

# VISUAL **QUICKSTART** GUIDE

*Get up and running in no time!*



# **PHP** for the Web

Fourth Edition

LARRY ULLMAN

© LEARN THE QUICK AND EASY WAY!

VISUAL QUICKSTART GUIDE

# PHP for the Web

Fourth Edition

LARRY ULLMAN

Visual QuickStart Guide

## **PHP for the Web, Fourth Edition**

Larry Ullman

Peachpit Press

1249 Eighth Street

Berkeley, CA 94710

510/524-2178

510/524-2221 (fax)

Find us on the Web at: [www.peachpit.com](http://www.peachpit.com)

To report errors, please send a note to: [errata@peachpit.com](mailto:errata@peachpit.com)

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Editor: Rebecca Gulick

Copyeditor: Liz Welch

Technical Reviewer: Jay Blanchard

Proofreader: Bob Campbell

Production Coordinator: Myrna Vladic

Compositor: Debbie Roberti

Indexer: Valerie Haynes-Perry

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## **Dedication**

For Jessica, Gina, and Rich, with gratitude for all of their love and support.

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# Table of Contents

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Introduction . . . . .	ix	
<b>Chapter 1</b>	<b>Getting Started with PHP . . . . .</b>	<b>1</b>
Basic HTML Syntax . . . . .	2	
Basic PHP Syntax . . . . .	7	
Using FTP . . . . .	10	
Testing Your Script . . . . .	12	
Sending Text to the Browser . . . . .	15	
Using the PHP Manual . . . . .	18	
Sending HTML to the Browser . . . . .	22	
Adding Comments to Scripts . . . . .	25	
Basic Debugging Steps . . . . .	28	
Review and Pursue . . . . .	30	
<b>Chapter 2</b>	<b>Variables . . . . .</b>	<b>31</b>
What Are Variables? . . . . .	32	
Variable Syntax . . . . .	36	
Types of Variables . . . . .	38	
Variable Values . . . . .	41	
Understanding Quotation Marks . . . . .	45	
Review and Pursue . . . . .	48	
<b>Chapter 3</b>	<b>HTML Forms and PHP . . . . .</b>	<b>49</b>
Creating a Simple Form . . . . .	50	
Choosing a Form Method . . . . .	54	
Receiving Form Data in PHP . . . . .	57	
Displaying Errors . . . . .	61	
Error Reporting . . . . .	64	
Manually Sending Data to a Page . . . . .	67	
Review and Pursue . . . . .	72	

<b>Chapter 4</b>	<b>Using Numbers . . . . .</b>	<b>73</b>
Creating the Form . . . . .	74	
Performing Arithmetic . . . . .	77	
Formatting Numbers . . . . .	81	
Understanding Precedence . . . . .	84	
Incrementing and Decrementing a Number . . . . .	86	
Creating Random Numbers . . . . .	88	
Review and Pursue . . . . .	90	
<b>Chapter 5</b>	<b>Using Strings . . . . .</b>	<b>91</b>
Creating the HTML Form . . . . .	92	
Concatenating Strings . . . . .	95	
Handling Newlines . . . . .	98	
HTML and PHP . . . . .	100	
Encoding and Decoding Strings . . . . .	103	
Finding Substrings . . . . .	107	
Replacing Parts of a String . . . . .	111	
Review and Pursue . . . . .	114	
<b>Chapter 6</b>	<b>Control Structures . . . . .</b>	<b>115</b>
Creating the HTML Form . . . . .	116	
The if Conditional . . . . .	119	
Validation Functions . . . . .	122	
Using else . . . . .	126	
More Operators . . . . .	129	
Using elseif . . . . .	138	
The Switch Conditional . . . . .	142	
The for Loop . . . . .	146	
Review and Pursue . . . . .	150	
<b>Chapter 7</b>	<b>Using Arrays . . . . .</b>	<b>151</b>
What Is an Array? . . . . .	152	
Creating an Array . . . . .	154	
Adding Items to an Array . . . . .	158	
Accessing Array Elements . . . . .	161	
Creating Multidimensional Arrays . . . . .	164	
Sorting Arrays . . . . .	168	
Transforming Between Strings and Arrays . . . . .	172	
Creating an Array from a Form . . . . .	176	
Review and Pursue . . . . .	182	

<b>Chapter 8</b>	<b>Creating Web Applications . . . . .</b>	<b>183</b>
	Creating Templates . . . . .	184
	Using External Files . . . . .	192
	Using Constants . . . . .	197
	Working with the Date and Time . . . . .	201
	Handling HTML Forms with PHP, Revisited . . . . .	204
	Making Forms Sticky . . . . .	210
	Sending Email . . . . .	217
	Output Buffering . . . . .	222
	Manipulating HTTP Headers . . . . .	225
	Review and Pursue . . . . .	230
<b>Chapter 9</b>	<b>Cookies and Sessions . . . . .</b>	<b>231</b>
	What Are Cookies? . . . . .	232
	Creating Cookies . . . . .	234
	Reading from Cookies . . . . .	239
	Adding Parameters to a Cookie . . . . .	242
	Deleting a Cookie . . . . .	245
	What Are Sessions? . . . . .	248
	Creating a Session . . . . .	249
	Accessing Session Variables . . . . .	252
	Deleting a Session . . . . .	254
	Review and Pursue . . . . .	256
<b>Chapter 10</b>	<b>Creating Functions . . . . .</b>	<b>257</b>
	Creating and Using Simple Functions . . . . .	258
	Creating and Calling Functions That Take Arguments . . . . .	265
	Setting Default Argument Values . . . . .	271
	Creating and Using Functions That Return a Value . . . . .	274
	Understanding Variable Scope . . . . .	279
	Review and Pursue . . . . .	286
<b>Chapter 11</b>	<b>Files and Directories . . . . .</b>	<b>287</b>
	File Permissions . . . . .	288
	Writing to Files . . . . .	293
	Locking Files . . . . .	301
	Reading from Files . . . . .	304
	Handling File Uploads . . . . .	307
	Navigating Directories . . . . .	315
	Creating Directories . . . . .	320
	Reading Files Incrementally . . . . .	327
	Review and Pursue . . . . .	332

<b>Chapter 12</b>	<b>Intro to Databases . . . . .</b>	<b>333</b>
Introduction to SQL . . . . .	334	
Connecting to MySQL . . . . .	336	
MySQL Error Handling . . . . .	340	
Creating and Selecting a Database . . . . .	343	
Creating a Table . . . . .	347	
Inserting Data into a Database. . . . .	352	
Securing Query Data . . . . .	358	
Retrieving Data from a Database . . . . .	361	
Deleting Data in a Database . . . . .	366	
Updating Data in a Database. . . . .	372	
Review and Pursue . . . . .	378	
<b>Chapter 13</b>	<b>Putting It All Together . . . . .</b>	<b>379</b>
Getting Started . . . . .	380	
Connecting to the Database. . . . .	382	
Writing the User-Defined Function . . . . .	383	
Creating the Template . . . . .	385	
Logging In . . . . .	388	
Logging Out . . . . .	392	
Adding Quotes. . . . .	393	
Listing Quotes . . . . .	397	
Editing Quotes. . . . .	400	
Deleting Quotes . . . . .	406	
Creating the Home Page . . . . .	410	
Review and Pursue . . . . .	414	
<b>Appendix A</b>	<b>Installation and Configuration . . . . .</b>	<b>415</b>
<b>Appendix B</b>	<b>Resources and Next Steps . . . . .</b>	<b>437</b>
	<b>Index . . . . .</b>	<b>447</b>

# Introduction

When I began the first edition of this book in 2000, PHP was a little-known *open source* project. It was adored by technical people in the know but not yet recognized as the popular choice for Web development that it is today. When I taught myself PHP, very little documentation was available on the language—and that was my motivation for writing this book in the first place.

Today things are different. The Internet has gone through a boom and a bust and has righted itself. Furthermore, PHP is now the reigning king of dynamic Web design tools and has expanded somewhat beyond the realm of just Web development. But despite PHP's popularity and the increase in available documentation, sample code, and examples, a good book discussing the language is still relevant. Although PHP is in the midst of its fifth major release, a book such as this—which teaches the language in simple but practical terms—can still be your best guide in learning the information you need to know.

This book will teach you PHP, providing both a solid understanding of the fundamentals and a sense of where to look for more advanced information. Although it isn't a comprehensive programming reference, through demonstrations and real-world examples, this book provides the knowledge you need to begin building dynamic Web sites and Web applications using PHP.

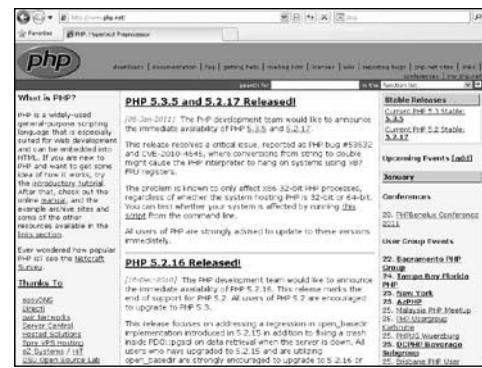
## What Is PHP?

PHP originally stood for *Personal Home Page*. It was created in 1994 by Rasmus Lerdorf to track the visitors to his online résumé. As its usefulness and capabilities grew (and as it began to be utilized in more professional situations), PHP came to mean *PHP: Hypertext Preprocessor*. (The definition basically means that PHP handles data before it becomes HTML—which stands for Hypertext Markup Language.)

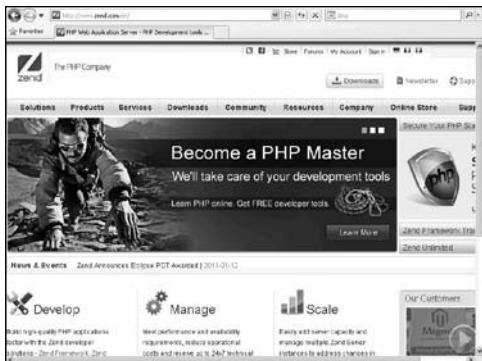
According to the official PHP Web site, found at [www.php.net](http://www.php.net) **A**, PHP is a “widely-used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML.” I’ll explain the two key parts of this definition in more detail.

To say that PHP *can be embedded into HTML* means that PHP code can be written within your HTML code—HTML being the code with which all Web pages are built. Therefore, programming with PHP starts off as only slightly more complicated than hand-coding HTML.

Also, PHP is a *scripting language*, as opposed to a *compiled language*. This means that PHP is designed to do something *only after an event occurs*—for example, when a user submits a form or goes to a URL (Uniform Resource Locator—the technical term for a Web address). Another popular example of a scripting language is JavaScript, which commonly handles events that occur within the Web browser. These two languages can also be described as *interpreted*, because the code must be run through an executable, such as the PHP module or the browser’s JavaScript component. Conversely, compiled languages such as C and C++ can be used to write stand-alone applications that can act independent of any event.



**A** As of this writing, this is the appearance of the official PHP Web site, located at [www.php.net](http://www.php.net). Naturally, this should be the first place you look to address most of your PHP questions and curiosities.



**B** This is the home page of Zend, creators of the programming at the heart of PHP. The site contains useful software as well as a code gallery and well-written tutorials.

## What PHP Is Not

The thing about PHP that confuses most new learners is what PHP *can't do*.

Although you can use the language for an amazing array of tasks, its main limitation is that PHP cannot be used for client-side features found in some Web sites.

Using a client-side technology like JavaScript, you can create a new browser window, add mouseovers, make pop-up alerts, resize the browser window, find out the screen size on the user's machine, and dynamically generate and alter forms. None of these tasks can be accomplished using PHP (because PHP is server-side, whereas those are client-side issues). But, you can use PHP to create JavaScript, just as you can use PHP to create HTML.

When it comes time to develop your own PHP projects, remember that you can only use PHP to send information (HTML and such) to the Web browser. You can't do anything else within the Web browser until another request from the server has been made (a form has been submitted or a link has been clicked).

You should also understand that PHP is a *server-side* technology. This refers to the fact that everything PHP does occurs on the server (as opposed to on the *client*, which is the computer being used by the person viewing the Web site). A server is just a computer set up to provide the pages you see when you go to a Web address with your browser (for example, Firefox, Microsoft Internet Explorer, or Safari). I'll discuss this process in more detail later (see "How PHP Works").

Finally, PHP is *cross-platform*, meaning that it can be used on machines running Unix, Windows, Macintosh, and other operating systems. Again, we're talking about the server's operating system, not the client's. Not only can PHP run on almost any operating system, but, unlike many other programming languages, it enables you to switch your work from one platform to another with few or no modifications.

At the time this book was written, PHP was simultaneously in versions 5.3.5 and 5.2.17. (There are slight differences between versions 5.3 and 5.2, so 5.2 continues to be supported for a while.) Although this book was written using a stable version of PHP 5.3, all of the code is backward compatible, at least to PHP version 5.x, if not to 4.x. In a couple of situations where a feature requires a more current version of PHP, or where older versions might have slight variations, a note in a sidebar or a tip will indicate how you can adjust the code accordingly.

More information can be found at PHP.net and www zend.com, the minds behind the core of PHP **B**.

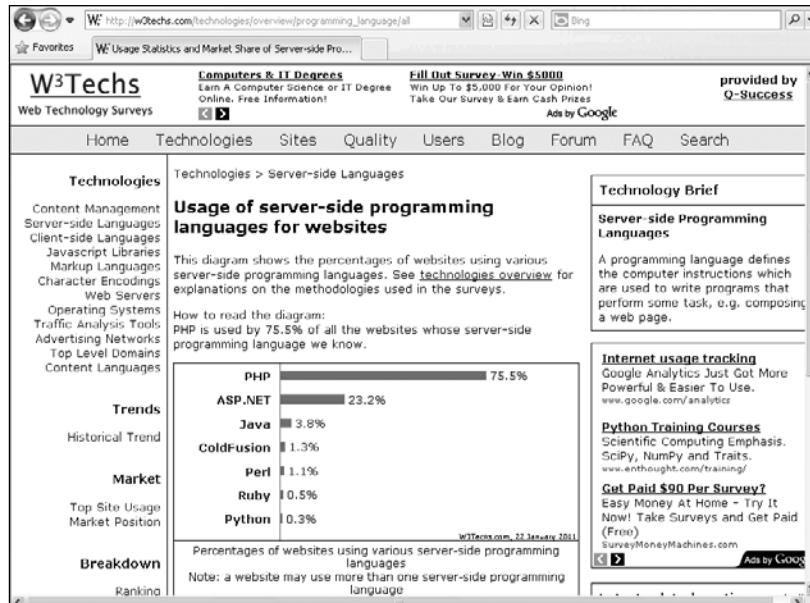
# Why Use PHP?

Put simply, PHP is better, faster, and easier to learn than the alternatives. All Web sites must begin with just HTML, and you can create an entire site using a number of static HTML pages. But basic HTML is a limited approach that does not allow for flexibility or responsiveness. Visitors accessing HTML-only sites see simple pages with no level of customization or dynamic behavior. With PHP, you can create exciting and original pages based on whatever factors you want to consider. PHP can also interact with databases and files, handle email, and do many other things that HTML alone cannot.

Webmasters learned a long time ago that HTML alone won't produce enticing

and lasting Web sites. Toward this end, server-side technologies such as PHP have become the norm. These technologies allow Web page designers to create Web applications that are dynamically generated, taking into account whichever elements the programmer desires. Often database-driven, these advanced sites can be updated and maintained more readily than static HTML pages.

When it comes to choosing a server-side technology, the primary alternatives to PHP are CGI scripts (Common Gateway Interface, commonly, but not necessarily written in Perl), ASP.NET (Active Server Pages), Adobe's ColdFusion, JSP (JavaServer Pages), and Ruby on Rails. And although there are some server-side JavaScript tools now available, JavaScript isn't truly an alternative to PHP (or vice versa).



**A** The Web Technology Surveys site says that PHP is running on 75% of all Web sites ([http://w3techs.com/technologies/overview/programming\\_language/all](http://w3techs.com/technologies/overview/programming_language/all)).

So the question is, why should a Web designer use PHP instead of CGI, ASP.NET, JSP, or whatever to make a dynamic Web site?

- **PHP is much easier to learn and use.** People—perhaps like you—without any formal programming training can write PHP scripts with ease after reading this one book. In comparison, ASP.NET requires an understanding of VBScript, C#, or another language; and CGI requires Perl (or C). These are more complex languages and are much more difficult to learn.
- **PHP was written specifically for dynamic Web page creation.** Perl (and VBScript and Java and Ruby) were not, and this fact suggests that, by its very intent, PHP can do certain tasks faster and more easily than the alternatives. I'd like to make it clear, however, that although I'm suggesting PHP is *better for certain things* (specifically those it

was created to do), PHP isn't a “better” programming language than Java or Perl—they can do things PHP can't.

- **PHP is both free and cross-platform.** Therefore, you can learn and use PHP on nearly any computer and at no cost. Furthermore, its open source nature means that PHP's users are driving its development, not some corporate entity.
- **PHP is the most popular tool available for developing dynamic Web sites.** As of this writing, PHP is in use on over 75% of all Web sites **A** and is the fourth most popular programming language overall **B**. Many of the biggest Web sites—Yahoo!, Wikipedia, and Facebook, just to name three—and content management tools, such as WordPress, Drupal, Moodle, and Joomla, use PHP. By learning this one language, you'll provide yourself with either a usable hobby or a lucrative skill.

Position Jan 2011	Position Jan 2010	Delta in Position	Programming Language	Ratings Jan 2011	Delta Jan 2010	Status
1	1	=	Java	17.773%	+0.29%	A
2	2	=	C	15.822%	-0.39%	A
3	4	↑	C++	8.783%	-0.93%	A
4	3	↓	PHP	7.835%	-2.24%	A
5	/	↑↑	Python	6.265%	+1.81%	A
6	6	=	C#	6.226%	+0.46%	A
7	5	↓↓	(Visual) Basic	5.867%	-1.49%	A
8	12	↑↑↑↑	Objective-C	3.011%	+1.63%	A
9	8	↓	Perl	2.857%	-0.71%	A
10	10	=	Ruby	1.784%	-0.69%	A
11	9	↓↓	JavaScript	1.589%	-1.12%	A

**B** The Tiobe Index (<http://www.tiobe.com/index.php/content/paperinfo/tpci/index.html>) uses a combination of factors to rank the popularity of programming languages.

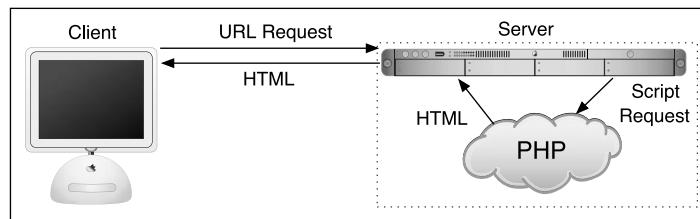
# How PHP Works

PHP is a server-side language, which means the code you write in PHP resides on a host computer that serves Web pages to Web browsers. When you go to a Web site ([www.LarryUllman.com](http://www.LarryUllman.com), for example), your Internet service provider (ISP) directs your request to the server that holds the [www.LarryUllman.com](http://www.LarryUllman.com) information. That server reads the PHP code and processes it according to its scripted directions. In this example, the PHP code tells the server to send the appropriate Web page data to your browser in the form of HTML **A**. In short, PHP creates an HTML page on the fly based on parameters of your choosing.

