this anchor
charset = encoding	Specifies a character set used to encode the target document
coords = x_y coordinates	Specifies a list of coordinates
href = url	Specifies the URL of the hyperlink target
hreflang = language_code	Specifies the language encoding for the target of the link
rel = relationship (same   next   parent   previous   string)	Indicates the relationship of the document to the target document
rev = relationship	Indicates the reverse relationship of the target document to this one
shape = circ   circle   poly   polygon   rect   rectangle	Defines the shape of a region
tabindex = number	Defines this element's position in the tabbing order
target = <window_name>   _parent   _blank   _top   _self	Defines the name of the frame or window that should load the linked document
type = MIME_type	Defines the MIME type of the target

## **<abbr> (IE4+, N6+, FF1+)**

Indicates that the content of the element is an abbreviation.

## **<acronym> (IE4+, N6+, FF1+)**

Indicates that the content of the element is an acronym.

## **<address> (all)**

Indicates that the content of the element is an address.

### <applet> Deprecated (all)

Used to place a Java applet or executable code in the page.

Takes only the attributes listed in the table that follows.

align = top   middle   bottom   left   right   absmiddle   baseline   absbottom   texttop	Aligns the applet within the containing element
alt = text	Specifies alternative text to replace the <applet> for browsers that support the element, but are unable to execute it
archive = url	Specifies a class archive that must be downloaded to the browser and searched for
class = name	Specifies a class for the element to associate it with rules in a style sheet
code = classname	Specifies the class name of the code (required)
codebase = url	Specifies a URL from which the code can be downloaded
height = number	Specifies the height of the <applet> in pixels
hspace = number	Specifies the width to allow to the left and right of the <applet> in pixels
id = name	Specifies a unique ID for the element
name = name	Specifies the name of this instance of the applet
object = data	Specifies the filename of the compiled code to run
vspace = number	Specifies the height to allow to the top and bottom of the <applet> in pixels
width = number	Specifies the width of the <applet> in pixels

## <param> (all)

<code>name = name</code>	Specifies the name of the parameter
<code>type = MIME_type</code>	Defines the MIME type of the parameter
<code>value = string</code>	Defines the value of the parameter

## <area> (all)

Used to specify coordinates for a clickable area or hotspot in an image map.

<code>accesskey = key_character</code>	Defines a hotkey/keyboard shortcut for this area
<code>alt = text</code>	Specifies alternative text for the area if the image cannot be loaded
<code>coords = string</code>	Specifies a list of coordinates for the area
<code>href = url</code>	Specifies the URL of the hyperlink target
<code>name = string</code>	Specifies a name for the element that can be used to identify it
<code>nohref</code>	Specifies that there is not a document associated with the area
<code>notab</code>	Specifies that this element does not take part in the tabbing order for the document
<code>shape = circ   circle   poly   polygon   rect   rectangle</code>	Defines the shape of a region
<code>tabindex = number</code>	Defines this element's position in the tabbing order
<code>target = &lt;window_name&gt;   _parent   _blank   _top   _self</code>	Defines the name of the frame or window that should load the linked document

### <b> (all)

The content of the element should be displayed in a bold font.

### <base>

Specifies a base URL for the links in a document.

Supports only the attributes listed in the table that follows.

<code>href = url</code>	Specifies the URL of the base for the links in this document
<code>id = id</code>	Specifies a unique identifier for the element
<code>target = &lt;window_name&gt;   _parent   _blank   _top   _self</code>	Defines the name of the frame or window that should load the linked document

### <basefont> Deprecated (all)

Specifies a base font to be the default font when rendering a document.

Supports only the attributes listed in the table that follows.

<code>color = color</code>	Specifies the color of text in this element
<code>face = font_family_name</code>	Specifies the font family in this element
<code>size = value</code>	Specifies the size of the font (required)

### <bdo> (IE5+, N6+, FF1+)

Turns off the bidirectional rendering algorithm for selected fragments of text.

<code>dir = ltr   rtl</code>	Specifies the font family in this element
------------------------------	---

## <bgsound> (IE only — IE3+)

Specifies a background sound or audio file to be played when the page is loaded.

loop = number	Specifies the number of times the audio file should be played (can be an integer or the keyword <code>infinite</code> )
src = url	Specifies the URL of the audio file to be played

## <big> (IE4+, N4+, FF1)

Renders text in a font size larger than its containing element.

## <blink> (Netscape/Firefox only — N3+, FF1+)

The content of the element blinks on and off. Netscape and Firefox only.

## <blockquote> (all)

The content of the element is a quotation. Usually used for a paragraph quote or longer (otherwise use the <q> element).

cite = url	Specifies a URL for the source of the quote
------------	---

## <body> (all)

Specifies the start and end of the body section of a page.

accesskey = key_character	Defines a hotkey/keyboard shortcut for the
alink = color	Specifies the color of active links

*Continued*

## Appendix B: XHTML Element Reference

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background = url	Specifies the URL for a background image to be used as wallpaper for the background of the whole document
bgcolor = color	Specifies a background color for the document
bgproperties = fixed	Image does not scroll with document content
leftmargin = number	Specifies a margin in pixels for the left of the document
link = color	Specifies the color of unvisited links
onload = script event handler	Specifies a script to run when the page loads
onunload = script event handler	Specifies a script to run when the page is unloaded
text = color	Specifies a color for the text in the document
topmargin = number	Specifies a margin in pixels for the top of the document
vlink = color	Specifies the color of visited links

## <br /> (all)

Inserts a line break.

Supports only the attributes listed in the table that follows.

class = name	Specifies a class for the element to associate it with rules in a style sheet
clear = left   right   none   all	Breaks the flow of the page and moves the break down until the specified margin is clear
id = id	Specifies a unique identifier for this element
style = style	Specifies inline CSS style rules for this element
title = string	Specifies a title for this element

## <button> (IE4+, N3+, FF1+)

Creates an HTML button. Any enclosed markup is used as the button's caption.

<code>accesskey = key_character</code>	Defines a hotkey/keyboard shortcut for this
<code>disabled = disabled</code>	Disables the button, preventing user intervention
<code>name = name</code>	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)
<code>onblur = script</code>	Specifies a script to run when the mouse moves off the button
<code>onfocus = script</code>	Specifies a script to run when the element gains focus
<code>tabindex = number</code>	Defines this element's position in the tabbing order
<code>type = button   submit   reset</code>	Specifies the type of button
<code>value = string</code>	Specifies the value of the parameter sent to the processing application as part of the name/value pair (required)

## <caption> (all)

The content of this element specifies a caption to be placed next to a table.

<code>align = top  _ bottom   right   left</code>	For IE this specifies the horizontal alignment of the caption; in Netscape it sets vertical position
<code>valign = bottom   top</code>	Specifies the vertical position of the caption

## <center> Deprecated (all)

The content of this element (and child elements) should be centered on the page.

### <cite> (all)

The content of the element is a citation and tends to be rendered in italics.

### <code> (all)

The content of the element is code and should be rendered in a fixed width font.

### <col> (IE3+, N4+, FF1+)

Specifies column-based defaults for a table.

<td>Specifies the alignment of the column</td>	Specifies the alignment of the column
bgcolor = color	Specifies a background color for the column
char = string	Specifies the alignment character for text within the cells
charoff = string	Specifies the offset character that the alignment character is set to
span = number	Number of columns affected by the <col> tag
valign = bottom   top	Specifies the vertical alignment of content within the element
width = number	Specifies the width of the column in pixels

### <colgroup> (IE3+, N4+, FF1+)

Used to contain a group of columns.

<td>Specifies the horizontal alignment of content within the column</td>	Specifies the horizontal alignment of content within the column
bgcolor = color	Specifies the background color for the group of columns
char = string	Specifies the alignment character for text within the cells

<code>charoff = string</code>	Specifies the offset character that the alignment character is set to
<code>valign = bottom   top</code>	Specifies the vertical alignment of content within the element
<code>width = number</code>	Specifies the width of the column group in pixels

## <comment> (IE4+ only)

The content is a comment that will not be displayed (IE4+ only — not part of HTML or XHTML).

Supports only the attributes shown in the table that follows.

<code>id = string</code>	Specifies a unique identifier for the element
<code>Lang = language_type</code>	Specifies the language of the comment
<code>xml:lang = language_type</code>	Specifies the language of the comment

## <dd> (all)

The definition of an item in a definition list. This is usually indented from other text.

## <del> (IE4+, N6+, FF1+)

The content of the element has been deleted from an earlier version of the document.

<code>cite = url</code>	Specifies a URL for justification of deletion
<code>datetime = date</code>	Specifies the date and time it was deleted

## <dfn> (all)

Defines an instance of a term.

### <dir> Deprecated (all)

The content of the element is rendered in a directory-style file list.

type = bullet	Specifies the type of bullet used to display the list
---------------	---

### <li> (all)

type = format	Specifies the type of bullet used to display the list item
---------------	--

value = number	Specifies the number of the list item
----------------	---------------------------------------

### <div> (all)

A containing element to hold other elements, defining a section of a page. This is a block-level container.

align = center   left   right	Specifies the alignment of text within the <div> element
-------------------------------	--

nowrap = nowrap	Prevents word-wrapping within this <div> element
-----------------	--

### <dl> (all)

Denotes a definition list.

compact = compact	Makes the list more vertically compact
-------------------	--

### <dt> (all)

Denotes a definition term within a definition list.

### <em> (all)

The element content is emphasized text, and is usually rendered in an italic font.

## <embed> (all)

Embeds documents in a page that require another supporting application.

	Specifies the alignment within the containing element
border = number	Specifies the width of the border around the embedded object in pixels
height = number	Specifies the height of the embedded object in pixels
hidden = hidden	Specifies that the embedded object should be hidden
hspace = number	Specifies the amount of additional space to be added to the left and right of the embedded object
name = name	Specifies a name for the embedded object
palette=foreground   background	Sets foreground and background colors of the embedded object
pluginspage = url	Specifies the URL of the page where the plug-in associated with the object can be downloaded
src = url	Specifies the URL of the data to be used by the object
type = MIME_type	Specifies the MIME type of the data used by the object
units = en   ems   pixels	Sets units for height and width attributes
vpsace = number	Specifies the amount of additional space to be added above and below the embedded object
width = number	Specifies the width of the embedded object in pixels

## <fieldset> (IE4+, N6+, FF1+)

Creates a box around the contained elements indicating that they are related items in a form.

	Specifies the alignment of the group of elements
tabindex = number	Defines this <fieldset>'s position in the tabbing order

### <font> Deprecated (all)

Specifies the typeface, size, and color of the font to be used for text within the element.

color = color	Specifies the color of text in this element
face = font_family_list	Specifies the family of font to be used for the text in this element
size = value	Specifies the size of the text used in this element

### <form> (all)

Containing element for form controls and elements.

accept-charset = list	Specifies a list of accepted character sets the processing application can handle
action = url	Specifies the URL of the processing application that will handle the form
enctype = encoding	Specifies the encoding method for form values
method = get   post	Specifies how the data gets sent from the browser to the processing application
onreset = script	Specifies a script that is run when the form values are reset
onsubmit = script	Specifies a script that is run before the form is submitted
target = <window_name>   _parent   _blank   _top   _self	Defines the name of the frame or window that should load the results of the form

### <frame> (all)

Specifies a frame within a frameset.

Supports only the attributes listed in the table that follows.

[event_name] = script	The intrinsic events supported by most elements
bordercolor = color	Specifies the color of the border of the frame

<code>class = name</code>	Specifies a class name to associate styles with the element
<code>frameborder = no   yes   0   1</code>	Specifies the presence or absence of a frame border
<code>Id = string</code>	Specifies a unique value for the element
<code>lang = language_type</code>	Specifies the language used for the content of the frame
<code>longdesc = url</code>	Specifies a URL for a description of the content of the frame
<code>marginheight = number</code>	Specifies the height of the margin for the frame in pixels
<code>marginwidth = number</code>	Specifies the width of the margin for the image in pixels
<code>noresize = noresize</code>	Specifies that the frame cannot be resized
<code>scrolling = auto   yes   no</code>	Specifies whether the frame can have scrollbars if the content does not fit in the space in the browser
<code>style = style</code>	Specifies inline CSS style rules
<code>src = url</code>	Specifies a URL for the location of the content for that frame
<code>title = title</code>	Specifies a title for the frame

## <noframes> (all)

The content of this element should be displayed if the browser does not support frames.

## <frameset> (all)

Specifies a frameset containing multiple frames (and possibly other nested framesets). This element replaces the <body> element in a document.

<code>border = number</code>	Specifies the width of the borders for each frame in the frameset
<code>bordercolor = color</code>	Specifies the color of the borders for frames in the frameset
<code>cols = list</code>	Specifies the number of columns in the frameset allowing you to control layout of the frameset

*Continued*

## Appendix B: XHTML Element Reference

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frameborder = no   yes   0   1	Specifies whether borders will be present for the frames in this frameset
framespacing = number	Specifies the space between each frame in pixels
onblur = script	Specifies a script to run when the mouse moves off the frameset
onload = script	Specifies a script to run when the frameset loads
onunload = script	Specifies a script to run when the frameset is unloaded
rows = number	Specifies the number of rows in a frameset allowing you to control the layout of the frameset

## <head> (all)

Container element for heading information *about* the document; its content will not be displayed in the browser.

Supports only the attributes listed in the table that follows.

class = classname	Specifies a class to associate style rules with this element
dir = ltr   rtl	Specifies the direction of text within this element
Id = string	Specifies a unique identifier for this element
lang = language_type	Specifies the language used in this element
profile = url	Specifies a URL for a profile of the document
xml:lang = language_type	Specifies the language used in this element

## <hn> (all)

Headings from <h1> (largest) through <h6> (smallest).

align = left   center   right	Specifies the horizontal alignment of the header within its containing element
-------------------------------	--

## <hr /> (all)

Creates a horizontal rule across the page (or containing element).

Supports only the attributes listed in the table that follows.

[event_name] = script	The intrinsic events supported by most elements
align = center   left   right	Specifies the horizontal alignment of the rule
class = classname	Specifies a class for the element to associate it with rules in a style sheet
color = color	Specifies the color of the horizontal rule
dir = ltr   rtl	Specifies the direction of the text
id = string	Specifies a unique identifier for this element
noshade = noshade	Specifies that there should not be a 3D shading on the rule
style = string	Specifies inline CSS style rules for the element
title = string	Specifies a title for the element
width = number	Specifies the width of the rule in pixels or as a percentage of the containing element

## <html> (all)

Containing element for an HTML or XHTML page.

class = classname	Specifies a class for the element to associate it with rules in a style sheet
dir = ltr   rtl	Specifies the direction of the text within the element
id = string	Specifies a unique identifier for this element
lang = language_type	Specifies the language used in this element
version = url	Specifies the version of HTML used in the document — replaced by the DOCTYPE declaration in XHTML

*Continued*

## Appendix B: XHTML Element Reference

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xmlns = uri	Specifies namespaces used in XHTML documents
xml:lang = language_type	Specifies the language used in this element

## <i> (all)

The content of this element should be rendered in an italic font.

## <iframe> (IE3+, N6+, FF1+)

Creates an inline floating frame within a page.

align = absbottom   absmiddle   baseline   bottom   top   left   middle   right   texttop   top	Specifies the alignment of the frame in relation to surrounding content or margins
frameborder = no   yes   0   1	Specifies the presence of a border: 1 enables borders, 0 disables them
height = number	Specifies the height of the frame in pixels
longdesc = url	Specifies a URL for a description of the content of the frame
Marginheight = number	Specifies the space above and below the frame and surrounding content in pixels
marginwidth = number	Specifies the space to the left and right of the frame and surrounding content in pixels
scrolling = auto   yes   no	Specifies whether scrollbars should be allowed to appear if the content is too large for the frame
src = url	Specifies the URL of the file to be displayed in the frame
width = number	Specifies the width of the frame in pixels

## <img> (all)

Embeds an image within a document.

## Appendix B: XHTML Element Reference

	Specifies the alignment of the image in relation to the content that surrounds it
alt = text	Specifies alternative text if the application is unable to load the image (required); also used in accessibility devices
border = number	Specifies the width of the border of the image in pixels — you must use this property if the image is a link, to prevent borders from appearing
controls	Displays playback controls for video clips (IE3 only)
dynsrc = url	Specifies the URL of a video clip to be played
height = number	Specifies the height of the image in pixels
hspace = number	Specifies the amount of additional space to be added to the left and right of the image
ismap = ismap	Specifies whether the image is a server-side image map
longdesc = url	Specifies a URL for a description of the content of the image
loop = number	Specifies the number of times the video should be played; can take a value of <code>infinite</code>
lowsrc = url	Specifies a URL for a low-resolution version of the image that can be displayed while the full image is loading
name = name	Specifies a name for the element
onabort = script	Specifies a script to run if loading of the image is aborted
onerror = script	Specifies a script to run if there is an error loading the image
onload = script	Specifies a script to run when the image has loaded
src = url	Specifies the URL of the image
start=fileopen mouseover _ number	Specifies when to play a video clip
usemap = url	Specifies the map containing coordinates and links that define the links for the image (server-side image map)

*Continued*

## Appendix B: XHTML Element Reference

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vspace = number	Specifies the amount of additional space to be added above and below the image
width = name	Specifies the width of the image

### <input type="button"> (all)

Creates a form input control that is a button a user can click.

accesskey = key_character	Defines a hotkey/keyboard shortcut for this
disabled = disabled	Disables the button, preventing user intervention
name = name	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)
notab = notab	Specifies that this element does not take part in the tabbing order for the document
tabindex = number	Defines this element's position in the tabbing order
taborder = number	Specifies the element's position in the tabbing order
value = string	Specifies the value of the parameter sent to the processing application as part of the name/value pair

### <input type="checkbox"> (all)

Creates a form input control that is a checkbox a user can check.

accesskey = key_character	Defines a hotkey/keyboard shortcut for this
checked = checked	Specifies that the checkbox is checked (can be used to make the checkbox selected by default)
disabled = disabled	Disables the checkbox, preventing user intervention
name = name	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)

<code>notab = notab</code>	Specifies that this element does not take part in the tabbing order for the document
<code>readonly = readonly</code>	Prevents user from modifying content
<code>tabindex = number</code>	Defines this element's position in the tabbing order
<code>taborder = number</code>	Specifies the element's position in the tabbing order
<code>value = string</code>	Specifies the value of the control sent to the processing application as part of the name/value pair

## <input type="file"> (all)

Creates a form input control that allows a user to select a file.

<code>accesskey = key_character</code>	Defines a hotkey/keyboard shortcut for this
<code>disabled = disabled</code>	Disables the file upload control, preventing user intervention
<code>maxlength = number</code>	Maximum number of characters the user may enter
<code>name = name</code>	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)
<code>notab = notab</code>	Specifies that this element does not take part in the tabbing order for the document
<code>onblur = script</code>	Specifies a script to run when the mouse leaves the control
<code>onchange = script</code>	Specifies a script to run when the value of the element changes
<code>onfocus = script</code>	Specifies a script to run when the element gains focus
<code>readonly = readonly</code>	Prevents user from modifying content
<code>size = number</code>	Specifies the number of characters to display for the element
<code>tabindex = number</code>	Defines this element's position in the tabbing order
<code>taborder = number</code>	Specifies the element's position in the tabbing order
<code>value = string</code>	Specifies the value of the control sent to the processing application as part of the name/value pair

### <input type="hidden"> (all)

Creates a form input control, similar to a text input, but is hidden from the user's view (although the value can still be seen if the user views the source for the page).

name = name	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)
value = string	Specifies the value of the control sent to the processing application as part of the name/value pair

### <input type="image"> (all)

Creates a form input control that is like a button or submit control, but uses an image instead of a button.

accesskey = key_character	Defines a hotkey/keyboard shortcut for this
align = center   left   right	Specifies the alignment of the image
alt = string	Provides alternative text for the image
border = number	Specifies the width of the border in pixels
Disabled = disabled	Disables the image button, preventing user intervention
name = name	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)
notab = notab	Specifies that this element does not take part in the tabbing order for the document
src = url	Specifies the source of the image
Readonly = readonly	Prevents user from modifying content
tabindex = number	Defines this element's position in the tabbing order
taborder = number	Specifies the element's position in the tabbing order
value = string	Specifies the value of the control sent to the processing application as part of the name/value pair

## <input type="password"> (all)

Creates a form input control that is like a single-line text input control but shows asterisks or bullet marks rather than the characters to prevent an onlooker from seeing the values a user has entered. This should be used for sensitive information — although you should note that the values get passed to the servers as plain text. (If you have sensitive information you should still consider making submissions safe using a technique such as SSL.)

<code>accesskey = key_character</code>	Defines a hotkey/keyboard shortcut for this
<code>disabled = disabled</code>	Disables the text input, preventing user intervention
<code>maxlength = number</code>	Maximum number of characters the user can enter
<code>name = name</code>	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)
<code>notab = notab</code>	Specifies that this element does not take part in the tabbing order for the document
<code>onblur = script</code>	Specifies a script to run when the mouse moves off the element
<code>onchange = script</code>	Specifies a script to run when the value of the element changes
<code>onfocus = script</code>	Specifies a script to run when the element gains focus
<code>onselect = script</code>	Specifies a script to run when the user selects this element
<code>readonly = readonly</code>	Prevents user from modifying content
<code>size = number</code>	Specifies the width of the input in numbers of characters
<code>tabindex = number</code>	Defines this element's position in the tabbing order
<code>taborder = number</code>	Specifies the element's position in the tabbing order
<code>value = string</code>	Specifies the value of the control sent to the processing application as part of the name/value pair

## <input type="radio"> (all)

Creates a form input control that is a radio button. These appear in groups that share the same value for the name attribute and create mutually exclusive groups of values (only one of the radio buttons in the group can be selected).

## Appendix B: XHTML Element Reference

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accesskey = key_character	Defines a hotkey/keyboard shortcut for this
checked = checked	Specifies that the default condition for this radio button is checked
disabled = disabled	Disables the radio button, preventing user intervention
name = name	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)
notab = notab	Specifies that this element does not take part in the tabbing order for the document
readonly = readonly	Prevents user from modifying content
tabindex = number	Defines this element's position in the tabbing order
taborder = number	Specifies the element's position in the tabbing order
value = string	Specifies the value of the control sent to the processing application as part of the name/value pair

## <input type="reset"> (all)

Creates a form input control that is a button to reset the values of the form to the same values present when the page loaded.

accesskey = key_character	Defines a hotkey/keyboard shortcut for this
disabled = disabled	Disables the button, preventing user intervention
notab = notab	Specifies that this element does not take part in the tabbing order for the document
tabindex = number	Defines this element's position in the tabbing order
taborder = number	Specifies the element's position in the tabbing order
value = string	Specifies the value of the control sent to the processing application as part of the name/value pair

## <input type="submit"> (all)

Creates a form input control that is a submit button to send the form values to the server.

accesskey = key_character	Defines a hotkey/keyboard shortcut for this
disabled = disabled	Disables the button, preventing user intervention
name = name	Specifies a name for the form control passed to the form's processing application as part of the name/value pair
notab = notab	Specifies that this element does not take part in the tabbing order for the document
tabindex = number	Defines this element's position in the tabbing order
taborder = number	Specifies the element's position in the tabbing order
value = string	Specifies the value of the control sent to the processing application as part of the name/value pair

## <input type="text"> (all)

Creates a form input control that is a single-line text input.

accesskey = key_character	Defines a hotkey/keyboard shortcut for this
disabled = disabled	Disables the text input, preventing user intervention
maxlength = number	Maximum number of characters the user can enter
name = name	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)
notab = notab	Specifies that this element does not take part in the tabbing order for the document
onblur = script	Specifies a script to run when the mouse moves off the element
onchange = script	Specifies a script to run when the value of the element changes
onfocus = script	Specifies a script to run when the element gains focus

*Continued*

## Appendix B: XHTML Element Reference

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onselect = script	Specifies a script to run when the element is selected
readonly = readonly	Prevents user from modifying content
size = number	Specifies the width of the control in characters
tabindex = number	Defines this element's position in the tabbing order
taborder = number	Specifies the element's position in the tabbing order
value = string	Specifies the value of the control sent to the processing application as part of the name/value pair

## <ins> (IE4+, N6+, FF1+)

The content of the element has been added since an earlier version of the document.

cite = url	Specifies a URL indicating why the content was added
datetime = date	Specifies a date and time for the addition of content

## <isindex> Deprecated (all)

Identifies a searchable index.

Only the attributes listed in the table that follows are supported.

accesskey = key_character	Defines a hotkey/keyboard shortcut for this
action = url	IE only specifies the URL of the search application
class = classname	Specifies a class for the element to associate it with rules in a style sheet
dir = ltr   rtl	Specifies the direction of the text within the element
id = string	Specifies a unique identifier for this element
lang = language_type	Specifies the language used in this element
prompt = string	Specifies an alternative prompt for the field input

<code>style = string</code>	Specifies inline CSS style rules for the element
<code>tabindex = number</code>	Defines this element's position in the tabbing order
<code>title = string</code>	Specifies a title for the element
<code>xml:lang = language_type</code>	Specifies the language used in this element

## <**kbd**> (all)

The content of the element is something that should be entered on a keyboard, and is rendered in a fixed-width font.

## <**keygen**> (Netscape only, N3+)

Used to generate key material in the page — key material referring to encryption keys for security.

Takes only the attributes listed in the table that follows.

<code>challenge = string</code>	Provides a challenge string to be packaged with the key
<code>class = classname</code>	Specifies a class for the element to associate it with rules in a style sheet
<code>id = string</code>	Specifies a unique identifier for this element
<code>name = string</code>	Specifies a name for the element

## <**label**> (IE4+, N6+, FF1+)

The content of the element is used as a label for a form element.

<code>accesskey = key_character</code>	Defines a hotkey/keyboard shortcut for this
<code>for = name</code>	Specifies the value of the <code>id</code> attribute for the element it is a label for
<code>onblur = script</code>	Specifies a script to run when the mouse moves off the label
<code>onfocus = string</code>	Specifies a script to run when the label gains focus

### <layer> (Netscape only, N4+)

Defines an area of a page that can hold a different page. Netscape-specific; not covered in this book.

above = name	Positions this layer above the named layer
background = url	Specifies the URL for a background image for the layer
below = name	Positions this layer below the named layer
bgcolor = color	Sets the background color for the layer
clip = number [, number, number, number]	Specifies the layer's clipping region
left = number	Specifies the position of the layer's left edge from the containing document or layer
Name = name	Specifies the name for the layer
src = url	Specifies another document as the content of the layer
top = number	Specifies the position of the layer from the top of the containing document or layer
visibility=show   hide   inherit	Specifies whether the layer should be visible
width = number	Specifies the width of the layer in pixels
z-index = number	Specifies the stacking order of the layer

### <legend> (IE4+, N6+, FF1+)

The content of this element is the title text to place in a <fieldset>.

accesskey = key_character	Defines a hotkey/keyboard shortcut for this
align = top   left   bottom   right	Specifies the position of the legend in relation to the fieldset

## <li> (all)

The content of this element is an item in a list. The element is referred to as a line item. For appropriate attributes, see the parent element for that kind of list (<ul>, <ol>, <menu>).

type = bullet_type	Specifies the type of bullet used to display the list items
value = number	Specifies the number the list will start with

## <link> (all)

Defines a link between the document and another resource. Often used to include style sheets in documents.

Takes only the attributes listed in the table that follows.

charset = character_set	Specifies a character set used to encode the linked file
href = url	Specifies the URL of the linked document
hreflang = language_type	Specifies the language encoding for the target of the link
media = list	Types of media the document is intended for
rel = same   next   parent   previous   string	Indicates the relationship of the document to the target document
rev = relation	Indicates the reverse relationship of the target document to this one
type = type	Specifies the MIME type of the document being linked to

## <listing> Deprecated (IE3+)

The content of this element is rendered in a fixed-width font.

### <map> (all)

Creates a client-side image map and specifies a collection of clickable areas or hotspots.

name = string

Name of the map (required)

### <marquee> (IE only, IE3+)

Creates a scrolling text marquee (IE3+ only).

accesskey = key_character	Defines a hotkey/keyboard shortcut for this
align = top   middle   bottom	Positions the marquee in relation to its surrounding content
behavior = alternate   scroll   side	Specifies the action or behavior of the marquee
bgcolor = color	Specifies the background color of the marquee
direction = down   left   up   right	Specifies the direction in which the text scrolls
height = number	Specifies the height of the marquee in pixels
hspace = number	Specifies the amount of additional space to be added to the left and right of the marquee
id = string	Specifies a unique identifier for this element
loop = number	Specifies the number of times the marquee loops or can have the keyword <code>infinite</code>
scrollamount = number	Specifies the number of pixels moved each time the text scrolls
scrolldelay = number	Specifies the delay in milliseconds between each movement of the scroll
tabindex = number	Defines this element's position in the tabbing order
vspace = number	Specifies the amount of additional space to be added above and below the marquee
width = number	Specifies the width of the marquee in pixels

## <menu> Deprecated (all)

Renders the child elements as individual items. Replaced by lists (<ol> and <ul>). Deprecated in HTML 4.01.

## <li> (all)

type = bullet_type	Specifies the type of bullet used to display the list items
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## <meta> (all)

Allows for information about the document or instructions for the browser; these are not displayed to the user.

Takes only the attributes listed in the table that follows.

charset = character_set	Specifies a character set used to encode the document
content= meta_content	Specifies the value for the meta-information
dir = ltr   rtl	Specifies the direction of the text within the element
http-equiv = string	Specifies the HTTP equivalent name for the meta-information; causes the server to include the name and content in the HTTP header
lang = language_type	Specifies the language used in this element
name = string	Specifies the name of the meta-information
scheme = scheme	Specifies the profile scheme used to interpret the property
xml:lang = language_type	Specifies the language used in this element

## <multicol> (N3, N4 only)

Used to define multiple-column formatting. (Netscape 3 and 4 only — not part of XHTML.)

cols = number of columns	Specifies the number of columns
gutter = number	Specifies the size of the gutter (space between columns) in pixels
width = number	Specifies the width of the columns in pixels

### **<nextid> (not supported in browsers)**

Used to specify identifiers that would have been used by HTML editing software so that it knew the next document's ID in a series of documents (was part of the HTML 2.0 specification only, not implemented by browsers).

Takes only the attribute listed in the table that follows.

n = string

Sets the nextid number

### **<nobr> (all)**

Means “no break,” and prevents the content of the element from wrapping onto a new line.

### **<noembed> (N2, N3, N4)**

The content of the element is displayed for browsers that do not support <embed> elements or the required viewing application.

### **<noframes> (all)**

The content of the element is displayed for browsers that do not support frames.

### **<nolayer> (N4+ only)**

The content of the element is displayed for browsers that do not support layers.

### **<noscript> (all)**

The content of the element is displayed for browsers that do not support the script. Most browsers will also display this content if scripting is disabled.

### **<object> (IE3+, N6+, FF1+)**

Adds an object or non-HTML control to the page. Will be the standard way of including images in the future.

## Appendix B: XHTML Element Reference

	Specifies the position of an object in relation to surrounding text
archive = url	Specifies a list of URLs for archives or resources used by the object
border = number	Specifies the width of the border in pixels
classid = url	Specifies the URL of the object
codebase = url	Specifies the URL of the code required to run the object
codetype = MIME-type	Specifies the MIME type of the code base
data = url	Specifies the data for the object
declare	Declares an object without instantiating it
height = number	Specifies the height of the object in pixels
hspace = number	Specifies the amount of additional space to be added to the left and right of the embedded object
name = name	Specifies a name for the object
notab = notab	Specifies that this element does not take part in the tabbing order for the document
shapes = shapes	Specifies that the object has shaped hyperlinks
standby = string	Defines a message to display while the object is loading
tabindex = number	Defines this element's position in the tabbing order
type = MIME type	Specifies the MIME type for the object's data
usemap = url	Defines an image map for use with the object
vspace = number	Specifies the amount of additional space to be added above and below the embedded object
width = number	Specifies the object's width in pixels

## Appendix B: XHTML Element Reference

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### <param> (IE3+, N6+, FF1+)

Used as a child of <object> to set properties of the object.