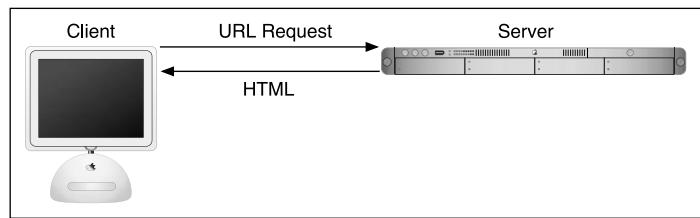
This differs from an HTML-generated site in that when a request is made, the server merely sends the HTML data to the Web browser—no server-side interpretation

occurs **B**. Hence, to the end user's browser, there may or may not be an obvious difference between what `home`.**html** and `home.php` look like, but how you arrive at that point is critically altered. The major difference is that by using PHP, you can have the server *dynamically* generate the HTML code. For example, different information could be presented if it's Monday as opposed to Tuesday or if the user has visited the page before. Dynamic Web page creation sets apart the less appealing, static sites from the more interesting and, therefore, more visited, interactive ones.

The central difference between using PHP and using straight HTML is that PHP does everything on the server and then sends the appropriate information to the browser. This book covers how to use PHP to send the right data to the browser.



**A** This graphic demonstrates (albeit in very simplistic terms) how the process works between a client, the server, and a PHP module (an application added to the server to increase its functionality) to send HTML back to the browser.



**B** Compare this direct relationship of how a server works handles basic HTML to **A**. This is also why HTML pages can be viewed in your browser from your own computer—they don't need to be “served,” but dynamically generated pages need to be accessed through a server that handles the processing.



**A** The popular Dreamweaver application supports PHP development, among other server-side technologies.

## What You'll Need

The most important requirement for working with PHP—because it's a server-side scripting language—is access to a PHP-enabled server. Considering PHP's popularity, your ISP or Web host most likely has this option available to you on their servers. You'll need to contact them to see what technology they support.

Your other option is to install PHP and a Web server application (like Apache) on your own computer. Users of Windows, Mac OS X, or Linux can easily install and use PHP for no cost. Directions for installing PHP are available in Appendix A, “Installation and Configuration.” If you’re up to the task of using your own PHP-installed server, you can take some consolation in knowing that PHP is available for free from the PHP Web site ([www.php.net](http://www.php.net)) and comes in easy-to-install packages. If you take this approach, and I recommend that you do, then your computer will act as both the client and the server.

The second requirement is almost a given: You must have a text editor on your computer. Crimson Editor, SciTE, TextWrangler, and similar freeware applications are all sufficient for your purposes; and BBEdit, TextPad, TextMate, and other commercial applications offer more features that you may appreciate. If you’re accustomed to using a graphical interface (also referred to as WYSIWYG—What You See Is What You Get) like Adobe Dreamweaver **A** or Aptana Studio, you can consult that application’s manual to see how to program within it.

*continues on next page*

Third, you need a method of getting the scripts you write to the server. If you've installed PHP on your own computer, you can save the scripts to the appropriate directory. However, if you're using a remote server with your ISP or Web host, you'll need an **FTP (File Transfer Protocol)** program to send the script to the server. There are plenty of FTP applications available; in Chapter 1, "Getting Started with PHP," I use the free FileZilla (<http://filezilla-project.org>) **B**) for an example.

Finally, if you want to follow the examples in Chapter 12, "Intro to Databases," you need access to MySQL ([www.mysql.com](http://www.mysql.com) **C**) or another database application. MySQL is available in a free version that you can install on your own computer.

This book assumes only a basic knowledge of HTML, although the more comfortable you are handling raw HTML code *without* the aid of a WYSIWYG application such as Dreamweaver, the easier the transition to using PHP will be. Every programmer will eventually turn to an HTML reference at some time or other, regardless of how much you know, so I encourage you to keep a good HTML book by your side. One such introduction to HTML is Elizabeth Castro's *HTML, XHTML, and CSS: Visual QuickStart Guide* (Peachpit Press, 2007).

Previous programming experience is certainly not required. However, it may expedite your learning, because you'll quickly see numerous similarities between, for example, Perl and PHP or JavaScript and PHP.



**B** The FileZilla application can be used on many different operating systems to move PHP scripts and other files to a remote server.



**C** MySQL's Web site (as of this writing).

**Script i.1** A sample PHP script, with line numbers and bold emphasis on a specific section of code.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
2   1.0 Transitional//EN"  
3   "http://www.w3.org/TR/xhtml1/DTD/  
4   xhtml1-transitional.dtd">  
5   <html xmlns="http://www.w3.org/1999/  
6   xhtml" xml:lang="en" lang="en">  
7   <head>  
8     <meta http-equiv="Content-Type"  
9      content="text/html; charset=utf-8"/>  
10  <title>Hello, World!</title>  
11  </head>  
12  <body>  
13  <?php print "Hello, World!"; ?>  
14  </body>  
15  </html>
```

## About This Book

This book attempts to convey the fundamentals of programming with PHP while hinting at some of the more advanced features you may want to consider in the future, without going into overwhelming detail. It uses the following conventions to do so.

The step-by-step instructions indicate what coding you're to add to your scripts and where. The specific text you should type is printed in a unique type style to separate it from the main body text. For example:

**<?php print "Hello, World!"; ?>**

The PHP code is also written as its own complete script and is numbered by line for reference (**Script i.1**). You shouldn't insert these numbers yourself, because doing so will render your work inoperable.

*continues on next page*

## What's New in This Book?

I would consider this fourth edition to be a modest revision of an already solid book. The biggest change in this edition is the removal of the previous version of Chapter 13, covering regular expressions. The type of regular expressions being discussed in earlier versions of the book have since been *deprecated*, meaning support for them is being dropped from the language. A more complex way of addressing regular expressions is beyond what's appropriate for beginning readers, and is covered in detail in my *PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide* (Peachpit Press, 2008).

As a replacement for the excised material, the new Chapter 13, “Putting It All Together,” walks you through the creation of a fully functioning Web site, using almost everything discussed in the entire book (while still teaching a couple of tricks). I hope you’ll find this added chapter to be an illuminating demonstration of how to apply your new knowledge.

Second, each chapter in this edition of the book now concludes with a “Review and Pursue” section. Over a page or two, you’ll be asked questions meant to reinforce some of the chapter’s key points. Prompts will direct you toward ways you can learn related, additional information, or try similar exercises. Help with the questions and prompts can be found in the book’s corresponding forum (at [www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

Finally, I tweaked some of the examples mostly to satisfy my own drive for perfection.

I recommend using a text editor that automatically displays the line numbers for you—the numbers will help when you’re debugging your work. In the scripts you’ll sometimes see particular lines highlighted in bold, in order to draw attention to new or relevant material.

Because of the nature of how PHP works, you need to understand that there are essentially three views of every script: the PHP code (e.g., Script i.1), the code that’s sent to the browser (primarily HTML), and what the browser displays to the end user. Where appropriate, sections of or all of the browser window are revealed, showing the end result of the exercise **A**. Occasionally, you’ll also see an image displaying the HTML source that the browser received **B**. You can normally access this view by choosing View Source or View Page Source from the appropriate Web browser menu. To summarize, **B** displays the HTML the browser receives, and **A** demonstrates how the browser interprets that HTML. Using PHP, you’ll create the HTML that’s sent to the browser.

Because the column in this book is narrower than the common text editor screen, sometimes lines of PHP code printed in the steps have to be broken where they would not otherwise break in your editor. A small gray arrow indicates when this kind of break occurs. For example:

```
print "This is going to be a longer  
→ line of code.";
```

You should continue to use one line in your scripts, or else you’ll encounter errors when executing them. (The gray arrow isn’t used in scripts that are numbered.)

While demonstrating new features and techniques, I’ll do my best to explain the why’s and how’s of them as I go. Between reading about and using a function, you should clearly comprehend it. Should something remain confusing, though, this book contains a number of references where you can find answers to any questions (see Appendix B, “Resources and Next Steps”). If you’re confused by a particular function or example, your best bet will be to check the online PHP manual or the book’s supporting Web site (and its user support forum).



**A** This is a sample view you’ll see of the browser window. For the purposes of this book, it won’t make any difference which Web browser or operating system you use.

A screenshot of a text editor window titled 'http://10.0.1.2:8888/script\_i\_01.php - Original Source'. The file menu shows 'File Edit Format'. The code is displayed in a monospaced font with line numbers 1 through 10 on the left. The code is as follows:

```
1 <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
2 "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">  
3 <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">  
4 <head>  
5 <meta http-equiv="Content-Type" content="text/html; charset=utf 8"/>  
6 <title>Hello, World!</title>  
7 </head>  
8 <body>  
9 Hello, World!</body>  
10 </html>
```

**B** By viewing the source code received by the Web browser, you can see the HTML created by PHP and sent by the server.

## Which Book Is Right for You?

This is the fourth edition of my first book on PHP. Like the original, it's written with the beginner or nonprogrammer in mind. If you have little or no programming experience, prefer a gentler pace, or like to learn things in bite-sized pieces, this is the book for you. Make no mistake: This book covers what you need to know to begin develop dynamic Web sites (while using practical examples), but it does so without any in-depth theory or advanced applications.

Conversely, if you pick up new technologies really quickly or already have some experience developing Web sites, you may find this to be too basic. In that case, you should consider my *PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide* instead (Peachpit Press, 2008). It discusses SQL and MySQL in much greater detail and goes through several more complex examples, but it does so at a quick jog.

## Companion Web Site

While you're reading this book, you may also find it helpful to visit the *PHP for the Web: Visual QuickStart Guide, 4th Edition* Web site, found within [www.LarryUllman.com](http://www.LarryUllman.com). There you'll find every script in this book available in a downloadable form. (However, I strongly encourage you to type the scripts yourself in order to become more familiar with the structure and syntax of PHP.)

The site also includes a more detailed reference section with links to numerous useful Web pages where you can continue learning PHP. In addition, the site provides an errata page listing any mistakes made in this text.

What many users find most helpful, though, is the book's supporting forum, found through the Web site or more directly at [www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/). Using the forum, you can:

- Find answers to problems you're having
- Receive advice on how to approach an idea you have
- Get debugging help
- See how changes in the technologies have affected the examples in the book
- Learn what other people are doing with PHP
- Confirm the answers to review questions
- Receive a faster reply from me than if you send me a direct email

## **Questions, comments, or suggestions?**

If you have a PHP-specific question, there are newsgroups, mailing lists, and question-and-answer sections available on PHP-related Web sites for you to turn to. These are discussed in more detail in Appendix B. Browsing through these references or searching the Internet will almost always provide you with the fastest answer.

You can also direct your questions, comments, and suggestions to me. You'll get the fastest reply using the book's corresponding forum (I always answer those questions first). If you'd rather email me, you can do so through the contact page on the Web site. I do try to answer every email I receive, but it will probably take a week or two (whereas you'll likely get a reply in the forum within a couple of days).

For more tips and an enlightening read, see the sidebar and Eric Steven Raymond's "How to Ask Questions the Smart Way" at [www.catb.org/~esr/faqs/smart-questions.html](http://www.catb.org/~esr/faqs/smart-questions.html). The 10 minutes you spend on it will save you hours in the future. Those people who will answer your questions, like myself, will be most appreciative!

## **How to Ask Questions the Smart Way**

Whether you're posting a message to the book's supporting forum, sending me an email, or asking a question in a newsgroup, knowing how to most effectively ask a question improves the quality of the response you'll receive as well as the speed with which you'll get your answer. To receive the best answer in the shortest amount of time, follow these steps:

- 1.** Search the Internet, read the manuals, and browse any applicable documentation.
- 2.** Ask your question in the most appropriate forum (newsgroup, mailing list, and so on).
- 3.** Use a clear and concise subject.
- 4.** Describe your problem in detail, show any relevant code, say what went wrong, indicate what version of PHP you're using, and state what operating system you're running.

# 1

# Getting Started with PHP

When learning any new programming language, you should always begin with an understanding of the basic syntax and functionality, which is what you'll learn in this chapter. The focus here is on the fundamentals of both HTML and PHP, and how the two languages work together. The chapter also covers some recommended programming and debugging techniques, the mastery of which will improve your work in the long run.

If you've never programmed before, a focused reading of this chapter will start you on the right track. If you have some programming experience, you'll be able to breeze through these pages, gaining a perspective for the book's remaining material in the meantime. By the end of this chapter you will have successfully written and executed your first PHP scripts and be on your way to developing dynamic Web applications.

---

## In This Chapter

Basic HTML Syntax	2
Basic PHP Syntax	7
Using FTP	10
Testing Your Script	12
Sending Text to the Browser	15
Using the PHP Manual	18
Sending HTML to the Browser	22
Adding Comments to Scripts	25
Basic Debugging Steps	28
Review and Pursue	30

---

# Basic HTML Syntax

All Web pages are made using HTML (Hypertext Markup Language). Every Web browser, be it Microsoft's Internet Explorer, Apple's Safari, Mozilla's Firefox, or Google's Chrome, turns HTML code—

```
<h1>Hello, World!</h1>  
I just wanted to say <em>Hello</em>.
```

—into the stylized Web page seen by the user A.

As of this writing, the most current version of HTML is 4.01. The next major release, HTML 5, is being actively developed and discussed, but is not production ready (again, as of this writing). This book uses a slight variant of HTML called XHTML (eXtensible HTML) (XHTML is almost exactly like HTML, with the following differences:

- All tags are written in lowercase.
- Nested tags must be *well formed*.

This rule isn't as complicated as it sounds. It means that you can't write `<div><p>text</div></p>`; instead you use `<div><p>text</p></div>`.

- All tag attributes must be quoted.

In HTML, you might write `<table border=2>`, but in XHTML, you must use `<table border="2">`.

- All tags must be closed.

This rule is the most confusing for most people. Many HTML tags have both an open and a close, like `<div class="someclass">text</div>`. However, a few don't have implicit closing tags. These include `<hr>`, `<br>`, `<img>`, and `<input>`. To make these valid XHTML tags, you need to close

## Hello, World!

I just wanted to say *Hello*.

A How one Web browser renders the HTML code.

them by adding a space and a slash at the end, like this:

```
<hr />
<br />

<input type="text" name="age" />
```

## Basic CSS

The HTML and XHTML elements define a page's content, but formatting the look and behavior of such content is best left to CSS (Cascading Style Sheets). As with HTML and XHTML, this book does not teach CSS in any detail, but as some of the book's code will use CSS, you should be familiar with its basic syntax, too.

You can add CSS to a Web page in a couple of ways. The first, and recommended, method is to use HTML **style** tags:

```
<style type="text/css">
rules
</style>
```

Between the opening and closing tags, the CSS rules are defined. You can also use the **link** HTML tag to incorporate CSS rules defined in an external file:

```
<link href="styles.css" rel="stylesheet" type="text/css" />
```

CSS rules are applied to combinations of general page elements, CSS classes, and specific items:

```
img { border: 0px; }
.error { color: red; }
#about { background-color: #ccc; }
```

The first rule applies to every image tag. The second applies to any element that has a class of *error*:

```
<p class="error">Error!</p>
```

The third rule applies to just the specific element that has an ID value of *about*:

```
<p id="about">About...</p>
```

(Not all elements need to have an **id** attribute, but no two elements can have the same **id** value.)

For the most part, this book will just use CSS to do simple things, such as changing the color or background color of an element or some text.

Even though using a separate CSS section or file is best, in order to keep things simple, this book will occasionally apply CSS inline:

```
<p style="color: red;">Error!</p>
```

For more on CSS, search the Web or see a dedicated book on the subject.

Before getting into the syntax of PHP, let's create one simple but valid XHTML document that will act as a template for almost all of this book's examples.

## To create an XHTML page:

1. Open your text editor or Integrated Development Environment (IDE).

You can use pretty much any application to create HTML, XHTML, and PHP pages. Popular choices include Adobe's Dreamweaver ([www.adobe.com](http://www.adobe.com)), which runs on Windows and Mac OS X; EditPlus ([www.editplus.com](http://www.editplus.com)) and Crimson Editor ([www.crimsoneditor.com](http://www.crimsoneditor.com)) for Windows; and Bare Bones' BBEdit ([www.barebones.com](http://www.barebones.com)) or MacroMates' TextMate ([www.macromates.com](http://www.macromates.com)) for the Mac.

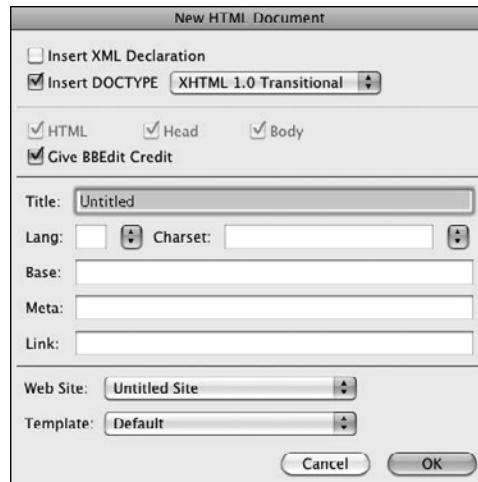
2. Choose File > New to create a new, blank document.

Some text editors allow you to start by creating a new document of a certain type—for example, a new XHTML file B. If your application has this option, use it.

3. Start with the XHTML header lines (Script 1.1):

```
<!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" xml:lang="en"
→ lang="en">
```

A valid XHTML document begins with these lines. They tell the Web browser what type of document to expect. For this template, and in the entire book, *XHTML 1.0 Transitional* pages will be created.



B BBEdit and most other Web development applications will create the basics of an XHTML document for you.

**Script 1.1** This sample document shows the basics of XHTML code.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   → xhtml1-transitional.dtd">
5   <html xmlns="http://www.w3.org/1999/
6   → xhtml" xml:lang="en" lang="en">
7   <head>
8     <meta http-equiv="content-type"
9       content="text/html; charset=utf-8" />
10    <title>Welcome to this Page!</title>
11  </head>
12  <body>
13    <h1>This is a basic XHTML page!</h1>
14    <br />
15    <p>Even with <span style="font-size:
16      150%;">some</span> decoration, it's still
17      not very exciting.</p>
18  </body>
19  </html>
```

## Understanding Encoding

Encoding is a huge subject, but what you most need to understand is this: *the encoding you use in a file dictates what characters can be represented* (and therefore, what languages can be used). To select an encoding, you must first confirm that your text editor or IDE can save documents using that encoding. Some applications let you set the encoding in the preferences or options area; others set the encoding when you save the file.

To indicate to the Web browser the encoding being used, there's the corresponding **meta** tag:

```
<meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
```

The **charset=utf-8** part says that **UTF-8** (short for *8-bit Unicode Transformation Format*) encoding is being used. Unicode is a way of reliably representing every symbol in every alphabet. Version 6 of Unicode—the current version as of this writing—supports over 99,000 characters! The most commonly used Unicode encoding is UTF-8.

If you want to create a multilingual Web page, UTF-8 is the way to go and I'll be using it in this book's examples. You don't have to, of course. But whatever encoding you do use, make sure that the encoding indicated by the XHTML page matches the actual encoding used by the text editor or IDE. If you don't, you'll likely see odd characters when you view the page in a Web browser.

This means adherence to XHTML 1.0 standards. The *Transitional* part means the page can use *deprecated* (no longer recommended) tags (as opposed to *Strict* mode, which isn't forgiving).

### 4. Create the head section of the page:

```
<head>
  <meta http-equiv="content-type"
    → content="text/html;
    → charset=utf-8"/>
  <title>Welcome to this Page!
  → </title>
</head>
```

The head of an XHTML page includes the **content-type** meta tag, required for valid XHTML. The “Understanding Encoding” sidebar discusses what the **charset** part of the tag means.

The head also contains the page’s title, which will appear at the top of the browser window, as well as in the browser’s bookmarks and history. You can also place JavaScript and CSS references in the head.

### 5. Create the body section:

```
<body>
  <h1>This is a basic XHTML page!
  → </h1>
  <br />
  <p>Even with <span style=
  → "font-size: 150%;">some</span>
  → decoration, it's still not very
  → exciting.</p>
</body>
```

*continues on next page*

The page's content—what is seen in the Web browser—goes between opening and closing **body** tags. Per XHTML rules, the break tag (**<br />**) includes a space before the slash that closes it. All the other tags are similar to their standard HTML counterparts except that they're in lowercase. CSS is used to increase the font size for the word *some*.

6. Type **</html>** to complete the HTML page.
7. Choose File > Save As. In the dialog box that appears, choose Text Only (or ASCII) for the format, if you're given the option.

XHTML and PHP documents are just plain text files (unlike, for example, a Microsoft Word document, which is stored in a proprietary format). You may also need to indicate the encoding when you save the file (again, see the sidebar).

8. Navigate to the location where you wish to save the script.

You can place this script anywhere you'd like on your computer, although using one dedicated folder for every script in this book, perhaps with subfolders for each chapter, makes sense.

## 9. Save the file as **welcome.html**.

Even though you're coding with XHTML, the page will still use the standard **.html** extension.

## 10. Test the page by viewing it in your Web browser C.

Unlike with PHP scripts (as you'll soon discover), you can test XHTML and HTML pages by opening them directly in a Web browser.

**TIP** Use the book's support forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)) or search the Web to find a good HTML and PHP editor or IDE.

**TIP** The book uses XHTML, but that doesn't mean you have to. If you're more comfortable with HTML, stick with what you know. It won't affect the operability of your PHP scripts.

**TIP** For more information on XHTML and HTML, check out Elizabeth Castro's excellent book, *HTML, XHTML, and CSS, Sixth Edition: Visual QuickStart Guide* (Peachpit Press, 2006).

**TIP** I'll use the terms HTML and XHTML interchangeably throughout the book. In fact, you'll probably see just HTML the majority of the time, but understand that I mean XHTML as well.



C The XHTML page, as interpreted by the Web browser.

## Basic PHP Syntax

Now that you've seen how HTML will be handled in this book, it's time to begin PHP scripting. To create your first PHP page, you'll start exactly as you would if you were creating an HTML document from scratch. Understanding the reason for this is vitally important: Web browsers are client applications that understand HTML; *PHP is a server-side technology*, which cannot be run in the client. To bridge this gap, PHP will be used on the server to generate HTML that's run in a Web browser (refer to the book's Introduction for a visual representation of this relationship).

There are three main differences between a standard HTML document and a PHP document. First, PHP scripts should be saved with the **.php** file extension (for example, **index.php**). Second, you place PHP code within **<?php** and **?>** tags, normally within the context of some HTML:

```
...
<body><h1>This is HTML.</h1>
<?php PHP code! ?>
<p>More HTML</p>
...
```

The PHP tags indicate the parts of the page to be run through the PHP processor on the server. This leads to the third major difference: *PHP scripts must be run on a PHP-enabled Web server* (whereas HTML pages can be viewed on any computer, directly in a browser). This means that *PHP scripts must always be run through a URL* (i.e., `http://something/page.php`). If you're viewing a PHP script in a Web browser and the address does not begin with *http*, the PHP script will not work.

*continues on next page*

To make this first PHP script do something without too much programming fuss, you'll use the `phpinfo()` function. This function, when called, sends a table of information to the Web browser. That table lists the specifics of the PHP installation on that particular server. It's a great way to test your PHP installation, and it has a high "bang for your buck" quality.

## To create a new PHP script on your computer:

1. Create a new HTML document in your text editor or IDE, to be named `phpinfo.php` (Script 1.2):

```
<!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" xml:lang="en"  
→ lang="en">  
<head>  
    <meta http-equiv="content-type"  
        → content="text/html;  
        → charset=utf-8" />  
    <title>First PHP Script</title>  
</head>  
<body>  
</body>  
</html>
```

This particular HTML is largely irrelevant to the overall point of creating a PHP page—but, for consistency's sake, this is the same template as in the basic XHTML example (Script 1.1).

**Script 1.2** This first PHP script takes a typical HTML page, adds the PHP tags, and invokes a PHP function.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
1.0 Transitional//EN"  
2      "http://www.w3.org/TR/xhtml1/DTD/  
xhtml1-transitional.dtd">  
3  <html xmlns="http://www.w3.org/1999/  
xhtml" xml:lang="en" lang="en">  
4  <head>  
5      <meta http-equiv="content-type"  
       content="text/html; charset=utf-8" />  
6  <title>First PHP Script</title>  
7  </head>  
8  <body>  
9  <?php  
10 phpinfo();  
11 ?>  
12 </body>  
13 </html>
```

2. Create some blank lines between the opening and closing **body** tags by pressing Return (Mac) or Enter (PC).
3. Type `<?php` on its own line, just after the opening **body** tag.

This initial PHP tag tells the server that the following code is PHP and should be handled as such.

4. Add the following on the next line:

```
phpinfo();
```

The syntax will be explained in detail later, but in short, this is just a call to an existing PHP function named *phpinfo*. You must use the opening and closing parentheses, with nothing between them, and the semicolon.

5. Type `?>` on its own line, just before the closing body tag.

The closing PHP tag tells the server that the PHP section of the script is over. Any text outside of the PHP tags is immediately sent to the Web browser as HTML and isn't treated as PHP code.

6. Save the script as **phpinfo.php**.

Not to overstate the point, but remember that PHP scripts must use a valid file extension. Most likely you'll have no problems if you save your files as *filename.php*.

You also need to be certain that the application or operating system is not adding a hidden extension to the file. Notepad on Windows, for example, will attempt to add `.txt` to uncommon file extensions, which will render the PHP script unusable.

**TIP** Just as a file's extension on your computer tells the operating system in what application to open the file, a Web page's extension tells the server how to process the file: *file.php* goes through the PHP module, *file.aspx* is processed as ASP.NET, and *file.html* is a static HTML document (normally). The extension associations are determined by the Web server's settings.

**TIP** If you're developing PHP scripts for a hosted Web site, check with your hosting company to learn which file extensions you can use for PHP documents. In this book you'll see `.php`, the most common extension.

**TIP** You'll occasionally see PHP's *short tags*—simply `<?` and `?>`—used in other people's scripts, although it's best to stick with the formal tags. In fact, support for the short tags is being dropped from the language.

**TIP** You'll find it handy to have a copy of the *phpinfo.php* file around. As you'll soon see, this script will report upon PHP's capabilities, settings, and other features of your server. In fact, this book will frequently suggest you return to this script for those purposes.

**TIP** PHP scripts can also be executed without a Web browser, using a command-line interface and a stand-alone PHP executable. But that topic is well outside the scope of this book (and it's a much less common use of PHP regardless).

# Using FTP

Unlike HTML, which can be tested directly in a Web browser, PHP scripts need to be run from a PHP-enabled server in order for you to see the results. Specifically, PHP is run through a *Web server application*, like Apache (<http://httpd.apache.org>), Abyss ([www.aprelium.com](http://www.aprelium.com)), or Internet Information Server (IIS, [www.iis.net](http://www.iis.net)).

There are two ways you can obtain a PHP-enabled server:

1. Install the software on your computer.
2. Acquire Web hosting.

PHP is open source software (meaning, in part, that it's free) and is generally easy to install (with no adverse effect on your computer as a whole). If you want to install PHP and a Web server on your computer, follow the directions in Appendix A, "Installation and Configuration." Once you've done so, you can skip ahead to the next section of the chapter, where you'll learn how to test your first PHP script.

If you're not running PHP on your own computer, you'll need to transfer your

PHP scripts to the PHP-enabled server using FTP (File Transfer Protocol).

The Web hosting company or server's administrator will provide you with FTP access information, which you'll enter into an FTP client. There are many FTP client applications available; in this next sequence of steps, I'll use the free FileZilla (<http://filezilla-project.org/>), which runs on many operating systems.

## To FTP your script to the server:

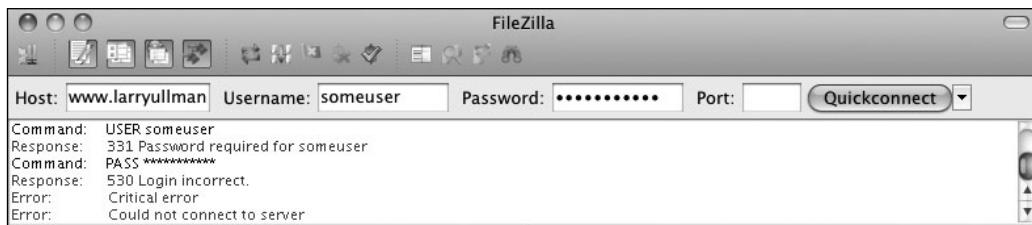
1. Open your FTP application.
2. In the application's connection window, enter the information provided by your Web host **A**.

FTP access requires a hostname (e.g., the domain name or an IP address), username, and password.

3. Click Quickconnect (or your FTP client's equivalent).
- If you've provided the correct information, you should be able to connect. If not, you'll see error messages at the top of the FileZilla window **B**.



**A** The connection section of FileZilla's main window (as it appears on the Mac).



**B** The reported error says that the login information is incorrect.

4. Navigate to the proper directory for your Web pages (for example, `www`, `htdocs`, or `httpdocs`).

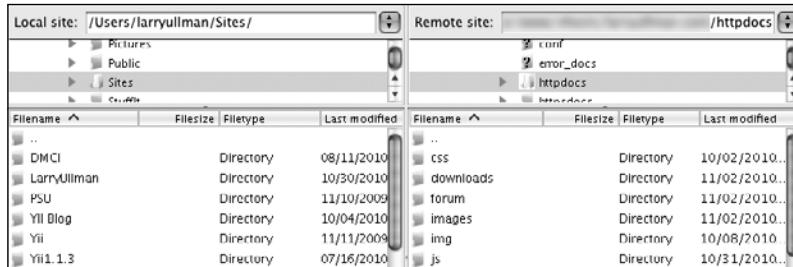
The FTP application won't necessarily drop you off in the appropriate directory. You may need to do some navigation to get to the *Web document root*. The Web document root is the directory on the server to which a URL directly points (for example, `www.larryullman.com`). If you're unsure of what the Web document root is for your setup, see the documentation provided by the hosting company (or ask them for support).

In FileZilla, the right-hand column represents the files and directories on the server; the left-hand column represents the files and directories on your computer C. Just double-click on folders to enter them.

5. Upload your script—`phpinfo.php`—to the server.

To do this in FileZilla, you just need to drag the file from the left column—your computer—to the right column—the server.

**TIP** Some text editors and IDEs have built-in FTP capability, allowing you to save your scripts directly to the server. Some, like Dreamweaver and TextMate, can run PHP scripts without leaving the application at all.



C I've successfully connected to the remote server and navigated into the `htdocs` directory (aka the *Web document root*).

# Testing Your Script

Testing a PHP script is a two-step process. First you must put the PHP script in the appropriate directory for the Web server. Second, you run the PHP script in your Web browser by loading the correct URL.

If you're using a separate Web server, like one provided by a hosting company, you just need to use an FTP application to upload your PHP script to it (as in the previous steps). If you have installed PHP on your personal computer, then you can test your PHP scripts by saving them in, or moving them to, the Web document root. This is normally

- **~/Sites** for Mac OS X users (where ~ stands for your home directory)
- **AbyssDir/htdocs** on any operating system, where **AbyssDir** is the directory in which the Abyss Web Server was installed
- **C:\Inetpub\wwwroot** for Windows users running IIS
- **C:\xampp\htdocs** for Windows users running XAMPP ([www.apachefriends.com](http://www.apachefriends.com))
- **/Applications/MAMP/htdocs** for Mac users running MAMP ([www.mamp.info](http://www.mamp.info))

If you're not sure what the Web document root for your setup is, see the documentation for the Web server application or operating system (if the Web server application is built-in).

Once you've got the PHP script in the right place, use your browser to execute it.

## To test your script in the browser:

1. Open your favorite Web browser.

For the most part, PHP doesn't behave differently on different browsers (because PHP runs on the server), so use whichever browser you prefer. In this book, you'll see that I primarily use Firefox and Safari, regardless of the operating system.

2. In the browser's address bar, enter the URL of the site where your script has been saved.

In my case, I enter [www.larryullman.com](http://www.larryullman.com), but your URL will certainly be different.

If you're running PHP on your own computer, the URL is `http://localhost` (Windows); or `http://localhost/~username` (Mac OS X), where you should replace `username` with your username. Some all-in-one packages, such as MAMP and XAMPP, may also use a *port* as part of the URL: `http://localhost:8888`.

If you're not sure what URL to use, see the documentation for the Web server application you installed.

### 3. Add `/phpinfo.php` to the URL.

If you placed the script within a subdirectory of the Web document root, you would add that subdirectory name to the URL as well (e.g., `/ch01/phpinfo.php`).

### 4. Press Return/Enter to load the URL.

The page should load in your browser window **A**.

*continues on next page*

System		Darwin Larry-Ullmans-iMac.local 10.4.1 Darwin Kernel Version 10.4.1: Fri Jul 16 23:04:20 PDT 2010; root:xnu-1504.7.51~1RELEASE_i386 i386
Build Date		Mar 5 2010 16:41:09
Configure Command		'/configure' '--with-mysql=/Applications/MAMP/Library' '--with-apxs2=/Applications/MAMP/Library/bin/apxs' '--with-jpeg-dir=/Applications/MAMP/Library' '--with-png-dir=/Applications/MAMP/Library' '--prefix=/Applications/MAMP/bin/php5.3' '--exec-prefix=/Applications/MAMP/bin/php5.3' '--sysconfdir=/Applications/MAMP/conf/php5.3' '--with-soap' '--with-config-file-path=/Applications/MAMP/conf/php5.3' '--enable-track-vars' '--enable-bcmath' 'enable ftp' 'enable gd native ttf' 'with bz2' 'with ldap' 'with mysql=/Applications/MAMP/Library/bin/mysql_config' '--with-sqlite' '--with-ttf' '--with-ttfib=/Applications/MAMP/Library' '--enable-mbstring=all' '--with-curl=/Applications/MAMP/Library' '--enable-dbx' '--enable-sockets' '--enable-bcmath' '--with-imap=shared,/Applications/MAMP/Library/lib/imap-2007e' '--enable-soap' '--with-kerberos' '--enable-calendar' '--with-pgsql=shared,/Applications/MAMP/Library/pg' '--enable-dbase' '--enable-exif' '--with-libxml-dir=/Applications/MAMP/Library' '--with-gd=/Applications/MAMP/Library' 'with xsl=/Applications/MAMP/Library' 'with pdo-mysql=shared,/Applications/MAMP/Library' '--with-pdo-pgsql=shared,/Applications/MAMP/Library/pg' '--with-mcrypt=shared,/Applications/MAMP/Library' '--with-openssl'
Server API		Apache 2.0 Handler
Virtual Directory Support		disabled
Configuration File (php.ini) Path		/Applications/MAMP/conf/php5.3
Loaded Configuration File		/Library/Application Support/appsolute/MAMP PRO/conf/php.ini
Scan this dir for additional ini files		(none)
Additional .ini files parsed		(none)
PHP API		20090626
PHP		20090626

**A** If the script has been executed correctly, the browser result should look like this (woohoo!).

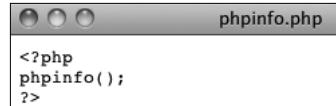
If you see the PHP code **B** or a blank page, it could mean many things:

- ▶ You are not loading the PHP script through a URL (i.e., the address does not begin with *http*).
  - ▶ PHP has not been enabled on the server.
  - ▶ You are not using the proper extension.
- If you see a *file not found* or similar error **C**, it could be because
- ▶ You entered the incorrect URL.
  - ▶ The PHP script is not in the proper directory.
  - ▶ The PHP script does not have the correct name or extension.

**TIP** It's very important to remember that you can't open a PHP file directly in a Web browser as you would open HTML pages or files in other applications. PHP scripts must be processed by the Web server, which means you must access them via a URL (an address that starts with *http://*).

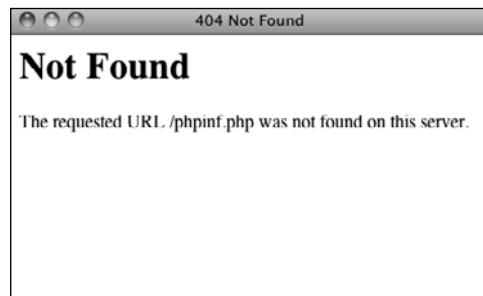
**TIP** Even if you aren't a seasoned computer professional, you should consider installing PHP on your computer. Doing so isn't too difficult, and PHP is free. Again, see Appendix A for instructions.

**TIP** Technically speaking, you don't need to add any HTML to a `phpinfo()` script. If you don't, the `phpinfo()` function will still generate a complete HTML page.



A screenshot of a web browser window titled "phpinfo.php". The content area contains the following raw PHP code:  
<?php  
phpinfo();  
?>

**B** If you see the raw PHP code, then the PHP code is not being executed.



**C** This server response indicates a mismatch between the URL attempted and the files that actually exist on the server.

# Sending Text to the Browser

PHP wouldn't be very useful if all you could do was see that it works (although that confirmation is critical). You'll use PHP most frequently to send information to the browser in the form of plain text and HTML tags. To do so, use `print`:

```
print "something";
```

Just type the word `print`, followed by what you want to display: a simple message, the value of a variable, the result of a calculation, and so forth. In the previous example, the message is a string of text, so it must be surrounded with quotation marks (in comparison, numbers are not quoted).

To be clear, `print` doesn't actually *print* anything; it just outputs data. When a PHP script is run through a Web browser, that PHP output is received by the browser itself.

Also notice that the line is terminated with a semicolon (;). Every statement in PHP code must end with a semicolon, and forgetting this requirement is a common cause of errors. A *statement* in PHP is an executable line of code, like

```
print "something";
```

or

```
phpinfo();
```

Conversely, comments, PHP tags, control structures (conditionals, loops, and so on), and certain other constructs discussed in this book don't require semicolons.

Finally, you should know about a minor technicality: whereas `phpinfo()` is a *function*, `print` is actually a *language construct*.

Although it's still standard to refer to `print` as a function, because `print` is a language construct, no parentheses are required when using it, as in the `phpinfo()` example.

## To print a simple message:

1. Begin a new HTML document in your text editor or IDE, to be named `hello.php` (Script 1.3):

```
<!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" xml:lang="en"
→ lang="en">
<head>
    <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
    <title>Hello, World!</title>
</head>
<body>
    <p>The following was created
→ by PHP:
```

Most of this code is the standard HTML. The last line will be used to distinguish between the hard-coded HTML and the PHP-generated HTML.

2. On the next line, type `<?php` to create the initial PHP tag.

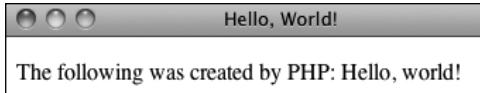
3. Add

```
print "Hello, world!";
```

Printing the phrase *Hello, world!* is the first step most programming references teach. Even though it's a trivial reason to use PHP, you're not really a programmer until you've made at least one *Hello, world!* application.

**Script 1.3** By putting the `print` statement between the PHP tags, the server will dynamically send the *Hello, world!* greeting to the browser.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml"
xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="content-type"
content="text/html; charset=utf-8" />
6      <title>Hello, World!</title>
7  </head>
8  <body>
9      <p>The following was created by PHP:
10     <?php
11     print "Hello, world!";
12     ?>
13     </p>
14     </body>
15     </html>
```



- A A simple **Hello, world!** example: your first foray into PHP programming.