<code>id = id</code>	Specifies a unique ID for this parameter
<code>name = name</code>	Specifies a name for the parameter
<code>type = MIME type</code>	Specifies the MIME type for the parameter
<code>value = string</code>	Specifies a value for the parameter
<code>valuetype = type</code>	Specifies the type of value attribute

### <ol> (all)

Creates an ordered or numbered list.

<code>compact = compact</code>	Attempts to make the list more vertically compact
<code>start = number</code>	Specifies the number with which the list should start
<code>type = bullet_type</code>	Specifies the type of bullet used to display the list items

### <li> (all)

<code>type = bullet_type</code>	Specifies the type of bullet used to display the list items
<code>value = number</code>	Specifies the number of the list item

### <optgroup> (IE6+, N6+, FF1+)

Used to group <option> elements in a select box.

<code>disabled = disabled</code>	Disables the group, preventing user intervention
<code>label = string</code>	Specifies a label for the option group

## <option> (all)

Contains one choice in a drop-down list or select box.

<code>disabled = disabled</code>	Disables the option, preventing user intervention
<code>label = string</code>	Specifies a label for the option
<code>selected = selected</code>	Indicates that the option should be selected by default when the page loads
<code>value = string</code>	Specifies the value of this option in the form control sent to the processing application as part of the name/value pair

## <p> (all)

The content of this element is a paragraph.

<code>align = center   left   right</code>	Specifies the alignment of the text within the paragraph
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## <param>

Used as a child of an <object> or <applet> element to set properties of the object. See the <object> or <applet> elements for details.

## <plaintext> Deprecated (IE3+, N2, N3, N4)

Renders the content of the element without formatting (deprecated in HTML 3.2).

## <pre> (all)

The content of this element is rendered in a fixed-width type that retains the formatting (such as spaces and line breaks) in the code.

<code>width = number</code>	Specifies the width of the preformatted area in pixels
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### <q> (IE4+, N6+, FF1+)

The content of the element is a short quotation.

cite = url	Specifies the URL for the content of the quote in question
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### <s> Deprecated (all)

The content of the element should be rendered with strikethrough.

### <samp> (all)

The content of the element is a sample code listing. Usually rendered in a smaller fixed-width font.

### <script> (all)

The content of the element is a script code that the browser should execute.

charset = encoding	Specifies a character set used to encode the script
Defer = defer	Defers execution of the script
language = name	Specifies the language used in this element
src = url	URL for the location of the script file
type = encoding	Specifies the MIME type of the script

### <select> (all)

Creates a select or drop-down list box.

disabled = disabled	Disables the select box, preventing user intervention
Multiple = multiple	Permits selection of multiple items from the list

<code>name = name</code>	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)
<code>onblur = script</code>	Specifies a script to run when the mouse moves off the control
<code>onchange = script</code>	Specifies a script to run when the value of the element changes
<code>onfocus = script</code>	Specifies a script to run when the element gains focus
<code>size = number</code>	Specifies the number of items that may appear at once
<code>tabindex = number</code>	Defines this element's position in the tabbing order

## <**small**> (all)

The content of this element should be displayed in a smaller font than its containing element.

## <**span**> (all)

Used as a grouping element for inline elements (as opposed to block-level elements); also allows for the definition of non-standard attributes for text on a page.

## <**strike**> Deprecated (all)

The content of this element should be rendered in strikethrough.

## <**strong**> (all)

The content of this element has strong emphasis and should be rendered in a bold typeface.

## <**style**> (IE3+, N4+, FF1+)

Contains CSS style rules that apply to that page.

## <**sub**> (all)

The content of this element is displayed as subscript.

### <sup> (all)

The content of this element is rendered as superscript.

### <table> (all)

Creates a table.

<td>Specifies the alignment of the table within its content</td>	Specifies the alignment of the table within its content
background = url	Specifies a URL for a background image
bgcolor = color	Specifies a background color for the table
border = number	Specifies the width of the border in pixels
bordercolor = color	Specifies the color of the border
bordercolordark = color	Specifies the darker border color
bordercolorlight = color	Specifies the lighter border color
cellpadding = number	Specifies the distance between the border and its content in pixels
cellspacing = number	Specifies the distance between the cells in pixels
cols = number	Specifies the number of columns in the table
frame = above   below   border   box   hsides   lhs   rhs   void   vsides	Defines where the borders are displayed
height = number	Specifies the height of the table in pixels
hspace = number	Specifies the amount of additional space to be added to the left and right of the table
nowrap = nowrap	Prevents the content of the table from wrapping
rules = all   cols   groups   none   rows	Specifies where the inner dividers are drawn
summary = string	Offers a summary description of the table

<code>valign = bottom   top</code>	Specifies the alignment of content in the table
<code>vspace = number</code>	Specifies the amount of additional space to be added above and below the table
<code>width = number</code>	Specifies the width of the table in pixels

## <tbody> (IE3+, N6+, FF1+)

Denotes the body section of a table.

<code>align = center   left   right</code>	Specifies the alignment of the content of the body of the table
<code>char = string</code>	Specifies an offset character for alignment
<code>charoff = string</code>	Specifies the offset within the cells of the alignment position
<code>valign = bottom   top</code>	Specifies the vertical alignment of content in the body of the table
<code>width = number</code>	Specifies the width of the table body in pixels

## <td> (all)

Creates a cell of a table.

<code>abbr = string</code>	Specifies an abbreviation for the cell's content
<code>align = center   left   right</code>	Specifies the alignment of the content of the cell
<code>axis = string</code>	Specifies a name for a related group of cells
<code>background = url</code>	Specifies a URL for a background image for the cell
<code>bgcolor = color</code>	Specifies the background color of the cell
<code>border = number</code>	Specifies the border width of the cell in pixels
<code>bordercolor = color</code>	Specifies the border color of the cell

*Continued*

## Appendix B: XHTML Element Reference

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bordercolordark= color	Specifies the dark border color of the cell
bordercolorlight= color	Specifies the light border color of the cell
char = string	Specifies the cell alignment character
charoff = string	Specifies the offset from the cell alignment character
colspan = number	Specifies the number of columns this cell spans
headers = string	Specifies the names of header cells associated with this cell
height = number	Specifies the height of the cell in pixels
nowrap = nowrap	Prevents the content of the cell from wrapping
rowspan = number	Specifies the number of rows the cell spans
scope = row   col   rowgroup   colgroup	Specifies the scope of a header cell
valign = bottom   top	Specifies vertical alignment of the content of the cell
width = number	Specifies the width of the cell in pixels

## <textarea> (all)

Creates a multiple-line text input control in a form.

accesskey= key_character	Defines a hotkey/keyboard shortcut for this form control
cols = number	Specifies the number of columns of characters the text area should be (the width in characters)
disabled = disabled	Disables the text area, preventing user intervention
name = string	Specifies a name for the form control passed to the form's processing application as part of the name/value pair (required)
onblur = script	Specifies a script to run when the mouse moves off the text area
onchange = script	Specifies a script to run when the value of the element changes
onfocus = script	Specifies a script to run when the element gains focus

<code>onselect = script</code>	Specifies a script to run when the text area is selected
<code>readonly = readonly</code>	Prevents the user from modifying content
<code>rows = number</code>	Specifies the number of rows of text that should appear in the text area without the scrollbar appearing
<code>tabindex = number</code>	Defines this element's position in the tabbing order
<code>wrap = physical _ vertical _ off</code>	Specifies whether the text in a text area should wrap or continue on the same line when width of text area is reached

## <tfoot> (IE3+, N6+, FF1+)

Denotes row or rows of a table to be used as a footer for the table.

<code>align = center   left   right</code>	Specifies the alignment of the content of the footer of the table
<code>char = string</code>	Specifies an offset character for alignment
<code>charoff = string</code>	Specifies the offset within the cells of the alignment position
<code>valign = bottom   top</code>	Specifies the vertical alignment of content in the foot of the table
<code>width = number</code>	Specifies the width of the table body in pixels

## <thead> (IE3+, N6+, FF1+)

Denotes row or rows of a table to be used as a header for the table.

<code>align = center   left   right</code>	Specifies the alignment of the content of the head of the table
<code>char = string</code>	Specifies an offset character for alignment
<code>charoff = string</code>	Specifies the offset within the cells of the alignment position
<code>valign = bottom   top</code>	Specifies the vertical alignment of content in the head of the table
<code>width = number</code>	Specifies the width of the table body in pixels

### <th> (all)

Denotes a header cell of a table. By default, content is often shown in bold font.

abbr = string	Specifies an abbreviation for the cell's content
align = center   left   right	Specifies the alignment of the content of the cell
axis = string	Specifies a name for a related group of cells
background = url	Specifies a URL for a background image for the cell
bgcolor = color	Specifies the background color of the cell
border = number	Specifies the border width of the cell in pixels
bordercolor = color	Specifies the border color of the cell
bordercolordark = color	Specifies the dark border color of the cell
bordercolorlight = color	Specifies the light border color of the cell
char = string	Specifies the cell alignment character
charoff = string	Specifies the offset from the cell alignment character
colspan = number	Specifies the number of columns this cell spans
headers = string	Specifies the names of header cells associated with this cell
height = number	Specifies the height of the cell in pixels
nowrap	Prevents the content of the cell from wrapping
<td>Specifies the number of rows the cell spans</td>	Specifies the number of rows the cell spans
scope = row   col   rowgroup   colgroup	Specifies the scope of a header cell
valign = bottom   top	Specifies vertical alignment of the content of the cell
width = number	Specifies the width of the cell in pixels

## <title> (all)

The content of this element is the title of the document and will usually be rendered in the top title bar of the browser; it may only live in the head of the page. Supports only the attributes listed in the table that follows.

<code>dir = ltr   rtl</code>	Specifies the direction of the text within the element
<code>id = string</code>	Specifies a unique identifier for this element
<code>lang = language_type</code>	Specifies the language used in this element
<code>xml:lang = language_type</code>	Specifies the language used in this element

## <tr> (all)

Denotes a row of a table.

<code>align = center   left   right</code>	Specifies the alignment of the content of the row
<code>background = url</code>	Specifies a URL for a background image for the row
<code>bgcolor = color</code>	Specifies the background color of the row
<code>border = number</code>	Specifies the border width of the row in pixels
<code>bordercolor = color</code>	Specifies the border color of the row
<code>bordercolordark = color</code>	Specifies the dark border color of the row
<code>bordercolorlight = color</code>	Specifies the light border color of the row
<code>char = string</code>	Specifies the row alignment character
<code>charoff = string</code>	Specifies the offset from the row alignment character
<code>nowrap = nowrap</code>	Prevents the content of the cell from wrapping
<code>valign = bottom   top</code>	Specifies vertical alignment of the content of the cell

### <tt> (all)

The content of this element is rendered in a fixed-width font, as if on a teletype device.

### <u> (all)

The content of this element is rendered with underlined text (deprecated in HTML 4.01).

### <ul> (all)

Creates an unordered list.

compact = compact	Attempts to make the list more compact vertically
type = bullet_type	Specifies the type of bullet used to display the list items

### <li> (all)

type = bullet_type	Specifies the type of bullet used to display the list items
value = number	Specifies the number of the list item

### <var> (IE3+, N6+, FF1+)

The content of this element is a programming variable, and is usually rendered in a small fixed-width font.

### <wbr> (IE3, N2, N3, N4)

Creates a soft line break within a <nobr> element.

### <xmp> Deprecated (all)

The content of this element is rendered in a fixed-width typeface, for example or sample code. Replaced by <pre> and <samp> elements.

# C

## CSS Properties

This appendix is a reference to the main CSS properties that you will be using to control the appearance of your documents.

For each property covered, you will first see a very brief description of the property and then an example of its usage. Then the tables on the left show the possible values the property can take, along with the first versions of IE, Netscape, and Firefox to support these properties.

The table on the right indicates whether the property can be inherited, what the default value for the property is, and which elements it applies to.

At the end of the appendix are units of measurement.

While Netscape and Firefox support the `inherit` value of many properties, if it is unable to set the property to some other value in the first place, then this value is of little use.

*The tables indicating which browser version supported a value are based on browsers on the Windows platform. Internet Explorer 5 on a Mac has notably better support for many of the properties than its Windows counterparts.*

## Font Properties

The font properties allow you to change the appearance of a typeface.

### **font**

Allows you to set several font properties at the same time, separated by spaces. You can specify `font-size`, `line-height`, `font-family`, `font-style`, `font-variant`, and `font-weight` in this one property.

```
font {color:#ff0000; arial, verdana, sans-serif; 12pt;}
```

## Appendix C: CSS Properties

---

Value	IE	N	FF	Inherited	Yes
[font-family]	3	4	1	Default	n/a
[font-size]	3	4	1	Applies to	All elements
[font-style]	3	4	1		
[font-variant]	4	6	1		
[font-weight]	3	4	1		
[line-height]	3	4	1		
inherit	-	6	1		

### **font-family**

Allows you to specify the typefaces you want to use. Can take multiple values separated by commas, starting with your first preference, then your second choice, and ending with a generic font-family (serif, sans-serif, cursive, fantasy, or monospace).

```
p {font-family:arial, verdana, sans-serif;}
```

Value	IE	N	FF	Inherited	Yes
[generic family]	3	4	1	Default	Set by browser
[specific family]	3	4	1	Applies to	All elements
inherit	-	6	1		

### **font-size**

Allows you to specify a size of font. The `font-size` property has its own specific values:

- ❑ **Absolute sizes:** xx-small, x-small, small, medium, large, x-large, xx-large
- ❑ **Relative sizes:** larger, smaller
- ❑ **Percentage:** Percentage of the parent font
- ❑ **Length:** A unit of measurement (as described at end of the appendix)

Value	IE	N	FF	Inherited	Yes
[absolute size]	3	4	1	Default	medium
[relative size]	4	4	1	Applies to	All elements
[percent]	3	4	1		
[length]	3	4	1		
inherit	-	6	1		

## **font-size-adjust**

Allows you to adjust the aspect value of a font, which is the ratio between the height of a lowercase letter *x* in the font and the height of the font.

```
{font-size-adjust:0.5;}
```

Value	IE	N	FF	Inherited	Yes
[number]	-	-	-	Default	Specific to font
none	-	-	-	Applies to	All elements
inherit	-	6	1		

## **font-stretch**

Allows you to specify the width of the letters in a font (not the size between them).

- Relative values:** normal, wider, narrower
- Fixed values:** ultra-condensed, extra-condensed, condensed, semi-condensed, semi-expanded, expanded, extra-expanded, ultra-expanded

```
p {font-family:courier; font-stretch:semi-condensed;}
```

Value	IE	N	FF	Inherited	Yes
[relative]	-	-	-	Default	Specific to font
[fixed]	-	-	-	Applies to	All elements
inherit	-	6	1		

## Appendix C: CSS Properties

---

### **font-style**

Applies styling to a font. If the specified version of the font is available, it will be used; otherwise, the browser will render it.

```
p {font-style:italic;}
```

Value	IE	N	FF	Inherited	Yes
normal	3	4	1	Default	normal
italic	3	4	1	Applies to	All elements
oblique	4	6	1		
inherit	-	6	1		

### **font-variant**

Creates capital letters that are the same size as normal lowercase letters.

Value	IE	N	FF	Inherited	Yes
normal	4	6	1	Default	normal
small-caps	4	6	1	Applies to	All elements
inherit	-	6	1		

### **font-weight**

Specifies the thickness of the text — its “boldness.”

- Absolute values:** normal, bold
- Relative values:** bolder, lighter
- Numeric value:** Between 0 and 100

```
p {font-weight:bold;}
```

Value	IE	N	FF	Inherited	Yes
[absolute]	3	4	1	Default	normal
[relative]	4	6	1	Applies to	All elements
[number 1-100]	4	6	1		
inherit	-	6	1		

## Text Properties

Text properties change the appearance and layout of text in general (as opposed to the font).

### ***letter-spacing***

Specifies the distance between letters as a unit of length.

```
p {letter-spacing:1em;}
```

Value	IE	N	FF	Inherited	Yes
[length]	4	6	1	Default	normal
normal	4	6	1	Applies to	All elements
inherit	-	6	1		

### ***text-align***

Specifies whether text is aligned `left`, `right`, `center`, or `justified`.

Value	IE	N	FF	Inherited	Yes
left	3	4	1	Default	Depends on user agent and element (usually <code>left</code> except for <code>&lt;th&gt;</code> elements, which are <code>center</code> )
right	3	4	1	Applies to	All elements
center	3	4	1		
justify	4	4	1		
inherit	-	6	1		

## Appendix C: CSS Properties

---

### **text-decoration**

Specifies whether text should have an underline, overline, line-through, or blink appearance.

```
p {text-decoration:underline;}
```

Value	IE	N	FF	Inherited	No
none	3	4	1	Default	none
underline	3	4	1	Applies to	All elements
overline	4	6	1		
line-through	3	4	1		
blink	-	4	1		
inherit	-	6	1		

### **text-indent**

Specifies the indentation in length or as a percentage of the parent element's width.

```
p {text-indent:3em;}
```

Value	IE	N	FF	Inherited	Yes
[length]	4	4	1	Default	zero
[percentage]	4	4	1	Applies to	Block elements
inherit	-	6	1		

### **text-shadow**

Creates a drop shadow for the text. It should take three lengths; the first two specify X and Y coordinates for the offset of the drop shadow, while the third specifies a blur effect. This is then followed by a color, which can be a name or a hex value.

```
.dropShadow {text-shadow: 0.3em 0.3em 0.5em black}
```

Value	IE	N	FF	Inherited	No
[shadow effects]	-	-	-	Default	none
none	-	-	-	Applies to	All elements
inherit	-	6	1		

## ***text-transform***

Specifies capitalization of text in an element:

- none:** Removes inherited settings
- uppercase:** All characters are uppercase.
- lowercase:** All characters are lowercase.
- capitalize:** First letter of each word is capitalized.

```
p {text-transform:uppercase;}
```

Value	IE	N	FF	Inherited	Yes
none	4	4	1	Default	none
uppercase	4	4	1	Applies to	All elements
lowercase	4	4	1		
capitalize	4	4	1		
inherit	-	6	1		

## ***white-space***

This indicates how white space should be dealt with:

- normal:** White space should be collapsed.
- pre:** White space should be preserved.
- nowrap:** Text should not be broken to a new line except with <br /> element.

```
p {white-space:pre;}
```

## Appendix C: CSS Properties

Value	IE	N	FF	Inherited	Yes
normal	5.5	4	1	Default	normal
pre	5.5	4	1	Applies to	Block elements
nowrap	5.5	6	1		
inherit	-	6	1		

### ***word-spacing***

This specifies the gap between words:

```
p {word-spacing:2em;}
```

Value	IE	N	FF	Inherited	Yes
normal	6	6	1	Default	normal
[length]	6	6	1	Applies to	All elements
inherit	-	6	1		

## **Color and Background Properties**

The following properties allow you to change the colors and backgrounds of both the page and other boxes.

### ***background***

This is shorthand for specifying background properties for color, url, repeat, scroll, and position; separated by a space. By default, the background is transparent.

```
body {background: #efefef url(images/background.gif); }
```

Value	IE	N	FF	Inherited	No
[background-attachment]	4	6	1	Default	Not defined (by default background is transparent)
[background-color]	3	4	1	Applies to	All elements
[background-image]	3	4	1		

Value	IE	N	FF
[background-position]	4	6	1
[background-repeat]	3	4	1
inherit	-	6	1

## ***background-attachment***

This specifies whether a background image should be fixed in one position or scroll along the page:

```
body {background-attachment:fixed;
      background-image: url(images/background.gif);}
```

Value	IE	N	FF	Inherited	No
fixed	4	6	1	Default	scroll
scroll	4	6	1	Applies to	All elements
inherit	4	6	1		

## ***background-color***

Sets the color of the background. This can be a single color or two colors blended together. Colors can be specified as a color name, hex value, or RGB value. By default the box will be transparent.

```
body {background-color:#efefef;}
```

Value	IE	N	FF	Inherited	No
[color]	4	4	1	Default	transparent
transparent	4	4	1	Applies to	All elements
inherit	-	6	1		

## ***background-image***

This specifies an image to be used as a background, which by default will be tiled. Value is a URL for the image.

## Appendix C: CSS Properties

---

```
body {background-image: url(images/background.gif);}
```

Value	IE	N	FF	Inherited	No
[url]	4	4	1	Default	none
none	4	4	1	Applies to	All elements
inherit	-	6	1		

### ***background-position***

Specifies where a background image should be placed in the page, from the top-left corner. Values can be an absolute distance, percentage, or one of the keywords. If only one value is given, it is assumed to be horizontal.

- Keywords available are: top, bottom, left, right, center

```
body {background-position:center;  
background-image: url(images/background.gif);}
```

Value	IE	N	FF	Inherited	No
[length - x y]	4	6	1	Default	top, left
[percentage - x% y%]	4	6	1	Applies to	Block-level elements
top	4	6	1		
left	4	6	1		
bottom	4	6	1		
right	4	6	1		
center	4	6	1		
inherit	-	6	1		

### ***background-positionX***

Position of a background image to run horizontally across page. Values are the same as for `background-position` (default: `top`).

## ***background-positionY***

Position of a background image to run vertically down the page. Values are the same as for `background-position` (default: `left`).

# **Border properties**

The border properties allow you to control the appearance and size of a border around any box.

## ***border (border-bottom, border-left, border-top, border-right)***

This is shorthand for specifying `border-style`, `border-width`, and `border-color` properties.

Value	IE	N	FF	Inherited	No
<code>&lt;border-style&gt;</code>	4	6	1	<b>Default</b>	<code>none, medium, none</code>
<code>&lt;border-width&gt;</code>	4	6	1	<b>Applies to</b>	All elements
<code>&lt;border-color&gt;</code>	4	6	1		
<code>inherit</code>	-	6	1		

## ***border-style (border-bottom-style, border-left-style, border-top-style, border-right-style)***

This specifies the style of line that should surround a block box.

```
div.page {border-style:solid;}
```

Note that Netscape did not support properties for individual sides until version 6.

Value	IE	N	FF	Inherited	No
<code>none</code>	4	4	1	<b>Default</b>	<code>none</code>
<code>dotted</code>	5.5	6	1	<b>Applies to</b>	All elements
<code>dashed</code>	5.5	6	1		
<code>solid</code>	4	4	1		

*Continued*

## Appendix C: CSS Properties

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Value	IE	N	FF
double	4	4	1
groove	4	4	1
ridge	4	4	1
inset	4	4	1
outset	4	4	1
hidden	-	-	-
inherit	-	6	1

### ***border-width (border-bottom-width, border-left-width, border-top-width, border-right-width)***

Specifies the width of a border line; can be a width or a keyword.

```
div.page {border-width:2px;}
```

Value	IE	N	FF	Inherited	No
[length]	4	4	1	Default	medium
thin	4	4	1	Applies to	All elements
medium	4	4	1		
thick	4	4	1		
inherit	-	6	1		

### ***border-color (border-bottom-color, border-left-color, border-top-color, border-right-color)***

Specifies the color of a border; values can be a color name, hex code, or RGB value.

```
table {border-color:#000000;}
```

Value	IE	N	FF	Inherited	No
[color value]	4	4	1	Default	none
inherit	-	6	1	Applies to	All elements

## Dimensions

The dimensions properties allow you to specify the size that boxes should be.

### ***height***

Specifies the vertical height of a block element; can scale the element.

```
table {height:400px;}
```

Value	IE	N	FF	Inherited	No
auto	4	6	1	Default	auto
[length]	4	6	1	Applies to	Block-level elements
[percentage]	4	-	1		
inherit	-	6	1		

### ***width***

Specifies the horizontal width of an element; can scale the element.

```
td {width:150px;}
```

Value	IE	N	FF	Inherited	No
auto	4	4	1	Default	auto
[length]	4	4	1	Applies to	Block level elements
[percentage]	4	4	1		
inherit	-	6	1		

## Appendix C: CSS Properties

---

### ***line-height***

This specifies the height of a line of text, and therefore the leading (space between multiple lines of text).

```
p {line-height:18px;}
```

Value	IE	N	FF	Inherited	Yes
normal	3	4	1	Default	Depends on browser
[number]	4	4	1	Applies to	All elements
[length]	3	4	1		
[percentage]	3	4	1		
inherit	-	6	1		

### ***max-height***

This specifies the maximum height of a block-level element (same values as for `height`).

```
td {max-height:200px;}
```

Value	IE	N	FF	Inherited	No
auto	7	-	1	Default	auto
[length]	7	-	1	Applies to	Block-level elements
[percentage]	7	-	1		
inherit	-	6	1		

### ***max-width***

This specifies the maximum width of a block-level element (same values as for `width`).

```
td {max-width:400px;}
```

Value	IE	N	FF	Inherited	No
auto	7	-	1	Default	auto
[length]	7	-	1	Applies to	Block elements
[percentage]	7	-	1		
inherit	-	6	1		

## ***min-height***

This specifies the maximum height of a block-level element (same values as for `height`).

```
td {min-height:100px;}
```

Value	IE	N	FF	Inherited	No
auto	7	-	1	Default	auto
[length]	7	-	1	Applies to	Block-level elements
[percentage]	7	-	1		
inherit	-	6	1		

## ***min-width***

This specifies the minimum width of a block-level element (same values as for `width`).

```
td {min-width:200px;}
```

Value	IE	N	FF	Inherited	No
auto	7	-	1	Default	auto
[length]	7	-	1	Applies to	Block elements
[percentage]	7	-	1		
inherit	-	6	1		

# Margin Properties

Margin properties allow you to specify a margin around a box and therefore create a gap between elements' borders.

## ***margin (margin-bottom, margin-left, margin-top, margin-right)***

This specifies the width of a margin around a box.

```
p {margin:15px;}
```

Value	IE	N	FF	Inherited	No
auto	3	4	1	Default	zero
[length]	3	4	1	Applies to	All elements
[percentage — relative to parent element]	3	4	1		
inherit	-	6	1		

# Padding Properties

Padding properties set the distance between the border of an element and its content. They are important for adding white space to documents (in particular table cells).

## ***padding (padding-bottom, padding-left, padding-right, padding-top)***

This specifies the distance between an element's border and its content.

```
td {padding:20px;}
```

Value	IE	N	FF	Inherited	No
auto	4	4	1	Default	zero
[length]	4	4	1	Applies to	All elements

Value	IE	N	FF
[percentage — relative to parent element]	4	4	1
inherit	-	6	1

## List Properties

List properties affect the presentation of bulleted, numbered, and definition lists.

### *list-style*

This is shorthand allowing you to specify *list-style-position* and *list-style-type*.

```
ul {list-style: inside disc}
```

Value	IE	N	FF
<position>	4	6	1
<type>	4	4	1
<image>	4	6	1
inherit	-	6	1

Inherited	Yes
Default	Depends on browser
Applies to	List elements

### *list-style-position*

This specifies whether the marker should be placed inside each item of a list or to the left of them.

```
ul {list-style-position:inside;}
```

Value	IE	N	FF
inside	4	6	1
outside	4	6	1
inherit	-	6	1

Inherited	Yes
Default	outside
Applies to	List elements

## Appendix C: CSS Properties

---

### **list-style-type**

This indicates the type of bullet or numbering that a bullet should use.

```
ul {list-style-type:circle;}
```

Value	IE	N	FF	Inherited	Yes
None	4	4	1	Default	disc
disc (default)	4	4	1	Applies to	List elements
Circle	4	4	1		
square	4	4	1		
decimal	4	4	1		
decimal-leading-zero	-	-	-		
lower-alpha	4	4	1		
upper-alpha	4	4	1		
lower-roman	4	4	1		
upper-roman	4	4	1		

Additional numbered list styles are available in CSS, but unfortunately they are not supported in IE7, Netscape 7, or Firefox 2.

hebrew	Traditional Hebrew numbering
georgian	Traditional Georgian numbering (an, ban, gan, . . . , he, tan, in, in-an, . . . )
armenian	Traditional Armenian numbering
cjk-ideographic	Plain ideographic numbers
hiragana	(a, i, u, e, o, ka, ki, . . . )

katakana	(A, I, U, E, O, KA, KI, . . . )
hiragana-iroha	(i, ro, ha, ni, ho, he, to, . . . )
katakana-iroha	(I, RO, HA, NI, HO, HE, TO, . . . )

## marker-offset

This specifies the space between a list item and its marker.

```
ol {marker-offset:2em;}
```

Value	IE	N	FF	Inherited	No
[length]	-	7	1	Default	auto
auto	-	7	1	Applies to	Marker elements
inherit	-	6	1		

# Positioning Properties

Positioning properties allow you to use CSS for positioning boxes on the page.

## position

Specifies the positioning schema that should be used for an element. When an element is positioned, you also need to use the box-offset properties covered next (`top`, `left`, `bottom`, and `right`). Note that you should not use `top` and `bottom` or `left` and `right` together (if you do, `top` and `left` take priority).

- ❑ `absolute` can be fixed on the canvas in a specific position from its containing element (which is another absolutely positioned element); it will also move when the user scrolls the page.
- ❑ `static` will fix it on the page in the same place and keep it there even when the user scrolls.
- ❑ `relative` will be placed offset in relation to its normal position.
- ❑ `fixed` will fix it on the background of the page and not move when the user scrolls.

```
p.article{position:absolute; top:10px; left:20px;
```

## Appendix C: CSS Properties

---

Value	IE	N	FF	Inherited	No
absolute	4	4	1	Default	static
relative	4	4	1	Applies to	All elements
static	4	4	1		
fixed	-	6	1		
inherit	-	6	1		

## Top

This sets the vertical position of an element from the top of the window or containing element.

Value	IE	N	FF	Inherited	No
auto	4	6	1	Default	auto
[length]	4	6	1	Applies to	Positioned elements
[percentage - relative to parent's height]	4	6	1		
Inherit	-	6	1		

## Left

This sets the horizontal position of an element from the left of the window or containing element.

Value	IE	N	FF	Inherited	No
Auto	4	6	1	Default	auto
[length]	4	6	1	Applies to	Positioned elements
[percentage - relative to parent's width]	4	6	1		
inherit	-	6	1		

## ***bottom***

This sets the vertical position of an element from the bottom of the window or containing element.

Value	IE	N	FF	Inherited	No
auto	5	6	1	Default	auto
[length]	5	6	1	Applies to	Positioned elements
[percentage - relative to parent's height]	5	6	1		
inherit	-	6	1		

## ***right***

This sets the horizontal position of an element from the window or containing element.

Value	IE	N	FF	Inherited	No
auto	5	6	1	Default	auto
[length]	5	6	1	Applies to	Positioned elements
[percentage - relative to parent's width]	5	6	1		
inherit	-	6	1		

## ***vertical-align***

This sets the vertical positioning of an inline element:

- `baseline` aligns element with base of parent.
- `middle` aligns midpoint of element with half the height of parent.
- `sub` makes element subscript.
- `super` makes element superscript.
- `text-top` aligns element with top of parent element's font.
- `text-bottom` aligns element with the bottom of parent element's font.

## Appendix C: CSS Properties

---

- ❑ top aligns top of element with top of tallest element on current line.
- ❑ bottom aligns element with bottom of lowest element on the current line.

```
span.superscript {vertical-align:superscript;}
```

Value	IE	N	N	Inherited	No
baseline	4	4	1	Default	baseline
middle	4	4	1	Applies to	Inline elements
sub	4	6	1		
super	4	6	1		
text-top	4	4	1		
text-bottom	4	4	1		
top	4	4	1		
bottom	4	4	1		
[percentage relative to line height]	-	6	1		
[length]	-	-	-		
inherit	4	6	1		

## z-index

Controls which overlapping element appears to be on top; works for absolutely positioned elements only. Positive and negative numbers are permitted.

```
p {position:absolute; top:10px; left:20px; z-index:3;}
```

Value	IE	N	FF	Inherited	No
auto	4	-	1	Default	Depends on position of element in XHTML source document
[number]	4	4	1	Applies to	Positioned elements
inherit	-	6	1		

## clip

Controls which part of an element is visible. Parts outside the clip are not visible. If value is `rect()`, it takes the following form:

□ `rect([top] [right] [bottom] [left])`

`rect(25 100 100 25)`

Value	IE	N	FF	Inherited	No
<code>auto</code>	4	-	1	<b>Default</b>	<code>auto</code>
<code>rect</code>	4	6	1	<b>Applies to</b>	Block elements
<code>inherit</code>	-	6	1		

## overflow

This specifies how a container element will display content that is too large for its containing element.

`p {width:200px; height:200px; overflow:scroll;}`

Value	IE	N	FF	Inherited	No
<code>auto</code>	4	6	1	<b>Default</b>	<code>visible</code>
<code>hidden</code>	4	6	1	<b>Applies to</b>	Block elements
<code>visible</code>	4	6	1		
<code>scroll</code>	4	6	1		
<code>inherit</code>	-	6	6		

## overflow-x

Same as `overflow`, but only for the horizontal x-axis. First supported in IE5.

## overflow-y

Same as `overflow`, but only for the vertical y-axis. First supported in IE5.

## Appendix C: CSS Properties

---

# Outline Properties

Outlines act like borders, but do not take up any space — they sit on top of the canvas.

## ***Outline (outline-color, outline-style, outline-width)***

Shortcut for the `outline-color`, `outline-style`, and `outline-width` properties:

```
outline {solid #ff0000 2px}
```

Note that `outline-color`, `outline-style`, and `outline-width` take the same values as `border-color`, `border-style`, and `border-width`. They are not covered individually, because they are not supported yet.

Value	IE	N	FF	Inherited	No
<code>outline-color</code>	-	-	1.5	<b>Default</b>	<code>none</code>
<code>outline-style</code>	-	-	1.5	<b>Applies to</b>	All elements
<code>outline-width</code>	-	-	1.5		
<code>outline</code>	-	-	1.5		

# Table Properties

Table properties allow you to affect the style of tables, rows, and cells.

## ***border-collapse***

This specifies the border model that the table should use (whether adjacent borders should be collapsed into one value or kept separate).

```
table {border-collapse:separate;}
```

Value	IE	N	FF	Inherited	Yes
<code>collapse</code>	5	7	1	<b>Default</b>	<code>collapse</code>
<code>separate</code>	5	7	1	<b>Applies to</b>	Table and inline elements
<code>inherit</code>	-	6	1		

## ***border-spacing***

This specifies the distance between adjacent cells' borders.

```
table {border-spacing:2px;}
```

<b>Value</b>	<b>IE</b>	<b>N</b>	<b>FF</b>	<b>Inherited</b>	Yes
[length]	-	6	1	<b>Default</b>	0
inherit	-	6	1	<b>Applies to</b>	Table and inline elements

## ***caption-side***

This indicates which side of a table a caption should be placed on.

```
caption {caption-side:bottom;}
```

<b>Value</b>	<b>IE</b>	<b>N</b>	<b>FF</b>	<b>Inherited</b>	Yes
top	-	6	1	<b>Default</b>	top
left	-	6	1	<b>Applies to</b>	<caption> elements in <table> elements
bottom	-	6	1		
right	-	6	1		
inherit	-	6	1		

## ***empty-cells***

This specifies whether borders should be displayed if a cell is empty.

```
td, th {empty-cells:hide;}
```

<b>Value</b>	<b>IE</b>	<b>N</b>	<b>FF</b>	<b>Inherited</b>	Yes
show	5	6	1	<b>Default</b>	show
hide	5	6	1	<b>Applies to</b>	Table cell elements
inherit	-	6	1		

## Appendix C: CSS Properties

---

### **table-layout**

Specifies how the browser should calculate the layout of a table; can affect the speed of rendering a large or graphics-intensive table.

Value	IE	N	FF	Inherited	No
auto	5	6	1	Default	auto
fixed	5	6	1	Applies to	Table and inline elements
inherit	-	6	6		

## Classification Properties

Classification properties affect how the boxes in the box model are rendered.

### **clear**

Forces elements, which would normally wrap around an aligned element, to be displayed below it. Value indicates which side may not touch an aligned element.

```
p {clear:left;}
```

Value	IE	N	FF	Inherited	No
none	4	4	1	Default	none
both	4	4	1	Applies to	All elements
left	4	4	1		
right	4	4	1		
inherit	-	6	1		

### **display**

Specifies how an element is rendered, if at all. If set to none the element is not rendered and it does not take up any space. Can force an inline element to be displayed as a block or vice versa.

```
span.important {display:block;}
```

Value	IE	N	FF	Inherited	Yes
none	4	4	1	Default	inline
inline	5	4	1	Applies to	All elements
block	5	4	1		
list-item	5	4	1		
inherit	-	6	1		

Other properties are either not supported or not required for XHTML.

While the default value of this property is `inline`, browsers tend to treat the element depending on its inherent display type. Block-level elements, such as headings and paragraphs, get treated as if the default were `block`, whereas inline elements such as `<i>`, `<b>`, or `<span>` get treated as `inline`.

## ***float***

Subsequent elements should be wrapped to the left or right of the element, rather than below.

```
img.featuredItem {float:left;}
```

Value	IE	N	FF	Inherited	No
none	4	4	1	Default	none
left	4	4	1	Applies to	All elements
right	4	4	1		
inherit	-	6	1		

## ***visibility***

Specifies whether an element should be displayed or hidden. Even if hidden, elements take up space on page, but are transparent.

## Appendix C: CSS Properties

---

Value	IE	N	FF	Inherited	No
visible	4	-	1	Default	inherit
show	-	4	1	Applies to	All elements
hidden	4	-	1		
hide	-	4	1		
collapse	-	-	1		
inherit	4	4	1		

## Internationalization Properties

Internationalization properties affect how text is rendered in different languages.

### ***direction***

Specifies the direction of text from left to right or right to left. This should be used in association with the `unicode-bidi` property.

```
td.word{direction:rtl; unicode-bidi:bidi-override;}
```

Value	IE	N	FF	Inherited	Yes
ltr	5	6	1	Default	ltr
rtl	5	6	1	Applies to	All elements
inherit	5	6	1		

### ***unicode-bidi***

The `unicode-bidi` property allows you to override Unicode's built-in directionality settings for languages.

```
td.word{unicode-bidi:bidi-override; direction:rtl; }
```

Value	IE	N	FF	Inherited	No
Default	normal	-	2		
Applies to	embed	-	2		All elements
bidi-override	5	-	2		
inherit	-	6	2		

## Lengths

Following are the unit measurement for lengths that can be used in CSS.

### Absolute Lengths

Unit	IE	N	FF
cm	3	4	1
in	3	4	1
mm	3	4	1
pc	3	4	1
pt	3	4	1

### Relative Lengths

Unit	IE	N	FF
em	4	4	1
ex	4	4	1
px	3	4	1



# D

## Color Names and Values

The first thing you need to learn about color is how to specify exactly the color you want; after all, there are a lot of different reds, greens, and blues, and it is important you choose the right ones.

In XHTML there are two key ways of specifying a color:

- ❑ **Hex codes:** A six-digit code representing the amount of red, green, and blue that make up the color, preceded by a pound or hash sign # (for example, #333333).
- ❑ **Color names:** A set of names that represent over 200 colors, such as red, lightslategray, and fuchsia.

In CSS you can also use values to represent the red, green, and blue values that make up each color.

## Using Hex Codes to Specify Colors

When you start using *hexadecimal codes* (or hex codes for short), they can appear a little daunting. The idea that colors are represented by a mix of numbers and letters might seem a little strange, but what follows the # sign is actually the amount of red, green, and blue that make up the color. The format for hex codes is:

```
# rrggbb
```

The table that follows provides some examples.

## Appendix D: Color Names and Values

Color	Hexadecimal Code	Color	Hexadecimal Code
Black	#000000	Green	#008000
White	#FFFFFF	Blue	#0000FF
Red	#FF0000	Purple	#800080

As you might already know, computer monitors work in a color space known as an *RGB color space*. When a computer monitor is not switched on, the screen is black because it is not emitting any color. To create the image you see onscreen, each of the pixels that make up the screen emits different amounts of the colors red, green, and blue, just like a television screen.

It's hardly surprising, therefore, that you specify colors in the amounts of red, green, and blue that are required to make a given color. The values of red, green, and blue required to make a color are between 0 and 255, so when red, green, and blue all have a value of 0 you get black, whereas if each has a value of 255 you get white.

You may have seen that some software represents colors using three sets of numbers between 0 and 255. Figure D-1 shows the color window in Adobe Photoshop.

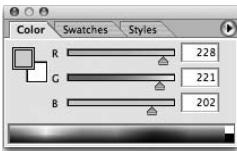


Figure D-1

The hexadecimal codes used on the web for color are a direct translation of these values between 0 and 255, except they use two characters, not three, to represent the numbers between 0 and 255. For example, FF represents 255 and 00 represents 0.

The best way to really understand how hex codes work is to take a quick look at how computers store information.

## Understanding Hex Codes

You may have heard people say that computers store all their information in 0s and 1s, and while it may sound hard to believe, it's true! The smallest unit of information a computer stores in is known as a *bit*, and a bit can have only one of two values:

- 0, which means off (or false)
- 1, which means on (or true)

## Appendix D: Color Names and Values

These two values on their own will not store much information, yet if you combine 4 bits together, you can get 16 different values. For example, using combinations of four 0s and 1s, you can represent the digits 0 through 9 (and still have values to spare):

0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-

Four bits can be replaced by a single hexadecimal digit. There are 16 digits in hexadecimal numbers to represent the 16 possible values of four 0s and 1s:

0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

0 is the smallest; F is the largest.

Still, computers need to work with more than 16 possible values, so they tend to store information in even larger segments. A group of 8 bits is known as a *byte*. A byte can therefore be represented using just two hexadecimal digits. For example:

Binary	0100	1111
Hexadecimal	4	F

This gives 256 possible combinations of 0s and 1s, plenty for the characters of the English language, and yes, that is why colors are represented in numbers between 0 and 255.

So, while hexadecimal codes for web colors may appear a little complicated, I think you would agree that #4F4F4F is a lot easier to read than 01001110100111101001111. The following table shows some more hexadecimal codes and their corresponding decimal numbers.

Hexadecimal	Decimal	Hexadecimal	Decimal
00	0	BB	187
33	51	CC	204
66	102	DD	221
99	153	EE	238
AA	170	FF	255

## Using Color Names to Specify Colors

Rather than using hex values to specify colors, you can also use color names such as red, green, and white to specify the color you want. There are more than 200 different color names supported by Netscape, Firefox, and IE, all of which are listed at the end of this appendix.

## Appendix D: Color Names and Values

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Although names might sound a lot easier to understand than hex codes, some of the colors are easier to remember than others, and remembering which color each of the 200 names looks like is a tall order. Here is a sample of some of the color names:

aqua, beige, coral, darkcyan, firebrick, green, honeydew, indianred,  
lavenderblush, maroon, navy, oldlace, palegreen, red, saddlebrown,  
tan, white, yellow

Furthermore, if you do jobs for larger companies, such companies often want to specify very exact colors that represent their brand, and their color might not have an HTML name. Indeed, when clients specify the color they want, they usually specify a hex code.

## Hex Codes versus Color Names

It may seem as though color names are more straightforward to use than hex codes; if you use colors such as red, orange, green, blue, black, and white, then they are simple to remember and use. However, remembering each color name and the color it gives you is very difficult.

In practice, you often end up referring to a color chart to find the color you want, whether you're working with hex codes or color names. Given that hex codes give you many more choices of shades, tints, and hues of colors than color names, and bearing in mind that a lot of companies ask for specific colors to represent their company, hex codes tend to be the choice of web professionals.

If you are using either a graphics program or a web page authoring tool, that program will usually generate the color code you need for you, and many graphics packages also have a color-picking tool to help you select the exact color you want. You can also find color picking tools on several web sites such as [www.visibone.com/colorlab/](http://www.visibone.com/colorlab/). Figure D-2 shows the color picker from Photoshop.

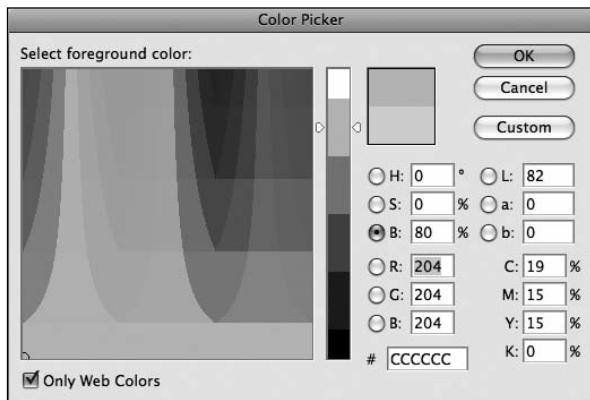


Figure D-2

Note that the checkbox on the bottom left of this window indicates an option to use only web-safe colors. This is for a restricted color palette (containing a subset of all colors available) known as the Web Safe Color Palette, which was designed in the days when computers did not support as many colors. Nowadays,

most computers can handle many more than the 256 colors in the web-safe color palette and this can safely be ignored.

## Color Name and Number Reference

The following table shows the 16 color names that were introduced in HTML 3.2 to support the 16 colors that 8-bit graphics cards offered.

Color Name	Hex Value	Color Name	Hex Value
aqua	#00ffff	navy	#000080
black	#000000	olive	#808000
blue	#0000ff	purple	#800080
fuchsia	#ff00ff	red	#ff0000
green	#008000	silver	#c0c0c0
gray	#808080	teal	#008080
lime	#00ff00	white	#ffffff
maroon	#800000	yellow	#ffff00

All of the colors listed in the table that follows are available in IE, and most in Netscape and Firefox, too. However, they are browser extensions, not part of the HTML or XHTML recommendations.

Color Name	Hex Value	Color Name	Hex Value
aliceblue	#f0f8ff	black	#000000
antiquewhite	#faebd7	blanchedalmond	#ffebcd
aqua	#00ffff	blue	#0000ff
aquamarine	#7fffdd	blueviolet	#8a2be2
azure	#f0ffff	brown	#a52a2a
beige	#f5f5dc	burlywood	#deb887
bisque	#ffe4c4	cadetblue	#5f9ea0

*Continued*

## Appendix D: Color Names and Values

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Color Name	Hex Value	Color Name	Hex Value
chartreuse	#7fff00	darkturquoise	#00ced1
chocolate	#d2691e	darkviolet	#9400d3
coral	#ff7f50	deeppink	#ff1493
cornflowerblue	#6495ed	deepskyblue	#00bfff
cornsilk	#fff8dc	dimgray	#696969
crimson	#dc143c	dodgerblue	#1e90ff
cyan	#00ffff	firebrick	#b22222
darkblue	#00008b	floralwhite	#ffffaf0
darkcyan	#008b8b	forestgreen	#228b22
darkgoldenrod	#b8860b	fuchsia	#ff00ff
darkgray	#a9a9a9	gainsboro	#dcfdcfc
darkgreen	#006400	ghostwhite	#f8f8ff
darkkhaki	#bdb76b	gold	#ffd700
darkmagenta	#8b008b	goldenrod	#daa520
darkolivegreen	#556b2f	gray	#808080
darkorange	#ff8c00	green	#008000
darkorchid	#9932cc	greenyellow	#adff2f
darkred	#8b0000	honeydew	#f0ffff
darksalmon	#e9967a	hotpink	#ff69b4
darkseagreen	#8fbcb8f	indianred	#cd5c5c
darkslateblue	#483d8b	indigo	#4b0082
darkslategray	#2f4f4f	ivory	#ffffff0

## Appendix D: Color Names and Values

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Color Name	Hex Value	Color Name	Hex Value
khaki	#f0e68c	maroon	#800000
lavender	#e6e6fa	mediumaquamarine	#66cdAA
lavenderblush	#ffff0f5	mediumblue	#0000cd
lawngreen	#7cfcc00	mediumorchid	#ba55d3
lemonchiffon	#ffffacd	mediumpurple	#9370db
lightblue	#add8e6	mediumseagreen	#3cb371
lightcoral	#f08080	mediumslateblue	#7b68ee
lightcyan	#e0ffff	mediumspringgreen	#00fa9a
lightgoldenrodyellow	#fafad2	mediumturquoise	#48d1cc
lightgreen	#90ee90	mediumvioletred	#c71585
lightgrey	#d3d3d3	midnightblue	#191970
lightpink	#ffb6c1	mintcream	#f5ffff
lightsalmon	#ffa07a	mistyrose	#ffe4e1
lightseagreen	#20b2aa	moccasin	#ffe4b5
lightskyblue	#87cefa	navajowhite	#ffdead
lightslategray	#778899	navy	#000080
lightsteelblue	#b0c4de	oldlace	#fdf5e6
lightyellow	#ffffe0	olive	#808000
lime	#00ffff	olivedrab	#6b8e23
limegreen	#32cd32	orange	#ffa500
linen	#faf0e6	orangered	#ff4500
magenta	#ff00ff	orchid	#da70d6

*Continued*

## Appendix D: Color Names and Values

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Color Name	Hex Value	Color Name	Hex Value
palegoldenrod	#eee8aa	sienna	#a0522d
palegreen	#98fb98	silver	#c0c0c0
paleturquoise	#afEEEE	skyblue	#87ceeb
palevioletred	#db7093	slateblue	#6a5acd
papayawhip	#ffefed5	slategray	#708090
peachpuff	#ffdab9	snow	#ffffafa
peru	#cd853f	springgreen	#00ff7f
pink	#fffc0cb	steelblue	#4682b4
plum	#dda0dd	tan	#d2b48c
powderblue	#b0e0e6	teal	#008080
purple	#800080	thistle	#d8bfd8
red	#ff0000	tomato	#ff6347
rosybrown	#bc8f8f	turquoise	#40e0d0
royalblue	#4169e1	violet	#ee82ee
saddlebrown	#8b4513	wheat	#f5deb3
salmon	#fa8072	white	#ffffff
sandybrown	#f4a460	whitesmoke	#f5f5f5
seagreen	#2e8b57	yellow	#ffff00
seashell	#fff5ee	yellowgreen	#9acd32

# E

## Character Encodings

In Appendix D, I discussed how computers store information, how a character-encoding scheme is a table that translates between characters, and how they are stored in the computer.

The most common character set (or character encoding) in use on computers is ASCII (The American Standard Code for Information Interchange), and it is probably the most widely used character set for encoding text electronically. You can expect all computers browsing the Web to understand ASCII.

Character Set	Description
ASCII	American Standard Code for Information Interchange, which is used on most computers

The problem with ASCII is that it supports only the upper- and lowercase Latin alphabet, the numbers 0–9, and some extra characters: a total of 128 characters in all. Here are the printable characters of ASCII (the other characters are things such as line feeds and carriage-return characters).

!	“	#	\$	%	&	`	(	)	*	+	,	-	.	/
0	1	2	3	4	5	6	7	8	9	:	;	<	=	>
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N
P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^
~	a	b	c	d	e	f	g	h	i	j	k	l	m	n
p	q	r	s	t	u	v	w	x	y	z	{		}	~

However, many languages use either accented Latin characters or completely different alphabets. ASCII does not address these characters, so you need to learn about character encodings if you want to use any non-ASCII characters.

Character encodings are also particularly important if you want to use symbols, as these cannot be guaranteed to transfer properly between different encodings (from some dashes to some quotation

## Appendix E: Character Encodings

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mark characters). If you do not indicate the character encoding the document is written in, some of the special characters might not display.

The International Standards Organization created a range of character sets to deal with different national characters. ISO-8859-1 is commonly used in Western versions of authoring tools such as Macromedia Dreamweaver, as well as applications such as Windows Notepad.

Character Set	Description
ISO-8859-1	Latin alphabet part 1 Covering North America, Western Europe, Latin America, the Caribbean, Canada, Africa
ISO-8859-2	Latin alphabet part 2 Covering Eastern Europe including Bosnian, Croatian, Czech, Hungarian, Polish, Romanian, Serbian (in Latin transcription), Serbocroatian, Slovak, Slovenian, Upper Sorbian, and Lower Sorbian
ISO-8859-3	Latin alphabet part 3 Covering SE Europe, Esperanto, Maltese, and Turkish miscellaneous others
ISO-8859-4	Latin alphabet part 4 Covering Scandinavia/Baltics (and others not in ISO-8859-1)
ISO-8859-5	Latin/Cyrillic alphabet part 5
ISO-8859-6	Latin/Arabic alphabet part 6
ISO-8859-7	Latin/Greek alphabet part 7
ISO-8859-8	Latin/Hebrew alphabet part 8
ISO-8859-9	Latin 5 alphabet part 9 (same as ISO-8859-1 except Turkish characters replace Icelandic ones)
ISO-8859-10	Latin 6 Lappish, Nordic, and Eskimo
ISO-8859-15	The same as ISO-8859-1 but with more characters added
ISO-8859-16	Latin 10 Covering SE Europe Albanian, Croatian, Hungarian, Polish, Romanian and Slovenian, plus can be used in French, German, Italian, and Irish Gaelic
ISO-2022-JP	Latin/Japanese alphabet part 1
ISO-2022-JP-2	Latin/Japanese alphabet part 2
ISO-2022-KR	Latin/Korean alphabet part 1

## Appendix E: Character Encodings

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It is helpful to note that the first 128 characters of ISO-8859-1 match those of ASCII, so you can safely use those characters as you would in ASCII.

The *Unicode* Consortium was then set up to devise a way to show *all* characters of different languages, rather than have these different incompatible character codes for different languages.

Therefore, if you want to create documents that use characters from multiple character sets, you will be able to do so using the single Unicode character encodings. Furthermore, users should be able to view documents written in different character sets, providing their processor (and fonts) support the Unicode standards, no matter what platform they are on or which country they are in. By having the single character encoding, you can reduce software development costs because the programs do not need to be designed to support multiple character encodings.

One problem with Unicode is that a lot of older programs were written to support only 8-bit character sets (limiting them to 256 characters), which is nowhere near the number required for all languages.

Unicode therefore specifies encodings that can deal with a string in special ways so as to make enough space for the huge character set it encompasses. These are known as UTF-8, UTF-16, and UTF-32.

Character Set	Description
UTF-8	A Unicode Translation Format that comes in 8-bit units. That is, it comes in <i>bytes</i> . A character in UTF-8 can be from 1 to 4 bytes long, making UTF-8 variable width.
UTF-16	A Unicode Translation Format that comes in 16-bit units. That is, it comes in <i>shorts</i> . It can be 1 or 2 shorts long, making UTF-16 variable width.
UTF-32	A Unicode Translation Format that comes in 32-bit units. That is, it comes in <i>longs</i> . It is a fixed-width format and is always 1 “long” in length.

The first 256 characters of Unicode character sets correspond to the 256 characters of ISO-8859-1.

By default, HTML 4 processors should support UTF-8, and XML processors are supposed to support UTF-8 and UTF-16; therefore, all XHTML-compliant processors should also support UTF-16 (as XHTML is an application of XML).

For more information on internationalization and different character sets and encodings, see [www.i18nguy.com/](http://www.i18nguy.com/).



# F

## Special Characters

Some characters are reserved in XHTML; for example, you cannot use the greater-than and less-than signs or angle brackets within your text because the browser could mistake them for markup. XHTML processors must support the five special characters listed in the table that follows.

Symbol	Description	Entity Name	Number Code
&	Ampersand	&amp;	&#38;
<	Less than	&lt;	&#60;
>	Greater than	&gt;	&#62;
"	Double quote	&quot;	&#34;
	Non-breaking space	&nbsp;	&#160;

To write an element and attribute into your page so that the code is shown to the user rather than being processed by the browser (for example, as <div id="character">), you would write:

```
&lt;div id=&quot;character&quot;&gt;
```

There is also a long list of special characters that HTML 4.0-aware processors should support. In order for these to appear in your document, you can use either the numerical code or the entity name. For example, to insert a copyright symbol you can use either of the following:

```
&copy; 2008  
&#169; 2008
```

## Appendix F: Special Characters

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The special characters have been split into the following sections:

- ❑ Character Entity References for ISO 8859-1 Characters
- ❑ Character Entity References for Symbols, Mathematical Symbols, and Greek Letters
- ❑ Character Entity References for Markup-Significant and Internationalization Characters

They are taken from the W3C Web site at [www.w3.org/TR/REC-html40/sgml/entities.html](http://www.w3.org/TR/REC-html40/sgml/entities.html).

Character Entity References for ISO 8859-1 Characters			
Entity Name	Symbol	Number Code	Description
&nbsp;		&#160;	No-break space = non-breaking space
&iexcl;	¡	&#161;	Inverted exclamation mark
&cent;	¢	&#162;	Cent sign
&pound;	£	&#163;	Pound sign
&curren;	¤	&#164;	Currency sign
&yen;	¥	&#165;	Yen sign = yuan sign
&brvbar;	׀	&#166;	Broken bar = broken vertical bar
&sect;	§	&#167;	Section sign
&uml;	΅	&#168;	Diaeresis = spacing diaeresis
&copy;	©	&#169;	Copyright sign
&ordf;	ª	&#170;	Feminine ordinal indicator
&laquo;	«	&#171;	Left-pointing double angle quotation mark = left-pointing guillemet
&not;	¬	&#172;	Not sign
&shy;	‐	&#173;	Soft hyphen = discretionary hyphen
&reg;	®	&#174;	Registered sign = registered trademark sign
&macr;	‐	&#175;	Macron = spacing macron = overline = APL overbar
&deg;	°	&#176;	Degree sign

## Character Entity References for ISO 8859-1 Characters (continued)

Entity Name	Symbol	Number Code	Description
&deg;	°	&#176;	Degree sign
&plusmn;	±	&#177;	Plus-minus sign = plus-or-minus sign
&sup2;	²	&#178;	Superscript two = superscript digit two = squared
&sup3;	³	&#179;	Superscript three = superscript digit three = cubed
&acute;	'	&#180;	Acute accent = spacing acute
&micro;	µ	&#181;	Micro sign
&para;	¶	&#182;	Pilcrow sign = paragraph sign
&middot;	·	&#183;	Middle dot = Georgian comma = Greek middle dot
&cedil;	,	&#184;	Cedilla = spacing cedilla
&sup1;	¹	&#185;	Superscript one = superscript digit one
&ordm;	º	&#186;	Masculine ordinal indicator
&raquo;	»	&#187;	Right-pointing double angle quotation mark = right pointing guillemet
&frac14;	¼	&#188;	Vulgar fraction one-quarter = fraction one-quarter
&frac12;	½	&#189;	Vulgar fraction one-half = fraction one-half
&frac34;	¾	&#190;	Vulgar fraction three-quarters = fraction three-quarters
&iquest;	¿	&#191;	Inverted question mark = turned question mark
&Agrave;	À	&#192;	Latin capital letter A with grave = Latin capital letter A grave
&Aacute;	Á	&#193;	Latin capital letter A with acute

*Continued*

## Appendix F: Special Characters

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Character Entity References for ISO 8859-1 Characters ( <i>continued</i> )			
Entity Name	Symbol	Number Code	Description
&Acirc;	Â	&#194;	Latin capital letter A with circumflex
&Atilde;	Ã	&#195;	Latin capital letter A with tilde
&Auml;	Ä	&#196;	Latin capital letter A with diaeresis
&Aring;	Å	&#197;	Latin capital letter A with ring above = Latin capital letter A ring
&AElig;	Æ	&#198;	Latin capital letter AE = Latin capital ligature AE
&Ccedil;	Ç	&#199;	Latin capital letter C with cedilla
&Egrave;	È	&#200;	Latin capital letter E with grave
&Eacute;	É	&#201;	Latin capital letter E with acute
&Ecirc;	Ê	&#202;	Latin capital letter E with circumflex
&Euml;	Ë	&#203;	Latin capital letter E with diaeresis
&Igrave;	Ì	&#204;	Latin capital letter I with grave
&Iacute;	Í	&#205;	Latin capital letter I with acute
&Icirc;	Î	&#206;	Latin capital letter I with circumflex
&Iuml;	Ï	&#207;	Latin capital letter I with diaeresis
&ETH;	Ð	&#208;	Latin capital letter ETH
&Ntilde;	Ñ	&#209;	Latin capital letter N with tilde
&Ograve;	Ò	&#210;	Latin capital letter O with grave
&Oacute;	Ó	&#211;	Latin capital letter O with acute
&Ocirc;	Ô	&#212;	Latin capital letter O with circumflex
&Otilde;	Õ	&#213;	Latin capital letter O with tilde

**Character Entity References for ISO 8859-1 Characters (*continued*)**

Entity Name	Symbol	Number Code	Description
&Ouml;	Ö	&#214;	Latin capital letter O with diaeresis
&times;	×	&#215;	Multiplication sign
&Oslash;	Ø	&#216;	Latin capital letter O with stroke = Latin capital letter O slash
&Ugrave;	Ù	&#217;	Latin capital letter U with grave
&Uacute;	Ú	&#218;	Latin capital letter U with acute
&Ucirc;	Û	&#219;	Latin capital letter U with circumflex
&Uuml;	Ü	&#220;	Latin capital letter U with diaeresis
&Yacute;	Ý	&#221;	Latin capital letter Y with acute
&THORN;	Þ	&#222;	Latin capital letter THORN
&szlig;	ß	&#223;	Latin small letter sharp s = ess-zed
&agrave;	à	&#224;	Latin small letter a with grave = Latin small letter a grave
&aacute;	á	&#225;	Latin small letter a with acute
&acirc;	â	&#226;	Latin small letter a with circumflex
&atilde;	ã	&#227;	Latin small letter a with tilde
&auml;	ä	&#228;	Latin small letter a with diaeresis
&aring;	å	&#229;	Latin small letter a with ring above = Latin small letter a ring
&aelig;	æ	&#230;	Latin small letter ae = Latin small ligature ae
&ccedil;	ç	&#231;	Latin small letter c with cedilla
&egrave;	è	&#232;	Latin small letter e with grave
&eacute;	é	&#233;	Latin small letter e with acute