4. Close the PHP section and complete the HTML page:

```
?>  
</p>  
</body>  
</html>
```

5. Save the file as **hello.php**, place it on your PHP-enabled server, and test it in your browser A.

If you're running PHP on your own computer, remember that you can save the file to the proper directory and access the script via `http://localhost/`.

If you see an error or a blank page instead of the results shown in the figure, see the debugging section at the end of this chapter.

**TIP** PHP is case-insensitive when it comes to calling functions like `phpinfo()` and `print`: `print`, `Print`, and `PRINT` net the same results. Later in the book you'll see examples where case makes a crucial difference.

**TIP** You can use other functions to send text to the browser, including `echo` and `printf()`, but this book primarily uses `print`.

**TIP** You can—and commonly will—use `print` over multiple lines:

```
print "This is a longer  
sentence of text.;"
```

The closing quotation mark terminates the message being printed and the semicolon is placed only at the end of that line.

# Using the PHP Manual

The PHP manual—accessible online at [www.php.net/manual](http://www.php.net/manual)—lists every function and feature of the language. The manual is organized with general concepts (installation, syntax, variables) discussed first and ends with the functions by topic (MySQL, string functions, and so on).

To quickly look up any function in the PHP manual, go to [www.php.net/functionname](http://www.php.net/functionname) in your Web browser (for example, [www.php.net/print](http://www.php.net/print)).

To understand how functions are described, look at the start of the **print** function's page **A**.

The first line is the name of the function itself, followed by the versions of PHP in which it's available. As the language grows, new functions are added and, occasionally, older functions are removed. Then there's a textual description of the function along with the function's basic usage. The usage is the most important and confusing part.

In this example, the first value, **int**, says that **print** returns an integer value (specifically, **print** returns 1, always).

The screenshot shows a section of the PHP manual for the **print** construct. The title is **print** and it specifies compatibility with PHP 4 and PHP 5. A brief description states that **print** outputs a string. Below this is a **Description** box containing the function signature **int print ( string \$arg )**. A note below the signature says "Outputs *arg*." At the bottom of the box, a note states: "**print()** is not actually a real function (it is a language construct) so you are not required to use parentheses with its argument list." There is also a link to "Report a bug".

**A** The PHP manual's page for the **print** construct.

Within the parentheses, `string $arg` states that the function takes one required argument, which should be in the form of a string. You've already seen this in action.

As a comparison, check out the manual's listing for the `nl2br()` function **B**. This function converts newlines found within text (the equivalent of pressing Return/Enter) into HTML break tags. This function, which returns a string, takes a string as its first argument and an optional Boolean (`true/false`) as its second. Whenever you see the square brackets, that indicates optional arguments, which are always listed last. When a function takes multiple arguments, they are separated by commas. Hence, this function can be called like so:

```
nl2br("Some text");
nl2br("Some text", false);
```

As the definition also indicates, the second argument has a default value of `true`, meaning it'll create XHTML `<br />` tags unless the function is passed a second argument value of `false`. In that case, the function will create HTML `<br>` tags instead.

If you're ever confused by a function or how it is properly used, check the PHP manual's reference page for it.

## nl2br

(PHP 4, PHP 5)

nl2br — Inserts HTML line breaks before all newlines in a string

### Description

[Report a bug](#)

```
string nl2br ( string $string [, bool $is_xhtml = true ] )
```

Returns `string` with '`<br />`' or '`<br>`' inserted before all newlines.

**B** The PHP manual's page for the `nl2br()` function.

## To look up a function definition:

1. Head to [www.php.net/functionname](http://www.php.net/functionname) in your Web browser.

If the PHP manual doesn't have a matching record for the function you tried, check the spelling or look at the recommended alternatives that the manual presents **C**.

2. Compare the versions of PHP that the function exists in with the version of PHP you're using.

Use the **phpinfo()** function, already demonstrated, to know for certain what version of PHP you are running.

If a function was added in a later version of PHP, you'll either need to upgrade the version you have or use a different approach.

3. Examine what type of data the function returns.

Sometimes you may be having a problem with a function because it returns a different type of value than you expect it to.

### PHP Function List

Sorry, but the function **n2br** is not in the online manual. Perhaps you misspelled it, or it is a relatively new function that hasn't made it into the online documentation yet. The following are the 20 functions which seem to be closest in spelling to **n2br** (really good matches are in bold). Perhaps you were looking for one of these:

**n1zbr**  
png2wbmp  
atan2  
mongodref  
substr  
hebrev  
bzread

bcsqrt  
finfo\_buffer  
iconv\_substr  
bzerror  
bin2hex  
deg2rad  
scandir

long2ip  
bzerrno  
natsort  
opendir  
strpbrk  
mongodb

If you want to search the entire PHP website for the string "**n2br**", then [click here](#).

For a quick overview over all documented PHP functions, [click here](#).

- C** The manual will present alternative functions if the entered URL doesn't directly match a reference.

4. Examine how many and what types of arguments the function requires or can take.

The most common mistake when using functions is sending the wrong number or type of arguments when the function is called.

5. Read the user comments, when present, to learn more.

Sometimes the user comments can be quite helpful (other times not).

**TIP** If you see a message saying that a function has been deprecated **D**, that means the function will be dropped from future versions of PHP and you should start using the newer, better alternative (there almost always is one, and it will be identified).

## ereg

(PHP 4, PHP 5)

ereg — Regular expression match

### Description

[Report a bug](#)

```
int ereg ( string $pattern , string $string [, array &$regs ] )
```

Searches a *string* for matches to the regular expression given in *pattern* in a case-sensitive way.



### Warning

This function has been **DEPRECATED** as of PHP 5.3.0. Relying on this feature is highly discouraged.

- D** Deprecated functions should be avoided in your code.

# Sending HTML to the Browser

As those who first learned HTML quickly discovered, viewing plain text in a Web browser leaves a lot to be desired. Indeed, HTML was created to make plain text more appealing and useful. Because HTML works by adding tags to text, you can use PHP to also send HTML tags to the browser, along with other data:

```
print "<b>Hello, world!</b>";
```

There is one situation where you have to be careful, though. HTML tags that require double quotation marks, like `<a href="page.php">link</a>`, will cause problems when printed by PHP, because the `print` function uses quotation marks as well **A**:

```
print "<a href="page.php">link</a>";
```

One workaround is to escape the quotation marks within the HTML by preceding them with a backslash (\):

```
print "<a href=\"page.php\">link</a>";
```

By escaping each quotation mark within the `print` statement, you tell PHP to print the mark itself instead of treating the quotation mark as either the beginning or end of the string to be printed.

## To send HTML to the browser:

1. Open the `hello.php` script (Script 1.3) in your text editor or IDE, if it is not already open.
2. Edit the `Hello, world!` text on line 11 by adding HTML tags, making it read (Script 1.4) as follows:

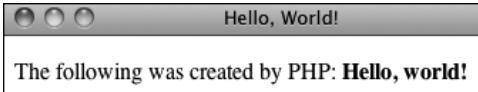
```
print "<span style=\"font-weight:  
→ bold;\">Hello, world!</span>";
```

```
Parse error: syntax error, unexpected T_STRING in  
/Users/larryullman/Sites/phpvqs4/hello.php on line 11
```

**A** Attempting to print double quotation marks will create errors, as they conflict with the `print` statement's primary double quotation marks.

**Script 1.4** With the `print` function, you can send HTML tags along with text to the browser, where the formatting will be applied.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
1.0 Transitional//EN"  
2      "http://www.w3.org/TR/xhtml1/DTD/  
3      xhtml1-transitional.dtd">  
4  <html xmlns="http://www.w3.org/1999/xhtml"  
5      xml:lang="en" lang="en">  
6      <head>  
7          <meta http-equiv="content-type"  
8              content="text/html; charset=utf-8" />  
9          <title>Hello, World!</title>  
10     </head>  
11     <body>  
12         <p>The following was created by PHP:  
13         <?php  
14             print "<span style=\"font-weight:  
15                 bold;\">Hello, world!</span>";  
16         ?>  
17     </p>  
18     </body>  
19  </html>
```



- B The new version of the *Hello, world!* page, with a little more decoration and appeal.

To make the PHP-generated part of the message stand out, CSS styling will embolden the greeting. For this to work, you must escape the quotation marks within the **span** tag so that they don't conflict with the **print** statement's quotation mark.

3. Save the script as **hello2.php**, place it on your PHP-enabled server, and run the page in your browser B.

*continues on next page*

## Using White Space

When you're programming in PHP, you should understand that white space is generally (but not universally) ignored. Any blank line (just one or several in a row) in PHP code is irrelevant to the end result. Likewise, tabs and spaces are normally inconsequential to PHP. And as PHP code is not visible in the Web browser (unless there's a problem with the server), white space in your PHP files has no impact on what the end user sees.

The spacing of HTML code shows up in the HTML source of a Web page but has only a minimal effect on what's viewed in the Web browser. For example, all of a Web page's HTML source code could be placed on one line without changing what the end user sees. If you had to hunt for a problem in the HTML source, however, you would not like the long, single line of HTML. You can affect the spacing of dynamically generated HTML code by printing it in PHP over multiple lines, or by using the newline character (`\n`) within double quotation marks:

```
print "Line 1\nLine 2";
```

Again, use of the newline character affects the *HTML source code* of the Web page, not what the end user will see rendered in the browser.

To adjust the spacing in the rendered Web page, you'll use CSS, plus paragraph, div, and break tags, among others.

**4.** View the HTML page source to see the code that was sent to the browser **C**.

How you do this depends upon the browser: select View > Page Source in Firefox, View > Source in Internet Explorer, or View > View Source in Safari.

This is a step you'll want to be in the habit of taking, particularly when problems occur. Remember that PHP is primarily used to generate HTML, sent to and interpreted by the Web browser. Often, confirming what was sent to the Web browser (by viewing the source) will help explain the problem you're seeing in the browser's interpretation (or visible result).

**TIP** Understanding the role of quotation marks and how to escape problematic characters is crucial to programming with PHP. These topics will be covered in more detail in the next two chapters.

**TIP** The HTML you send to the Web browser from PHP doesn't need to be this simple. You can create tables, JavaScript, and much, much more.

**TIP** Remember that any HTML outside of the PHP tags will automatically go to the browser. Within the PHP tags, print statements are used to send HTML to the Web browser.



The screenshot shows a browser window with the title "Source of http://phpvqs4:8888/hello2.php". The content of the browser is the raw HTML source code of the PHP file. The code includes a DOCTYPE declaration, an HTML head with a meta tag and a title, and a body containing a paragraph and a bolded span element.

```
<!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" xml:lang="en" lang="en">
<head>
  <meta http-equiv="content-type" content="text/html; charset=utf-8" />
  <title>Hello, World!</title>
</head>
<body>
  <p>The following was created by PHP:</p>
  <span style="font-weight: bold;">Hello, world!</span></p>
</body>
</html>
```

**C** The resulting HTML source code of **hello2.php** **B** on page 22.

# Adding Comments to Scripts

Comments are integral to programming, not because they do anything but because they help you remember why *you* did something. The computer ignores these comments when it processes the script. Furthermore, PHP comments are never sent to the Web browser and therefore remain your secret.

PHP supports three ways of adding comments. You can comment out one line of code by putting either `//` or `#` at the beginning of the line you want ignored:

```
// This is a comment.
```

You can also use `//` or `#` to begin a comment at the end of a PHP line, like so:

```
print "Hello"; // Just a greeting.
```

Although it's largely a stylistic issue, `//` is much more commonly used in PHP than `#`.

You can comment out multiple lines by using `/*` to begin the comment and `*/` to conclude it:

```
/* This is a  
multi-line comment. */
```

Some programmers also prefer this comment style as it contains both open and closing “tags,” providing demarcation for where the comment begins and ends.

## To add comments to a script:

1. Open the hello2.php (Script 1.4) in your text editor or IDE.
2. After the initial PHP tag, add some comments to your script (**Script 1.5**):

```
/*
 *Filename: hello3.php
 *Book reference: Script 1.5
 *Created by: Larry Ullman
 */
```

This is just a sample of the kind of comments you can write. You should document what the script does, what information it relies on, who created it, when, and so forth. Stylistically, such comments are often placed at the top of a script (as the first thing within the PHP section, that is), using formatting like this. The extra asterisks aren't required; they just draw attention to the comments.

3. On line 17, in front of the **print** statement, type **//**.

By preceding the **print** statement with two slashes, the function call is “commented out,” meaning it will never be executed.

4. After the closing PHP tag (on line 19), add an HTML comment:

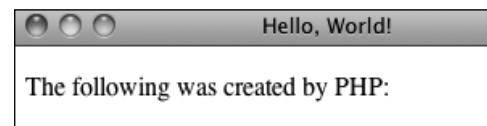
```
<!-- This is an HTML comment. -->
```

This line of code will help you distinguish among the different comment types and where they appear. This comment will only appear within the HTML source code.

5. Save the script as **hello3.php**, place it on your PHP-enabled server, and run the page in your Web browser **A**.

**Script 1.5** PHP and HTML comments are added to the script to document it and to render a line of PHP code inert.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/xhtml"
6  xml:lang="en" lang="en">
7  <head>
8  <meta http-equiv="content-type"
9   content="text/html; charset=utf-8" />
10 <title>Hello, World!</title>
11 </head>
12 <body>
13 <p>The following was created by PHP: <br />
14 <?php
15 /**
16 *Filename: hello3.php
17 *Book reference: Script 1.5
18 *Created by: Larry Ullman
19 */
20 //print "<span style=\"font-weight:
21 bold;\">Hello, world!</span>\n";
22 <!-- This is an HTML comment. -->
23 </p>
24 </body>
25 </html>
```



**A** With the **print** statement commented out, the page looks just as it would if the **print** function weren't there.

6. View the source of the page to see the HTML comment B.

**TIP** You can comment out just one line of code or several using the /\* and \*/ method. With // or #, you can negate only one line at a time.

**TIP** Different programmers prefer to comment code in different ways. The important thing is to find a system that works for you and stick to it.

**TIP** Note that you cannot use HTML comment characters (<!-- and -->) within PHP to comment out code. You could have PHP print those tags to the browser, but in that case you'd create a comment that appeared in the HTML source code on the client's computer (but not in the browser window). PHP comments never make it as far as a user's computer.

**TIP** Despite my strong belief that you can't over-comment your scripts, the scripts in this book aren't as documented as they should be, in order to save space. But the book will document each script's name and number, for cross-reference purposes.

**TIP** When you change a script's code, be certain to update its comments as well. It's quite confusing to see a comment that suggests a script or a line of code does something other than what it actually does.



The screenshot shows a browser window with the title "Source of http://phpvqs4:8888/hello3.php". The content area displays the following HTML code:

```
<!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" xml:lang="en" lang="en">
<head>
  <meta http-equiv="content-type" content="text/html; charset=utf-8" />
  <title>Hello, World!</title>
</head>
<body>
<p>The following was created by PHP: <br />
<!-- This is an HTML comment. -->
</p>
</body>
</html>
```

B HTML comments don't appear in the Web browser but are in the HTML source. PHP comments remain in the PHP script on the server.

# Basic Debugging Steps

Debugging is by no means a simple concept to grasp, and unfortunately, it's one that is only truly mastered by doing. The next 50 pages could be dedicated to the subject and you'd still only be able to pick up a fraction of the debugging skills that you'll eventually acquire and need.

The reason I introduce debugging in this somewhat harrowing way is that it's important not to enter into programming with delusions. Sometimes code won't work as expected, you'll inevitably create careless errors, and some days you'll want to pull your hair out, even when using a comparatively user-friendly language such as PHP. In short, *prepare to be perplexed and frustrated at times*. I've been coding in PHP since 1999, and occasionally I still get stuck in the programming muck. But debugging is a very important skill to have, and one that you will eventually pick up out of necessity and experience. As you begin your PHP programming adventure, I can offer the following basic but concrete debugging tips.

## To debug a PHP script:

- **Make sure you're always running PHP scripts through a URL!**

This is perhaps the most common beginner's mistake. PHP code must be run through the Web server application, which means it must be requested through **http://something**. When you see actual PHP code instead of the result of that code's execution, most likely you're not running the PHP script through a URL.

- **Know what version of PHP you're running.**

Some problems will arise from the version of PHP in use. Before you ever use any PHP-enabled server, run the **phpinfo.php** file (Script 1.2) to confirm the version of PHP in use.

- **Make sure `display_errors` is on.**

This is a basic PHP configuration setting (discussed in Appendix A). You can confirm this setting by executing the `phpinfo()` function (just use your browser to search for `display_errors` in the resulting page). For security reasons, PHP may not be set to display the errors that occur. If that's the case, you'll end up seeing blank pages when problems occur. To debug most problems, you'll need to see the errors, so turn this setting on while you're learning. You'll find instructions for doing so in Appendix A and Chapter 3, "HTML Forms and PHP."

- **Check the HTML source code.**

Sometimes the problem is hidden in the HTML source of the page. In fact, sometimes the PHP error message can be hidden there!

- **Trust the error message.**

Another very common beginner's mistake is to not fully read or trust the error that PHP reports. Although an error message can often be cryptic and may seem meaningless, it can't be ignored. At the very least, PHP is normally correct as to the line on which the problem can be found. And if you need to relay that error message to someone else (like when you're asking me for help), do include the entire error message!

- **Take a break!**

So many of the programming problems I've encountered over the years, and the vast majority of the toughest ones, have been solved by stepping away from my computer for a while. It's easy to get frustrated and confused, and in such situations, any further steps you take are likely to only make matters worse.

**TIP** These are just some general debugging techniques, specifically tailored to the beginning PHP programmer. They should suffice for now, though, as the examples in this book are relatively simple. More complex coding requires more advanced debugging techniques, so my *PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide* (Peachpit Press, 2007) dedicates a whole chapter to this subject.

# Review and Pursue

New in this edition of the book, each chapter ends with a “Review and Pursue” section. In these sections you’ll find questions regarding the material just covered and prompts for ways to expand your knowledge and experience on your own. If you have any problems with these sections, either in answering the questions or pursuing your own endeavors, turn to the book’s supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- What is HTML? What is XHTML? Name two differences between HTML and XHTML.
- What encoding is your text editor or IDE set to use? Does that match the encoding specified in your generated HTML pages?
- What is CSS and what is it used for?
- What file extension should PHP scripts have for your particular server?
- What is meant by “Web root directory”? What is the Web root directory for your server?
- How do you test PHP scripts? What happens when PHP scripts are not run through a URL?
- Name two ways comments can be added to PHP code. Identify some ways you would use comments.

## Pursue

- If you have access to more than one server, confirm what version of PHP is running on another server.
- Create a static HTML page that displays some information. Then replace some of the static content with content created by PHP.
- Create a template to use for your own work. The template should contain the HTML shell, the opening and closing PHP tags, and some basic comments.
- Confirm, using the `phpinfo()` function, that `display_errors` is enabled on your server. If it’s not, change your server’s configuration to enable it (see Chapter 3 and Appendix A).
- In subsequent chapters, occasionally check the PHP manual’s page when a new function is mentioned in the book.

# 2

# Variables

In the previous chapter, you learned how to use PHP to send simple text and HTML to a Web browser—in other words, something for which you don’t need PHP at all! Don’t worry, though; this book will teach you how to use `print` in conjunction with other PHP features to do great and useful things with your Web site.

To make the leap from creating simple, static pages to dynamic Web applications and interactive Web sites, you need *variables*. Understanding what variables are, the types that a language supports, and how to use them is critical.

This chapter discusses the fundamentals of variables used in PHP, and later chapters cover the different types in greater detail. If you’ve never dealt with variables before, this chapter will be a good introduction. If you’re familiar with the concept, then you should be able to work through this chapter with ease.

---

## In This Chapter

What Are Variables?	32
Variable Syntax	36
Types of Variables	38
Variable Values	41
Understanding Quotation Marks	45
Review and Pursue	48

---

# What Are Variables?

A *variable* is a container for data. Once data has been stored in a variable (or, stated more accurately, once a variable has been assigned a value), that data can be altered, printed to the Web browser, saved to a database, emailed, and so forth.

Variables in PHP are, by their nature, flexible: You can put data into a variable, retrieve that data from it (without affecting the value of the variable), put new data in, and continue this cycle as long as necessary. But variables in PHP are largely temporary: *Most only exist*—that is, they only have a value—for the duration of the script's execution on the server. Once the execution passes the final closing PHP tag, those variables cease to exist. Furthermore, after users click a link or submit a form, they are taken to a new page that may have an entirely separate set of variables.

Before getting too deep into the discussion of variables, let's write a quick script that reveals some of PHP's predefined variables. These are variables that PHP automatically creates when a script runs.

Over the course of the book you'll be introduced to many different predefined variables. For this particular example, let's look at the predefined `$_SERVER` variable. It contains lots of information about the computer on which PHP is running.

The `print_r()` function offers an easy way to display any variable's value:

```
print_r($variable_name);
```

Just provide the name of the variable you'd like to inspect as a single argument to the `print_r()` function (you'll learn more about a variable's syntax throughout this chapter).

**Script 2.1** The `print_r()` function is called to show the values stored in the `$_SERVER` predefined variable.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/
3      xhtml1-transitional.dtd">
4  <html xmlns="http://www.w3.org/1999/xhtml"
5      xml:lang="en" lang="en">
6  <head>
7      <meta http-equiv="Content-Type"
8          content="text/html; charset=utf-8"/>
9  </head>
10 <body>
11 <pre>
12 // Show the value of the $_SERVER
13 // variable:
14 print_r($_SERVER);
15 ?>
16 </pre>
17 </body>
18 </html>
```

## To print PHP's predefined variables:

1. Create a new PHP script in your text editor or IDE, to be named `predefined.php` (Script 2.1).

2. Create the initial HTML tags:

```
<!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" xml:lang="en"
→ lang="en">
<head>
    <meta http-equiv="Content-Type"
→ content="text/html;
→ charset=utf-8"/>
    <title>Predefined Variables
→ </title>
</head>
<body>
<pre>
```

This code repeats the XHTML template created in the preceding chapter. Within the body of the page, the `<pre>` tags are being used to make the generated PHP information more legible. Without using the `<pre>` tags, the `print_r()` function's output would be quite messy.

3. Add the PHP code:

```
<?php // Script 2.1 - predefined.php
print_r($_SERVER);
?>
```

The PHP code contains just one function call. The function should be provided with the name of a variable.

*continues on next page*

In this example, the variable is `$_SERVER`, which is special in PHP. `$_SERVER` stores all sorts of data about the server: its name and operating system, the name of the current user, information about the Web server application (Apache, Abyss, IIS, etc.), and more. It also reflects the PHP script being executed; its name, where it's stored on the server, and so forth.

Note that you must type `$_SERVER` exactly as it is here, in all uppercase letters.

**4.** Complete the HTML page:

```
</pre>
</body>
</html>
```

**5.** Save the file as `predefined.php`, upload it to your server (or save it to the appropriate directory on your computer), and test it in your Web browser **A**.

Once again, remember that you must run all PHP scripts through a URL (i.e., `http://something`).

```
Array
(
    [HTTP_HOST] => phpvqs4:8888
    [HTTP_USER_AGENT] => Mozilla/5.0 (Macintosh; U; Intel Mac OS X 10.6;
    [HTTP_ACCEPT] => text/html,application/xhtml+xml,application/xml;q=0
    [HTTP_ACCEPT_LANGUAGE] => en-us,en;q=0.5
    [HTTP_ACCEPT_ENCODING] => gzip,deflate
    [HTTP_ACCEPT_CHARSET] => ISO-8859-1,utf-8;q=0.7,*;q=0.7
    [HTTP_KEEP_ALIVE] => 115
    [HTTP_CONNECTION] => keep-alive
    [PATH] => /usr/bin:/bin:/usr/sbin:/sbin
    [SERVER_SIGNATURE] =>
    [SERVER_SOFTWARE] => Apache
    [SERVER_NAME] => phpvqs4
    [SERVER_ADDR] => 127.0.0.1
    [SERVER_PORT] => 8888
    [REMOTE_ADDR] => 127.0.0.1
    [DOCUMENT_ROOT] => /Users/larryullman/Sites/phpvqs4
    [SERVER_ADMIN] => you@example.com
    [SCRIPT_FILENAME] => /Users/larryullman/Sites/phpvqs4/predefined.php
    [REMOTE_PORT] => 51149
    [GATEWAY_INTERFACE] => CGI/1.1
    [SERVER_PROTOCOL] => HTTP/1.1
    [REQUEST_METHOD] => GET
    [QUERY_STRING] =>
    [REQUEST_URI] => /predefined.php
    [SCRIPT_NAME] => /predefined.php
    [PHP_SELF] => /predefined.php
    [REQUEST_TIME] => 1289831848
    [argv] => Array
        (
        )
    [argc] => 0
)
```

**A** The `$_SERVER` variable, as printed out by this script, is a master list of values pertaining to the server and the PHP script.

- If possible, transfer the file to another computer or server running PHP and execute the script in your Web browser again **B**.

**TIP** Printing out the value of any variable as you've done here is one of the greatest debugging tools. Scripts often don't work as you expect them to because one or more variables do not have the values you assume they should, so confirming their actual values is extremely helpful.

**TIP** If you don't use the HTML `<pre></pre>` tags, the result will be like the mess in **C**.

```
Array
(
    [HTTP_HOST] => larryullman.com
    [HTTP_USER_AGENT] => Mozilla/5.0 (Macintosh; U; Intel Mac OS X 10_6_5; en-us
    [HTTP_ACCEPT] => application/xml,application/xhtml+xml,text/html;q=0.9,text/
    [HTTP_ACCEPT_LANGUAGE] => en-us
    [HTTP_ACCEPT_ENCODING] => gzip, deflate
    [HTTP_CONNECTION] => keep-alive
    [PATH] => /sbin:/usr/sbin:/bin:/usr/bin:/usr/X11R6/bin
    [SERVER_SIGNATURE] =>
Apache/2.0.63 (CentOS) Server at larryullman.com Port 80

    [SERVER_SOFTWARE] => Apache/2.0.63 (CentOS)
    [SERVER_NAME] => larryullman.com
    [SERVER_ADDR] => 207.58.187.78
    [SERVER_PORT] => 80
    [REMOTE_ADDR] => 71.58.97.51
    [DOCUMENT_ROOT] => /var/www/larryullman.com/public_html/htdocs
    [SERVER_ADMIN] => Larry@DMCInsights.com
    [SCRIPT_FILENAME] => /var/www/larryullman.com/public_html/htdocs/predefined.php
    [REMOTE_PORT] => 44766
    [GATEWAY_INTERFACE] => CGI/1.1
    [SERVER_PROTOCOL] => HTTP/1.1
    [REQUEST_METHOD] => GET
    [QUERY_STRING] =>
    [REQUEST_URI] => /predefined.php
    [SCRIPT_NAME] => /predefined.php
    [PHP_SELF] => /predefined.php
    [REQUEST_TIME] => 1289832083
)
```

- With the `predefined.php` page, different servers will generate different results (compare with Figure **A**).

```
Array ( [HTTP_HOST] => phpvqs4:8888 [HTTP_USER_AGENT] => Mozilla/5.0 (Macintosh; U; Intel Mac OS X 10.6; en-US; rv:1.9.2.12) Gecko
/*;q=0.8 [HTTP_ACCEPT_LANGUAGE] => en-us,en;q=0.5 [HTTP_ACCEPT_ENCODING] => gzip,deflate [HTTP_ACCEPT_CHARSET] => I
[HTTP_CACHE_CONTROL] => max-age=0 [PATH] => /usr/bin:/bin:/usr/sbin:/sbin [SERVER_SIGNATURE] => [SERVER_SOFTWARE] => Ap
[REMOTE_ADDR] => 127.0.0.1 [DOCUMENT_ROOT] => /Users/larryullman/Sites/phpvqs4 [SERVER_ADMIN] => you@example.com [SCRIP
[GATEWAY_INTERFACE] => CGI/1.1 [SERVER_PROTOCOL] => HTTP/1.1 [REQUEST_METHOD] => GET [QUERY_STRING] => [REQUE
[REQUEST_TIME] => 1289832176 [argv] => Array () [argc] => 0 )
```

- With large, complex variables such as `$_SERVER`, not using the HTML preformatting tags with `print_r()` creates an incomprehensible mess (compare to Figures **A** and **B**).

# Variable Syntax

Now that you've had a quick dip in the variable pool, it's time to investigate the subject further. In the preceding example, the script reported upon PHP's predefined `$_SERVER` variable. You can also create your own variables, once you understand the proper syntax. To create appropriate variable names, you must follow these rules:

- All variable names must be preceded by a dollar sign (\$).
- Following the dollar sign, the variable name must begin with either a letter (A–Z, a–z) or an underscore (\_). It can't begin with a number.
- The rest of the variable name can contain any combination of letters, underscores, and numbers.
- You may not use spaces within the name of a variable. (Instead, the underscore is commonly used to separate words.)
- Each variable must have a unique name.
- Variable names are *case-sensitive*! Consequently, `$variable` and `$Variable` are two different constructs, and it would be a bad idea to use two variables with such similar names.

This last point is perhaps the most important: variable names in PHP are case-sensitive. Using the wrong letter case is a very common cause of bugs. (If you used, for example, `$_server` or `$_Server` in the previous script, you'd see either an error message or nothing at all A.)

```
Notice: Undefined variable: _server in /Users/larryullman/Sites/phpvqs4/predefined.php on line 13
```

A Misspelling a variable's name, including its case, will create undesired and unpredictable results.

**Script 2.2** Properly documenting the purposes of variables, along with using meaningful names, is a hallmark of a professional programmer.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/xhtml"
6  xml:lang="en" lang="en">
7  <head>
8   <meta http-equiv="Content-Type"
9    content="text/html; charset=utf-8"/>
10  <title>Variables and Comments</title>
11 </head>
12 <body>
13 <?php // Script 2.2
14 // Define my variables....
15
16
17 // ... and so forth.
18
19 ?>
20 </body>
21 </html>
```

**TABLE 2.1** Valid Variables in PHP

Name
\$first_name
\$person
\$address1
\$_SERVER

**TABLE 2.2** Invalid Variables in PHP

Name	Reason
\$first name	Has a space
\$first.name	Has a period
first_name	Does not begin with \$
\$1address	A number cannot follow \$

To help minimize bugs, I recommend the following policies:

- Always use all lowercase variable names.
- Make your variable names descriptive (e.g., `$first_name` is better than `$fn`).
- Use comments to indicate the purpose of variables (**Script 2.2**), redundant as that may seem.
- Above all, be consistent with whatever naming convention you choose!

**Table 2.1** lists some sample valid variables; **Table 2.2** lists some invalid variables and the rules they violate.

**TIP** Unlike some other languages, PHP generally doesn't require you to declare or initialize a variable prior to use. In other words, you can refer to variables without first defining them. But it's best not to do that; I try to write my scripts so that every variable is defined or validated before use.

**TIP** There are two main variable naming conventions, determined by how you delineate words. These are the so-called *camel-hump* or *camel-case* (named because of the way capital letters break up the word—for example, `$FirstName`) and *underscore* (`$first_name`) styles. This book uses the latter convention.

# Types of Variables

This book covers the three main PHP variable types: *numbers*, *strings*, and *arrays*. I'll introduce them quickly here, and later chapters will discuss them in more detail:

- Chapter 4, “Using Numbers”
- Chapter 5, “Using Strings”
- Chapter 7, “Using Arrays”

A fourth variable type, *objects*, is introduced in Appendix B, “Resources and Next Steps,” but isn’t covered in this book. That particular subject is just too advanced for a beginner’s guide—in fact, basic coverage of the subject in my *PHP 5 Advanced: Visual QuickPro Guide* (Peachpit Press, 2007) requires over 150 pages!

## Numbers

Technically speaking, PHP breaks numbers into two types: *integers* and *floating-point* (also known as *double-precision floating-point* or *doubles*). Due to the lax way PHP handles variables, it won’t affect your programming to group the two categories of numbers into one all-inclusive membership. Still, let’s briefly discuss the differences between the two, for clarity’s sake.

The first type of numbers—*integers*—are the same as whole numbers. They can be positive or negative but include neither fractions nor decimals. Numbers that use a decimal point (even something like 1.0) are floating-point numbers. You must also use floating-point numbers to refer to fractions, because the only way to express a fraction in PHP is to convert it to its decimal equivalent. Hence,  $1\frac{1}{4}$  is written as 1.25.

**Table 2.3** lists some sample valid numbers and their formal type; **Table 2.4** lists invalid numbers and the rules they violate.

**TIP** As you’ll soon see, you can quote invalid numbers to turn them into valid strings.

---

**TABLE 2.3** Valid Numbers in PHP

Number	Type
1	Integer
1.0	Floating-point
1972	Integer
19.72	Floating-point
-1	Integer
-1.0	Floating-point

---

**TABLE 2.4** Invalid Numbers in PHP

Number	Reason
1/3	Contains a slash
1996a	Contains a letter
08.02.06	Contains multiple decimals

---

## Strings

A string is any number of characters enclosed within a pair of either single ('') or double ("") quotation marks. Strings can contain any combination of letters, numbers, symbols, and spaces. **Strings can also contain variables.**

Here are examples of valid string values:

```
"Hello, world!"  
"Hello, $first_name!"  
"1/3"  
'Hello, world! How are you today?'  
"08.02.06"  
"1996"  
""
```

That last one is an *empty string*—a string that contains no characters.

In short, to create a string, just wrap something within quotation marks. There are cases, however, where you may run into problems. For example:

```
"I said, "How are you?""
```

This string will be tricky and I hinted at the same problem in Chapter 1, “Getting Started with PHP,” with respect to printing HTML code. When PHP hits the second quotation mark in the above, it assumes the string ends there; the continuing text (*How...*) causes an error. To use a quotation mark within a string you can escape the quotation mark by putting a backslash (\) before it:

```
"I said, \"How are you?\""
```

The backslash tells PHP to treat each escaped quotation mark as part of the *value* of the string, rather than using it as the string’s opening or closing indicators.

You can similarly circumvent this problem by using different quotation mark types:

```
'I said, "How are you?"'  
"I said, 'How are you?'"
```

**TIP** Notice that “1996” converts an integer into a string, simply by placing the number within quotes. Essentially, the string contains the characters **1996**, whereas the number (a nonquoted value) would be equal to **1996**. It’s a fine distinction, and one that won’t matter in your code, because you can perform mathematical calculations with the string **1996** just as you can with the number.

**TIP** Chapter 1 also demonstrated how to create a new line by printing the \n character within double quotation marks. Although escaping a quotation mark prints the quotation mark, escaping an *n* prints a new line, escaping an *r* creates a carriage return, and escaping a *t* creates a tab.

**TIP** Understanding strings, variables, and the single and double quotation marks is critical to programming with PHP. For this reason, a section at the end of this chapter is dedicated to the subject.

## Arrays

Arrays are covered more thoroughly in Chapter 7, but let's look at them briefly here. Whereas a string or a number contains a single value (both are said to be *scalar*), an array can have more than one value assigned to it. You can think of an array as a list or table of values: you can put multiple strings and/or numbers into one array.

Arrays use *keys* to create and retrieve the values they store. The resulting structure—a list of key-value pairs—looks similar to a two-column spreadsheet.

Unlike arrays in other programming languages, the array structure in PHP is so flexible that it can use either numbers or strings for both the keys and the values. The array doesn't even need to be consistent in this respect. (All of this will make more sense in Chapter 7, when you start working with specific examples.)

PHP has two different types of arrays, based on the format of the keys. If the array uses numbers for the keys (Table 2.5), it's called an *indexed array*. If it uses strings for the keys (Table 2.6), it's an *associative array*. In either case, the values in the array can be of any variable type (string, number, and so on).