*Continued*

## Appendix F: Special Characters

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Character Entity References for ISO 8859-1 Characters ( <i>continued</i> )			
Entity Name	Symbol	Number Code	Description
&ecirc;	ê	&#234;	Latin small letter <i>e</i> with circumflex
&euml;	ë	&#235;	Latin small letter <i>e</i> with diaeresis
&igrave;	ì	&#236;	Latin small letter <i>i</i> with grave
&iacute;	í	&#237;	Latin small letter <i>i</i> with acute
&icirc;	î	&#238;	Latin small letter <i>i</i> with circumflex
&iuml;	ï	&#239;	Latin small letter <i>i</i> with diaeresis
&eth;	ð	&#240;	Latin small letter <i>eth</i>
&ntilde;	ñ	&#241;	Latin small letter <i>n</i> with tilde
&ograve;	ò	&#242;	Latin small letter <i>o</i> with grave
&oacute;	ó	&#243;	Latin small letter <i>o</i> with acute
&ocirc;	ô	&#244;	Latin small letter <i>o</i> with circumflex
&otilde;	õ	&#245;	Latin small letter <i>o</i> with tilde
&ouml;	ö	&#246;	Latin small letter <i>o</i> with diaeresis
&divide;	÷	&#247;	Division sign
&oslash;	ø	&#248;	Latin small letter <i>o</i> with stroke = Latin small letter <i>o</i> slash
&ugrave;	ù	&#249;	Latin small letter <i>u</i> with grave
&uacute;	ú	&#250;	Latin small letter <i>u</i> with acute
&ucirc;	û	&#251;	Latin small letter <i>u</i> with circumflex
&uuml;	ü	&#252;	Latin small letter <i>u</i> with diaeresis
&yacute;	ý	&#253;	Latin small letter <i>y</i> with acute
&thorn;	þ	&#254;	Latin small letter <i>thorn</i>
&yuml;	ÿ	&#255;	Latin small letter <i>y</i> with diaeresis

## Appendix F: Special Characters

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Character Entity References for Symbols, Mathematical Symbols, and Greek Letters			
Entity Name	Symbol	Number Code	Description
<i>Latin Extended-B</i>			
&fnof;	f	&#402;	Latin small f with hook = function = florin
<i>Greek</i>			
&Alpha;	A	&#913;	Greek capital letter alpha
&Beta;	B	&#914;	Greek capital letter beta
&Gamma;	Γ	&#915;	Greek capital letter gamma
&Delta;	Δ	&#916;	Greek capital letter delta
&Epsilon;	Ε	&#917;	Greek capital letter epsilon
&Zeta;	Ζ	&#918;	Greek capital letter zeta
&Eta;	Η	&#919;	Greek capital letter eta
&Theta;	Θ	&#920;	Greek capital letter theta
&Iota;	Ι	&#921;	Greek capital letter iota
&Kappa;	Κ	&#922;	Greek capital letter kappa
&Lambda;	Λ	&#923;	Greek capital letter lambda
&Mu	Μ	&#924;	Greek capital letter mu
&Nu;	Ν	&#925;	Greek capital letter nu
&Xi;	Ξ	&#926;	Greek capital letter xi
&Omicron;	Ο	&#927;	Greek capital letter omicron
&Pi;	Π	&#928;	Greek capital letter pi
&Rho;	Ρ	&#929;	Greek capital letter rho
&Sigma;	Σ	&#931;	Greek capital letter sigma
&Tau;	Τ	&#932;	Greek capital letter tau

## Appendix F: Special Characters

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Character Entity References for Symbols, Mathematical Symbols, and Greek Letters (continued)			
Entity Name	Symbol	Number Code	Description
<i>Greek</i>			
&Upsilon;	Υ	&#933;	Greek capital letter upsilon
&Phi;	Φ	&#934;	Greek capital letter phi
&Chi;	Χ	&#935;	Greek capital letter chi
&Psi;	Ψ	&#936;	Greek capital letter psi
&Omega;	Ω	&#937;	Greek capital letter omega
&alpha;	α	&#945;	Greek small letter alpha
&beta;	β	&#946;	Greek small letter beta
&gamma;	γ	&#947;	Greek small letter gamma
&delta;	δ	&#948;	Greek small letter delta
&epsilon;	ε	&#949;	Greek small letter epsilon
&zeta;	ζ	&#950;	Greek small letter zeta
&eta;	η	&#951;	Greek small letter eta
&theta;	θ	&#952;	Greek small letter theta
&iota;	ι	&#953;	Greek small letter iota
&kappa;	κ	&#954;	Greek small letter kappa
&lambda;	λ	&#955;	Greek small letter lambda
&mu;	μ	&#956;	Greek small letter mu
&nu;	ν	&#957;	Greek small letter nu
&xi;	ξ	&#958;	Greek small letter xi
&omicron;	ο	&#959;	Greek small letter omicron

**Character Entity References for Symbols, Mathematical Symbols, and Greek Letters (continued)**

Entity Name	Symbol	Number Code	Description
<i>Greek</i>			
&pi;	π	&#960;	Greek small letter pi
&rho;	ρ	&#961;	Greek small letter rho
&sigmaf;	ς	&#962;	Greek small letter final sigma
&sigma;	σ	&#963;	Greek small letter sigma
&tau;	τ	&#964;	Greek small letter tau
&upsilon;	υ	&#965;	Greek small letter upsilon
&phi;	φ	&#966;	Greek small letter phi
&chi;	χ	&#967;	Greek small letter chi
&psi;	ψ	&#968;	Greek small letter psi
&omega;	ω	&#969;	Greek small letter omega
&thetasym;	ϑ	&#977;	Greek small letter theta symbol
&upsih;	ϒ	&#978;	Greek upsilon with hook symbol
&piv;	ϖ	&#982;	Greek pi symbol
<i>General Punctuation</i>			
&bull;	•	&#8226;	Bullet = black small circle
&hellip;	...	&#8230;	Horizontal ellipsis = three dot leader
&prime;	'	&#8242;	Prime = minutes = feet
&Prime;	"	&#8243;	Double prime = seconds = inches
&oline;	—	&#8254;	Overline = spacing overscore
&frasl;	/	&#8260;	Fraction slash

*Continued*

## Appendix F: Special Characters

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Character Entity References for Symbols, Mathematical Symbols, and Greek Letters (continued)			
Entity Name	Symbol	Number Code	Description
<i>Letterlike Symbols</i>			
&weierp;	$\wp$	&#8472;	Script capital $P$ = power set = Weierstrass p
&image;	$\Im$	&#8465;	Blackletter capital $I$ = imaginary part
&real;	$\Re$	&#8476;	Blackletter capital $R$ = real part symbol
&trade;	$^{\text{TM}}$	&#8482;	Trademark sign
&alefsym;	$\aleph$	&#8501;	Alef symbol = first transfinite cardinal
<i>Arrows</i>			
&larr;	$\leftarrow$	&#8592;	Left arrow
&uarr;	$\uparrow$	&#8593;	Up arrow
&rarr;	$\rightarrow$	&#8594;	Right arrow
&darr;	$\downarrow$	&#8595;	Down arrow
&harr;	$\leftrightarrow$	&#8596;	Left-right arrow
&crarr;	$\downarrow\leftarrow$	&#8629;	Down arrow with corner leftward = carriage return
&lArr;	$\Leftarrow$	&#8656;	Left double arrow
&uArr;	$\Uparrow$	&#8657;	Up double arrow
&rArr;	$\Rightarrow$	&#8658;	Right double arrow
&dArr;	$\Downarrow$	&#8659;	Down double arrow
&hArr;	$\Leftrightarrow$	&#8660;	Left-right double arrow
<i>Mathematical Operators</i>			
&forall;	$\forall$	&#8704;	For all
&part ;	$\partial$	&#8706;	Partial differential

**Character Entity References for Symbols, Mathematical Symbols, and Greek Letters (continued)**

Entity Name	Symbol	Number Code	Description
<i>Mathematical Operators</i>			
&exist;	∃	&#8707;	There exists
&empty;	∅	&#8709;	Empty set = null set = diameter
&nabla;	∇	&#8711;	Nabla = backward difference
&isin;	∈	&#8712;	Element of
&notin;	∉	&#8713;	Not an element of
&ni;	∋	&#8715;	Contains as member
&prod;	∏	&#8719;	<i>n</i> -ary product = product sign
&sum;	∑	&#8721;	<i>n</i> -ary summation
&minus;	–	&#8722;	Minus sign
&lowast;	*	&#8727;	Asterisk operator
&radic;	√	&#8730;	Square root = radical sign
&prop;	∞	&#8733;	Proportional to
&infin;	∞	&#8734;	Infinity
&ang;	∠	&#8736;	Angle
&and;	∧	&#8743;	Logical and = wedge
&or ;	∨	&#8744;	Logical or = vee
&cap;	∩	&#8745;	Intersection = cap
&cup;	∪	&#8746;	Union = cup
&int;	∫	&#8747;	Integral
&there4;	∴	&#8756;	Therefore

*Continued*

## Appendix F: Special Characters

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Character Entity References for Symbols, Mathematical Symbols, and Greek Letters (continued)			
Entity Name	Symbol	Number Code	Description
<i>Mathematical Operators</i>			
&sim;	~	&#8764;	Tilde operator = varies with = similar to
&cong;	≈	&#8773;	Approximately equal to
&asymp;	≈	&#8776;	Almost equal to = asymptotic to
&ne;	≠	&#8800;	Not equal to
&equiv;	≡	&#8801;	Identical to
&le;	≤	&#8804;	Less than or equal to
&ge;	≥	&#8805;	Greater than or equal to
&sub;	⊂	&#8834;	Subset of
&sup;	⊃	&#8835;	Superset of
&nsub;	⊄	&#8836;	Not a subset of
&sube;	⊆	&#8838;	Subset of or equal to
&supe;	⊇	&#8839;	Superset of or equal to
&oplus;	⊕	&#8853;	Circled plus = direct sum
&otimes;	⊗	&#8855;	Circled times = vector product
&perp;	⊥	&#8869;	Up tack = orthogonal to = perpendicular
&sdot;	.	&#8901;	Dot operator
<i>Miscellaneous Technical</i>			
&lceil;	[	&#8968;	Left ceiling = apl upstile
&rceil;	]	&#8969;	Right ceiling
&lfloor;	[	&#8970;	Left floor = apl downstile

**Character Entity References for Symbols, Mathematical Symbols, and Greek Letters (continued)**

Entity Name	Symbol	Number Code	Description
<i>Miscellaneous Technical</i>			
&rfloor;	⌋	&#8971;	Right floor
&lang;	⟨	&#9001;	Left-pointing angle bracket = bra
&rang;	⟩	&#9002;	Right-pointing angle bracket = ket
<i>Geometric Shape</i>			
&loz;	◊	&#9674;	Lozenge
<i>Miscellaneous Symbols</i>			
&spades;	♠	&#9824;	Black spade suit
&clubs;	♣	&#9827;	Black club suit = shamrock
&hearts;	♥	&#9829;	Black heart suit = valentine
&diams;	♦	&#9830;	Black diamond suit

**Markup-Significant and Internationalization Characters**

Entity Name	Symbol	Number Code	Description
&quot;	"	&#34;	Quotation mark = APL quote
&amp;	&	&#38;	Ampersand
&lt;	<	&#60;	Less-than sign
&gt;	>	&#62;	Greater-than sign
&OElig;	Œ	&#338;	Latin capital ligature OE
&oelig;	œ	&#339;	Latin small ligature oe

*Continued*

## Appendix F: Special Characters

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Markup-Significant and Internationalization Characters ( <i>continued</i> )			
Entity Name	Symbol	Number Code	Description
&Scaron;	Š	&#352;	Latin capital letter S with caron
&scaron;	š	&#353;	Latin small letter s with caron
&Yuml;	Ŷ	&#376;	Latin capital letter Y with diaeresis
<i>Spacing Modifiers</i>			
&circ;	^	&#710;	Modifier letter circumflex accent
&tilde;	~	&#732;	Small tilde
<i>General Punctuation</i>			
&ensp;		&#8194;	En space
&emsp;		&#8195;	Em space
&thinsp;		&#8201;	Thin space
&zwnj;	܂	&#8204;	Zero width non-joiner
&zwj;	܂܃	&#8205;	Zero width joiner
&lrm;	܂	&#8206;	Left-to-right mark
&rlm;	܃	&#8207;	Right-to-left mark
&ndash;	–	&#8211;	En dash
&mdash;	—	&#8212;	Em dash
&lsquo;	‘	&#8216;	Left single quotation mark
&rsquo;	’	&#8217;	Right single quotation mark
&sbquo;	,	&#8218;	Single low-9 quotation mark
&ldquo;	“	&#8220;	Left double quotation mark
&rdquo;	”	&#8221;	Right double quotation mark

**Markup-Significant and Internationalization Characters (continued)**

Entity Name	Symbol	Number Code	Description
<i>General Punctuation</i>			
&bdquo;	„	&#8222;	Double low-9 quotation mark
&dagger;	†	&#8224;	Dagger
&Dagger;	‡	&#8225;	Double dagger
&permil;	%o	&#8240;	Per mille sign
&lslaquo;	‘	&#8249;	Single left-pointing angle quotation mark (proposed, but not yet standardized)
&rsaquo;	’	&#8250;	Single right-pointing angle quotation mark (proposed, but not yet standardized)
&euro;	€	&#8364;	Euro sign



# G

## Language Codes

The following table shows the two-letter ISO 639 language codes that are used to declare the language of a document in the `lang` and `xml:lang` attributes. It covers many of the world's major languages.

Country	ISO Code	Country	ISO Code
Abkhazian	AB	Bengali; Bangla	BN
Afan (Oromo)	OM	Bhutani	DZ
Afar	AA	Bihari	BH
Afrikaans	AF	Bislama	BI
Albanian	SQ	Breton	BR
Amharic	AM	Bulgarian	BG
Arabic	AR	Burmese	MY
Armenian	HY	Byelorussian	BE
Assamese	AS	Cambodian	KM
Aymara	AY	Catalan	CA
Azerbaijani	AZ	Chinese	ZH
Bashkir	BA	Corsican	CO
Basque	EU	Croatian	HR

*Continued*

## Appendix G: Language Codes

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Country	ISO Code	Country	ISO Code
Czech	CS	Icelandic	IS
Danish	DA	Indonesian	ID
Dutch	NL	Interlingua	IA
English	EN	Interlingue	IE
Esperanto	EO	Inuktitut	IU
Estonian	ET	Inupiak	IK
Faroese	FO	Irish	GA
Fiji	FJ	Italian	IT
Finnish	FI	Japanese	JA
French	FR	Javanese	JV
Frisian	FY	Kannada	KN
Galician	GL	Kashmiri	KS
Georgian	KA	Kazakh	KK
German	DE	Kinyarwanda	RW
Greek	EL	Kirghiz	KY
Greenlandic	KL	Kurundi	RN
Guarani	GN	Korean	KO
Gujarati	GU	Kurdish	KU
Hausa	HA	Laothian	LO
Hebrew	HE	Latin	LA
Hindi	HI	Latvian; Lettish	LV
Hungarian	HU	Lingala	LN

## Appendix G: Language Codes

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Country	ISO Code	Country	ISO Code
Lithuanian	LT	Romanian	RO
Macedonian	MK	Russian	RU
Malagasy	MG	Samoan	SM
Malay	MS	Sangho	SG
Malayalam	ML	Sanskrit	SA
Maltese	MT	Scots Gaelic	GD
Maori	MI	Serbian	SR
Marathi	MR	Serbo-Croatian	SH
Moldavian	MO	Sesotho	ST
Mongolian	MN	Setswana	TN
Nauru	NA	Shona	SN
Nepali	NE	Sindhi	SD
Norwegian	NO	Singhalese	SI
Occitan	OC	Siswati	SS
Oriya	OR	Slovak	SK
Pashto; Pushto	PS	Slovenian	SL
PERSIAN (Farsi)	FA	Somali	SO
Polish	PL	Spanish	ES
Portuguese	PT	Sudanese	SU
Punjabi	PA	Swahili	SW
Quechua	QU	Swedish	SV
Rhaeto-Romance	RM	Tagalog	TL

*Continued*

## Appendix G: Language Codes

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Country	ISO Code	Country	ISO Code
Tajik	TG	Ukrainian	UK
Tamil	TA	Urdu	UR
Tatar	TT	Uzbek	UZ
Telugu	TE	Vietnamese	VI
Thai	TH	Volapuk	VO
Tibetan	BO	Welsh	CY
Tigrinya	TI	Wolof	WO
Tonga	TO	Xhosa	XH
Tsonga	TS	Yiddish	YI
Turkish	TR	Yoruba	YO
Turkmen	TK	Zhuang	ZA
Twi	TW	Zulu	ZU
Uigur	UG		

# H

## MIME Media Types

You have seen the `type` attribute used throughout this book on a number of elements, the value of which is a MIME media type.

MIME (Multipurpose Internet Mail Extension) media types were originally devised so that e-mails could include information other than plain text. MIME media types indicate the following things:

- ❑ How the parts of a message, such as text and attachments, are combined into the message
- ❑ The way in which each part of the message is specified
- ❑ The way the items are encoded for transmission so that even software that was designed to work only with ASCII text can process the message

As you have seen, however, MIME types are not just for use with e-mail; they were adopted by web servers as a way to tell web browsers what type of material was being sent to them so that they could cope with that kind of file correctly.

MIME content types consist of two parts:

- ❑ A main type
- ❑ A sub-type

The main type is separated from the sub-type by a forward slash character — for example, `text/html` for HTML.

This appendix is organized by the main types:

- ❑ `text`
- ❑ `image`
- ❑ `multipart`
- ❑ `audio`
- ❑ `video`

## Appendix H: MIME Media Types

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- message
- model
- application

For example, the `text` main type contains types of plain-text files, such as:

- `text/plain` for plain text files
- `text/html` for HTML files
- `text/rtf` for text files using rich text formatting

MIME types are officially supposed to be assigned and listed by the Internet Assigned Numbers Authority (IANA).

Many of the popular MIME types in this list (all those that begin with “x-”) are not assigned by the IANA and do not have official status. (Having said that, I should mention that some of these are very popular and browsers support them, such as `audio/x-mp3`. You can see the list of official MIME types at [www.iana.org/assignments/media-types/](http://www.iana.org/assignments/media-types/).)

Those preceded with `.vnd` are vendor-specific.

The most popular MIME types are listed in this appendix in a bold typeface to help you find them.

## text

Note that, when specifying the MIME type of a content-type field (for example in a `<meta>` element), you can also indicate the character set for the text being used. For example:

```
content-type:text/plain; charset=iso-8859-1
```

If you do not specify a character set, the default is US-ASCII.

calendar	parityfec	richtext
<b>css</b>	<b>plain</b>	<b>rtf</b>
directory	prs.fallenstein.rst	<b>sgml</b>
enriched	prs.lines.tag	t140
<b>html</b>	rfc822-headers	tab-separated-values

uri-list	vnd.in3d.spot	vnd.sun.j2me.app-descriptor
vnd.abc	vnd.IPTC.NewsML	vnd.wap.si
vnd.curl	vnd.IPTC.NITF	vnd.wap.sl
vnd.DMClientScript	vnd.latex-z	vnd.wap.wml
vnd.fly	vnd.motorola.reflex	vnd.wap.wmlscript
vnd.fmi.flexstor	vnd.ms-mediapackage	<b>xml</b>
vnd.in3d.3dml	vnd.net2phone.commcenter.command	<b>xml-external-parsed-entity</b>

## image

bmp	tiff-fx	vnd.mix
cgm	vnd.cns.inf2	vnd.ms-modi
g3fax	vnd.djvu	vnd.net-fpx
<b>gif</b>	vnd.dwg	vndsealed.png
ief	vnd.dxf	vndsealedmedia.softseal.gif
<b>jpeg</b>	vnd.fastbidsheet	vndsealedmedia.softseal.jpg
naplps	vnd.fpx	vnd.svf
<b>png</b>	vnd.fst	vnd.wap.wbmp
prs.btif	vnd.fujixerox.edmics-mmr	vnd.xiff
prs.pti	vnd.fujixerox.edmics-rlc	<b>x-portable-pixmap</b>
t38	vnd.globalgraphics.pgb	<b>x-xbitmap</b>
<b>tiff</b>	vnd.microsoft.icon	

## Appendix H: MIME Media Types

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### **multipart**

alternative	<b>form-data</b>	report
appledouble	header-set	signed
byteranges	mixed	voice-message
digest	parallel	
<b>encrypted</b>	related	

### **audio**

32kadpcm	G726-24	<b>MP4A-LATM</b>
AMR	G726-32	mpa-robust
AMR-WB	G726-40	<b>mpeg</b>
basic	G728	<b>mpeg4-generic</b>
CN	G729	parityfec
DAT12	G729D	PCMA
dsr-es201108	G729E	PCMU
DVI4	GSM	prs.sid
EVRC	GSM-EFR	QCELP
EVRC0	L8	RED
EVRC-QCP	L16	SMV
G722	L20	SMV0
G.722.1	L24	SMV-QCP
G723	LPC	telephone-event
G726-16	<b>MPA</b>	tone

VDVI	vnd.nokia.mobile-xmf	vndsealedmedia.softseal.mpeg
vnd.3gpp.iufp	vnd.nortel.vbk	vnd.vmx.csvd
vnd.cisco.nse	vnd.nuera.ecelp4800	<b>x-aiff</b>
vnd.cns.anp1	vnd.nuera.ecelp7470	<b>x-midi</b>
vnd.cns.inf1	vnd.nuera.ecelp9600	<b>x-mod</b>
vnd.digital-winds	vnd.octel.sbc	<b>x-mp3</b>
vnd.everad.plj	vnd.qcelp — deprecated, use audio/qcelp	<b>x-wav</b>
vnd.lucent.voice	vnd.rhetorex.32kadpcm	

## video

BMPEG	MP4V-ES	vnd.mpegurl
BT656	MPV	vnd.nokia.interleaved-multimedia
CelB	<b>mpeg</b>	vnd.objectvideo
DV	mpeg4-generic	vndsealedmpeg1
H261	nv	vndsealedmpeg4
H263	parityfec	vndsealedswf
H263-1998	pointer	vndsealedmedia.softseal.mov
H263-2000	<b>quicktime</b>	vnd.vivo
JPEG	SMPTE292M	<b>x-sgi-movie</b>
MP1S	vnd.fvt	<b>x-msvideo</b>
MP2P	vnd.motorola.video	
MP2T	vnd.motorola.videop	

## Appendix H: MIME Media Types

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### message

CPIM	http	s-http
delivery-status	news	sip
disposition-notification	partial	sipfrag
external-body	rfc822	

### model

iges	vnd.gdl	vnd.parasolid.transmit.binary
mesh	vnd.gs-gdl	vnd.parasolid.transmit.text
vnd.dwf	vnd.gtw	vnd.vtu
vnd.flatland.3dml	vnd.mts	<b>vrm</b>

### application

activemessage	cpl+xml	eshop
andrew-inset	cybercash	font-tdpfr
applefile	dca-rft	http
atomicmail	dec-dx	hyperstudio
batch-SMTP	dicom	iges
beep+xml	dvcs	index
cals-1840	EDI-Consent	index.cmd
cnrp+xml	EDIFACT	index.obj
commonground	EDI-X12	index.response

index/vnd	pkcs10	sgml-open-catalog
iotp	pkcs7-mime	sieve
ipp	pkcs7-signature	slate
isup	pkix-cert	timestamp-query
mac-binhex40	pkixcmp	timestamp-reply
macwriteii	pkix-crl	tve-trigger
marc	pkix-pkipath	vemmi
mathematica	<b>postscript</b>	vnd.3gpp.pic-bw-large
mpeg4-generic	prs.alvestrand.titrax-sheet	vnd.3gpp.pic-bw-small
msword	prs.cww	vnd.3gpp.pic-bw-var
news-message-id	prs.nprend	vnd.3gpp.sms
news-transmission	prs.plucker	vnd.3M.Post-it-Notes
ocsp-request	qsig	vnd.accpac.simply.aso
ocsp-response	reginfo+xml	vnd.accpac.simply.imp
octet-stream	remote-printing	vnd.acucobol
oda	riscos	vnd.acucorp
ogg	rtf	vnd.adobe.xfdf
parityfec	sdp	vnd.aether.imp
<b>pdf</b>	set-payment	vnd.amiga.ami
pgp-encrypted	set-payment-initiation	vnd.anser-web-certificate-issue-initiation
pgp-keys	set-registration	vnd.anser-web-funds-transfer-initiation
pgp-signature	set-registration-initiation	vnd.audiograph
pidf+xml	sgml	vnd.blueice.multipass

*Continued*

## Appendix H: MIME Media Types

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vnd.bmi	vnd.ecowin.chart	vnd.fujitsu.oasysgp
vnd.businessobjects	vnd.ecowin.filerequest	vnd.fujitsu.oasysprs
vnd.canon-cpd1	vnd.ecowin.fileupdate	vnd.fujixerox.ddd
vnd.canon-lips	vnd.ecowin.series	vnd.fujixerox.docuworks
vnd.cinderella	vnd.ecowin.seriesrequest	vnd.fujixerox.docuworks.binder
vnd.claymore	vnd.ecowin.seriesupdate	vnd.fut-misnet
vnd.commerce-battelle	vnd.enliven	vnd.genomatix.tuxedo
vnd.commonspace	vnd.epson.esf	vnd.grafeq
vnd.cosmocaller	vnd.epson.msf	vnd.groove-account
vnd.contact.cmsg	vnd.epson.quickanime	vnd.groove-help
vnd.criticaltools.wbs+xml	vnd.epson.salt	vnd.groove-identity-message
vnd.ctc-posml	vnd.epson.ssf	vnd.groove-injector
vnd.cups-postscript	vnd.ericsson.quickcall	vnd.groove-tool-message
vnd.cups-raster	vnd.eudora.data	vnd.groove-tool-template
vnd.cups-raw	vnd.fdf	vnd.groove-vcard
vnd.curl	vnd.ffsns	vnd.hbci
vnd.cybank	vnd.fints	vnd.hhe.lesson-player
vnd.data-vision.rdz	vnd.FloGraphIt	vnd.hp-HPGL
vnd.dna	vnd.framemaker	vnd.hp-hpid
vnd.dpgraph	vnd.fsc.weblaunch	vnd.hp-hps
vnd.dreamfactory	vnd.fujitsu.oasys	vnd.hp-PCL
vnd.dxr	vnd.fujitsu.oasys2	vnd.hp-PCLXL
vnd.ecdis-update	vnd.fujitsu.oasys3	vnd.httpphone

## Appendix H: MIME Media Types

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vnd.hzn-3d-crossword	vnd.japannet-setstore-wakeup	vnd.lotus-notes
vnd.ibm.afplinedata	vnd.japannet-verification	vnd.lotus-organizer
vnd.ibm.electronic-media	vnd.japannet-verification-wakeup	vnd.lotus-screencam
vnd.ibm.MiniPay	vnd.jisp	vnd.lotus-wordpro
vnd.ibm.modcap	vnd.kde.karbon	vnd.mcd
vnd.ibm.rights-management	vnd.kde.kchart	vnd.mediastation.cdkey
vnd.ibm.secure-container	vnd.kde.kformula	vnd.meridian-slingshot
vnd.informix-visionary	vnd.kde.kivio	vnd.micrografx.flo
vnd.intercon.formnet	vnd.kde.kontour	vnd.micrografx.igx
vnd.intertrust.digibox	vnd.kde.kpresenter	vnd.mif
vnd.intertrust.nncp	vnd.kde.kspread	vnd.minisoft-hp3000-save
vnd.intu.qbo	vnd.kde.kword	vnd.mitsubishi.misty-guard.trustweb
vnd.intu.qfx	vnd.kenameaapp	vnd.Mobius.DAF
vnd.ipunplugged.rcprofile	vnd.kidspiration	vnd.Mobius.DIS
vnd.irepository.package+xml	vnd.koan	vnd.Mobius.MBK
vnd.is-xpr	vnd.liberty-request+xml	vnd.Mobius.MQY
vnd.japannet-directory-service	vnd.llamagraphics.life-balance.desktop	vnd.Mobius.MSL
vnd.japannet-jpnstore-wakeup	vnd.llamagraphics.life-balance.exchange+xml	vnd.Mobius.PLC
vnd.japannet-payment-wakeup	vnd.lotus-1-2-3	vnd.Mobius.TXF
vnd.japannet-registration	vnd.lotus-approach	vnd.mophun.application
vnd.japannet-registration-wakeup	vnd.lotus-freelance	vnd.mophun.certificate

*Continued*

## Appendix H: MIME Media Types

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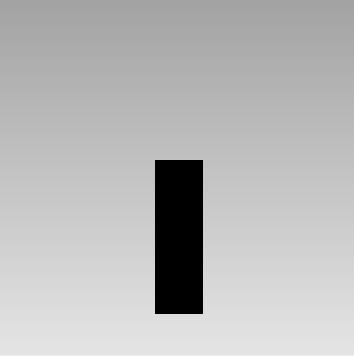
vnd.motorola.flexsuite	vnd.netfp	vnd.pvi.ptid1
vnd.motorola.flexsuite.adsi	vnd.noblenet-directory	vnd.pwg-multiplexed [RFC3391]
vnd.motorola.flexsuite.fis	vnd.noblenet-sealer	vnd.pwg-xhtml-print+xml
vnd.motorola.flexsuite.gotap	vnd.noblenet-web	vnd.Quark.QuarkXPress
vnd.motorola.flexsuite.kmr	vnd.novadigm.EDM	vnd.rapid
vnd.motorola.flexsuite.ttc	vnd.novadigm.EDX	vnd.s3sms
vnd.motorola.flexsuite.wem	vnd.novadigm.EXT	vndsealed.doc
vnd.mozilla.xul+xml	vnd.obn	vndsealed.eml
vnd.ms-artgalry	vnd.osa.netdeploy	vndsealed.mht
vnd.ms-asf	vnd.palm	vndsealed.net
vnd.mseq	vnd.paos.xml	vndsealed.ppt
<b>vnd.ms-excel</b>	vnd.pg.format	vndsealed.xls
vnd.msign	vnd.pg.osasli	vndsealedmedia.softseal.html
vnd.ms-lrm	vnd.picsel	vndsealedmedia.softseal.pdf
<b>vnd.ms-powerpoint</b>	vnd.powerbuilder6	vndseemail
vnd.ms-project	vnd.powerbuilder6-s	vnd.shana.informed.formdata
vnd.ms-tnef	vnd.powerbuilder7	vnd.shana.informed.formtemplate
vnd.ms-works	vnd.powerbuilder7-s	vnd.shana.informed.interchange
vnd.ms-wpl	vnd.powerbuilder75	vnd.shana.informed.package
vnd.musician	vnd.powerbuilder75-s	vnd.smaf
vnd.music-niff	vnd.previewsystems.box	vndsss-cod
vnd.nervana	vnd.publishare-delta-tree	vndsss-dtf

## Appendix H: MIME Media Types

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vnd.sss-ntf	vnd.vectorworks	vnd.yamaha.smaf-audio
vnd.street-stream	vnd.vidsoft.vidconference	vnd.yamaha.smaf-phrase
vnd.svd	vnd.visio	vnd.yellowriver-custom-menu
vnd.swiftview-ics	vnd.visionary	watcherinfo+xml
vnd.triscape.mxs	vnd.vividence.scriptfile	whoispp-query
vnd.trueapp	vnd.vsf	whoispp-response
vnd.truedoc	vnd.wap.sic	wita
vnd.ufdl	vnd.wap.slc	wordperfect5.1
vnd.uiq.theme	vnd.wap.wbxml	x400-bp
vnd.uplanet.alert	vnd.wap.wmlc	<b>x-debian-package</b>
vnd.uplanet.alert-wbxml	vnd.wap.wmlscriptc	<b>x-gzip</b>
vnd.uplanet.bearer-choice	vnd.webturbo	<b>x-java</b>
vnd.uplanet.bearer-choice-wbxml	vnd.wqd	<b>x-javascript</b>
vnd.uplanet.cacheop	vnd.wrq-hp3000-labelled	<b>x-msaccess</b>
vnd.uplanet.cacheop-wbxml	vnd.wt.stf	<b>x-msexcel</b>
vnd.uplanet.channel	vnd.wv.csp+xml	<b>x-mspowerpoint</b>
vnd.uplanet.channel-wbxml	vnd.wv.csp+wbxml	<b>x-rpm</b>
vnd.uplanet.list	vnd.wv.ssp+xml	<b>x-zip</b>
vnd.uplanet.list-wbxml	vnd.xara	<b>xhtml+xml</b>
vnd.uplanet.listcmd	vnd.xfdl	<b>xml</b>
vnd.uplanet.listcmd-wbxml	vnd.yamaha.hv-dic	<b>xml-dtd</b>
vnd.uplanet.signal	vnd.yamaha.hv-script	<b>xml-external-parsed-entity</b>
vnd.vcx	vnd.yamaha.hv-voice	<b>zip</b>





# Deprecated and Browser-Specific Markup

As the versions of HTML and XHTML have developed, quite a lot of markup has been *deprecated*, which means it has either already been removed from XHTML specifications or that it will be removed in coming versions. While you will still be able to use much of this markup with Transitional XHTML, Strict XHTML 1.0 has already removed most of the elements, attributes, and styles that you can read about in this appendix.