**TIP** The array's key is also called its *index*. You'll see these two terms used interchangeably.

**TIP** An array can, and frequently will, contain other arrays, creating what is called a *multi-dimensional array*.

**TIP** What PHP calls an *associative array* is called a *hash* in Perl and Ruby, among other languages.

---

**TABLE 2.5** Indexed Array

Key	Value
0	Don
1	Betty
2	Roger
3	Jane

---

**TABLE 2.6** Associative Array

Key	Value
VT	Vermont
NH	New Hampshire
IA	Iowa
PA	Pennsylvania

```
Number is 1
String is Hello, world!
```

- A The result of printing the values of two variables.

```
_SERVER is Array
```

- B Using the `print` statement on a complex variable type, such as an array, will not have the results you desire.

## Variable Values

To assign a value to a variable, regardless of the variable type, you use the equals sign (`=`). Therefore, the equals sign is called the *assignment operator*, because it assigns the value on the right to the variable on the left. For example:

```
$number = 1;
$floating_number = 1.2;
$string = "Hello, world!";
```

As each of these lines represents a complete statement (i.e., an executable action), they each conclude with a semicolon.

To print out the value of a variable, you can use the `print` function:

```
print $number;
print $string;
```

If you want to print a variable's value within a context, you can place the variable's name in the printed string, as long as you use double quotation marks A:

```
print "Number is $number";
print "String is $string";
```

Using `print` in this way works for the scalar (single-valued) variable types—numbers and strings. For complex variable types—arrays and objects—you cannot just use `print` B:

```
print "_SERVER is $_SERVER";
```

As you've already seen, `print_r()` can handle these nonscalar types, and you'll learn other approaches later in the book.

*continues on next page*

Whether you're dealing with scalar or nonscalar variables, don't forget that printing out their values is an excellent debugging technique when you're having problems with a script!

Because variable types aren't locked in (PHP is referred to as a *weakly typed* language), they can be changed on the fly:

```
$variable = 1;  
$variable = "Greetings";
```

If you were to print the value of `$variable` now, the result would be *Greetings*. The following script better demonstrates the concept of assigning values to variables and then accessing those values.

### To assign values to and access variables:

1. Create a new PHP script in your text editor or IDE, to be named `variables.php` (**Script 2.3**).
2. Create the initial HTML tags:

```
<!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" xml:lang="en"  
→ lang="en">  
<head>  
    <meta http-equiv="Content-Type"  
    → content="text/html;  
    → charset=utf-8"/>  
    <title>Variables</title>  
</head>  
<body>
```

**Script 2.3** Some basic variables are defined and their values printed by this script.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
1.0 Transitional//EN"  
2      "http://www.w3.org/TR/xhtml1/DTD/  
xhtml1-transitional.dtd">  
3  <html xmlns="http://www.w3.org/1999/xhtml"  
xml:lang="en" lang="en">  
4  <head>  
5      <meta http-equiv="Content-Type"  
content="text/html; charset=utf-8"/>  
6      <title>Variables</title>  
7  </head>  
8  <body>  
9  ?php // Script 2.3 - variables.php  
10 // An address:  
12 $street = "100 Main Street";  
13 $city = "State College";  
14 $state = "PA";  
15 $zip = 16801;  
16  
17 // Print the address:  
18 print "<p>The address is:<br />$street  
→ <br />$city $state $zip</p>";  
19  
20 ?>  
21 </body>  
22 </html>
```

3. Begin the PHP code:

```
<?php // Script 2.3 - variables.php
```

4. Define some number and string variables:

```
$street = "100 Main Street";  
$city = "State College";  
$state = "PA";  
$zip = 16801;
```

These lines create four different variables of both string and number types. The strings are defined using quotation marks, and each variable name follows the syntactical naming rules.

Remember that each statement must conclude with a semicolon and that the variable names are case-sensitive.

5. Print out the values of the variables within some context:

```
print "<p>The address is:<br />  
→ $street <br />$city $state  
→ $zip</p>";
```

Here a single **print** statement can access all the variables. The entire string to be printed (consisting of text, HTML tags, and variables) is enclosed within double quotation marks. The HTML **<br />** tags make the text flow over multiple lines in the browser window (remember, the extra space and slash in the break tag are there for sake of XHTML compliance).

*continues on next page*

6. Complete the PHP section and the HTML page:

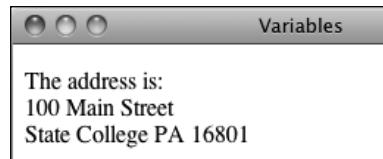
```
?>  
</body>  
</html>
```

7. Save the file as **variables.php**, upload it to your server (or save it to the appropriate directory on your computer), and test it in your Web browser **C**.

**TIP** If you see a parse error **D** when you run this script, you probably either omitted a semicolon or have an imbalance in your quotation marks.

**TIP** If one of the variable's values isn't printed out or you see an *Undefined variable* error **E**, you most likely failed to spell a variable name the same way twice.

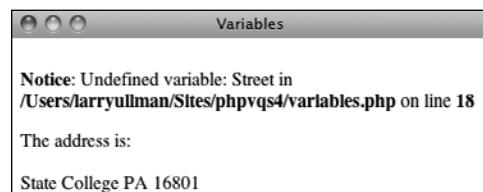
**TIP** If you see a blank page, you most likely have an error but PHP's `display_errors` configuration is set to off. See Chapter 3, "HTML Forms and PHP," for details.



**C** Some variables are assigned values, and then printed within a context.

```
Parse error: syntax error, unexpected T_VARIABLE in  
/Users/larryullman/Sites/phpvqs4/variables.php on line 15
```

**D** Parse errors are the most common type of PHP error, as you'll discover. They're frequently caused by missing semicolons or an imbalance of quotation marks or parentheses.



**E** The *Undefined variable* error indicates that you used a variable with no value (it hasn't been defined). This can happen with misspellings and capitalization inconsistencies.

**Script 2.4** This script simply demonstrates how the type of quotation mark you use with variables affects the end result.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
2   1.0 Transitional//EN"  
3   "http://www.w3.org/TR/xhtml1/DTD/  
4   xhtml1-transitional.dtd">  
5  <html xmlns="http://www.w3.org/1999/xhtml"  
6  xml:lang="en" lang="en">  
7  <head>  
8    <meta http-equiv="content-type"  
9     content="text/html; charset=utf-8" />  
10   <title>Quotes</title>  
11 </head>  
12 <body>  
13 <?php // Script 2.4 - quotes.php  
14  
15 // Single or double quotation marks  
16 // won't matter here:  
17 $first_name = 'Larry';  
18 $last_name = "Ullman";  
19  
20 // Single or double quotation marks DOES  
21 // matter here:  
22 $name1 = '$first_name $last_name';  
23 $name2 = "$first_name $last_name";  
24  
25 print "<h1>Double Quotes</h1><p>name1  
26 is $name1 <br />  
27 name2 is $name2</p>";  
28  
29 print '<h1>Single Quotes</h1><p>name1  
30 is $name1 <br />  
31 name2 is $name2</p>';  
32  
33 ?>  
34 </body>  
35 </html>
```

# Understanding Quotation Marks

Now that you know the basics of variables and how to create them, I want to make sure you completely understand how to properly use quotation marks. PHP, like most programming languages, allows you to use both double ("") and single ('') quotation marks—but they give vastly different results. It's critical that you comprehend the distinction, so the next example will run tests using both types.

The rule to remember is: *Items within single quotation marks are treated literally; items within double quotation marks are extrapolated.* This means that within double quotation marks, a variable's name is replaced with its value, as in Script 2.3, but the same is not true for single quotation marks.

This rule applies anywhere in PHP you might use quotation marks, including uses of the **print** function and the assignment of values to string variables. An example is the best way to demonstrate this critical concept.

## To use quotation marks:

1. Begin a new PHP script in your text editor or IDE, to be named **quotes.php** (Script 2.4).
2. Create the initial HTML tags:

```
<!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" xml:lang="en"  
→ lang="en">
```

*continues on next page*

```
<head>
  <meta http-equiv="content-type"
    → content="text/html;
    → charset=utf-8" />
  <title>Quotes</title>
</head>
<body>
```

3. Begin the PHP code:

```
<?php // Script 2.4 - quotes.php
```

4. Create two string variables:

```
$first_name = 'Larry';
$last_name = "Ullman";
```

It doesn't matter whether you use single or double quotation marks for these two variables, as each string can be treated literally. However, if you're using your own name here (and feel free to do so) and it contains an apostrophe, you'll need to either use double quotation marks or escape the apostrophe within single quotation marks:

```
$last_name = "O'Toole";
$last_name = 'O\'Toole';
```

5. Create two different *name* variables, using the existing first- and last-name variables:

```
$name1 = '$first_name $last_name';
$name2 = "$first_name
→ $last_name";
```

In these lines it makes a huge difference which quotation marks you use. The **\$name1** variable is now literally equal to **\$first\_name \$last\_name**, because no extrapolation occurs.

Conversely, **\$name2** is equal to *Larry Ullman*, presumably the intended result.

6. Print out the variables using both types of quotation marks:

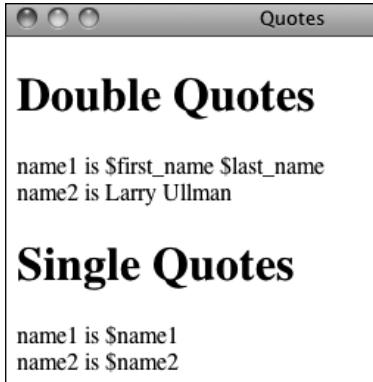
```
print "<h1>Double Quotes
→ </h1><p>name1 is $name1 <br />
name2 is $name2</p>";
print '<h1>Single Quotes
→ </h1><p>name1 is $name1 <br />
name2 is $name2</p>';
```

Again, the quotation marks make all the difference here. The first **print** statement, using double quotation marks, prints out the values of the **\$name1** and **\$name2** variables, whereas the second, using single quotation marks, prints out **\$name1** and **\$name2** literally.

The HTML in the **print** statements makes them more legible in the browser, and each statement is executed over two lines, which is perfectly acceptable.

7. Complete the PHP section and the HTML page:

```
?>
</body>
</html>
```



A The different quotation marks (single versus double) dictate whether the variable's name or value is printed.

- Save the file as `quotes.php`, upload it to your server (or save it to the appropriate directory on your computer), and test it in your Web browser A.

**TIP** If you're still confused about the distinction between the two types of quotation marks, stick with double quotation marks and you'll be safer.

**TIP** Arguably, using single quotation marks when you can is marginally preferable, as PHP won't need to search the strings looking for variables. But, at best, this is a minor point.

**TIP** The shortcuts for creating newlines (\n), carriage returns (\r), and tabs (\t) must also be used within double quotation marks to have the desired effect.

**TIP** Remember that you don't always need to use quotation marks at all. When assigning a numeric value or when only printing a variable, you can omit them:

```
$num = 2;  
print $num;
```

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book’s supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- What kind of variable is `$_SERVER` an example of?
- What character must all variables begin with?
- What characters can be used first in a variable’s name? What other characters can be used in a variable’s name, after the first character?
- Are variable names case-sensitive or case-insensitive?
- What does it mean to say that a variable is *scalar*? What are examples of scalar variable types? What is an example of a nonscalar variable type?
- What is the assignment operator?
- What great debugging technique—with respect to variables—was introduced in this chapter?
- What is the difference between using single or double quotation marks?

## Pursue

- Create another PHP script that defines some variables and prints their values. Try using variables of different scalar types.
- Create a PHP script that prints the value of some variables within some HTML. More sophisticated practice might involve using PHP and variables to create a link or image tag.

# 3

# HTML Forms and PHP

The previous chapter provided a brief introduction to the topic of variables. Although you'll often create your own variables, you'll also commonly use variables in conjunction with HTML forms. Forms are a fundamental unit of today's Web sites, enabling such features as registration and login systems, search capability, and online shopping. Even the simplest site will find logical reasons to incorporate HTML forms. And with PHP, it's stunningly simple to receive and handle data generated by them.

With that in mind, this chapter will cover the basics of creating HTML forms and explain how the submitted form data is available to a PHP script. This chapter will also introduce several key concepts of real PHP programming, including how to manage errors in your scripts.

---

## In This Chapter

Creating a Simple Form	50
Choosing a Form Method	54
Receiving Form Data in PHP	57
Displaying Errors	61
Error Reporting	64
Manually Sending Data to a Page	67
Review and Pursue	72

---

# Creating a Simple Form

For the HTML form example in this chapter, you'll create a feedback page that takes the user's salutation, name, email address, response, and comments **A**. The code that generates a form goes between opening and closing **form** tags:

```
<form>  
  form elements  
</form>
```

The **form** tags dictate where a form begins and ends. Every element of the form must be entered between these two tags. The opening **form** tag also contains an **action** attribute. It indicates the page to which the form data should be submitted. This value is one of the most important considerations when you're creating a form. In this book, the **action** attributes will always point to PHP scripts:

```
<form action="somepage.php">
```

Before creating this next form, let's briefly revisit the topic of XHTML. As stated in the first chapter, XHTML has some rules that result in a significantly different syntax than HTML. For starters, the code needs to be in all lowercase letters, and every tag attribute must be enclosed in quotes. Further, every tag must be closed; those that don't have formal closing tags, like **input**, are closed by adding a blank space and a slash at the end. Thus, in HTML you might write

```
<INPUT TYPE=TEXT NAME=address  
→ SIZE=40>
```

but in XHTML you'd write

```
<input type="text" name="address"  
→ size="40" />
```

Please complete this form to submit your feedback:

Name:  Mr.

Email Address:

Response: This is...  excellent  okay  boring

Comments:

**A** The HTML form that will be used in this chapter's examples.

**Script 3.1** This HTML page has a form with several different input types.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
2   1.0 Transitional//EN"  
3   "http://www.w3.org/TR/xhtml1/DTD/  
4   xhtml1-transitional.dtd">  
5   <html xmlns="http://www.w3.org/1999/  
6   xhtml" xml:lang="en" lang="en">  
7   <head>  
8     <meta http-equiv="Content-Type"  
9       content="text/html; charset=utf-8"/>  
10    <title>Feedback Form</title>  
11  </head>  
12  <body>  
13  <!-- Script 3.1 - feedback.html -->  
14  <div><p>Please complete this form to  
15  submit your feedback:</p>  
16  
17  <form action="handle_form.php">  
18  
19  <p>Name: <select name="title">  
20    <option value="Mr.">Mr.</option>  
21    <option value="Mrs.">Mrs.</option>  
22    <option value="Ms.">Ms.</option>  
23  </select> <input type="text"  
24    name="name" size="20" /></p>  
25  
26  <p>Email Address: <input  
27    type="text" name="email"  
28    size="20" /></p>  
29  
30  <p>Response: This is...  
31  <input type="radio"  
32    name="response" value="excellent" />  
33  excellent  
34  <input type="radio"  
35    name="response" value="okay" />  
36  okay  
37  <input type="radio"  
38    name="response" value="boring" />  
39  boring</p>  
40  
41  <p>Comments: <textarea  
42    name="comments" rows="3"  
43    cols="30"></textarea></p>  
44  
45  <input type="submit" name="submit"  
46    value="Send My Feedback" />  
47  
48  </form>  
49  </div>  
50  </body>  
51  </html>
```

Hopefully this quick explanation will help you understand the XHTML in the following script.

Finally, in both HTML and XHTML, each form element needs to have its own unique name. Stick to a consistent naming convention when naming elements, using only letters, numbers, and the underscore (\_). The result should be names that are also logical and descriptive.

## To create a basic HTML form:

1. Begin a new document in your text editor or IDE, to be named **feedback.html** (Script 3.1):

```
<!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" xml:lang="en"  
  → lang="en">  
<head>  
  <meta http-equiv="Content-Type"  
  → content="text/html;  
  → charset=utf-8"/>  
  <title>Feedback Form</title>  
</head>  
<body>  
  <!-- Script 3.1 - feedback.html -->  
  <div><p>Please complete this form  
  → to submit your feedback:</p>
```

2. Add the opening **form** tag:

```
<form action="handle_form.php">
```

The **form** tag indicates that this form will be submitted to the page **handle\_form.php**, found within the same directory as this HTML page. You can use a full URL to the PHP script, if you'd prefer to be explicit (e.g., [http://www.example.com/handle\\_form.php](http://www.example.com/handle_form.php)).

*continues on next page*

3. Add a select menu plus a text input for the person's name:

```
<p>Name: <select name="title">
<option value="Mr.">Mr.</option>
<option value="Mrs.">Mrs.</option>
<option value="Ms.">Ms.</option>
</select> <input type="text"
name="name" size="20" /></p>
```

The inputs for the person's name will consist of two elements A. The first is a drop-down menu of common titles: *Mr.*, *Mrs.*, and *Ms.*. Each option listed between the **select** tags is an answer the user can choose B. The second element is a basic text box for the person's full name.

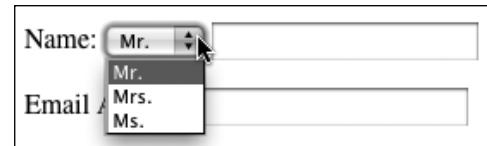
4. Add a text input for the user's email address:

```
<p>Email Address: <input
→ type="text" name="email"
→ size="20" /></p>
```

5. Add radio buttons for a response:

```
<p>Response: This is...
<input type="radio" name="response"
→ value="excellent" /> excellent
<input type="radio" name="response"
→ value="okay" /> okay
<input type="radio" name="response"
→ value="boring" /> boring</p>
```

This HTML code creates three radio buttons (clickable circles, A). Because they all have the same **name** value, only one of the three can be selected at a time. Per XHTML rules, the code is in lowercase except for the values, and an extra space and slash are added to the end of each input to close the tag.



B The **select** element creates a drop-down menu of options.

**6.** Add a `textarea` to record the comments:

```
<p>Comments: <textarea  
→ name="comments" rows="3"  
→ cols="30"></textarea></p>
```

A `textarea` gives users more space to enter their comments than a text input would. However, the text input lets you limit how much information users can enter, which you can't do with the `textarea` (not without using JavaScript, that is). When you're creating a form, choose input types appropriate to the information you wish to retrieve from the user.

Note that a `textarea` does have a closing tag.

**7.** Add the submit button:

```
<input type="submit" name="submit"  
→ value="Send My Feedback" />
```

The `value` attribute of a submit element is what appears on the button in the Web browser **A**. You could also use *Go!* or *Submit*, for example.

**8.** Close the form:

```
</form>
```

**9.** Complete the page:

```
</div>  
</body>  
</html>
```

**10.** Save the page as `feedback.html` and view it in your browser.

Because this is an HTML page, not a PHP script, you could view it in your Web browser directly from your computer.

**TIP** Note that `feedback.html` uses the HTML extension because it's a standard HTML page (not a PHP script). You could use the `.php` extension without a problem, even though there's no actual PHP code. (Remember that in a PHP page, anything not within the PHP tags—`<?php` and `?>`—is assumed to be HTML.)

**TIP** Be certain that your `action` attribute correctly points to an existing file on the server, or your form won't be processed properly. In this case, the form will be submitted to `handle_form.php`, to be located in the same directory as the `feedback.html` page.

**TIP** In this example, an HTML form is created by hand-coding the HTML, but you can do this in a Web page application (such as Adobe Dreamweaver) if you're more comfortable with that approach.

**TIP** One welcome addition in the forthcoming HTML 5 specification are new form elements, such as `email`, `url`, and `number`.

# Choosing a Form Method

The experienced HTML developer will notice that the feedback form just created is missing one thing: The initial `form` tag has no `method` attribute. The `method` attribute tells the server how to transmit the data from the form to the handling script.

You have two choices with `method`: `GET` and `POST`. With respect to forms, the difference between using `GET` and `POST` is squarely in how the information is passed from the form to the processing script. The `GET` method sends all the gathered information along as part of the URL. The `POST` method transmits the information invisibly to the user. For example, upon submitting a form, if you use the `GET` method, the resulting URL will be something like

```
http://www.example.com/page.php?  
→ some_var=some_value&age=20&...
```

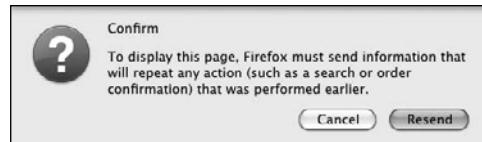
Following the name of the script, `page.php`, is a question mark, followed by one `name=value` pair for each piece of data submitted.

When using the `POST` method, the end user will only see

```
http://www.example.com/page.php
```

When deciding which method to use, keep in mind these four factors:

- With the `GET` method, a limited amount of information can be passed.
- The `GET` method sends the data to the handling script publicly (which means, for example, that a password entered in a form would be viewable by anyone within eyesight of the Web browser, creating a larger security risk).



- If users refresh a PHP script that data has been sent to via the `POST` method, they will be asked to confirm the action (the specific message will differ using other browsers).

**Script 3.2** The **method** attribute with a value of **post** is added to complete the form.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
2   1.0 Transitional//EN"  
3   "http://www.w3.org/TR/xhtml1/DTD/  
4   xhtml1-transitional.dtd">  
5   <html xmlns="http://www.w3.org/1999/  
6   xhtml" xml:lang="en" lang="en">  
7   <head>  
8     <meta http-equiv="Content-Type"  
9       content="text/html; charset=utf-8"/>  
10  <title>Feedback Form</title>  
11  </head>  
12  <body>  
13  <!-- Script 3.2 - feedback.html -->  
14  <div><p>Please complete this form to  
15  submit your feedback:</p>  
16  
17  <12  <form action="handle_form.php"  
18    method="post">  
19  
20  <p>Name: <select name="title">  
21  <option value="Mr.">Mr.</option>  
22  <option value="Mrs.">Mrs.</option>  
23  <option value="Ms.">Ms.</option>  
24  </select> <input type="text"  
25  name="name" size="20" /></p>  
26  
27  <p>Email Address: <input type="text"  
28  name="email" size="20" /></p>  
29  
30  <p>Response: This is...  
31  <input type="radio" name="response"  
32  value="excellent" /> excellent  
33  <input type="radio" name="response"  
34  value="okay" /> okay  
35  <input type="radio" name="response"  
36  value="boring" /> boring</p>  
37  
38  <p>Comments: <textarea name="comments"  
39  rows="3" cols="30"></textarea></p>  
40  
41  <input type="submit" name="submit"  
42  value="Send My Feedback" />  
43  
44  </form>  
45  </div>  
46  </body>  
47  </html>
```

- A page generated by a form that used the GET method can be bookmarked, but one based on POST can't be.
- Users will be prompted if they attempt to reload a page accessed via POST **A**, but will not be prompted for pages accessed via GET.

Generally speaking, GET requests are used when asking for information from the server. Search pages almost always use GET (check out the URLs the next time you use a search engine), as do sites that paginate results (like the ability to browse categories of products). Conversely, POST is normally used to trigger a server-based action. This might be the submission of a contact form (result: an email gets sent) or the submission of a blog's comment form (result: a comment is added to the database and therefore the page).

This book uses POST almost exclusively for handling forms, although you'll also see a useful technique involving the GET method (see "Manually Sending Data to a Page" at the end of this chapter).

## To add a method to a form:

1. Open **feedback.html** (Script 3.1) in your text editor or IDE, if it is not already open.
2. Within the initial **form** tag, add **method="post"** (Script 3.2, line 12).

The form's **method** attribute tells the browser how to send the form data to the receiving script. Because there may be a lot of data in the form's submission (including the comments), and because it wouldn't make sense for the user to bookmark the resulting page, POST is the logical method to use.

*continues on next page*

3. Save the script and reload it in your Web browser.

It's important that you get in the habit of reloading pages in the Web browser after you make changes. It's quite easy to forget the reloading step and find yourself flummoxed when your changes are not being reflected.

4. View the source of the page to make sure all the required elements are present and have the correct attributes **B**.

**TIP** In the discussion of the methods, **GET** and **POST** are written in capital letters to make them stand out. However, the form in the script uses **post** for XHTML compliance. Don't worry about this inconsistency (if you caught it at all)—the method will work regardless of case.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
<head>
    <meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
    <title>Feedback Form</title>
</head>
<body>
<!-- Script 3.2 - feedback.html -->
<div><p>Please complete this form to submit your feedback:</p>

<form action="handle_form.php" method="post">

    <p>Name: <select name="title">
        <option value="Mr.">Mr.</option>
        <option value="Mrs.">Mrs.</option>
        <option value="Ms.">Ms.</option>
    </select> <input type="text" name="name" size="20" /></p>

    <p>Email Address: <input type="text" name="email" size="20" /></p>

    <p>Response: This is...
        <input type="radio" name="response" value="excellent" /> excellent
        <input type="radio" name="response" value="okay" /> okay
        <input type="radio" name="response" value="boring" /> boring</p>

    <p>Comments: <textarea name="comments" rows="3" cols="30"></textarea></p>

    <input type="submit" name="submit" value="Send My Feedback" />

</form>
</div>
</body>
</html>
```

**B** With forms, much of the important information, such as the **action** and **method** values or element names, can only be seen within the HTML source code.

# Receiving Form Data in PHP

Now that you've created a basic HTML form capable of taking input from a user, you need to write the PHP script that will receive and process the submitted form data. For this example, the PHP script will simply repeat what the user entered into the form. In later chapters, you'll learn how to take this information and store it in a database, send it in an email, write it to a file, and so forth.

To access the submitted form data, you need to refer to a particular *predefined variable*. Chapter 2, "Variables," already introduced one predefined variable: `$_SERVER`. When it comes to handling form data, the specific variable the PHP script would refer to is either `$_GET` or `$_POST`. If an HTML form uses the GET method, the submitted form data will be found in `$_GET`. When an HTML form uses the POST method, the submitted form data will be found in `$_POST`.

`$_GET` and `$_POST`, besides being predefined variables (i.e., ones you don't need to create), are *arrays*, a special variable type (`$_SERVER` is also an array). This means that both `$_GET` and `$_POST` may contain numerous values, making the printing of those values more challenging. You cannot treat arrays like so (also see Figure B under "Variable Values" in Chapter 2):

```
print $_POST; // Will not work!
```

Instead, to access a specific value, you must refer to the array's *index or key*.

Chapter 7, "Using Arrays," goes into this subject in detail, but the premise is simple. Start with a form element whose `name` attribute has a value of *something*:

```
<input type="text" name="something" />
```

Then, assuming that the form uses the POST method, the value entered into that form element would be available in `$_POST['something']`:

```
print $_POST['something'];
```

Unfortunately, there is one little hitch here: When used within double quotation marks, the single quotation marks around the key will cause parse errors **A**:

```
print "Thanks for saying:  
→ $_POST['something']";
```

There are a couple of ways you can avoid this problem. This chapter will use the solution that's syntactically the simplest: just assign the particular `$_POST` element to another variable first:

```
$something = $_POST['something'];  
print "Thanks for saying: $something";
```

Two final notes before implementing this information in a new PHP script: First, as with all variables in PHP, `$_POST` is case-sensitive: it must be typed exactly as you see it here (a dollar sign, one underscore, then all capital letters). Second, the indexes in `$_POST—something` in the preceding example—must exactly match the `name` attributes values in the corresponding form element.

**Parse error:** syntax error, unexpected T\_ENCAPSED\_AND\_WHITESPACE, expecting T\_STRING or T\_VARIABLE or T\_NUM\_STRING in /Users/larryullman/Sites /phpvqs4/handle\_form.php on line 19

**A** This ugly parse error is created by attempting to use `$_POST['something']` within double quotation marks.

## To handle an HTML form:

1. Begin a new document in your text editor or IDE, to be named **handle\_form.php** (Script 3.3):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="Content-Type"
    → content="text/html;
    → charset=utf-8"/>
  <title>Your Feedback</title>
</head>
<body>
```

2. Add the opening PHP tag and any comments:

```
<?php // Script 3.3 handle_form.php
// This page receives the data
→ from feedback.html.
// It will receive: title, name,
→ email, response, comments, and
→ submit in $_POST.
```

Comments are added to the script to make the script's purpose clear. Even though the **feedback.html** page indicates where the data is sent (via the **action** attribute), a comment here indicates the reverse (where this script is getting its data). It also helps to spell out the exact form element names, in a case-sensitive manner.

3. Assign the received data to new variables:

```
$title = $_POST['title'];
$name = $_POST['name'];
$response = $_POST['response'];
$comments = $_POST['comments'];
```

**Script 3.3** This script displays the form data submitted to it by referencing the associated **\$\_POST** variables.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
1.0 Transitional//EN"
2    "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="Content-Type"
      content="text/html; charset=utf-8"/>
6    <title>Your Feedback</title>
7  </head>
8  <body>
9  <?php // Script 3.3 handle_form.php
10
11 // This page receives the data from
feedback.html.
12 // It will receive: title, name, email,
response, comments, and submit in $_POST.
13
14 // Create shorthand versions of the
variables:
15 $title = $_POST['title'];
16 $name = $_POST['name'];
17 $response = $_POST['response'];
18 $comments = $_POST['comments'];
19
20 // Print the received data:
21 print "<p>Thank you, $title $name,
for your comments.</p>
22 <p>You stated that you found this
example to be '$response' and
added:<br />$comments</p>";
23
24 ?>
25 </body>
26 </html>
```

## Magic Quotes

Earlier versions of PHP had a feature called *Magic Quotes*, which has since been deprecated (meaning you shouldn't use it and it will be removed from the language in time). Magic Quotes—when enabled—automatically escapes single and double quotation marks found in submitted form data. So the string *I'd like more information* would be turned into *I'd like more information*.

The escaping of potentially problematic characters can be useful and even necessary in some situations. But if the Magic Quotes feature is enabled on your PHP installation, you'll see these backslashes when the PHP script prints out the form data. You can undo its effect using the `stripslashes()` function. To apply it to the `handle_form.php` script, you would do this, for example:

```
$comments = stripslashes  
($POST['comments']);
```

instead of just this:

```
$comments = $POST['comments'];
```

That will have the effect of converting an escaped submitted string back to its original, non-escaped value.

If you're not seeing extraneous slashes added to submitted form data, you don't need to worry about Magic Quotes.

Again, since the form uses the `POST` method, the submitted data can be found in the `$_POST` array. The individual values are accessed using the syntax `$_POST['name_attribute_value']`. This works regardless of the form element's type (input, select, checkbox, etc.).

To make it easier to use these values in a `print` statement in Step 4, each value is assigned to a new variable in this step. Neither `$_POST['email']` nor `$_POST['submit']` is being addressed, but you can create variables for those values if you'd like.

4. Print out the user information:

```
print "<p>Thank you, $title $name,  
→ for your comments.</p>  
<p>You stated that you found this  
→ example to be '$response' and  
→ added:<br />$comments</p>";
```

This one `print` statement uses the four variables within a context to show the user what data the script received.

5. Close the PHP section and complete the HTML page:

```
?>  
</body>  
</html>
```

6. Save the script as `handle_form.php`.

Note that the name of this file must exactly match the value of the `action` attribute in the form.

7. Upload the script to the server (or store it in the proper directory on your computer if you've installed PHP), making sure it's saved in the same directory as `feedback.html`.

*continues on next page*

8. Load `feedback.html` in your Web browser through a URL (`http://something`).

You must load the HTML form through a URL so that when it's submitted to the PHP script, that PHP script is also run through a URL. PHP scripts must always be run through a URL!

Failure to load a form through a URL is a common beginner's mistake.

9. Fill out **B**, and then submit the form **C**.

If you see a blank page, read the next section of the chapter for how to display the errors that presumably occurred.

If you see an error notice **D** or see that a variable does not have a value when printed, you likely misspelled either the form element's `name` value or the `$_POST` array's index (or you filled out the form incompletely).

**TIP** If you want to pass a preset value along to a PHP script, use the `hidden` type of input within your HTML form. For example, the line

```
<input type="hidden" name="form_page"  
value="feedback.html" />
```

inserted between the form tags will create a variable in the handling script called `$_POST['form_page']` with the value `feedback.html`.

**TIP** Notice that the value of radio button and certain menu variables is based on the `value` attribute of the selected item (for example, `excellent` from the radio button). This is also true for checkboxes. For text boxes, the value of the variable is what the user typed.

**TIP** If the `handle_form.php` script displays extra slashes in submitted strings, see the "Magic Quotes" sidebar for an explanation and solution.

**TIP** You can also access form data, regardless of the form's method, in the `$_REQUEST` pre-defined variable. `$_GET` and `$_POST` are more precise, however, and therefore preferable.

Please complete this form to submit your feedback:

Name:

Email Address:

Response: This is...  excellent  okay  boring

No problems so far!

Comments:

**B** Whatever the user enters into the HTML form should be printed out to the Web browser by the `handle_form.php` script **C**.

Thank you, Mr. Larry Ullman, for your comments.

You stated that you found this example to be 'excellent' and added: No problems so far!

**C** This is another application of the `print` statement discussed in Chapter 1, but it constitutes your first dynamically generated Web page.

**Notice:** Undefined index: Name in /Users/larryullman/Sites /phpvqs4/handle\_form.php on line 16

Thank you, Mr. , for your comments.

**D** Notices like these occur when a script refers to a variable that doesn't exist. In this particular case, the cause is erroneously referring to `$_POST['Name']` when it should be `$_POST['name']`.

# Displaying Errors

One of the very first issues that arise when it comes to debugging PHP scripts is that you may or may not even see the errors that occur. After you install PHP on a Web server, it will run under a default configuration with respect to security, performance, how it handles data, and so forth. One of the default settings is to not display any errors. In other words, the `display_errors` setting will be off **A**. When that's the case, what you might see when a script has an error is a blank page. (This is the norm on fresh installations of PHP; most hosting companies will enable `display_errors`.)

The reason that errors should not be displayed on a live site is that it's a security risk. Simply put, PHP's errors often give away too much information for the public at large to see (not to mention showing PHP errors looks unprofessional). But you, the developer, *do* need to see these errors in order to fix them!

To have PHP display errors, you can do one of the following:

- Turn `display_errors` back on for PHP as a whole. (See the “Configuring PHP” section of Appendix A, “Installation and Configuration,” for more information.)
- Turn `display_errors` back on for an individual script.

*continues on next page*

<code>display_errors</code>	Off	Off
<code>display_startup_errors</code>	On	On
<code>doc_root</code>	<i>no value</i>	<i>no value</i>
<code>doctype</code>	<i>no value</i>	<i>no value</i>
<code>doctroot</code>	<i>no value</i>	<i>no value</i>
<code>enable_dl</code>	On	On
<code>error_append_string</code>	<i>no value</i>	<i>no value</i>
<code>error_log</code>	/Applications/MAMP/logs /php_error.log	/Applications/MAMP/logs /php_error.log
<code>error_prepend_string</code>	<i>no value</i>	<i>no value</i>
<code>error_reporting</code>	32767	32767

**A** Run a `phpinfo()` script (e.g., Script 1.2) to view your server's `display_errors` setting.

While developing a site, the first option is by far preferred. However, it's only a possibility for those with administrative control over the server. Anyone can use the second option by including this line in a script:

```
ini_set ('display_errors', 1);
```

The `ini_set()` function allows a script to temporarily override a setting in PHP's configuration file (many, but not all, settings can be altered this way). The previous example changes the `display_errors` setting to *on*, which is represented by the number 1.

Although this second method can be implemented by anyone, the downside is that if your script contains certain kinds of errors (discussed next), the script cannot be executed. In that situation, this line of code won't be executed, and the particular error—or any that prevents a script from running at all—still results in a blank page.

### To display errors in a script:

1. Open `handle_form.php` in your text editor or IDE, if it is not already open.
2. As the first line of PHP code, enter the following ([Script 3.4](#)):

```
ini_set ('display_errors', 1);
```

Again, this line tells PHP you'd like to see any errors that occur. You should call it first thing in your PHP section so the rest of the PHP code will abide by this new setting.

3. Save the file as `handle_form.php`.

**Script 3.4** This addition to the PHP script turns on the `display_errors` directive so that errors will be shown.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
2   1.0 Transitional//EN"  
3   "http://www.w3.org/TR/xhtml1/DTD/  
4   xhtml1-transitional.dtd">  
5   <html xmlns="http://www.w3.org/1999/  
6   xhtml" xml:lang="en" lang="en">  
7   <head>  
8     <meta http-equiv="Content-Type"  
9       content="text/html; charset=utf-8"/>  
10    <title>Your Feedback</title>  
11  </head>  
12  <body>  
13  <?php // Script 3.4 - handle_form.php #2  
14  
15  ini_set ('display_errors', 1);  
16  // Let me learn from my mistakes!  
17  
18  // This page receives the data from  
19  // feedback.html.  
20  // It will receive: title, name, email,  
21  // response, comments, and submit in  
22  // $_POST.  
23  
24  // Create shorthand versions of the  
25  // variables:  
26  $title = $_POST['title'];  
27  $name = $_POST['name'];  
28  $response = $_POST['response'];  
29  $comments = $_POST['comments'];  
30  
31  // Print the received data:  
32  print "<p>Thank you, $title $name, for  
33  your comments.</p>  
34  <p>You stated that you found this  
35  example to be '$response' and added:  
36  <br />$comments</p>";  
37  
38  ?>  
39  </body>  
40  </html>
```

Please complete this form to submit your feedback:

Name:

Email Address:

Response: This is...  excellent  okay  boring

Comments:

**B** Incompletely filling out the form...

**Notice:** Undefined index: response in /Users/larryullman/Sites/phpvqs4/handle\_form.php on line 19

Thank you, Mr. Larry Ullman, for your comments.

You stated that you found this example to be " and added:

**C** ...results in error messages. These notices are generated by references to form elements for which there are no values.