I have included it in this book, despite the fact that the markup is deprecated or out-of-date, because you are likely to come across it in other people's code, and on very rare occasions you might need to resort to some of it in order to get a specific job done (for example, if it has to work in very old browsers such as IE 3 and Netscape 3), and some of these browsers will not support what you want to do with CSS.

In addition to deprecated markup, you will also see some of the browser-specific markup that you may well come across. This is markup that Microsoft or Netscape (and in some cases both companies) added to its browsers to allow users to do more things than its competitors — but these elements and attributes never made it into the HTML recommendations, and are therefore referred to as *browser-specific markup*.

So not only does this appendix help you deal with markup you come across that has been deprecated, but you might also use some techniques to get the result you want. This appendix covers the following:

- ❑ Elements and attributes that have been deprecated in recent versions of HTML and XHTML
- ❑ Specifying font appearances without using CSS
- ❑ Controlling backgrounds without using CSS
- ❑ Controlling presentations of links, lists, and tables without using CSS
- ❑ Elements and attributes that control the formatting of a document
- ❑ Elements, attributes, and styles that Microsoft added to IE (but that are not supported by other browser manufacturers)
- ❑ Elements, attributes, and styles that Netscape added to Navigator (but that are not supported by other browser manufacturers)

## Appendix I: Deprecated and Browser-Specific Markup

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Before you look at any of this markup, however, a quick word on why a good part of an appendix is deprecated markup.

## Why Deprecated Markup Exists

In the first chapter, I explained how XHTML 1.0 was created after its predecessor (HTML) had reached version 4.01. With each version of HTML, new elements and attributes are added or old ones removed. These changes have been necessary, not only because web page authors have wanted to create increasingly complicated pages, but also because the types of browsers (also known as *clients*) accessing the Internet have changed.

While you used to be able to browse the web only on desktop computers, lots of new devices are going online, and these new devices are part of the reason why markup that describes the content of a document (headings, paragraphs, and so on) has been separated from the presentation rules.

In older versions of HTML, before CSS was introduced, HTML contained markup that could be used to control the presentation of a web page (such as the `<font>` element that would control the font used in a document, or the `bgcolor` attribute that would set the background color of a page). The separation of style from content and the introduction of CSS were the largest sources of deprecated markup.

Unfortunately, the older browsers that were built before CSS and other more recent markup simply will not understand the newer ways of doing things, and if you ever have to create a web site for IE 3 or Netscape 3 you will have to think very carefully about whether you use CSS (which they barely understand, if at all) or whether you should use these deprecated elements and attributes. In reality, it is very unlikely that you will have to create markup that would work in such an old browser; however, you might need to understand how a page written back then works.

## Older Pages Break Many Rules

You should be aware that a lot of the pages you see on the Web probably break a lot of the rules you have learned in this book so far. You will see element and attribute names in upper- and lowercase, you will see missing quotation marks on attribute values, even attributes without values, and you will see elements that do not have closing tags. You will see pages without DOCTYPE declarations and pages littered with deprecated markup. Keep in mind, however, that many of the pages that break the rules you have learned might have been written when the rules were not as strict, and at the time of writing the code may have been perfectly acceptable.

*Even if a page with bad or deprecated markup renders fine in your browser, it's still wise to avoid bad habits at all costs; otherwise your pages will not be viewable by as many browsers in the future.*

It is not just humans who wrote code that might be frowned upon these days. The early versions of authoring tools such as Microsoft FrontPage and Macromedia Dreamweaver sometimes generated code that had strange capitalization or missing quotation marks, and featured attributes without values. This certainly does not make it okay to follow their lead. The first versions of these programs were written before XHTML came along with its stricter rules (which were discussed in Chapter 1). Older browsers are very forgiving of code that is not written correctly and have been designed to render a page anyway. But that is one of

the main reasons why browsers have been increasing in size — future browsers will not necessarily be so forgiving.

You have been warned that this appendix will contain some odd things, but if you remember to stick to the principles you have learned in this book (and don't miss quotes, attribute values, and closing elements or follow the bad habits others have) your pages will be available for many more people and your skills will be more marketable.

## Fonts

In this section, you learn about several elements (and their attributes) that affect the appearance of text and fonts, all of which have been deprecated.

### The `<font>` Element

The `<font>` element was introduced in HTML 3.2 and deprecated in HTML 4.0, but is still widely used today. It allows you to indicate the typeface, size, and color of font the browser should display between the opening `<font>` and closing `</font>` tags. You could probably find many sites littered with `<font>` tags, one for each time you see the style of text change on the page.

The table that follows shows the three attributes the `<font>` element relies upon.

Attribute Name	Use	Values
<code>face</code>	Specify the typeface that should be used	Name of the typeface to use (can include more than one name in order of preference)
<code>size</code>	Specify the size of the font	A number between 1 and 7 where 1 is the smallest font size and 7 is the largest font size
<code>color</code>	Specify the color of the font	A color name or hex value (see Appendix D)

The following is an example of how the `<font>` element would have been used (`ai_eg01.html`). You can see that there are three occurrences of the `<font>` element:

```
<html>
  <head>
    <title>Example of &lt;font&gt; Element</title>
  </head>
  <body>
    <p>This is the browser's default font.</p>
    <font face="arial, verdana, sans-serif" size="2">
      <h1>Example of the &lt;font&gt; Element</h1>
```

## Appendix I: Deprecated and Browser-Specific Markup

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```
<p><font size="4" color="darkgray">Here is some size 3 writing  
in the color called darkgray. The typeface is determined by the  
previous &lt;font&ampgt element that contains this paragraph.</font></p>  
<p><font face="courier" size="2" color="#000000">Now here is a courier  
font, size 2, in back</font></p>  
</font>  
</body>  
</html>
```

The result of this example is shown in Figure I-1.

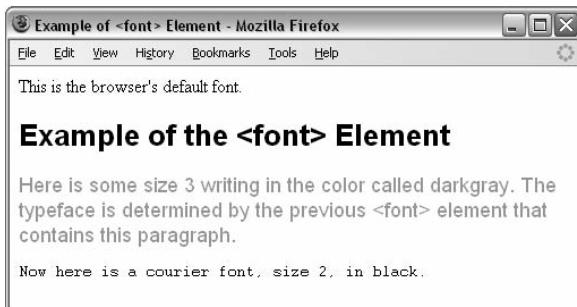


Figure I-1

As you can see from Figure I-1, all the writing within a `<font>` element follows the rules laid down in the attributes of the opening `<font>` tag. The first paragraph is in the browser's default font (which is probably a size 3 Times family font in black). The first `<font>` element appears directly after this paragraph, and contains the rest of the page. This first `<font>` element acts like a default setting for all but the first paragraph in this page. The element is not closed until just before the closing `</body>` tag, and therefore the remainder of the document should be in an Arial typeface.

As you can see, the name of the Arial typeface is followed by the typeface Verdana; this is supposed to be a second choice if Arial is not available. Then if Verdana is not available, the browser's default sans-serif font should be used:

```
<font face="arial, verdana, sans-serif" size="2">
```

This `<font>` element also indicates that the default size of the text in the rest of the document should be size 2. Note that this `<font>` element does not override the size of the `<h1>` element, but it does affect the typeface used — the heading is written in Arial.

While this `<font>` element is acting as a default for most of the page, if you want a particular part of the page to have any other font properties, you can indicate so in another `<font>` element.

You can see in the second paragraph that the color and size of font are changed to dark gray and size 4.

```
<p><font size="4" color="darkgray">Here is some size 4 darkgray  
writing</font></p>
```

## Appendix I: Deprecated and Browser-Specific Markup

The third paragraph then uses a different typeface, a smaller size, and black:

```
<p><font face="courier" size="2" color="#000000">Now here is a courier  
font, size 2, in back</font></p>
```

Note that you may have to use `<font>` elements inside `<td>` and `<th>` elements, as the styles specified outside tables are not inherited by the text inside cells. Figure I-2 shows you the different font sizes from 1 to 7 (`ai_eg02.html`).



Figure I-2

*Font sizes can change slightly from browser to browser, so you cannot rely on them to be exactly the same number of pixels tall or wide in a layout.*

The preferred method with CSS would be to use the `font-family`, `font-size`, and `color` properties on the element containing the text that you wanted to style. You learned about these CSS properties in Chapter 7.

## The `text` Attribute

The `text` attribute is used on the `<body>` element to indicate the default color for text in the document; it was deprecated in HTML 4. Its value should be either a color name or a hex color. For example (`ai_eg03.html`):

```
<body text="#999999">  
    This text should be in a different color than the next bit  
    <font color="#000000">which is black</font>, and now back to gray.  
</body>
```

You can see the result in Figure I-3.



Figure I-3

### The **<basefont>** Element

The **<basefont>** element is supposed to set a default font size, color, and typeface for any parts of the document that are not otherwise contained within a **<font>** element. You can then use the **<font>** elements to override the **<basefont>** settings. However, this is not supported in Firefox or Netscape 6, and other browsers do not always obey the settings in tables or headings.

The attributes that the **<basefont>** element takes are exactly the same as for the **<font>** element, which you've just seen. And again, elements such as the heading elements will retain their own size.

You can also set the size of fonts relative to the size of the **<basefont>** by giving them a value of +1 for a size larger or -2 for two sizes smaller (on the same scale from 1 to 7).

You can see these effects by revisiting the last example, and making some changes — the changes are highlighted (`ai_eg04.html`):

```
<html>
  <head>
    <title>Example of &lt;basefont&gt; Element</title>
  </head>
  <body>
    <basefont face="arial, verdana, sans-serif" size="2" color="#ff0000">
      <p>This is the page's default font.</p>
      <h2>Example of the &lt;basefont&gt; Element</h2>
      <p><font size="+4" color="darkgray">Here is some darkgray text
          four sizes larger</font></p>
      <p><font face="courier" size="-1" color="#000000">Here is a courier
          font, a size smaller, in black</font></p>
    </body>
  </html>
```

You can see the result in Figure I-4 shown in Internet Explorer (because the example does not work in Firefox).

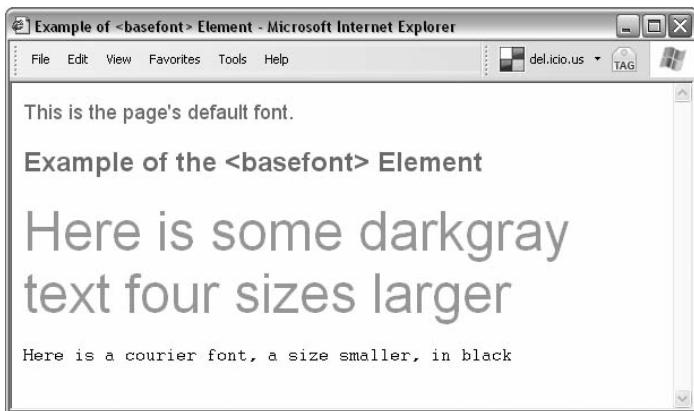


Figure I-4

## Appendix I: Deprecated and Browser-Specific Markup

As you can see, the default font now takes on the properties specified in the `<basefont>` element; it is red, size 2, and uses the Arial typeface.

The paragraph after the `<h2>` element uses a font size four sizes larger than the default size and is gray text, whereas the following paragraph uses a font one size smaller than the default font — you can also see that the color of this font is black (overriding the default).

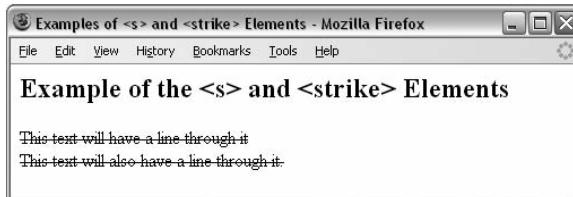
Because this element was deprecated in HTML 4, the preferred option is to use CSS styles attached to the `<body>` element to set default font properties for the document.

### ***The `<s>` and `<strike>` Elements***

Both the `<s>` and `<strike>` elements were added to HTML in version 3.2 and deprecated in version 4. They indicate that their content should have a strikethrough style. For example (`ai_eg05.html`):

```
<s>This text will have a line through it</s>
<strike>This text will also have a line through it.</strike>
```

You can see the results in Figure I-5.



**Figure I-5**

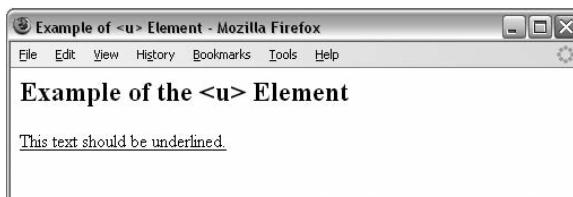
You should now use the `text-decoration` property in CSS, with a value of `strikethrough`, unless you are trying to indicate deleted content, in which case you should use the `<del>` element.

### ***The `<u>` Element***

The `<u>` element renders its content underlined. It was introduced in HTML 3.2 and deprecated in version 4.

```
<u>This text should be underlined.</u>
```

You can see the effect in Figure I-6.



**Figure I-6**

## Appendix I: Deprecated and Browser-Specific Markup

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You should now use the `text-decoration` property in CSS with a value of `underline` unless you are trying to indicate added content (when a document has been revised), in which case you should use the `<ins>` element.

### The `<listing>`, `<plaintext>`, and `<xmp>` Elements

These three elements are all obsolete; they were introduced in HTML 2 and removed from HTML 4. They are included here only because you may come across them in old examples.

All three elements display text in a monospaced font as the `<pre>` element does.

The `<xmp>` element was designed for a short snippet of example code, and cannot contain any other markup; any characters such as angle brackets in element names get displayed as if they are text, so you do not need to use escape characters for them. It is recommended that the author use a maximum limit of 80 characters on any one line.

The `<listing>` element meanwhile has a recommended limit of 132 characters per line, and tends to display text in a small font.

The `<plaintext>` tag indicates that *anything* following it should appear as plain text, even markup. Because everything following the `<plaintext>` element is displayed as normal text, including tags, there is no closing tag (if you tried to use a `</plaintext>` tag, it too would be displayed as normal text).

Here is an example of these three elements (`ai_eg07.html`):

```
<body>
  <h2>Example of the &lt;listing&gt;, &lt;plaintext&gt;, and &lt;xmp&gt;
    Elements</h2>
  <listing>These words are written inside a &lt;listing&gt; element.</listing>
  <xmp>These words are written inside an <xmp> element.</xmp>
  <plaintext>These words are written inside a <plaintext>
    element.
</body>
```

You can see the result in Figure I-7. Note how the escape characters in the `<xmp>` element are ignored and not escaped (this could also contain angle brackets and they would display normally). You will also see the closing `</body>` and `</html>` tags because anything after the opening `<plaintext>` tag is treated as plain text:

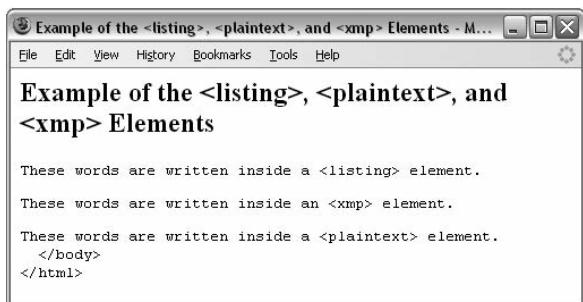


Figure I-7

The replacements in XHTML are `<pre>` and `<samp>`.

## Backgrounds

There were two attributes in HTML that would allow you to change the background of a whole page or part of it:

- ❑ `bgcolor`, which allowed you to specify a background color on the `<body>` and various table elements
- ❑ `background`, which allowed you to specify a background image on the `<body>` element

### ***The `bgcolor` Attribute***

The `bgcolor` attribute allowed you to specify a background color for the whole document, or just part of it. It could be used on the following elements:

```
<body> <table> <tr> <th> <td>
```

The value of the attribute should be a color name or hex color, as described in Appendix D.

The following is an example of a document using some different background colors (`ai_eg08.html`):

```
<html>
  <head>
    <title>Example of bgcolor Attribute</title>
  </head>
  <body bgcolor="#efefef">
    <h2>Example of the bgcolor Attribute</h2>
    <table bgcolor="#999999">
      <tr>
        <th bgcolor="#cccccc">Heading One</th>
        <th bgcolor="#cccccc">Heading Two</th>
      </tr>
      <tr bgcolor="#f2f2f2">
        <td>Cell One</td>
        <td>Cell Two</td>
      </tr>
      <tr>
        <td>Cell Three</td>
        <td>Cell Four</td>
      </tr>
    </body>
  </html>
```

You can see this page in Figure I-8.

## Appendix I: Deprecated and Browser-Specific Markup

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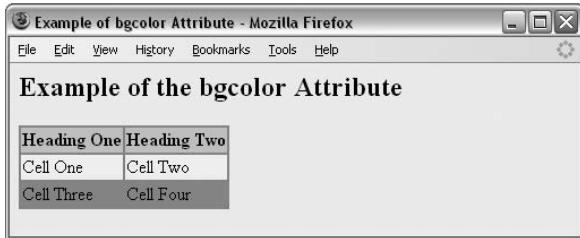


Figure I-8

The page has a very light gray background color specified on the `<body>` element. The table then has a background color, which you can see on the bottom row and all around the edges of the table. This is the default color for the table. Then you can see that the `bgcolor` attribute is used both on the `<th>` element (the table headings) and the following `<tr>` element in the first row.

The preferred method of changing background colors now is to use the `background-color` property in CSS.

## **The `background` Attribute**

The `background` attribute allowed you to specify a background image for the whole page, and its value should be the URL to the background image (which can be an absolute or relative URL). Netscape and Microsoft also allowed this attribute to be used on tables to create a background image for the tables.

Here you can see an example of the `background` attribute being used (`ai_eg09.html`):

```
<html>
  <head>
    <title>Example of background Attribute</title>
  </head>
  <body background="images/background_large.gif" bgcolor="#f2f2f2">
    <h2>Example of the background Attribute</h2>
  </body>
</html>
```

Note that the `bgcolor` attribute has also been used on the `<body>` element, which will be used if the image cannot be found. You can see the result of this example in Figure I-9.



Figure I-9

# Formatting

The next set of elements and attributes helps you format and position elements and their content on the page.

## ***The <center> Element***

The `<center>` element was introduced by Netscape to allow authors to center content on a page. Anything between the opening and closing `<center>` tags will be centered horizontally in the middle of the page or the containing element. It was added to the HTML 3.2 specification and deprecated in HTML 4.

The following is an example of how the `<center>` element was used. The example also contains a table because of the interesting way in which tables are dealt with inside a `<center>` element (`ai_eg10.html`).

```

<body>
  <h2>Example of the &lt;center&gt; Element</h2>
  <center>
    Anything inside a &lt;center&gt; element is centered on the page, or within
    its containing element.<br /><br />
    <table width="600" border="1">
      <tr>
        <td>Cells whose content is written inside a &lt;center&gt; will be
           centered within the cell, like the one to the right.</td>
        <td><center>This cell's content should be centered.</center></td>
      </tr>
      <tr>
        <td><center>This cell's content should be centered.</center></td>
        <td>Cells whose content is written inside a &lt;center&gt; will
           be centered within the cell, like the one to the left.</td>
      </tr>
    </table>
  </center>
</body>

```

In this example (see Figure I-10) you can see how the `<center>` tag (just after the `<h1>` element) centers the content of the rest of the page. Interestingly, it centers any text on the page, and the table itself, but it does not center the text in the cells unless they contain `<center>` elements inside the `<td>` elements. (The table in this example has been given a border using the `border` attribute to illustrate where its edges lie.)

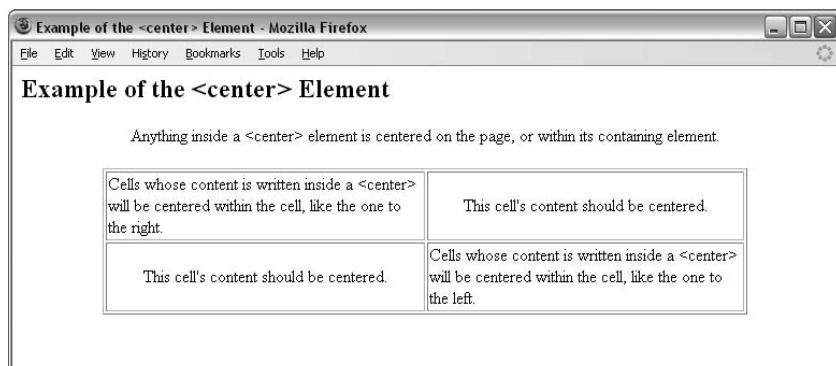


Figure I-10

## Appendix I: Deprecated and Browser-Specific Markup

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The preferred method of aligning text content is to use CSS properties such as `text-align`.

### **The `align` Attribute**

The `align` attribute is used with many elements to indicate positioning of an element within the browser or its containing element. It was deprecated in HTML 4.01.

The possible values for the `align` attribute are shown in the table that follows. Note that the value `justify` works with text only, and that `top`, `middle`, and `bottom` are less supported than `left`, `right`, and `center`.

Value	Purpose
<code>left</code>	Aligns element with the left side of the page or containing element
<code>right</code>	Aligns element with the right side of the page or containing element
<code>center</code>	Centers the element within the page or containing element
<code>justify</code>	Justifies words across the page or containing element so that the left and right side of the text touches the container
<code>top</code>	Aligns element with the top of the browser window or containing element
<code>middle</code>	Vertically aligns element in the middle of the browser window or containing element
<code>bottom</code>	Aligns element with the bottom of the browser window or containing element

Here are the elements that could carry the `align` attribute:

```
<caption> <applet> <iframe> <img> <input> <object> <legend> <table> <hr>
<div> <h1> <h2> <h3> <h4> <h5> <h6> <p>
```

The following code contains a few examples of how the `align` attribute can be used (`ai_eg11.html`).

```
<body>
  <h2 align="center">Example of the align Attribute</h2>

  <table width="600" align="center" border="1">
    <tr>
      <td align="left">This cell's content should be left-aligned.</td>
      <td align="right">This cell's content should be right-aligned.</td>
    </tr>
    <tr>
      <td align="center">This cell's content should be centered.</td>
      <td width="300" align="justify">This cell's content should be
        justified, but it needs to spread across more than one line to
        show it working.</td>
    </tr>
  </table>
</body>
```

## Appendix I: Deprecated and Browser-Specific Markup

You can see here that the `<h1>` and `<table>` elements are both centered, and then each cell in the table uses a different kind of alignment.

In order for text to be justified, it needs to wrap onto more than one line (which is why the `<td>` element carries a `width` attribute in this example). The last line of a justified paragraph does not have to stretch to the left and right borders of the browser or its containing element as the other lines do.

Figure I-11 shows what this page looks like.

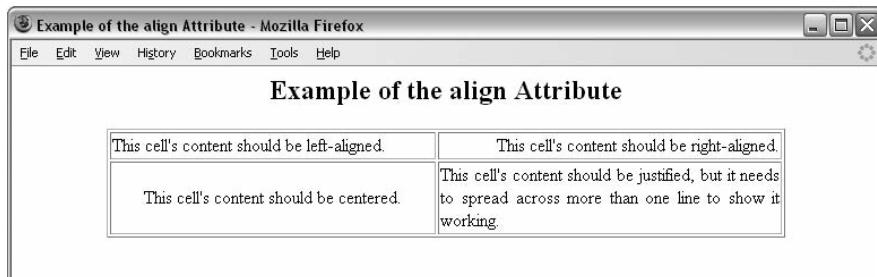


Figure I-11

The preferred methods of aligning content in CSS are the `text-align` and `vertical-align` properties and `float` positioning.

## The width Attribute

The `width` attribute sets the width of an element in pixels. It can be used with the following elements:

```
<td> <th> <table> <hr> <applet>
```

The `width` attribute is still commonly used today, especially among those who use tables for layout. Sites that rely on tables for positioning content need the width to be fixed for the page to display properly and make sense to the reader, and while few visitors would have browsers that are version 3 or older, those few that do would not be able to view the site properly without the fixed-width tables, because they do not support the CSS `width` property.

Here you can see an example of the `width` attribute on a table and an `<hr />` element (`ai_eg12.html`):

```
<body>
  <h2>Example of the width Attribute</h2>

  <table width="600" border="1">
    <tr>
      <td width="200">This cell should be 200 pixels wide.</td>
      <td width="400">This cell should be 400 pixels wide.</td>
    </tr>
    <tr>
      <td width="200">This cell should be 200 pixels wide.</td>
      <td width="400">This cell should be 400 pixels wide.</td>
    </tr>
  </table>
  <hr/>
```

## Appendix I: Deprecated and Browser-Specific Markup

---

```
</table>
<br /><br />
<hr width="300" />
</body>
```

Figure I-12 shows what this looks like in a browser.

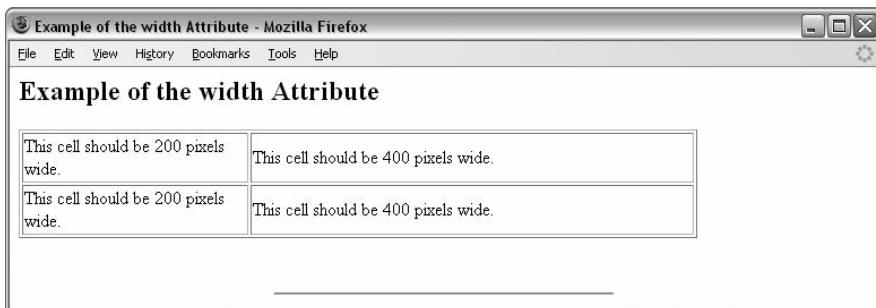


Figure I-12

The preferred method of setting the width for these elements is the `width` property in CSS.

## **The `height` Attribute**

The `height` attribute sets the height of an element in pixels. It was used with the `<th>`, `<td>`, and `<applet>` elements. Here you can see the `height` attribute used on the `<td>` element (`ai_eg13.html`):

```
<body>
  <h2>Example of the height Attribute</h2>

  <table width="600" border="1">
    <tr>
      <td width="300" height="300">This cell should be 300 pixels high.</td>
      <td width="300" height="300">This cell should be 300 pixels high.</td>
    </tr>
  </table>

</body>
```

As you can see from Figure I-13, these table cells are square.

The preferred method of setting the height for these elements is the `height` property in CSS.

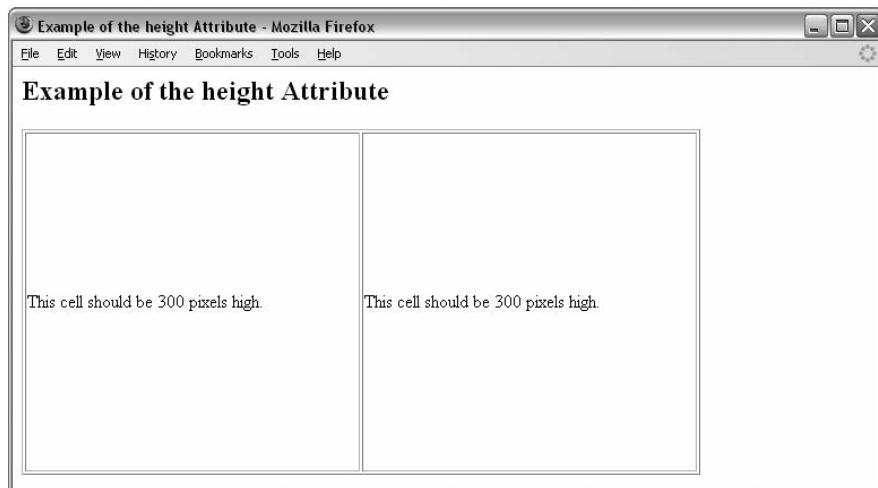


Figure I-13

### The *vspace* Attribute

The *vspace* attribute specifies the amount of white space or padding that should appear above or below an HTML element. Its value is given in pixels.

The following example shows how the *vspace* attribute on the *<img>* element makes sure that there are 20 pixels above and beneath the image to separate it from the text (*ai\_eg14.html*):

```
<body>
    <h2>Example of the vspace Attribute</h2>

    <p>Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed
    do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim
    ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut
    aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit
    in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur
    sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt
    mollit anim id est laborum.

        
        Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod
        tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam,
        quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo
        consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse
        cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat
        non proident, sunt in culpa qui officia deserunt mollit anim id est
        laborum.</p>

    </body>
```

## Appendix I: Deprecated and Browser-Specific Markup

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You can see the result in Figure I-14.

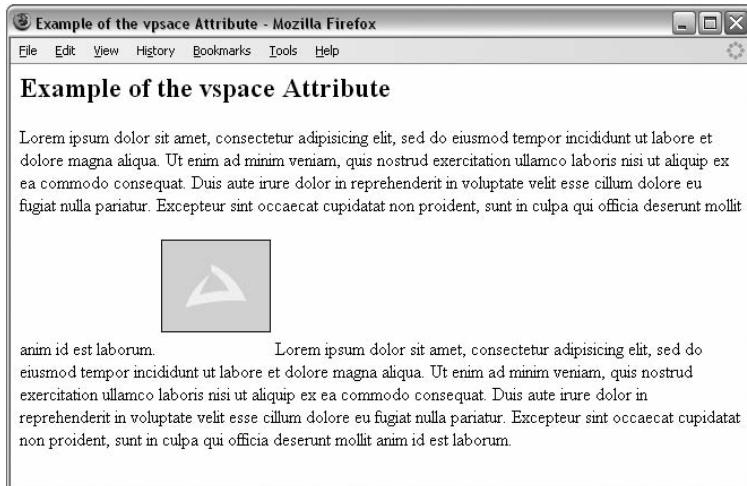


Figure I-14

This has been replaced by the padding properties in the CSS box model.

## The hspace Attribute

The hspace attribute is the horizontal equivalent of the vspace attribute and ensures that there is padding or white space to the left and right of an element.

Here you can see that the hspace attribute is used to create 40 pixels of padding to the left and right of the image (ai\_eg15.html):

```
<body>
  <h2>Example of the vspace Attribute</h2>

  <p>
  There should be 40 pixels between the image and the edge of the window, and
  another 40 pixels between the edge of the image and this text.</p>

</body>
```

You can see the result in Figure I-15.

This has been replaced by the padding properties in the CSS box model.

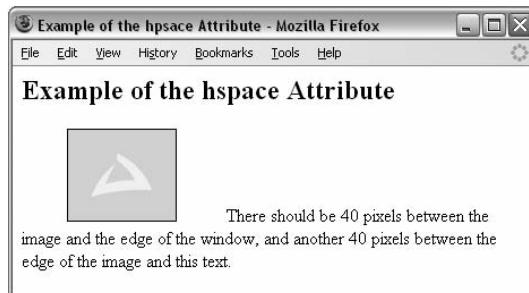


Figure I-15

### The **clear** Attribute (on **<br />** element)

The `clear` attribute used on a line break element `<br />` indicates how the browser should display the line after the `<br />` element. The `clear` attribute can take the values `left`, `right`, `all`, and `none`. Its use is best explained by way of an example (`ai_eg16.html`):

```
<body>
    
    The text after this image will be displayed next to the image and wrap
    to the next line until you see the line break element.<br clear="left"> Now
    it should be on a new line underneath (not next to) the image.
</body>
```

If the `clear` attribute is used on a `<br />` element, then the text or element that follows it will not be displayed until the border indicated as a value of the `clear` attribute is clear. In this case, because the `<br />` element has a `clear` attribute whose value is `left`, the text after the `<br />` element will not be shown until there is nothing to the left of it (within the containing element or box). In this example, the text does not continue until after the image, which was to the left of this text.

You can see the result in Figure I-16 — and note how the text continues under the image. If it were not for the `clear` attribute, this text would simply appear on the next line.

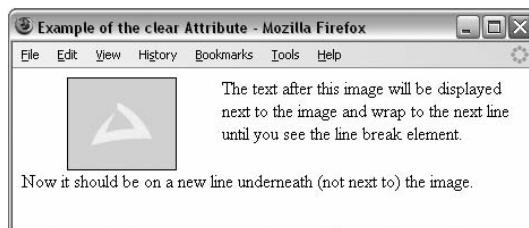


Figure I-16

## Appendix I: Deprecated and Browser-Specific Markup

---

If the value `all` is given, there must not be anything to the `left` or `right` of the text or element.

CSS has its own `clear` property to replace this attribute.

## Links

You may have noticed on some web sites that the colors of links change when you have visited a page or when you click the link. As you can see in the table that follows, there are three attributes that allow you to change the colors of links: `alink`, `link`, and `vlink`. Each should be specified on the `<body>` element.

Attribute	Use	Values
<code>alink</code>	Specify the color of an active link or selected link.	A hex code or color name
<code>link</code>	Specify the default color of all links in the document.	A hex code or color name
<code>vlink</code>	Specify the color of visited links.	A hex code or color name

The following is an example of the how these attributes affect the colors of links (`ai_eg17.html`):

```
<body alink="#0033ff" link="#0000ff" vlink="#333399">
    <h2>Example of the Link Attribute</h2>
    <p>This example contains some links, which you should play with to see how
        they behave:</p>
    <ul>
        <li>The <a href="http://www.wrox.com/">Wrox Web site</a> tells you about
            existing and forthcoming Wrox books.</li>
        <li>The <a href="http://www.w3.org/">W3C Web site</a> is the home of the
            XHTML and CSS recommendations.</li>
        <li>The <a href="http://www.google.com/">Google Web site</a> is a popular
            search engine.</li>
    </ul>
</body>
```

In this example, there are different shades of blue for links that have not yet been visited and those that the user has already been to. This helps users navigate a site because they can identify links they have already visited (which helps them find a page again by following a trail of links they have already been to), while also helping them not go to the same page twice if they do not want to.

Usually the colors for links that have and have not been visited are quite similar. This is the case with the links you can see in Figure I-17 (which may be hard to distinguish). For a better idea of how this example works, try it out for yourself (it is available for download along with the rest of the code for this appendix).

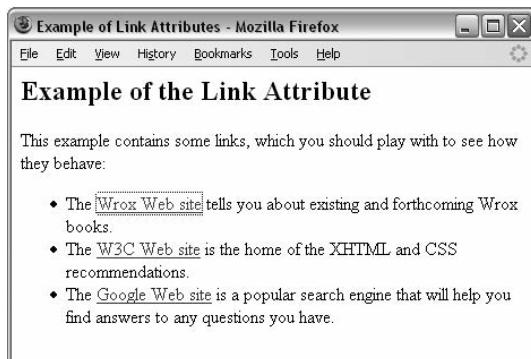


Figure I-17

## Lists

Several elements and attributes relate to lists and are deprecated or no longer permitted, from attributes that helped order and style lists to other elements that created visual effects similar to lists.

### The start Attribute

The `start` attribute is used on the `<ol>` element of ordered lists to indicate at what number a browser should start numbering a list. The default is, of course, 1. For example (`ai_eg18.html`):

```
<body>
<ol start="4">
    <li>This list should start at four</li>
    <li>Therefore this item should be five</li>
    <li>And this item should be six</li>
</ol>
</body>
```

You can see the result of this in Figure I-18.

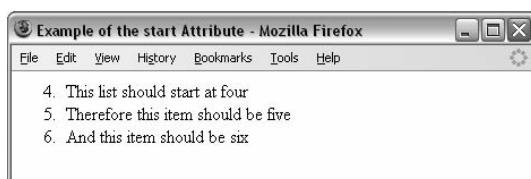


Figure I-18

This has been replaced by CSS counters and the `counter-reset` property. However, these CSS counters are not well supported in browsers yet, so you will probably have to use this attribute if you want a list to start with a number other than 1 and to work in a wide range of browsers.

## Appendix I: Deprecated and Browser-Specific Markup

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### The value Attribute

The `value` attribute was designed to be used on the `<li>` element to indicate what number that line item should be in numbered lists. It therefore allows you to create numbered lists that leave out numbers or are out of sequence. Here you can see an example:

```
<body>
  <ol>
    <li value="3">one</li>
    <li value="7">two</li>
    <li value="1">three</li>
    <li value="9">four</li>
    <li value="4">five</li>
  </ol>
</body>
```

You can see the result and how the points are numbered out of sequence in Figure I-19.

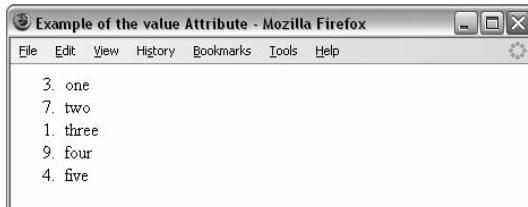


Figure I-19

### The type Attribute

The `type` attribute controls the type of bullet point or numbering (also known as the *marker*) that is used on lists. This attribute can be used on the `<li>`, `<ol>`, and `<ul>` elements.

The table that follows shows different types of markers for bullet points and numbering systems.

Value	Description
disc	A solid circle
square	A solid square
circle	An empty circle
1	Numbers 1, 2, 3, 4
a	Lowercase letters a, b, c, d
A	Uppercase letters A, B, C, D

Value	Description
i	Lowercase Roman numerals i, ii, iii, iv
I	Uppercase Roman numerals I, II, III, IV

The default for unordered lists is the disc, and the default for ordered lists is Arabic numerals such as 1, 2, 3, and so on. Here you can see these values for the `type` attribute in use (`ai_eg20.html`):

```
<body>
  <ul>
    <li type="disc">Disc bullet point</li>
    <li type="square">Square bullet point</li>
    <li type="circle">Circle bullet point</li>
  </ul>

  <ol>
    <li type="1">Numbers</li>
    <li type="a">Lowercase letters</li>
    <li type="A">Uppercase letters</li>
    <li type="i">Lowercase Roman numerals</li>
    <li type="I">Uppercase Roman numerals</li>
  </ol>

</body>
```

You can see each of these in Figure I-20.

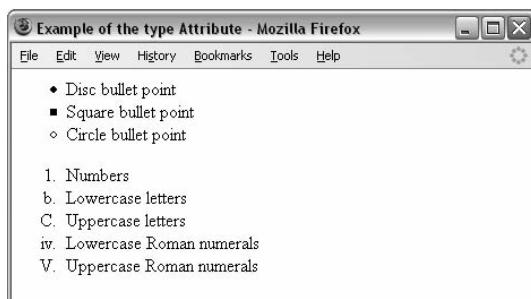


Figure I-20

### ***The <dir> and <menu> Elements***

The `<dir>` and `<menu>` elements were added in the HTML 2.0 specification, and are used to create unordered bulleted lists and nested lists. They are almost exactly the same as each other and the `<ul>` element (`ai_eg21.html`).

```
<dir>
  <li>Item 1</li>
```

## Appendix I: Deprecated and Browser-Specific Markup

---

```
<li>Item 2</li>
<li>Item 3</li>
<li>Item 4</li>
<dir>
  <li>Item 4.1</li>
  <li>Item 4.2</li>
  <li>Item 4.3</li>
  <li>Item 4.4</li>
</dir>
</dir>

<menu>
  <li>Item 1</li>
  <li>Item 2</li>
  <li>Item 3</li>
  <li>Item 4</li>
<menu>
  <li>Item 4.1</li>
  <li>Item 4.2</li>
  <li>Item 4.3</li>
  <li>Item 4.4</li>
</menu>
</menu>
```

You can see the result of each of these elements in Figure I-21.

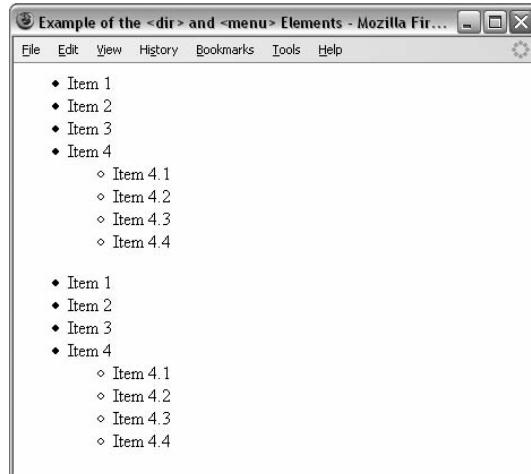


Figure I-21

The `<dir>` element was initially intended to list files in a directory, whereas the `<menu>` element was devised for a menu of links and can therefore be displayed a little bit more compactly in some browsers than the content of `<ul>` and `<dir>` elements. You should simply use the `<ul>` element instead of either of these deprecated elements.

## Tables

There are a couple of attributes that have been deprecated that were previously allowed on the `<table>` element — notably the `align` and `bgcolor` attributes, which you have already met, and the `nowrap` attribute, which is covered next.

### ***The nowrap Attribute***

The `nowrap` attribute used to be available on the `<td>` and `<th>` elements, and prevented the text from wrapping within that table cell. For example:

```
<table width="200">
<tr>
    <td nowrap>This text should not wrap even though the table is only
    supposed to be 200 pixels wide.</td>
</tr>
</table>
```

As you can see in Figure I-22, although the table is supposed to be only 200 pixels wide, it actually stretches for as long as the line — the text does not wrap.



Figure I-22

The replacement for the `nowrap` attribute is the `white-space` property in CSS with the value of `nowrap`.

## Miscellaneous Attributes

This section describes a selection of other elements and attributes that have been deprecated but do not easily fit into one of the preceding sections.

### ***The border Attribute***

The `border` attribute specifies the thickness of a border around an element in pixels. For example, here is an `<img>` element with a `border` attribute (`ai_eg23.html`):

```
<body>
    
</body>
```

## Appendix I: Deprecated and Browser-Specific Markup

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You can see the result in Figure I-23.

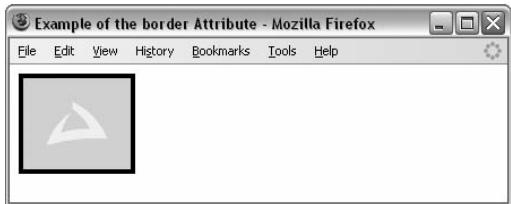


Figure I-23

This attribute has been replaced by the `border-width` property of CSS, but it is still often used — in particular, with images that are links, because IE will, by default, add a single-pixel blue border around any image that is a link.

### ***The compact Attribute***

The `compact` attribute tells the browser to show text with less height between lines than normal. It does not take a value (although if it were used with Transitional XHTML 1.0 it would require a value of `compact`).

The default value is `false`. This attribute has been replaced by `letter-spacing` and `word-spacing` properties.

### ***The language Attribute***

The `language` attribute is supposed to indicate what scripting language should be used for an HTML element — most commonly the `<script>` element. For example:

```
<script language="JavaScript">
```

The `language` attribute has been replaced with the `type` attribute, whose value is a MIME type (for example `type="text/JavaScript"`).

### ***The version Attribute***

The `version` attribute specifies which version of the HTML DTD the document is written according to.

This has been dropped because it duplicates information that should be provided by the `DOCTYPE` declaration.

### ***The <applet> Element***

The `<applet>` element was used to embed Java applets into an HTML page. The element and its attributes were introduced in HTML 3.2 and have been replaced by the `<object>` element, which was discussed in Chapter 3.

The table that follows shows the attributes that `<applet>` can carry.

## Appendix I: Deprecated and Browser-Specific Markup

Attribute	Use
code	The filename of the Java applet's compiled code. The path to the applet file specified by the code is relative to the codebase of the applet (not a URL or absolute path).
codebase	Specifies the directory for the Java applet code. If the codebase attribute is not specified, the applet files are assumed to be in the same directory as the HTML file.
object	Specifies the filename of the Java applet's compiled code that stores a serialized representation of an applet's state. The path to the file should be relative only to the codebase of the applet (not a URL or absolute path).
name	Specifies the name of the element so that scripts can communicate with it (only deprecated for use with the <applet> element).
archive	A space-delimited set of URLs with multiple Java classes or other resources that will be loaded into the browser to improve applet performance (only deprecated for use with the <applet> element).
width	The width of the applet in pixels.
height	The height of the applet in pixels.

## The <embed> Element

The <embed> element was used before the <object> element was introduced into HTML as a way of including a file that required a special plug-in application. For example, it was used to include Flash animations in pages.

The object to be included would be identified using the `src` attribute — just like an image. You indicate the type of content to be included using the `type` attribute, whose value is a MIME type for that resource (or just leave the browser to work it out itself).

The attributes that the <embed> element can take are listed in the table that follows.

Attribute	Use
align	Specifies the alignment of the object within the page or its containing element.
border	Specifies the width of the border for the object in pixels.
height	Specifies the height of the object (in pixels).

*Continued*

## Appendix I: Deprecated and Browser-Specific Markup

Attribute	Use
hidden	Hides the object from the user (making it 0 pixels wide and 0 pixels high). This is particularly useful for audio.
hspace	Specifies the horizontal space that should be left to the left and right of the object (in pixels).
name	As with the name attribute on other elements, this is used to label the element.
palette	In IE, the value is a pair of hexadecimal color values separated by a vertical bar. The first is the foreground color and the second is the background color. In Netscape the palette attribute is either foreground or background, indicating which palette of window system colors the plug-in should use.
pluginspage	Specifies the URL of a Web page from which you can download the plug-in required to use the file (Netscape only).
src	The URL of the object you want to embed.
type	Indicates the MIME type of the object to be included in the page (which determines the plug-in used to view the object).
units	Allows you to change the units of measurement that indicate the height and width of the embedded object from the default of pixels to the relative en unit (half of the width of the text's point size).
vpsace	Specifies the amount of vertical space that should be left to the top and bottom of the object (in pixels).
width	Specifies the width of the object in pixels.

The <embed> element can also carry attributes that are specific to the plug-in required to view them. You should refer to the documentation for the particular plug-in you need to use for documentation on these attributes, as there are too many to list here.

*If you are using Macromedia Flash to include graphics in your pages, you will find that the publishing tool that gives you the HTML code to include Flash animations in your pages not only uses the <object> element to include the animation in the page, but also provides the <embed> element for any browser that is older and does not understand the <object> element.*

## The <isindex> Element

The <isindex> element was introduced in HTML 2.0 to create a single-line text field without the need for a <form> element (the user's entry would be sent using the HTTP get method). When the user presses the Enter (or Return) key the form is submitted and spaces are replaced with a + character. (A program or page on the server would then have to respond to, or act upon, the data sent.)

## Appendix I: Deprecated and Browser-Specific Markup

When it is displayed, the text box will have a horizontal rule above and beneath it.

While you can use several `<isindex>` tags, only the last one with content will be sent to the server. It can also carry the `prompt` attribute, which allows you to provide a hint to users as to what they should be entering into the box. For example, here is an `<isindex>` element used to create a search box (`ai_eg24.html`):

```
<body>
  <isindex prompt="search">
</body>
```

You can see the result of this with its horizontal lines in Figure I-24.

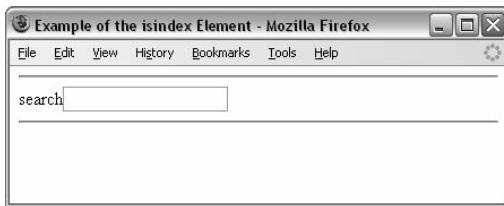


Figure I-24

### The `<nobr>` Element

Firefox, Netscape, and IE all support an extension to the XHTML recommendation that prevents line breaks: the `<nobr>` element. (This retains the normal style of its containing element and does not result in the text being displayed in a monospaced font.) If you choose to use the `<nobr>` element, it can contain another child element called `<wbr>` to indicate where a break can occur within a `<nobr>` element, although this is an extension as well.

### IE-Specific Elements

The table that follows lists five elements that IE supports that are not part of the HTML recommendations. You should generally avoid these elements unless you are providing different pages for different browsers or you know all your visitors will be using IE.

Element	IE	Purpose
<code>&lt;bgsound&gt;</code>	2	Plays a sound file in the background (replaced by the <code>&lt;object&gt;</code> element)
<code>&lt;marquee&gt;</code>	2	Renders text in a scrolling fashion
<code>&lt;ruby&gt;</code>	5	Provides pronunciation support

*Continued*

## Appendix I: Deprecated and Browser-Specific Markup

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Element	IE	Purpose
<rt>	5	Provides pronunciation support
<xml>	5	Creates an XML data island, embedding an XML recordset into the page

### IE-Specific Attributes

The following table lists IE-specific attributes.

Attribute	Purpose
atomicselection	Specifies whether the grouping element and its content must be selected as a whole.
balance	The balance of audio between the left and right speakers (used with <bgsound>).
behavior	Specifies how content of a <marquee> element scrolls.
bgproperties	Sets a fixed background image for a page; also known as a watermark.
bordercolordark	Specifies the darker of the colors used when cells in a table are rendered with 3D borders. Used on the <table> element.
bordercolorlight	Specifies the lighter of the colors used when cells in a table are rendered with 3D borders. Used on the <table> element.
bottommargin	Specifies the bottom margin for the page in pixels. Used on the <body> element.
contenteditable	Determines whether the content of a grouping element can be edited by a user.
dataformatas	Sets or retrieves whether data contained by the grouping element should be displayed as text or HTML.
datafld	Used in databinding when the browser is connected to a server-side database (see a reference on ASP for more information).
datasrc	Used in databinding when the browser is connected to a server-side database (see a reference on ASP for more information).
datapagesize	Used in databinding when the browser is connected to a server-side database (see a reference on ASP for more information).

## Appendix I: Deprecated and Browser-Specific Markup

---

Attribute	Purpose
direction	Indicates the direction of scrolling text within a <marquee> element.
dynsrc	Used for embedding movies into client-side caches.
framespacing	Specifies the amount of space between frames in a frameset in pixels.
hidefocus	Used to prevent a visible line showing around an element when it is in focus.
leftmargin	Specifies the left margin for the page in pixels. Used on the <body> element.
rightmargin	Specifies the right margin for the page in pixels. Used on the <body> element.
loop	Specifies the number of times the content of a <marquee> element should scroll.
lowsrc	Allows you to specify a low-resolution version of an image on an <img> element that should be loaded first.
scrolldelay	Specifies the time delay in milliseconds between each drawing of the <marquee> element. (The default is that it is redrawn every 60 milliseconds.)
topmargin	Specifies the top margin for the page in pixels. Used on the <body> element.
truespeed	A Boolean attribute indicating whether the scrolldelay value should be used. Default is false; if true, the <marquee> element will use the values that are indicated in scrollamount and scrolldelay attributes. (Any value under 60 milliseconds is ignored.)
unselectable	Indicates an element cannot be selected.
volume	Indicates the volume at which the content of a <bgsound> element should be played, with values from -10000 to 0 (default is 0, which is full volume).

Note that when a table is being used to control the whole layout of a page and the page appears in the very top-left corner of IE without a white border around the edge, the page sometimes uses the topmargin and leftmargin attributes on the <body> element to indicate that there should be no margin around the edges.

```
<body topmargin="0" leftmargin="0" border="0">
```

## Appendix I: Deprecated and Browser-Specific Markup

---

You can safely use the `topmargin` and `leftmargin` attributes in Transitional XHTML, as Netscape and other browsers should simply ignore the attributes they do not understand, although they would not be valid as they are not part of the markup. (Validation is discussed in Chapter 13.)

### IE-Specific CSS Styles

The table that follows lists some CSS styles that are supported only by IE (and the version they were introduced with).

Property	IE	Purpose
<code>behavior</code>	5	Determines how text in a <code>&lt;marquee&gt;</code> element scrolls.
<code>ime-mode</code>	5	Allows input of Chinese, Japanese, and Korean characters when used with an input method indicator.
<code>layout-grid</code>	5	Shorthand for other layout-grid properties.
<code>layout-grid-char</code>	5	Specifies the size of the character grid for rendering text (similar to <code>line-height</code> property).
<code>layout-grid-charspacing</code>	5	Specifies spacing between characters (similar effect to <code>line-height</code> ).
<code>layout-grid-line</code>	5	Specifies grid line value used to render text (similar to <code>line-height</code> ).
<code>layout-grid-mode</code>	5	Specifies whether the grid uses one or two dimensions.
<code>layout-grid-type</code>	5	Specifies the type (if any) of page layout grid to be used when rendering an element's content.
<code>line-break</code>	5	Specifies rules for when a line should break in Japanese.
<code>ruby-align</code>	5	Specifies horizontal alignment of the text in an <code>&lt;rt&gt;</code> element.
<code>ruby-overhang</code>	5	Specifies whether text in the <code>&lt;rt&gt;</code> element will hang over the edge of non-ruby content if wider than it.
<code>ruby-position</code>	5	Specifies the position of the text specified in the <code>&lt;rt&gt;</code> element (above or inline).
<code>text-autospace</code>	5	Controls the autospacing and narrow space width adjustment behavior of text; of particular use with ideographs used in Asian languages.

## Appendix I: Deprecated and Browser-Specific Markup

Property	IE	Purpose
text-justify	5	Justifies text in an element.
text-kashida-space	5.5	Controls the ratio of kashida expansion to white-space expansion when justifying text in an element. A kashida is a typographic effect that justifies lines of text by elongating certain characters in specific points; often used in Arabic.
text-underline-position	5.5	Specifies how far an underline should appear beneath the text when the <code>text-decoration</code> property is used.
word-break	5	Controls line breaking within words; of particular use with documents containing multiple languages.
word-wrap	5.5	Controls where a long word should break if it is too large for its containing element.
writing-mode	5.5	Controls horizontal and vertical direction of flow of content in object.
zoom	5.5	Specifies magnification scale of an object.

The `layout-grid` properties are used with Asian languages that often employ page layout for characters in order to format text using a one- or two-dimensional grid.

There are also several CSS styles that are particular to the presentation of a scrollbar. It does not hurt to add these properties to any CSS style sheet, as browsers that do not understand these properties will just ignore them. All colors can be specified as a color name, hex code, or RGB value (as with all colors in CSS).

Property	IE	Purpose
scrollbar-3dlight-color	5.5	Color of top-left edges of scroll box and scroll arrows on the scrollbar
scrollbar-arrow-color	5.5	Color of the arrows on a scroll arrow
scrollbar-base-color	5.5	Color of main elements of a scrollbar, which includes the scroll box, track, and scroll arrows
scrollbar-darkshadow-color	5.5	Color of the gutter of a scrollbar
scrollbar-face-color	5.5	Color of the scroll box and scroll arrows of a scrollbar

*Continued*

## Appendix I: Deprecated and Browser-Specific Markup

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Property	IE	Purpose
scrollbar-highlight-color	5.5	Color of the top-left edges of the scroll box and scroll arrows of a scrollbar
scrollbar-shadow-color	5.5	Color of the bottom and right edges of the scroll box and scroll arrows of a scrollbar

## Netscape-Specific Elements and Attributes

The table that follows shows the elements that are supported by Netscape only. The versions of Netscape that support these elements are given in the Versions column of the table.

Element	Versions	Use
<blink>	2, 3, 4, 6, 7	Makes the content of the element blink on and off. (The CSS2 <code>text-decoration</code> property has a value of <code>blink</code> that does not work in current browsers.)
<ilayer>	4	Creates an inline layer that can contain a different page from the one currently in view in a separate section of the HTML document. The <iframe> element in HTML 4 can create similar effects. It differs from the <layer> tag in that it is relatively positioned — not absolutely positioned.
<keygen>	2, 3, 4, 6, 7	Used to generate an encryption key for forms submitted from an HTML document (lives inside the form, creates a select list of available encryption key sizes, requires that the client has a certificate installed, and uses proprietary Netscape encryption schemes).
<layer>	4	Creates a layer that can contain a different page from the one currently in view in a separate section of the HTML document. The <div> element in HTML 4 can create similar effects.
<multicol>	2, 3, 4	Allows the user to define multiple-column formatting — such as newspaper-style columns. You use a table or CSS positioning to create a similar effect in XHTML.
<noembed>	2, 3, 4, 6, 7	Renders HTML text for browsers unable to support the <embed> element.

## Appendix I: Deprecated and Browser-Specific Markup

Element	Versions	Use
<nolayer>	4	Renders HTML text for browsers unable to render the content of a <layer> element.
<spacer>	3, 4	Renders white space in an HTML document.

### Netscape-Specific Attributes

The following table contains the attributes that are supported by Netscape only.

Attribute	Netscape Versions	Purpose
above	4	Indicates which layer should appear on top of the other if two layers overlap. Used on <layer> and <ilayer> elements (such as “bring to top” in a desktop publishing program).
below	4	Indicates which layer should appear on the bottom if two layers overlap. Used on <layer> and <ilayer> elements (like “send to back” in a desktop publishing program).
challenge	2	Used on the <keygen> element to specify the string value that the encrypted key value is packed into.
clip	4	Specifies an area in pixels that should be clipped so that the browser shows only the indicated content, which is specified using four values representing the <i>x</i> , <i>y</i> positions from the top-left corner and bottom-right corner. Used on <layer> and <ilayer> elements.
gutter	3, 4	Used on the <multicol> element to indicate the number of pixels between each column.
hidden	4	Used with the <embed> element to indicate that an object should not be visible to the viewer. Other items in the page should flow around it normally. Typically used for embedding sound files into a page where you do not want the user to see the object.
left	4	Specifies the horizontal offset of the parent element within the document. Value given in pixels. Used with <layer> and <ilayer> elements.

*Continued*

## Appendix I: Deprecated and Browser-Specific Markup

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Attribute	Netscape Versions	Purpose
mayscript	3, 4, 6, 7	Boolean attribute used on the <code>&lt;applet&gt;</code> element to indicate whether the Java applet will be able to access JavaScript features. Must be set to <code>yes</code> if an applet accesses JavaScript — otherwise the browser will crash.
pagex	4	Specifies the horizontal position of the layer in relation to the page (given in pixels). Used with <code>&lt;layer&gt;</code> and <code>&lt;ilayer&gt;</code> elements.
pagey	4	Specifies the vertical position of the layer in relation to the page (given in pixels). Used with <code>&lt;layer&gt;</code> and <code>&lt;ilayer&gt;</code> elements.
pluginspage	4, 6, 7	Used on the <code>&lt;embed&gt;</code> element to indicate the URL of a web page that allows users to download an embedded object if they do not have it installed.
point-size	4, 6, 7	Specifies the size of a font in points.
top	4	Specifies the vertical offset from the parent element. Value given in pixels. Used with <code>&lt;layer&gt;</code> and <code>&lt;ilayer&gt;</code> elements.
weight	4, 6, 7	Specifies the weight of a font (normal or bold).
z-index	4	Indicates which layer should be on top of, or underneath, others when they overlap. The value is a number above 0; the higher the number, the nearer to the top the layer is.

# Index

## SYMBOLS

-- (decrement) operator, 425  
/ / (slash) characters, 407  
/ (division) operator, 425  
- (subtraction) operator, 425  
+ (addition) operator, 425  
&& (And) operator, 427  
r (carriage return), 463  
d (digit), 463  
== (equal to) operator, 426  
f (form-feed), 463  
> (greater than) operator, 426  
>= (greater than or equal to) operator, 426  
++ (increment) operator, 425  
< (less than) operator, 426  
<= (less than or equal to) operator, 426  
n (linefeed), 463  
% (modulus, division remainder) operator, 425  
\* (multiplication) operator, 425  
D (non-digit), 463  
S (non-white-space character), 463  
W (non-word character), 463  
!= (not equal to) operator, 426  
! (Not) operator, 427  
?? (Or) operator, 427  
t (tab), 463  
v (vertical tab), 463  
s (white-space character), 463  
w (word), 463

## A

### **<a> element, 6**

accesskey attribute, 67–68  
attributes  
accesskey, 565  
charset, 68, 565  
coords, 68–69, 565  
href, 565  
hrelang, 69, 565  
rel, 69–70, 565

rev, 70, 565  
shape, 70, 565  
tabindex, 70, 565  
target, 70, 565  
title, 70  
type, 71, 565  
destination anchor, 66  
source anchor, 65–66  
**abbr attribute, 601, 604**  
**<abbr> element, 31, 565**  
**abbreviations, 31**  
**above attribute, <layer> element, 590**  
**above the fold information, 331**  
**abs( ) method, 445**  
**absolute positioning, 309–310**  
**absolute URLs, 59**  
**accept attribute, <form> element, 576**  
**access keys, 175–176**  
**accessibility checkers, 514–515**  
**accesskey attribute, 67–68**  
    <a> element, 565  
    <area> element, 567  
    <body> element, 569  
    <button> element, 571  
    <input type="button"> element, 582  
    <input type="checkbox"> element, 582  
    <input type="file"> element, 583  
    <input type="image"> element, 584  
    <input type="password"> element, 585  
    <input type="radio"> element, 586  
    <input type="reset"> element, 586  
    <input type="submit"> element, 587  
    <input type="text"> element, 587  
    <isindex> element, 588  
    <label> element, 589  
    <legend> element, 590  
    <marquee> element, 592  
**acos( ) method, 445**  
**<acronym> element, 31, 565**  
**acronyms, 31**  
**action attribute, 576, 588**

# :active pseudo class

---

:active pseudo class, 296  
addition (+) operator, 425  
<address> element, 35, 565  
adjacent sibling selector, 245  
:after pseudo-element, 297–298  
alert( ) method, 449  
**align attribute, 19–21, 692–693**  
  <caption> element, 571  
  <col> element, 572  
  <colgroup> element, 572  
  <div> element, 574  
  <embed> element, 575  
  <fieldset> element, 575  
  headings, 19–21  
  <hn> elements, 578  
  <hr /> element, 579  
  <iframe> element, 206, 580  
  <img> element, 87–88, 581  
  <legend> element, 590  
  <p> element, 597  
  <table> element, 113–114, 600  
  <tbody> element, 601  
  <td> element, 601  
  <tfoot> element, 603  
  <th> element, 604  
  <thead> element, 603  
  <tr> element, 117–118, 605  
**alignment, text, readability and, 365**  
**alink attribute, <body> element, 569**  
**alinkColor property (DOM), 413**  
**alphabetic characters, testing for, 465**  
**alphanumeric characters, testing for, 465**  
**alt attribute, 87**  
  <area> element, 567  
  <img> element, 581  
  <input type="image"> element, 584  
**anchor( ) method, 438**  
**anchor collection (DOM), 411**  
**anchor element, 65, 66**  
**angle brackets, 3**  
**animated GIFs, 82**  
**animation, Scriptaculous, 488–490**  
**APIs (Application Programming Interfaces), 405**  
**applet collection (DOM), 411**  
  <applet> element, 566, 704–705  
**archive attribute, 95**  
**area collection (DOM), 411**  
  <area> element, attributes, 567  
**arguments, 414**  
**arithmetic operators, 425**  
**array object, 446–447**  
**ASCII (American Standard Code for Information), 645**  
**asin( ) method, 445**  
**ASP.NET, 531–532**  
**assignment operators, 425–426**  
**atan( ) method, 445**  
**atan2( ) method, 445**  
**attribute groups, 11, 12–16**  
**attribute selectors, 247–248**  
**attributes, 6–7**  
  elements, 6–7  
  headers, 602, 604  
  IE-specific, 708–710  
  Internationalization, 14–15  
  names, 12  
  Netscape-specific, 713–714  
  rules, 116–117, 600  
  scope, 602, 604  
  text, 570, 685  
  UI events, 15–16  
  values, 12  
  xml, 564  
**author name, 507**  
**auto-completing text, YUI (Yahoo User Interface), 495–496**  
**auto-typing between fields, 471–472**  
**axis attribute, 601, 604**

## B

**<b> element, 26, 568**  
**back( ) method, 449**  
**background**  
  background attribute, 690  
  bgcolor attribute, 689–690  
  CSS, 275–276  
    background-attachment property, 282  
    background-color property, 276  
    background-image property, 277–278  
    background-position property, 281  
    background property, 283  
    background-repeat property, 278–280  
  images, text readability and, 366–367  
  properties, CSS, 614–617  
  transparent, 81  
**background-attachment property, 282**

**background attribute**, 690  
 <body> element, 570  
 <layer> element, 590  
 <table> element, 600  
 <td> element, 601  
 <th> element, 604  
 <tr> element, 605  
**background-color property**, 276  
**background-image property**, 277–278  
**background-position property**, 281  
**background property**, 283  
**background-repeat property**, 278–280  
**backslashes**, 463  
**banding**, 80  
**<base> element**, 64–65  
 attributes, 568  
 <head> element, 10  
**<basefont> element**, 568, 686–687  
**<bdo> element**, dir attribute, 568  
**:before pseudo-element**, 297–298  
**behavior attribute**, <marquee> element, 592  
**below attribute**, <layer> element, 590  
**bgcolor attribute**, 118, 689–690  
 <body> element, 570  
 <col> element, 572  
 <colgroup> element, 572  
 <layer> element, 590  
 <marquee> element, 592  
 <table> element, 114, 600  
 <td> element, 601  
 <th> element, 604  
 <tr> element, 605  
**bgcolor property (DOM)**, 413  
**bgproperties attribute**, <body> element, 570  
**<bgsound> elements, attributes**, 569  
**big( ) method**, 438  
**<big> element**, 28, 569  
**binary operators**, 424  
**bitmap images**, 78–79  
**bitmapped graphics**, 78  
**<blink> element**, 569  
**block elements**, 48–49  
**<blockquote> element**, 32, 569  
**blogs**, 529–530  
**blur( ) method**, 417, 449  
**body content**, 11  
**<body> element**, 5, 11  
 attributes, 569–570  
**bold( ) method**, 438  
**bold text**, 26  
**Boolean data types**, 451  
**Boolean operators**, 427  
**border attribute**, 88, 95, 703–704  
 <embed> element, 575  
 <frameset> element, 192, 577  
 <img> element, 581  
 <input type="image"> element, 584  
 <table> element, 114–115, 600  
 <td> element, 601  
 <th> element, 604  
 <tr> element, 605  
**border-collapse property**, 289–291  
**border property**, 419  
**bordercolor attribute**  
 <frame> element, 576  
 <frameset> element, 577  
 <table> element, 600  
 <td> element, 601  
 <th> element, 604  
 <tr> element, 605  
**bordercolordark attribute**  
 <table> element, 600  
 <td> element, 602  
 <th> element, 604  
 <tr> element, 605  
**bordercolorlight attribute**  
 <table> element, 600  
 <td> element, 602  
 <th> element, 604  
 <tr> element, 605  
**borders**  
 collapsing, 290  
 displaying, 289–291  
 properties, CSS, 617–619  
 spacing, 291  
**bottom navigation**, 344  
**box model**, 251–255  
**box offset properties**, 307  
**<br /> element, attributes**, 570  
**<br> element, line breaks**, 21–22  
**break statement**, 435  
**browser-specific markup**, 681  
**built-in objects**, 422  
 array object, 446–447  
 date object, 442–44  
 math object, 445  
 string, 437–439  
 window object, 447–449

## <button> element

---

**<button> element, attributes, 571**

**buttons, 150**

<button> element, 153  
creating, 150–152  
images as, 152–153  
placement, 394

## C

**caching web pages, preventing, 505**

**calendars, YUI (Yahoo User Interface), 494–495**

**calling functions, 428**

**<caption> element, attributes, 571**

**caption-side property, 292**

**carriage returns, 17, 463**

**case conversion, 474**

**case sensitivity**

  JavaScript, 449  
  XHTML, 8

**ceil( ) method, 445**

**cellpadding attribute, 115, 600**

**cells (tables)**

  empty-cells property, 292–294  
  introduction, 109

**cellspacing attribute, 115, 600**

**<center> element, 571, 691–692**

**challenge attribute, <keygen> element, 589**

**<changemages> function, 483**

**char attribute, 118**

  <col> element, 572  
  <colgroup> element, 572  
  <tbody> element, 601  
  <td> element, 602  
  <tfoot> element, 603  
  <th> element, 604  
  <thead> element, 603  
  <tr> element, 605

**character encoding, 507, 645–647**

**character set, 305**

**characters**

  escaping, 463  
  forms validation, 462–464  
  searching for, 463  
  special characters, 47, 649–663  
  testing, 464–465

**charAt( ) method, 438**

**charoff attribute, 118**

  <col> element, 572  
  <colgroup> element, 573  
  <tbody> element, 601

**<td> element, 602**

**<tfoot> element, 603**

**<th> element, 604**

**<thead> element, 603**

**<tr> element, 605**

**charset attribute, 68**

  <a> element, 565  
  <link> element, 591  
  <meta> element, 593  
  <script> element, 598

**@charset rule, 305**

**checkboxes, 154–155, 383**

  check/uncheck all, 476–477  
  forms validation and, 468–469  
  requiring selection, 469–470

**checked attribute, 582, 586**

**child elements, 5**

**child selector, 244–245**

**cite attribute, 569**

  <blockquote> element, 32  
  <del> element, 573  
  <ins> element, 588  
  <q> element, 598

**<cite> element, 33–34, 572**

**class attribute, 13, 564**

  <br /> element, 570  
  <frame> element, 577  
  <head> element, 578  
  <hr /> element, 579  
  <html> element, 579  
  <isindex> element, 588  
  <keygen> element, 589

**class selector, 244**

**classid attribute, 95**

**classification properties, CSS, 632–634**

**clear attribute, 570, 697–698**

**clear property, 314–315**

**click( ) method, 417**

**client-side image maps, 100, 102–105**

**clip attribute, <layer> element, 590**

**close( ) method, 449**

**closed property, 448**

**closing tags, 4**

**<code> element, 34**

**codebase attribute, 95**

**codetype attribute, 95**

**<col> element, attributes, 572**

**<colgroup> element, 130–132, 572–573**

**collections (DOM), 410**

# CSS (cascading style sheets)

**color**  
background-color property, 276  
banding, 80  
color names, 639–644  
depth, site testing, 514  
dithering, 80  
forms, 395–396  
hexadecimal codes, 637–638  
indexed color format, 79  
links, 274  
properties, CSS, 614–617

**color attribute**  
<basefont> element, 568  
<font> element, 576  
<hr /> element, 579

**cols attribute, 189–191**  
<frameset> element, 577  
<multicol> element, 593  
<table> element, 600

**colspan attribute**  
<td> element, 602  
<th> element, 604

**columns (frameset), 189–191**  
percentage, 190–191  
pixels, 190  
relative width between, 191  
sacrificial columns, 353–354  
single-column layout, 348–350  
three-column layout, 353–354  
two-column layout, 350–352  
wildcard symbol, 191

**columns (tables)**  
grouping, 130–132  
introduction, 109  
spanning, 128–129  
styles, sharing, 132

**columns (text), width, readability, 366**

**<comment> element, attributes, 573**

**comments, 47–48, 408**

**common events, 16**

**compact attribute, 704**  
<dl> element, 574  
<ol> element, 596  
<ul> element, 606

**comparison operators, 426**

**complete property, 419**

**compression**  
JPEGs, 82  
lossless, 81

lossy, 81  
LZW, 81

**concat( ) method, 447**

**conditional operator, 432**

**conditional statements**  
if statements, 429–430  
if...else statements, 430  
switch statements, 431–432

**confirm( ) method, 449**

**content attribute, <meta> element, 593**

**content management, 532–535**

**content pages, 345–346**

**content property, 298–300**

**controls**  
disabled, 176–177  
forms  
checkboxes, 383  
<fieldset> elements, 385  
grouping, 384–387  
labelling, 387–389  
radio buttons, 383  
relevant information, 391–393  
select boxes, 384  
text boxes, 384  
title attribute, 394–395  
hidden, 165–166  
labels, 169–171  
read-only, 176–177

**controls attribute, <img> element, 581**

**converting case, 474**

**cookies, setting, 507**

**coords attribute, 68–69**  
<a> element, 565  
<area> element, 567

**core attributes, 12–14**

**cos( ) method, 445**

**counters, 299–300**

**credentials, 60**

**credit card details, testing for, 465**

**CSS (cascading style sheets), 211**  
backgrounds, 275–283  
border properties, 255–258  
box model, 251–255  
declaration, 212  
dimensions, 260–265  
external, 220–221  
font test page, 240–243  
fonts, 223–230  
forms, 396–397

## CSS (cascading style sheets) (*continued*)

---

### **CSS (cascading style sheets) (*continued*)**

IE-specific styles, 710–712  
importing styles, 304–305  
inheritance, 216–217  
lengths, 249–250  
`<link>` element, 218–219  
links, 274–275  
lists, 283–287  
margin property, 259–260  
modularized style sheets, 304–305  
outlines, 294–296  
padding property, 258–259  
positioning and, 305–315  
properties, 212, 221–223  
background, 614–617  
borders, 617–619  
classification, 632–634  
color, 614–617  
dimensions, 619–621  
font-family, 368  
fonts, 607–611  
internationalization, 634–635  
lengths, 635  
lists, 623–625  
margins, 622  
outlines, 630  
padding, 622–623  
positioning properties, 625–629  
tables, 630–632  
text, 611–614  
pseudo classes, first-letter, 239–240  
rules, 212  
    adding, 217–221  
selectors, 212  
    adjacent sibling selector, 245  
    attribute selectors, 247–248  
    child selector, 244–245  
    class selector, 244  
    descendent selector, 245  
    id selector, 244  
    type selector, 243  
    universal, 243  
`<style>` element, 220  
style sheet for code, 265–270  
tables, 287–289  
    border-collapse property, 289–291  
    border-spacing property, 291  
`<caption>` element, 288  
caption-side property, 292

empty-cells property, 292–294  
`<table>` element, 288  
table-layout property, 294  
`<td>` element, 288  
`<th>` element, 288  
text formatting, 230–231  
color property, 231  
direction property, 238–239  
letter-spacing property, 236  
text-align property, 231–232  
text-indent property, 234–235  
text-shadow property, 234–235  
text-transform property, 235–236  
unicode-bidi property, 239  
vertical-align property, 232–233  
white-space property, 237  
word-spacing property, 237  
validation, 509–512  
values, 212  
**currency, testing for, 465**  
**cursor property, 301–302**  
**Cute FTP, 521**

## D

**data attribute, 96**  
**data object, parameters, 441**  
**data types, JavaScript, 450–451**  
**date( ) method, 442**  
**date object, 441–444**  
**datetime attribute, 573, 588**  
**<dd> element, attributes, 573**  
**decimal numbers, testing for, 465**  
**declare attribute, 96**  
**decrement (- -) operator, 425**  
**defaultStatus property, 448**  
**defer attribute, <script> element, 598**  
**defining functions, 428**  
**definition lists, 39–40**  
**<del> element, 46–47**  
**deleting, text, 46–47**  
**deprecated markup, 681**  
**descendent selector, 245**  
**designing pages**  
    content pages, 345–346  
    CSS and, 356  
    forms  
        controls, 382–384  
        group-related information, 381

- information provided, 381  
 layout, 387–397  
 listing required information, 380–381  
 paper forms and, 381  
 home pages, 345  
 influence of images on, 341  
 links  
   images as, 375  
   text links, 375  
 navigation, 342–343  
 bottom, 344  
 left, 343  
 menus, 369–374  
 right, 345  
 top, 343  
 top and left, 344  
 site searches  
   Google, 376–378  
   usability and, 376  
 sketching element placement, 337–339  
 structuring pages, 346–347  
   sacrificial columns, 354–355  
   single-column layout, 348–350  
   three-column layouts, 353–354  
   two-column layouts, 350–352  
 style, 339–342  
 tables, shading multiple rows, 378–379  
 text  
   alignment, 365  
   background images, 366–367  
   column width, 366  
   fonts, 367–368  
   line height, 365–366  
   white space and, 362–364  
 wireframe model, 338
- <dfn> element, 32, 573**
- digit (d), 463**
- dimensions, properties, CSS, 619–621**
- dir attribute, 14, 115, 564**
- <bdo> element, 568
  - <head> element, 578
  - <hr /> element, 579
  - <html> element, 579
  - <isindex> element, 588
  - <meta> element, 593
  - <title> element, 605
- <dir> element, 574, 701–702**
- direction attribute, <marquee> element, 592**
- directories, 57**
- directory structures, 57, 509**
- disabled attribute**
- <button> element, 571
  - <input type="button"> element, 582
  - <input type="checkbox"> element, 582
  - <input type="file"> element, 583
  - <input type="image"> element, 584
  - <input type="password"> element, 585
  - <input type="radio"> element, 586
  - <input type="reset"> element, 586
  - <input type="submit"> element, 587
  - <input type="text"> element, 587
  - <optgroup> element, 596
  - <option> element, 597
  - <select> element, 598
- disabled controls, 176–177**
- discussion boards, 530**
- display property, 302**
- dithering, 80**
- <div> element, 49–50, 489**
- attributes, 574
  - liquid designs, 334
- division (/) operator, 425**
- <dl> element, 39–40, 574**
- do while loops, 433, 434**
- DOCTYPE, 8–9, 187**
- document property, 448**
- document type declaration, 8–9**
- documents**
- linking to, 54–56
  - structure, 3
- DOM (document object model), 405**
- alinkColor property, 413
  - bgcolor property, 413
  - collections, 410–411, 415–416
  - fgcolor property, 413
  - introduction, 410–412
  - lastModified property, 413
  - linkColor property, 413
  - methods and, 410
  - properties and, 410
  - referrer property, 413
  - scriptable objects, 410
  - title property, 413
  - vlinkColor property, 413
  - write method, 414
  - writeln method, 414
- domain name, obtaining, 517–518**
- dot notation, 411**

**dots per inch, 79**  
**drag-and-drop, Scriptaculous, 490–492**  
**drop-down navigation menus, 497**  
**<dt> element, 574**  
**dynsrc attribute, <img> element, 581**

## E

### e-mail

addresses  
  hiding, 497  
  testing for, 465  
forms example, 477–482  
linking to addresses, 56–57  
**E property, 444**  
**editing, text, inserting, 46**  
**editing text, deleting, 46–47**  
**elements, 4**  
  [a](#), 6, 65  
  abbr, 31, 565  
  acronym, 31, 565  
  address, 35, 565  
  applet, 566, 704–705  
  area, 567  
  basefont, 565  
  attributes, 6–7  
  **b**, 26, 568  
  base, 64–65, 568  
  basefont, 686–687  
  **bdo**, 568  
  bgsound, 569  
  big, 28, 569  
  blink, 569  
  block elements, 48–49  
> blockquote

, 32, 569  
  body, 5, 11, 569–570  
    
  , 21–22  
    
  , 570  
  button, 153, 570  
  caption

, 571  
  center, 571, 691–697  
  child, 5  
  < cite>cite, 33–34, 572  
  `code`, 34, 572  
  col, 572  
  colgroup, 130–132, 572–573  
  comment, 573  
:   dd
, 573  
  ~~del~~, 46–47, 573  
  dfn, 32, 573

dir, 574, 701–702  

div

, 49–50, 574  

dl

, 39–40, 574  

dt
, 574  
  *em*, 30, 574  
  embed, 575, 705–706  
  empty elements, 21  
  fieldset, 171–173, 575  
  font, 48, 576, 683–685  
  form, 140, 576  
  frame, 195–197, 576–577  
  frameset, 186, 577–578  
  grouping, 49–50  
  head, 5, 10–11, 578  
  hn, 578  
  

---

hr, 28, 579  
  html, 9–10, 579–580  
  *i*, 26–27, 580  
  IE-specific, 707–708  
  iframe, 580  
  img, 86, 580–582  
  inline elements, 48–49  
  input, 582  
  input, 582–583  
  input, 583  
  input, 584  
  input, 584  
  input, 585  
  input, 585–586  
  input, 586  
  input, 587  
  input, 587–588  
  ins, 46, 588  
  inside another, 6  
  isindex, 588–589, 706–707  
  `kbd`, 34–35, 589  
  keygen, 589  
  label, 169–171, 589  
  layer, 589  
  legend, 171–173, 590  
- li
, 574, 591, 593  
  link, 591  
  listing, 591, 688–689  
  map, 592  
  marquee, 592  
  menu, 593, 701–702  
  meta, 502, 593  
  multicol, 593  
  nesting, 6  
  Netscape-specific, 712

<nextid>, 594  
 <nobr>, 594  
 <noembed>, 594  
 <noframes>, 186, 197–198, 577, 594  
 <nolayer>, 594  
 <noscript>, 408, 594  
 <object>, 93–94, 594  
 <ol>, 37–39, 596  
 <optgroup>, 596  
 <option>, 159, 597  
 <p>, 21, 597  
 <param>, 97–98, 567, 596, 597  
 parent, 5  
 <plaintext>, 597, 688–689  
 <pre>, 22–23, 597  
 <q>, 33, 598  
 <s>, 27, 598, 687  
 <samp>, 35, 598  
 <script>, 406, 598  
 <select>, 158–159, 598–599  
 <small>, 28, 599  
 <span>, 49–50, 599  
 <strike>, 27, 599, 687  
 <strong>, 30, 599  
 <style>, 599  
 <sub>, 28, 599  
 <sup>, 28, 599  
 <table>, 109, 600–601  
 tags, 4  
     comparison, 5  
 <tbody>, 126, 601  
 <td>, 601–602  
 <textarea>, 602–603  
 <tfoot>, 126, 603  
 <th>, 110, 604  
 <thead>, 126, 603  
 <title>, 11, 605  
 <tr>, 605  
 <tt>, 27, 606  
 <u>, 27, 606, 687–688  
 <ul>, 36–37, 606  
 <var>, 35, 606  
 <wbr>, 606  
 <xmp>, 606, 688–689  
**<em> element, 30, 574**  
**em units, 250**  
**<embed> element, 575, 705–706**  
**emphasis, 30**  
**empty-cells property, 292–294**  
**empty elements, 21**

**enctype attribute, <form> element, 576**  
**equal to (==) operator, 426**  
**escaping characters, 463**  
**events**  
     common events, 16  
     intrinsic, 435  
     onblur, 437  
     onchange, 437  
     ondblclick, 436  
     onfocus, 437  
     onkeydown, 436  
     onkeypress, 436  
     onkeyup, 436  
     onload, 436  
     onmousedown, 436  
     onmousemove, 436  
     onmouseout, 436  
     onmouseover, 436  
     onmouseup, 436  
     onreset, 437  
     onselect, 437  
     onsubmit, 437  
     onunload, 436  
     triggering, 407  
     UI events, 16  
     user events, 435  
     window events, 435  
**ex units, 250**  
**exp( ) method, 445**  
**expiring web pages, 505**  
**explicit labels, 387**  
**expressions, 414**  
**external JavaScript, 409**

## F

**face attribute, 568, 576**  
**Fetch, 521**  
**fgcolor property (DOM), 413**  
**fields (forms)**  
     auto-tabling, 471–472  
     trimming spaces from beginning and end, 474–475  
**<fieldset> element, 171–173, 385, 575**  
**file, size, 84–85**  
**file select boxes, 164–165**  
**filepath, 60**  
**FireFTP, 521**  
**first-letter pseudo class, 239–240**  
**fixed( ) method, 438**

# fixed positioning

---

**fixed positioning, 310–311**

**fixed-size fonts, screen resolution and, 369**

**fixed-width designs, 331, 335–336**

**Flash, 98–99, 535–536**

**Flash Player, files, 85**

**float property, 312–314**

**floating frames, 204–205**

**floor( ) method, 445, 485**

**flow, 17–18, 306**

**focus**

first form item, 470–471

<input> element, 296

tabbing order, 173–174

**focus( ) method, 417, 449, 471–472, 475–476**

**:focus pseudo class, 296**

**folders, directory structure, 57**

**<font> element, 48, 576, 683–685**

**font-family property, 368**

**font test page, 240–243**

**fontcolor( ) method, 438**

**fonts**

CSS properties, 607–611

fixed-size, screen resolution and, 369

font-family property, 368

sans-serif, 367

serifs, 367

**fontsize( ) method, 438**

**for attribute, <label> element, 589**

**for loops, 433, 434–435**

**<form> element, 140**

attributes, 142–145, 576

creating forms, 141–145

methods, 417

onsubmit event handler, 454

properties, 416

white space and, 145

**form-feed (f), 463**

**formatting**

align attribute, 692–693

<center> element, 691–697

text, 23–26

**forms**

buttons, 150–152, 394

case conversion, 474

checkboxes, 154–155, 476–477

collecting data, 417–419

color, 395–396

controls, 139, 382

checkboxes, 383

<fieldset> elements, 385

grouping, 384–387

hidden, 165–166

labelling, 387–389

radio buttons, 383

relevant information and, 391–393

select boxes, 384

text boxes, 384

text inputs, 145–150

title attribute, 394–395

CSS and, 396–397

designing

form controls, 382–384

group-related information, 381

information provided, 381

layout, 387–397

listing required information, 380–381

paper forms and, 381

e-mail example, 477–482

fields

auto-tabbing, 471–472

trimming spaces from beginning and end,  
474–475

file select boxes, 164–165

focus, first item, 470–471

introduction, 140–141

<legend> element, 385

name/value pairs, 141

numbering questions, 387

radio buttons, 156–157

registration form example, 166–169, 180–182

required information, 393

select boxes, 158–163

sending data to server, 178–179

site registration form example, 397–401

splitting into separate pages, 386

submission, preventing until checkbox selection,  
469–470

submit button, 140

tab order of elements, 395

tables and, 389–391

testing, 397

text, 472–474

text area, selecting all content, 475–476

validation

checkboxes, 468–469

checking text fields, 457–459

finding characters, 462–464

how, 456

preventing submission until checkbox selection,  
469–470

- radio buttons, 467–468  
 required text fields, 459–461  
 select box options, 464–465  
 testing characters, 464–465  
 when, 456
- forms collection (DOM), 410–411, 415**
- forums, 530**
- forward( ) method, 449**
- forward slashes, 462**
- fragment identifiers, 61**
- framborder attribute, <frame> element, 577**
- frame attribute, 115–116**  
 <table> element, 600
- frame-based book viewer, 201–204**
- <frame> element, 194–195**  
 attributes, 576–577
- frameborder attribute, 193**  
 <frame> element, 195  
 <frameset> element, 578  
 <iframe> element, 207, 580
- frames, 185**  
 DOCTYPE and, 187  
 floating, 204–205  
 inline, 204–205, 207–209  
 links between, 198–200  
 when to use, 188–189
- frames property, 448**
- frameset, columns, 189–191**
- <frameset> element, 186**  
 attributes, 189–194, 577–578  
 extensions, browser-specific, 192–194
- Frameset XHTML, 8**
- framesets, 185, 200**
- framespacing attribute, 194, 578**
- FTP (File Transfer Protocol), uploading site and, 520–522**
- FTPX, 521**
- functions, 422**  
 calling, 428  
 defining, 428  
 JavaScript, 407  
 return statements, 429
- G**
- generated content**  
 :after pseudo-element, 297–298  
 :before pseudo-element, 297–298  
 content property, 298
- getDate( ) method, 442**
- getDay( ) method, 442**
- getFullYear( ) method, 442**
- getHours( ) method, 442**
- getMinutes( ) method, 442**
- getMonth( ) method, 442**
- getSeconds( ) method, 442**
- getTime( ) method, 442**
- getTimezoneOffset( ) method, 442**
- getUTCDate( ) method, 443**
- getUTCDay( ) method, 443**
- getUTCFullYear( ) method, 443**
- getUTCHours( ) method, 443**
- getUTCMilliseconds( ) method, 443**
- getUTCMinutes( ) method, 443**
- getUTCMonth( ) method, 443**
- getUTCSeconds( ) method, 443**
- getYear( ) method, 442**
- GIF (Graphics Interchange Format), 79–82**
- graphics, 77–79**
- graphics packages, 536**
- greater than (>) operator, 426**
- greater than or equal to (>=) operator, 426**
- grids, 109**
- grouping elements, 49–50**
- gutter attribute, <multicol> element, 593**

**H**

- handleOther( ) function, 473**
- <head> element, 5, 10–11**  
 attributes, 578  
 meta tags, 502
- headers attribute, 602, 604**
- headings, 18–21**
- height attribute, 88–89, 96**  
 <embed> element, 575  
 <iframe> element, 206, 580  
 <img> element, 581  
 <marquee> element, 592  
 <table> element, 600  
 <td> element, 602  
 <th> element, 604
- height property, 419**
- hexadecimal codes, 638–639**  
 color, 637–638  
 color names and, 640–641  
 color reference, 641–644
- hidden attribute, <embed> element, 575**
- hidden controls, 165–166**
- history property, 448**

## <hn> elements

---

- <hn> elements, **18–19, 578**
  - home( ) method, **449**
  - home pages, designing, **345**
  - host address, **60**
  - hosting, **518**
    - backups, **519**
    - bandwidth, **519**
    - choosing host, **519–520**
    - country, **519**
    - data centers, **519**
    - dedicated, **520**
    - disk space, **519**
    - e-mail accounts, **519**
    - shared, **520**
    - statistical analysis, **526–527**
    - statistics packages, **520**
    - uptime, **520**
  - hosting company, **501**
  - <hr /> element, **28, 579**
  - href attribute, **7**
    - <a> element, **565**
    - <area> element, **567**
    - <base> element, **568**
    - <link> element, **591**
    - linking to documents, **54–56**
  - hreflang attribute, **69, 565, 591**
  - hspace attribute, **90, 96, 696–697**
    - <embed> element, **575**
    - <img> element, **581**
    - <marquee> element, **592**
    - <table> element, **600**
  - hspace property, **419**
  - <html> element, **9–10, 579–580**
  - HTML (Hypertext Markup Language), **2**
  - HTML validation, **509–512**
  - http-equiv attribute, <meta> element, **593**
  - HTTP headers, **505**
  - HTTP (Hypertext Transfer Protocol), **59**
  - hyperlinks. See links
- 
- |
  - <i> element, **26–27, 580**
  - id attribute, **12–13, 564**
    - <base> element, **568**
    - <br /> element, **570**
    - <comment> element, **573**
    - <frame> element, **577**
    - <head> element, **578**
  - <hr /> element, **579**
  - <html> element, **579**
  - <isindex> element, **588**
  - <keygen> element, **589**
  - <marquee> element, **592**
  - <param> element, **596**
  - <title> element, **605**
  - id selector, **244**
  - if statements, **429–430**
  - if...else statements, **430**
  - <iframe> element, **204–207, 580**
  - image maps, **77, 100–105**
  - image rollovers, **420–421, 482–483**
  - images, **77**
    - adding to documents, **92–93**
    - background, text readability and, **366–367**
    - background-image property, **277–278**
    - bitmap, **78–79**
    - as buttons, **152–153**
    - formats, **78**
    - GIF, **79**
    - <img> element, **86**
    - JPEG, **79**
    - as links, **99–100, 375**
    - list-style-image property, **286**
    - PNG, **79**
  - images collection (DOM), **410, 419–420**
  - <img> element, **86–91, 581**
  - implicit labels, **387**
  - @import rule, **304–305**
  - !important rule, **305**
  - importing, styles, **304–305**
  - increment (++) operator, **425**
  - indexed color format, **79**
  - indexOf( ) method, **438**
  - infinite loops, **435**
  - inline elements, **48–49**
  - inline frames, **204–205, 207–209**
  - input, forms, **145–150**
    - text, disabling, **472–474**
  - <input> element, **150–152, 296**
  - <input type="button"> element, attributes, **582**
  - <input type="checkbox"> element, attributes, **582–583**
  - <input type="file"> element, attributes, **583**
  - <input type="hidden"> element, attributes, **584**
  - <input type="image"> element, attributes, **584**
  - <input type="password"> element, attributes, **585**
  - <input type="radio"> element, attributes, **586**

**<input type="reset">** element, attributes, 586  
**<input type="submit">** element, attributes, 587  
**<input type="text">** element, attributes, 587–588  
**<ins>** element, 46, 588  
 inserting text, 46  
 internationalization attributes, 14–15  
 internationalization properties, 634–635  
 intrinsic events, 435  
**<isindex>** element, 588–589, 706–707  
 ismap attribute, 90, 581  
 italic text, 26–27  
 italics( ) method, 439

**J**

**JavaScript**  
 breaking up code lines, 450  
 case-sensitivity, 449  
 comments, 408  
 conditional statements, 423  
 data types, 450–451  
 external, 409  
 files, external, 455  
 functions, 407, 422  
 keywords, 451  
 libraries, 487–488  
     animation, 488–490  
     auto-completing text, 495–496  
     calendars, 494–495  
     drag-and-drop, 490–492  
     sortable tables, 492–493  
 loops, 423  
 opening and closing symbols, 450  
 operators, 422, 424–425  
     arithmetic, 425  
     assignment, 425–426  
     Boolean, 427  
     comparison, 426  
     logical, 427  
     string, 427  
 scripts  
     adding to pages, 406–408  
     folder, 455  
 special characters, 450  
 variables, 422  
     assigning values, 424  
     declaring, 423  
     lifetime, 424  
     rules, 423–424

when not to use, 496–497  
 write( ) method, 406  
**join( ) method**, 447  
**JPEG (Joint Photographic Experts Group Format)**, 79  
 compression and, 82

**K**

**<kbd>** element, 34–35, 589  
**keyboard, <kbd> element**, 34–35  
**<keygen>** element, attributes, 589  
**keywords**  
     JavaScript, 451  
     mailto, 56

**L**

**label attribute**, 596, 597  
**<label>** element, 169–171, 589  
**labels, controls**, 169–171  
**Lang attribute, <comment> element**, 573  
**lang attribute**, 14–15, 564  
**<frame>** element, 577  
**<head>** element, 578  
**<html>** element, 579  
**<isindex>** element, 588  
**<meta>** element, 593  
**<title>** element, 605  
**language attribute**, 598, 704  
**language codes**, 665–668  
**lastIndexOf( ) method**, 439  
**lastModified property (DOM)**, 413  
**<layer>** element, attributes, 590  
**leading**, 365  
**left attribute, <layer> element**, 590  
**left navigation**, 343  
**leftmargin attribute, <body> element**, 570  
**<legend>** element, 171–173, 385, 590  
**length property**, 438, 458  
**lengths, CSS properties**, 635  
**less than (<) operator**, 426  
**less than or equal to (<=) operator**, 426  
**<li>** element, attributes, 574, 591, 593  
**libraries, JavaScript**, 487–488  
     animation, 488–490  
     auto-completing text, 495–496  
     calendars, 494–495  
     drag-and-drop, 490–492  
     sortable tables, 492–493

**line breaks, 21–22**  
**line height, readability and, 365–366**  
**linefeed (n), 463**  
**link( ) method, 439**  
**link attribute, <body> element, 570**  
**<link> element**  
    attributes, 591  
    CSS, 218–219  
    <head> element, 10  
**Link Valet tool, 513–514**  
**linkColor property (DOM), 413**  
**links, 53, 698–699**  
    <a> element, 65  
    checking, 513–514  
    color, 274  
    CSS, 274–275  
    default files, 63  
    e-mail, 74–75  
    to e-mail addresses, 56–57  
    between frames, 198–200  
    images as, 99–100, 375  
    to other documents, 54–56  
    within pages, 71–74  
    parent directory, 63  
    from root, 63  
    same directory, 62  
    subdirectory, 62–63  
    text links, 375  
**links collection (DOM), 411**  
**liquid designs, 331, 333–335**  
**list-style-position property, 285–286**  
**list-style property, 286**  
**list-style-type property, 284–285**  
**<listing> element, 591, 688–689**  
**lists**  
    CSS properties, 623–625  
    definition, 39–40  
    list-style-image property, 286  
    list-style-position property, 285–286  
    list-style property, 286  
    list-style-type property, 284–285  
    marker-offset property, 287  
    nesting, 40–41  
    ordered, 37–39  
    start attribute, 699  
    type attribute, 700–701  
    unordered, 36–37  
    value attribute, 700  
**LN2 property, 444**  
**LN10 property, 444**

**location property, 448**  
**log( ) method, 445**  
**LOG2E property, 445**  
**LOG10E property, 445**  
**logical operators, 427**  
**longdesc attribute, 90–91**  
    <frame> element, 197, 577  
    <iframe> element, 207, 580  
    <img> element, 581  
**loop attribute**  
    <bgsound> element, 569  
    <img> element, 581  
    <marquee> element, 592  
**looping statements, 432–435**  
**loops, 423**  
**lossless compression, 81**  
**lossy compression, 81**  
**lowsrc property, 419**  
**lowsrc attribute, <img> element, 581**  
**LZW compression, 81**

## M

**mailto, 56**  
**<map> element, 592**  
**marginheight attribute, 196**  
    <frame> element, 577  
    <iframe> element, 207, 580  
**margins**  
    CSS properties, 622  
    white space and, 362  
**marginwidth attribute, 196**  
    <frame> element, 577  
    <iframe> element, 207, 580  
**marker offset property, 287**  
**markup languages, 2**  
**<marquee> element, attributes, 592**  
**matching strings, 462**  
**math object, 445**  
**max( ) method, 445**  
**maxlength attribute**  
    <input type="file"> element, 583  
    <input type="password"> element, 585  
    <input type="text"> element, 587  
**media attribute, <link> element, 591**  
**<menu> element, 593, 701–702**  
**menus**  
    consistency, 374  
    content, separation from, 370–372  
    focus, 370

grouping items, 373  
 icons, representing links, 372  
 loading, 374  
 navigation, drop-down, 497  
 readability, 372–373  
 selectability, 373–374  
**<meta> element, 502**  
 attributes, 502, 593  
 author name, 507  
 character encoding, 507  
 content attribute, 503, 504, 505–508  
 cookies, setting, 507  
 expiring web pages, 505  
**<head> element, 10**  
 http-equiv attribute, 505–508  
 name attribute, 503–505  
 rating web pages, 506–507  
 redirecting web pages, 506  
 refreshing web pages, 506  
 scheme attribute, 508  
 search engines and, 522–523  
**meta tags, <head> element and, 502**  
**method attribute, <form> element, 576**  
**methods, 405**  
 abs( ), 445  
 acos( ), 445  
 alert( ), 449  
 anchor( ), 438  
 arguments, 414  
 asin( ), 445  
 atan( ), 445  
 atan2( ), 445  
 back( ), 449  
 big( ), 438  
 blur( ), 417, 449  
 bold( ), 438  
 ceil( ), 445  
 charAt( ), 438  
 click( ), 417  
 close( ), 449  
 concat( ), 447  
 confirm( ), 449  
 cos( ), 445  
 date( ), 442  
 DOM, 410, 414  
 exp( ), 445  
 fixed( ), 438  
 floor( ), 445, 485  
 focus( ), 417, 449, 471–472, 475–476  
 fontcolor( ), 438  
 fontsize( ), 438  
 forward( ), 449  
 getDate( ), 442  
 getDay( ), 442  
 getFullYear( ), 442  
 getHours( ), 442  
 getMinutes( ), 442  
 getMonth( ), 442  
 getSeconds( ), 442  
 getTime( ), 442  
 getTimezoneOffset( ), 442  
 getUTCDate( ), 443  
 getUTCDay( ), 443  
 getUTCFullYear( ), 443  
 getUTCHours( ), 443  
 getUTCMilliseconds( ), 443  
 getUTCMinutes( ), 443  
 getUTCMonth( ), 443  
 getUTCSeconds( ), 443  
 getYear( ), 442  
 home( ), 449  
 indexOf( ), 438  
 italics( ), 439  
 join( ), 447  
 lastIndexOf( ), 439  
 link( ), 439  
 log( ), 445  
 max( ), 445  
 min( ), 445  
 moveBy( ), 449  
 moveTo( ), 449  
 open( ), 449  
 parameters, 414  
 parse( ), 442  
 pow( ), 445  
 print( ), 449  
 prompt( ), 449  
 random( ), 445, 485  
 replace( ), 462  
 reset( ), 415  
 reverse( ), 447  
 round( ), 445, 485  
 select( ), 417, 475–476  
 setDate( ), 443  
 setFullYear( ), 443  
 setHours( ), 443  
 setMinutes( ), 443  
 setMonth( ), 443  
 setSeconds( ), 443  
 setTime( ), 443

### methods (*continued*)

setUTCDate( ), 443  
setUTCDay( ), 444  
setUTCFullYear( ), 444  
setUTCHour( ), 444  
setUTCMilliseconds( ), 444  
setUTCMilliseconds( ), 444  
setUTCMonth( ), 444  
setUTCSeconds( ), 444  
setYear( ), 443  
sin( ), 445  
slice( ), 447  
small( ), 439  
sort( ), 447  
sqrt( ), 445  
stop( ), 449  
strike( ), 439  
sub( ), 439  
submit( ), 415  
substr( ), 439  
substring( ), 439, 474–475  
sup( ), 439  
tan( ), 445  
test( ), 464  
toGMTString( ), 443  
toLocalizedString( ), 443  
toLowerCase( ), 439, 474  
toString( ), 443  
toUpperCase( ), 439, 474

**methods (JavaScript), write( ), 406**

### MIME media types

application, 674–679  
audio, 672–673  
image, 671  
message, 674  
model, 674  
multipart, 672  
text, 670–671  
video, 673

### min( ) method, 445

### MochiKit, 492–493

### modularized style sheets, 304–305

### modulus, division remainder (%) operator, 425

### monospaced font, 27

### moveBy( ) method, 449

### moveTo( ) method, 449

### <multicol> element, attributes, 593

### multiple attribute, <select> element, 598

### multiple-line text input controls, 148–150

### multiplication (\*) operator, 425

## N

### name attribute, 91, 96, 97

<area> element, 567  
<button> element, 571  
<embed> element, 575  
<frame> element, 195  
<img> element, 581  
<input type="button"> element, 582  
<input type="checkbox"> element, 582  
<input type="file"> element, 583  
<input type="hidden"> element, 584  
<input type="image"> element, 584  
<input type="password"> element, 585  
<input type="radio"> element, 586  
<input type="submit"> element, 587  
<input type="text"> element, 587  
<keygen> element, 589  
<layer> element, 590  
<meta> element, 593  
<param> element, 567, 596  
<select> element, 599

### name property, 419, 448

### name/value pairs, 141

### namespace identifier, 10

### navigation, 342–343

bottom, 344  
left, 343  
menus, 369–374  
right, 345  
top, 343  
top and left, 344

### nesting

framesets, 200  
lists, 40–41  
tables, 356–359

### nesting elements, 6

<nextid> element, 594  
<nobr> element, 594  
<noembed> element, 594  
<noframes> element, 186, 197–198, 577, 594  
nohref attribute, <area> element, 567  
<nolayer> element, 594  
non-digit (D), 463  
non-white-space character (S), 463  
non-word character (W), 463  
noresize attribute, 196, 577  
normal flow, 306  
<noscript> element, 408, 594  
noshade attribute, <hr /> element, 579

**not equal to (!=) operator, 426**

**notab attribute**

- <area> element, 567
- <input type="button"> element, 582
- <input type="checkbox"> element, 583
- <input type="file"> element, 583
- <input type="image"> element, 584
- <input type="password"> element, 585
- <input type="radio"> element, 586
- <input type="reset"> element, 586
- <input type="submit"> element, 587
- <input type="text"> element, 587

**nowrap attribute, 703**

- <div> element, 574
- <table> element, 600
- <td> element, 602
- <th> element, 604
- <tr> element, 605

**null data types, 451**

**number data types, 451**

**numbers, ordered lists, 38–39**

# O

**<object> element, 10, 93–97**

**objects**

- built-in, 422
- string object, 437–439
- custom, 422
- W3C DOM, 422

**<ol> element, 37–39, 596**

**onabort attribute, <img> element, 581**

**onblur attribute**

- <button> element, 571
- <frameset> element, 578
- <input type="file"> element, 583
- <input type="password"> element, 585
- <input type="text"> element, 587
- <label> element, 589
- <select> element, 599

**onblur event, 437**

**onchange attribute**

- <input type="file"> element, 583
- <input type="password"> element, 585
- <input type="text"> element, 587
- <select> element, 599

**onchange event, 437**

**onclick attribute, 564**

**onclick event, 436**

**ondblclick attribute, 564**

**ondblclick event, 436**

**onerror attribute, <img> element, 581**

**onfocus attribute**

- <button> element, 571
- <input type="file"> element, 583
- <input type="password"> element, 585
- <input type="text"> element, 587
- <label> element, 589
- <select> element, 599

**onfocus event, 437**

**onkeydown attribute, 564**

**onkeydown event, 436**

**onkeypress attribute, 564**

**onkeypress event, 436**

**onkeyup attribute, 564**

**onkeyup event, 436, 471**

**onload attribute**

- <body> element, 570
- <frameset> element, 578
- <img> element, 581

**onload event, 436, 471**

**onmousedown attribute, 564**

**onmousedown event, 436**

**onmousemove attribute, 564**

**onmousemove event, 436**

**onmouseout attribute, 564**

**onmouseout event, 436**

**onmouseover attribute, 564**

**onmouseover event, 436**

**onmouseup attribute, 564**

**onmouseup event, 436**

**onreset attribute, <form> element, 576**

**onreset event, 437**

**onselect attribute**

- <input type="password"> element, 585
- <input type="text"> element, 588

**onselect event, 437**

**onsubmit attribute, <form> element, 576**

**onsubmit event, 437**

**onsubmit event handler, 454**

**onunload attribute**

- <body> element, 570
- <frameset> element, 578

**onunload event, 436**

**open( ) method, 449**

**opening tags, 4**

**operators, 422, 424–425**

- arithmetic, 425

- assignment, 425–426

- binary, 424

### operators (*continued*)

Boolean, 427  
comparison, 426  
conditional operator, 432  
logical, 427  
string, 427  
unary, 424

**<optgroup> element, 161–163, 596**

**<option> element, 159, 597**

**ordered lists, 37–39, 491**

**outline-color property, 295**

**outline property, 296**

**outline-style property, 295**

**outline-width property, 295**

**outlines, 630**

CSS, 294–295  
outline-color property, 295  
outline property, 296  
outline-style property, 295  
outline-width property, 295

## P

### <p> element, 21, 597

### padding

CSS properties, 622–623  
white space and, 362

**page layout**

above the fold, 331  
aims of site, 324–325  
categorization, 327–328  
content, defining, 326–327  
content pages, 345–346  
CSS and, 356  
elements, 329–330, 340–342  
fixed-width designs, 331, 335–336  
grouping, 327–328  
home pages, 345  
liquid designs, 331, 333–335  
new content, 326  
sacrificial columns, 354–355  
single-column, 348–350  
site map, creating, 328–329  
structuring pages, 346–347

<table> element and, 334  
tables, nested, 356–359  
three-column layouts, 353–354  
two-column, 350–352  
visitors and, 325–326  
width, 331

**page size, screen resolution and, 330**

**palette attribute, <embed> element, 575**

**paragraphs, 21**

**<param> element, 567, 597**

  attributes, 97–98, 567, 596

**parameters, 414, 441**

**parent elements, 5**

**parse( ) method, 442**

**password input controls, 147–148**

**path arguments, 61**

**percentage values, liquid designs, 333**

**PHP, 531–532**

**phrase elements, 29–30**

**PI property, 445**

**PICS (Platform for Internet Content Selection), 506**

**pilot testing, 516–517**

**pixels, 250**

  columns in framesets, 190  
  resolution, 79

**<plaintext> element, 597, 688–689**

**pluginspage attribute, <embed> element, 575**

**PNG (Portable Network Graphics), 79, 83–84**

**pop-up windows, 486–487**

**ports, 60**

**position property, 306–307**

**positioning, CSS, 625–629**

**pow( ) method, 445**

**<pre> element**

  preformatted text, 22–23  
  width attribute, 597

**preformatted text, 22–23**

**presentational elements, 26–28**

**preventing cached web pages, 505**

**print( ) method, 449**

**profile attribute, <head> element, 578**

**program output, 35**

**prompt( ) method, 449**

**prompt attribute, <isindex> element, 588**

**properties, 405**

  action, 415  
  alinkColor (DOM), 413  
  background, 283  
  background-attachment, 282  
  background-color, 276  
  background-image, 277–278  
  background-position, 281  
  background-repeat, 278–280  
  bgcolor (DOM), 413  
  border, 419  
  border-collapse, 289–291  
  box offset properties, 307

caption-side, 292  
 checked, 416  
 closed, 448  
 complete, 419  
 content, 298  
**CSS**  
     background, 614–617  
     borders, 617–619  
     classification, 632–634  
     color, 614–617  
     dimensions, 619–621  
     fonts, 607–611  
     internationalization, 634–635  
     lengths, 635  
     lists, 623–625  
     margins, 622  
     outlines, 630  
     padding, 622–623  
     positioning properties, 625–629  
     tables, 630–632  
     text, 611–614  
 cursor, 301–302  
 defaultStatus, 448  
 disabled, 416  
 display, 302  
 document, 448  
 DOM and, 410, 413–414  
**E**, 444  
 empty-cells, 292–294  
 fgcolor (DOM), 413  
 float, 312–314  
 form, 416  
 frames, 448  
 height, 419  
 history, 448  
 hspace, 419  
 lastModified (DOM), 413  
 length, 415, 416, 438  
 linkColor (DOM), 413  
 list-style, 286  
 list-style-position, 285–286  
 list-style-type, 284–285  
**LN2**, 444  
**LN10**, 444  
 location, 448  
**LOG2E**, 445  
**LOG10E**, 445  
 lowersrc, 419  
 marker offset, 287  
 method, 415  
 name, 415, 416, 419, 448  
     outline, 296  
     outline-color, 295  
     outline-style, 295  
     outline-width, 295  
 PI, 445  
 position, 306–307  
 referrer (DOM), 413  
 selectedIndex, 416, 466  
**SQRT1\_2**, 445  
**SQRT2**, 445  
 src, 419  
 status, 448  
 statusbar, 448  
 table-layout, 294  
 target, 415  
 title (DOM), 413  
 toolbar, 448  
 top, 448  
 type, 416  
 value, 416  
 visibility, 302–303  
 vlinkColor (DOM), 413  
 vspace, 420  
 width, 420  
 window, 448  
 z-index, 311–312  
**Prototype, 488**  
**pseudo classes, 274**  
     :active, 296  
     background-color property, 274  
     color property, 274  
     first-letter, 239–240  
     :focus, 296  
     text-decoration property, 274

**Q**

**<qp> element, 33, 598**  
**queries, 376**  
**Query String, 61**  
**quotation marks, 300**  
**quotes, 32, 33**

**R**

**radio buttons, 156–157, 383**  
     validation and, 467–468  
**random( ) method, 445, 485**  
**random script generator, 485–486**  
**rating label, 506**  
**rating web pages, 506–507**

# read-only controls

---

**read-only controls, 176–177**

**readonly attribute**

- <input type="checkbox"> element, 583
- <input type="file"> element, 583
- <input type="image"> element, 584
- <input type="password"> element, 585
- <input type="radio"> element, 586
- <input type="text"> element, 588

**redirecting web pages, 506**

**referrer property (DOM), 413**

**refreshing web pages, 506**

**registration form example, 166–169, 180–182**

**Regular Expressions, 462**

- characters, 463
- testing characters, 464–465
- testing for, 465

**rel attribute, 69–70**

- <a> element, 565
- <link> element, 591

**relative positioning, 307–308**

**relative URLs, 55, 59**

- <base> element, 64–65
- importance of, 509

**replace( ) method, 462**

**required information in forms, 393**

**reset( ) method, 415**

**resolution, 79**

**return statements, functions, 429**

**reusable functions, 454**

**rev attribute, 70, 565, 591**

**reverse( ) method, 447**

**RGB color space, 638**

**right navigation, 345**

**robots.txt, 524–525**

**rollover images, 405**

**round( ) method, 445, 485**

**rows attribute, 191–192, 578**

**rows (tables)**

- introduction, 109
- shading multiple, 378–379
- spanning, 129–130

**rowspan attribute, 602, 604**

**rules attribute, 116–117, 600**

## S

**<s> element, 27, 598, 687**

**sacrificial columns, 354–355**

**<samp> element, 35, 598**

**sample layout, 315–320**

**sample output, 35**

**sans-serif fonts, 367**

**scheme attribute, 508, 593**

**scope attribute, 602, 604**

**screen resolution**

- fixed-size fonts and, 369
- page size and, 330
- site testing, 514

**<script> element, 406**

- attributes, 598
- <head> element, 10
- ordered list, 491

**scriptable objects, 410**

**Scriptaculous, 488–492**

**scripting language, default, 508**

**scripts, 453–455, 485–486**

**scrollamount attribute, <marquee> element, 592**

**scrolldelay attribute, <marquee> element, 592**

**scrolling, scrolling select boxes, 159–160**

**scrolling attribute**

- <frame> element, 196, 577
- <iframe> element, 207, 580

**search engines, 522–525**

**search utilities, 530–531**

**select( ) method, 417, 475–476**

**select boxes, 158–163, 384**

- attributes, 163
- options, 466–467
- quick jump, 497

**<select> element, 158–159, 598–599**

**selected attribute, <option> element, 597**

**selectedIndex property, 466**

**serif fonts, 367**

**server-side image maps, 100, 101–102**

**server-side language, 532**

**server-side web programming, 531–532**

**setDate( ) method, 443**

**setFullYear( ) method, 443**

**setHours( ) method, 443**

**setMinutes( ) method, 443**

**setMonth( ) method, 443**

**setSeconds( ) method, 443**

**setTime( ) method, 443**

**setUTCDate( ) method, 443**

**setUTCDay( ) method, 444**

**setUTCFullYear( ) method, 444**

**setUTCHour( ) method, 444**

**setUTCMilliseconds( ) method, 444**

**setUTCMinutes( ) method, 444**

**setUTCMonth( ) method, 444**

**setUTCSeconds( ) method, 444**  
**setYear( ) method, 443**  
**shape attribute, 70**  
 <a> element, 565  
 <area> element, 567  
**Silverlight, 86**  
**sin( ) method, 445**  
**single-column layout, 348–350**  
**single-line text input controls, 146–147**  
**site registration form example, 397–401**  
**site searches, 376–378**  
**site testing, 508–509**  
 accessibility checkers, 514–515  
 browser versions, 515  
 color depth, 514  
 CSS validation, 509–512  
 directory structure, importance of, 509  
 HTML validation, 509–512  
 link checking, 513–514  
 pilot testing, 516–517  
 relative URLs, importance of, 509  
 screen resolution, 514  
 XHTML validation, 509–512  
**size attribute**  
 <basefont> element, 568  
 <font> element, 576  
 <input type="file"> element, 583  
 <input type="password"> element, 585  
 <input type="text"> element, 588  
 <select> element, 599  
**slash (/ /) characters, 407**  
**slashes, 462**  
**slice( ) method, 447**  
**small( ) method, 439**  
**<small> element, 28, 599**  
**sort( ) method, 447**  
**sortable tables, MochiKit and, 492–493**  
**spacing, borders, 291**  
**span attribute, <col> element, 572**  
**<span> element, 49–50, 599**  
**special characters, 47, 450, 649–663**  
**special terms, 32**  
**sqrt( ) method, 445**  
**SQRT1\_2 property, 445**  
**SQRT2 property, 445**  
**src attribute, 86–87**  
 <bgsound> element, 569  
 <embed> element, 575  
 <frame> element, 195, 577  
 <iframe> element, 206, 580  
 <img> element, 581  
 <input type="image"> element, 584  
 <layer> element, 590  
 <script> element, 598  
**src property, 419**  
**standby attribute, 96**  
**start attribute**  
 <img> element, 581  
 lists, 699  
 <ol> element, 596  
**statistical analysis, 526–527**  
**status property, 448**  
**statusbar property, 448**  
**stop( ) method, 449**  
**Strict XHTML, 8**  
**strike( ) method, 439**  
**<strike> element, 27, 599, 687**  
**strikethrough text, 27**  
**string data types, 451**  
**string object, 437–440**  
**string operator, 427**  
**strings, 414, 462**  
**<strong> element, 30, 599**  
**structure of document, 3**  
**structuring pages, 346–347**  
 sacrificial columns, 354–355  
 single-column layout, 348–350  
 three-column layouts, 353–354  
 two-column layouts, 350–352  
**style attribute, 13–14, 564**  
 <br /> element, 570  
 <frame> element, 577  
 <hr /> element, 579  
 <isindex> element, 589  
**<style> element, 599**  
 CSS, 220  
 <head> element, 10  
**style sheet for code, 265–270**  
**style sheet languages, default, 508**  
**sub( ) method, 439**  
**<sub> element, 28, 599**  
**submit( ) method, 415**  
**subscript text, 28**  
**substr( ) method, 439**  
**substring( ) method, 439, 474–475**  
**subtraction (-) operator, 425**  
**summary attribute, 117, 600**  
**sup( ) method, 439**  
**<sup> element, 28, 599**  
**superscript text, 28**

# SVG (Scalable Vector Graphics)

---

**SVG (Scalable Vector Graphics), 85**

**switch statement, 431–432**

## T

**tab (t), 463**

**tabbing order, 173–174**

**tabindex attribute, 70, 97**

- <a> element, 565
- <area> element, 567
- <button> element, 571
- <fieldset> element, 575
- <input type="button"> element, 582
- <input type="checkbox"> element, 583
- <input type="file"> element, 583
- <input type="image"> element, 584
- <input type="password"> element, 585
- <input type="radio"> element, 586
- <input type="reset"> element, 586
- <input type="submit"> element, 587
- <input type="text"> element, 588
- <isindex> element, 589
- <marquee> element, 592
- <select> element, 599

**<table> element**

- attributes, 113–117, 493, 600–601
- introduction, 109
- page layout and, 334

**table-layout property, 294**

**tables**

- body, 125–128
- cells, 109
- columns, 109, 128–132
- CSS, 287–294
- CSS properties, 630–632
- foot, 125–128
- forms, 389–391
- heads, 125–128
- introduction, 109–112
- linearization, 132–136
- nested, 356–359
- nowrap attribute, 703
- rows, 109
  - shading multiple, 378–379
  - spanning, 129–130

sortable, MochiKit and, 492–493

**taborder attribute**

- <input type="button"> element, 582
- <input type="checkbox"> element, 583
- <input type="file"> element, 583

- <input type="image"> element, 584
- <input type="password"> element, 585
- <input type="radio"> element, 586
- <input type="reset"> element, 586
- <input type="submit"> element, 587
- <input type="text"> element, 588

**tags, 3–5**

**tan( ) method, 445**

**target attribute, 70**

- <a> element, 565
- <area> element, 567
- <base> element, 568
- <form> element, 576

**<tbody> element, 126, 601**

**<td> element**

- attributes, 119–122, 493, 601–602

**test( ) method, 464**

**testing characters, 464–465**

**testing for**

- alphabetic characters, 465
- alphanumeric characters, 465
- credit card details, 465
- currency, 465
- decimal numbers, 465
- e-mail addresses, 465
- white space, 465

**testing forms, 397**

**testing site, 508–509**

- accessibility checker, 514–515
- browser versions, 515
- color depth, 514
- CSS validation, 509–512
- directory structure, importance of, 509
- HTML validation, 509–512
- link checking, 513–514
- pilot testing, 516–517
- relative URLs, importance of, 509
- screen resolution, 514
- XHTML validation, 509–512

**text**

- abbreviations, 31
- acronyms, 31
- alignment, readability and, 365
- auto-completing, 495–496
- background images and, 366–367
- bold, 26
- case conversion, 474
- columns, width, 366
- CSS properties, 611–614
- editing, 45–46

emphasized, 30  
 fonts, 367–368  
 formatting, 23–26  
 forms, disabling input, 472–474  
 input, forms, 145–150  
 italic, 26–27  
 keyboard, 34–35  
 line height, readability and, 365–366  
 markup, 41–45  
 monospaced font, 27  
 selecting all content area of form, 475–476  
 strikethrough, 27  
 strong, 30  
 subscript, 28  
 superscript, 28  
 underlined, 27  
 white space and, 362–364

**text attribute, 570, 685**

**text boxes, 384**

**text fields, required, validation, 459–461**

**text formatting, 16–18**

**text links, 375**

**<textarea> element, attributes, 602–603**

**<tfoot> element, 126, 603**

**<th> element, 110**  
 attributes, 119–122, 493, 604

**<thead> element, 126**  
 attributes, 603

**three-column layouts, 353–354**

**timetable example, 122–125**

**title attribute, 13, 55, 70, 564**  
 <br /> element, 570  
 form controls, 394–395  
 <frame> element, 577  
 <hr /> element, 579  
 <isindex> element, 589

**<title> element, 11, 605**

**title property (DOM), 413**

**toGMTString( ) method, 443**

**toLocaleString( ) method, 443**

**toLowerCase( ) method, 439, 474**

**toolbar property, 448**

**top attribute, <layer> element, 590**

**top navigation, 343**

**top property, 448**

**topmargin attribute, <body> element, 570**

**toString( ) method, 443**

**toUpperCase( ) method, 439, 474**

**<tr> element, 117–118, 605**

**Transitional XHTML, 8**

**Transmit, 521**

**transparent background, 81**

**<tt> element, 27, 606**

**two-column layouts, 350–352**

**type attribute, 71, 98**  
 <a> element, 565  
 <button> element, 571  
 <embed> element, 575  
 <li> element, 574, 591, 593  
 <link> element, 591  
 lists, 700–701  
 <ol> element, 596  
 <param> element, 567, 596  
 <script> element, 598  
 <ul> element, 606

**type selector, 243**

## U

**<u> element, 27, 606, 687–688**

**UI event attributes, 15–16**

**<ul> element, 36–37, 606**

**unary operators, 424**

**undefined data types, 451**

**underlined text, 27**

**units attribute, <embed> element, 575**

**unordered lists, 36–37**

**universal selector, 243**

**uptime, 520**

**URLs**  
 absolute, 59, 61–64  
 credentials, 60  
 filepath, 60  
 fragment identifiers, 61  
 host address, 60  
 path arguments, 61  
 ports, 60  
 Query String, 61  
 relative, 55, 59, 61–65  
 scheme, 59

**usemap attribute, 90, 97, 581**

**user events, 435**

**username variable, length property, 458**

## V

**validate( ) function, 457**

**validating forms**  
 checkboxes, 468–469  
 finding characters, 462–464

## validating forms (*continued*)

---

### **validating forms (*continued*)**

preventing submission until checkbox selection, 469–470  
radio buttons, 467–468  
select box options, 464–465  
testing characters, 464–465  
text fields, 457–461  
when, 456

**validation( ) function, 457**

**valign attribute, 118–119**

<caption> element, 571  
<col> element, 572  
<colgroup> element, 573  
<table> element, 601  
<tbody> element, 601  
<td> element, 602  
<tfoot> element, 603  
<th> element, 604  
<thead> element, 603  
<tr> element, 605

**value attribute, 97**

<button> element, 571  
<input type="button"> element, 582  
<input type="checkbox"> element, 583  
<input type="file"> element, 583  
<input type="hidden"> element, 584  
<input type="image"> element, 584  
<input type="password"> element, 585  
<input type="radio"> element, 586  
<input type="reset"> element, 586  
<input type="submit"> element, 587  
<input type="text"> element, 588  
<li> element, 574, 591  
lists, 700  
<option> element, 597  
<param> element, 567, 596

**valuetype attribute, 97–98, 596**

**<var> element, 35, 606**

**variables (JavaScript), 422–424**

**vector graphics, 78, 85–86**

**version attribute, 579, 704**

**version control, 527–529**

**vertical tab (v), 463**

**visibility attribute, <layer> element, 590**

**visibility property, 302–303**

**vlink attribute, <body> element, 570**

**vlinkColor property (DOM), 413**

### **vspace attribute, 90, 96, 695–696**

<embed> element, 575  
<img> element, 582  
<marquee> element, 592  
<table> element, 601

### **vspace property, 420**

## **W**

<wbr> element, 606

**W3C DOM objects, 422**

**web hosting, 518**

**web marketing, 525–526**

**web pages, 505–507**

### **web site**

aims, 324–325  
categorization, 327–328  
content, defining, 326–327  
grouping, 327–328  
new content, 326  
site map, creating, 328–329  
uploading, FTP and, 520–522  
version control, 527–529  
visitors, 325–326

### **while loops, 432, 433**

**white space, 17–18, 362–364, 465**

**white-space character (s), 463**

**width attribute, 88–89, 96, 117, 693–694, 694–695**

<col> element, 572  
<colgroup> element, 573  
<embed> element, 575  
<hr /> element, 579  
<iframe> element, 206, 580  
<img> element, 582  
<layer> element, 590  
<marquee> element, 592  
<multicol> element, 593  
<pre> element, 597  
<table> element, 601  
<tbody> element, 601  
<td> element, 602  
<tfoot> element, 603  
<th> element, 604  
<thead> element, 603

**width property, 420**

**window events, 435**

**window object**, 447–449  
**window property**, 448  
**windows, pop-up windows**, 486–487  
**wireframe model, element placement and**, 338  
**word (w)**, 463  
**wrapping text**, 17  
**write( ) method**, 406, 414  
**writeln( ) method**, 414

## X

**XHTML (Extensible Hypertext Markup Language)**, 2  
case sensitivity, 8  
Frameset, 8  
Strict, 8  
Transitional, 8  
**XHTML validation**, 509–512  
**xml attribute**, 564  
**XML Declaration**, 8

**XML (Extensible Markup Language)**, 8  
**xml:lang attribute**, 15  
<comment> element, 573  
<head> element, 578  
<html> element, 580  
<isindex> element, 589  
<meta> element, 593  
<title> element, 605  
**xmlns attribute, <html> element**, 580  
**<xmp> element**, 606, 688–689

## Y

**YUI (Yahoo User Interface)**, 494–496

## Z

**z-index attribute, <layer> element**, 590  
**z-index property**, 311–312



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