4. Upload the file to your Web server and test it in your Web browser (**B** and **C**).

If the resulting page has no errors in it, then the script will run as it did before. If you saw a blank page when you ran the form earlier, you should now see messages like those in **C**. Again, if you see such errors, you likely misspelled the name of a form element, misspelled the index in the `$_POST` array, or didn't fill out the form completely.

**TIP** Make sure `display_errors` is enabled any time you're having difficulties debugging a script. If you installed PHP on your computer, I highly recommend enabling it in your PHP configuration while you learn (again, see Appendix A).

**TIP** If you see a blank page when running a PHP script, also check the HTML source code for errors or other problems.

**TIP** Remember that the `display_errors` directive only controls whether error messages are sent to the Web browser. It doesn't create errors or prevent them from occurring in any way.

**TIP** Failure to use an equals sign after `name` in a form element will also cause problems:

```
<input name"something" />
```

# Error Reporting

Another PHP configuration issue you should be aware of, along with `display_errors`, is `error reporting`. There are eleven different types of errors in PHP, plus four user-defined types (which aren't covered in this book). **Table 3.1** lists the four most important general error types, along with a description and example of each.

You can set what errors PHP reports on in two ways. First, you can adjust

the `error_reporting` level in PHP's configuration file (again, see Appendix A).

If you are running your own PHP server, you'll probably want to adjust that global setting while developing your scripts.

The second option is to use the `error_reporting()` function in a script. The function takes either a number or one or more *constants* (nonquoted strings with predetermined meanings) to adjust the levels. The most important of these constants are listed in **Table 3.2**.

---

**TABLE 3.1** PHP Error Types

Type	Description	Example
<code>Notice</code>	Nonfatal error that may or may not be indicative of a problem	Referring to a variable that has no value
<code>Warning</code>	Nonfatal error that is most likely problematic	Misusing a function
<code>Parse error</code>	Fatal error caused by a syntactical mistake	Omission of a semicolon or an imbalance of quotation marks, braces, or parentheses
<code>Error</code>	A general fatal error	Memory allocation problem

---

**TABLE 3.2** Error Reporting Constants

Name
<code>E_NOTICE</code>
<code>E_WARNING</code>
<code>E_PARSE</code>
<code>E_ERROR</code>
<code>E_ALL</code>
<code>E_STRICT</code>
<code>E_DEPRECATED</code>

---

**Script 3.5** Adjust a script's level of error reporting to give you more or less feedback on potential and existing problems. In my opinion, more is always better.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5   <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7   <head>
8     <meta http-equiv="Content-Type"
9       content="text/html; charset=utf-8"/>
10    <title>Your Feedback</title>
11  </head>
12  <body>
13  <?php // Script 3.5 - handle_form.php #3
14  ini_set ('display_errors', 1);
15  // Let me learn from my mistakes!
16  error_reporting (E_ALL | E_STRICT);
17  // Show all possible problems!
18
19 // This page receives the data from
20 // feedback.html.
21 // It will receive: title, name, email,
22 // response, comments, and submit in
23 // $_POST.
24
25 // Create shorthand versions of the
26 // variables:
27 $title = $_POST['title'];
28 $name = $_POST['name'];
29 $response = $_POST['response'];
30 $comments = $_POST['comments'];
31
32 // Print the received data:
33 print '<p>Thank you, $title $name, for
34 your comments.</p>
35 <p>You stated that you found this
36 example to be '$response' and added:
37 <br />$comments</p>';
38
39 ?>
40 </body>
41 </html>
```

Using this information, you could add any of the following to a script:

```
error_reporting (0);
error_reporting (E_ALL);
error_reporting (E_ALL & ~E_NOTICE);
```

The first line says that no errors should be reported. The second requests that all errors be reported. The last example states that you want to see all error messages except notices (the **&** **~** means *and not*). Keep in mind that adjusting this setting doesn't prevent or create errors; it just affects whether or not errors are reported.

It's generally best to develop and test PHP scripts using the highest level of error reporting possible. To accomplish that, declare that you want *all errors plus strict* error reporting:

```
error_reporting (E_ALL | E_STRICT);
```

The **E\_ALL** setting does not include **E\_STRICT**, which is why that line says that all errors should be shown or (the vertical bar, called the *pipe*) strict errors should be shown. This latter setting takes reporting a step further, also raising notices for things that could be a problem in future versions of PHP. Let's apply this setting to the **handle\_form.php** page.

## To adjust error reporting in a script:

1. Open **handle\_form.php** (Script 3.4) in your text editor or IDE, if it is not already.
2. After the **ini\_set()** line, add the following (Script 3.5):  

```
error_reporting (E_ALL | E_STRICT);
```
3. Save the file as **handle\_form.php**.

*continues on next page*

- 4.** Place the file in the proper directory for your PHP-enabled server and test it in your Web browser by submitting the form (**A** and **B**).

At this point, if the form is filled out completely and the `$_POST` indexes exactly match the names of the form elements, you shouldn't see any errors (as in the figures). If any problems exist, including any potential problems (thanks to `E_STRICT`), they should be displayed and reported.

**TIP** The PHP manual lists all the error-reporting levels, but those listed here are the most important.

**TIP** The code in this book was tested using the highest level of error reporting: `E_ALL | E_STRICT`.

Please complete this form to submit your feedback:

Name:

Email Address:

Response: This is...  excellent  okay  boring

Comments:

**A** Try the form one more time...

Thank you, Ms. Blankenship, for your comments.

You stated that you found this example to be 'boring' and added:  
Enough already!

**B** ...and here's the result (if filled out completely and without any programmer errors).

# Manually Sending Data to a Page

The last example for this chapter is a slight tangent to the other topics but plays off the idea of handling form data with PHP. As discussed in the section “Choosing a Form Method,” if a form uses the GET method, the resulting URL is something like

```
http://www.example.com/page.php?  
→ some_var=some_value&age=20&...
```

The receiving page (here, `page.php`) is sent a series of `name=value` pairs, each of which is separated by an ampersand (`&`). The whole sequence is preceded by a question mark (immediately after the handling script’s name).

To access the values passed to the page in this way, turn to the `$_GET` variable. Just as you would when using `$_POST`, refer to the specific name as an index in `$_GET`.

In that example, `page.php` receives a `$_GET['some_var']` variable with a value of `some_value`, a `$_GET['age']` variable with a value of `20`, and so forth.

You can pass data to a PHP script in this way by creating an HTML form that uses the GET method. But you can also use this same idea to send data to a PHP page without the use of the form. Normally you’d do so by creating links:

```
<a href="page.php?id=22">Some Link</a>
```

That link, which could be dynamically generated by PHP, will pass the value `22` to `page.php`, accessible in `$_GET['id']`.

To try this for yourself, the next pair of scripts will easily demonstrate this concept, using a hard-coded HTML page.

## To create the HTML page:

1. Begin a new document in your text editor or IDE, to be named `hello.html` (Script 3.6):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="Content-Type"
    → content="text/html;
    → charset=utf-8"/>
  <title>Greetings!</title>
</head>
<body>
<!-- Script 3.6 - hello.html --&gt;
&lt;div&gt;&lt;p&gt;Click a link to say
→ hello:&lt;/p&gt;</pre>
```

2. Create links to a PHP script, passing values along in the URL:

```
<ul>
  <li><a href="hello.php?
  → name=Michael">Michael</a></li>
  <li><a href="hello.php?
  → name=Celia">Celia</a></li>
  <li><a href="hello.php?
  → name=Jude">Jude</a></li>
  <li><a href="hello.php?
  → name=Sophie">Sophie</a></li>
</ul>
```

**Script 3.6** This HTML page uses links to pass values to a PHP script in the URL (thereby emulating a form that uses the GET method).

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
1.0 Transitional//EN"
2    "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="Content-Type"
content="text/html; charset=utf-8"/>
6    <title>Greetings!</title>
7  </head>
8  <body>
9  <!-- Script 3.6 - hello.html --&gt;
10 &lt;div&gt;&lt;p&gt;Click a link to say hello:&lt;/p&gt;
11
12 &lt;ul&gt;
13   &lt;li&gt;&lt;a href="hello.php?
name=Michael"&gt;Michael&lt;/a&gt;&lt;/li&gt;
14   &lt;li&gt;&lt;a href="hello.php?
name=Celia"&gt;Celia&lt;/a&gt;&lt;/li&gt;
15   &lt;li&gt;&lt;a href="hello.php?
name=Jude"&gt;Jude&lt;/a&gt;&lt;/li&gt;
16   &lt;li&gt;&lt;a href="hello.php?
name=Sophie"&gt;Sophie&lt;/a&gt;&lt;/li&gt;
17 &lt;/ul&gt;
18
19 &lt;/div&gt;
20 &lt;/body&gt;
21 &lt;/html&gt;</pre>
```

Click a link to say hello:

- [Michael](#)
- [Celia](#)
- [Jude](#)
- [Sophie](#)

**A** The simple HTML page, with four links to the PHP script.

The premise here is that the user will see a list of links, each associated with a specific name **A**. When the user clicks a link, that name is passed to **hello.php** in the URL **B**.

If you want to use different names, that's fine, but stick to one-word names without spaces or punctuation (or else they won't be passed to the PHP script properly, for reasons that will be explained in time).

**3.** Complete the HTML page:

```
</div>
</body>
</html>
```

- 4.** Save the script as **hello.html** and place it within the proper directory on your PHP-enabled server.
- 5.** Load the HTML page through a URL in your Web browser.

Although you can view HTML pages without going through a URL, you'll click links in this page to access the PHP script, so you'll need to start off using a URL here. Don't click any of the links yet, as the PHP script doesn't exist!

```
<!-- Script 3.6 - hello.html -->
<div><p>Click a link to say hello:</p>

<ul>
    <li><a href="hello.php?name=Michael">Michael</a></li>
    <li><a href="hello.php?name=Celia">Celia</a></li>
    <li><a href="hello.php?name=Jude">Jude</a></li>
    <li><a href="hello.php?name=Sophie">Sophie</a></li>
</ul>

</div>
```

**B** The HTML source of the page shows how values are being passed along in the URL for the four links.

## To create the PHP script:

1. Begin a new document in your text editor or IDE, to be named **hello.php** (Script 3.7):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="Content-Type"
    → content="text/html;
    → charset=utf-8"/>
  <title>Greetings!</title>
</head>
<body>
```

2. Begin the PHP code:

```
<?php // Script 3.7 - hello.php
```

3. Address the error management, if desired:

```
ini_set ('display_errors', 1);
error_reporting (E_ALL | E_STRICT);
```

These two lines, which configure how PHP responds to errors, are explained in the pages leading up to this section. They may or may not be necessary for your situation but can be helpful.

4. Use the **name** value passed in the URL to create a greeting:

```
$name = $_GET['name'];
print "<p>Hello, <span
style=\"font-weight:
bold;\">$name</span>!</p>";
```

The **name** variable is sent to the page through the URL (see Script 3.6). To access that value, refer to **\$\_GET['name']**. Again, you would use **\$\_GET** (as opposed to **\$\_POST**) because the value is coming from a GET request.

**Script 3.7** This PHP page refers to the **name** value passed in the URL in order to print a greeting.

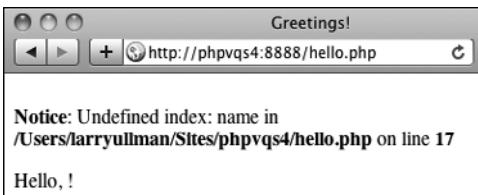
```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
1.0 Transitional//EN"
2    "http://www.w3.org/TR/xhtml1/DTD/
  → xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="Content-Type"
      content="text/html; charset=utf-8"/>
6    <title>Greetings!</title>
7  </head>
8  <body>
9  <?php // Script 3.7 - hello.php
10
11 ini_set ('display_errors', 1);
  // Let me learn from my mistakes!
12 error_reporting (E_ALL | E_STRICT);
  // Show all possible problems!
13
14 // This page should receive a name value
  in the URL.
15
16 // Say "Hello":
17 $name = $_GET['name'];
18 print "<p>Hello, <span
  style=\"font-weight: bold;\">$name
  </span>!</p>";
```



**C** By clicking the first link, *Michael* is passed along in the URL and is greeted by name.



**D** By clicking the second link, *Celia* is sent along in the URL and is also greeted by name.



**E** If the `$_GET['name']` variable isn't assigned a value, the browser prints out this awkward message, along with the error notice.



**F** Any value assigned to `name` (lowercase) in the URL is used by the PHP script.

As with earlier PHP scripts, the value in the predefined variable (`$_GET`) is first assigned to another variable, to simplify the syntax in the `print` statement.

5. Complete the PHP code and the HTML page:

```
?>  
</body>  
</html>
```

6. Save the script as `hello.php` and place it within the proper directory on your PHP-enabled server.

It should be saved in the same directory as `hello.html` (Script 3.6).

7. Click the links in `hello.html` to view the result **C** and **D**.

**TIP** If you run `hello.php` directly (i.e., without clicking any links), you'll get an error notice because no name value would be passed along in the URL **E**.

**TIP** Because `hello.php` reads a value from the URL, it actually works independently of `hello.html`. For example, you can directly edit the `hello.php` URL to greet anyone, even if `hello.html` does not have a link for that name **F**.

**TIP** If you want to use a link to send multiple values to a script, separate the `name=value` pairs (for example, `first_name=Larry`) with the ampersand (&). So, another link may be `hello.php? first_name=Larry&last_name=Ullman`. You should continue to use only single words, without punctuation or spaces, however (until you later learn about the `urlencode()` function).

**TIP** Although the example here—setting the value of a person's name—may not be very practical, this basic technique is useful on many occasions. For example, a PHP script might constitute a template, and the content of the resulting Web page would differ based on the values the page received in the URL.

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book’s supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- What is the significance of a form’s **action** attribute?
- What is the significance of a form’s **method** attribute? Is it more secure to use GET or POST? Which method type can be bookmarked in the browser?
- What predefined variable will contain the data from a form submission? Note: There are multiple answers.
- Why must an HTML page that contains a form that’s being submitted to a PHP script be loaded through a URL?
- Under what circumstances will attempts to enable **display\_errors** in a script not succeed? Why is it not secure to enable **display\_errors** on live sites?

## Pursue

- Load **feedback.html** in your Web browser without going through a URL (i.e., the address bar would likely start with *file://*). Fill out and submit the form. Observe the result so that you can recognize this problem, and understand its cause, in case you see similar results in the future.

- If you have not already, and if you can, make sure that **display\_errors** is enabled on your development environment.
- If you have not already, and if you can, make sure that **error\_reporting** is set to **E\_ALL | E\_STRICT** on your development environment.
- Try introducing different errors in a PHP script—by improperly balancing quotation marks, failing to use semicolons, referring to variables improperly, and so on—to see the result.
- Experiment with the **hello.html** and the **hello.php** pages to send different values, including numbers, to the PHP script through the URL.
- Create a variation on **hello.html** that sends multiple *name=value* pairs to a PHP script. Have the PHP script then print all the received values.
- If you’re the inquisitive type, and don’t mind waiting for answers, try passing more complicated values to a page through the URL. Try using spaces and punctuation to see what happens.
- Create a new HTML form that performs a task you envision yourself needing (or a lighter-weight version of that functionality). Then create the PHP script that handles the form, printing just the received data.

# 4

# Using Numbers

Chapter 2, “Variables,” briefly discussed the various types of variables, how to assign values to them, and how they’re generally used. In this chapter, you’ll work specifically with number variables—both integers (whole numbers) and floating-point numbers (aka floats or decimals).

The chapter begins by creating an HTML form that will be used to generate number variables. Then you’ll learn how to perform basic arithmetic, how to format numbers, and how to cope with *operator precedence*. The last two sections of this chapter cover incrementing and decrementing numbers, plus generating random numbers. Throughout the chapter, you’ll also learn about other useful number-related PHP functions.

---

## In This Chapter

Creating the Form	74
Performing Arithmetic	77
Formatting Numbers	81
Understanding Precedence	84
Incrementing and Decrementing a Number	86
Creating Random Numbers	88
Review and Pursue	90

---

# Creating the Form

Most of the PHP examples in this chapter will perform various calculations based on an e-commerce premise. A form will take price, quantity, discount amount, tax rate, and shipping cost **A**, and the PHP script that handles the form will return a total cost. That cost will also be broken down by the number of payments the user wants to make in order to generate a monthly cost value **B**.

To start, let's create an HTML page that allows the user to enter the values.

## To create the HTML form:

1. Begin a new HTML document in your text editor or IDE, to be named **calculator.html** (Script 4.1):

```
<!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" xml:lang="en"
  → lang="en">
<head>
  <meta http-equiv="Content-Type"
  → content="text/html;
  → charset=utf-8"/>
  <title>Product Cost Calculator
  → </title>
</head>
<body><!-- Script 4.1 -
  → calculator.html -->
<div><p>Fill out this form to
  → calculate the total cost:</p>
```

Fill out this form to calculate the total cost:

Price:

Quantity:

Discount:

Tax:  (%)

Shipping method:

Number of payments to make:

**A** This form takes numbers from the user and sends them to a PHP page.

You have selected to purchase:

100 widget(s) at

\$5.00 price each plus a

\$5.00 shipping cost and a

7.5 percent tax rate.

After your \$10.00 discount, the total cost is \$532.13.

Divided over 10 monthly payments, that would be \$53.21 each.

**B** The PHP script performs a series of calculations on the submitted data and outputs the results. The results should look like this by the end of the chapter.

**Script 4.1** This basic HTML form will be the origination of the numbers on which mathematical calculations will be performed in several PHP scripts.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
2   XHTML 1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8   <meta http-equiv="Content-Type"
9     content="text/html;
10    charset=utf-8"/>
11  <title>Product Cost Calculator
12  </title>
13 </head>
14 <body><!-- Script 4.1 -
15 calculator.html -->
16 <div><p>Fill out this form to
17 calculate the total cost:</p>
18 <form action="handle_calc.php"
19 method="post">
20 <p>Price: <input type="text"
21 name="price" size="5" /></p>
22 <p>Quantity: <input type="text"
23 name="quantity" size="5" /></p>
24 <p>Discount: <input type="text"
25 name="discount" size="5" /></p>
26 <p>Tax: <input type="text" name="tax"
27 size="3" /> (%)</p>
28 <p>Shipping method: <select
29 name="shipping">
30 <option value="5.00">Slow and steady
31 <option value="8.95">Put a move on
32 it.</option>
33 <option value="19.36">I need it
34 yesterday!</option>
35 </select></p>
36 <p>Number of payments to make:
37 <input type="text" name="payments"
38 size="3" /></p>
39 <input type="submit" name="submit"
40 value="Calculate!" />
41 </form>
42 </div>
43 </body>
44 </html>
```

**2.** Create the initial **form** tag:

```
<form action="handle_calc.php"
→ method="post">
```

This **form** tag begins the HTML form. Its **action** attribute indicates that the form data will be submitted to a page named **handle\_calc.php**. The tag's **method** attribute tells the page to use POST to send the data. See Chapter 3, “HTML Forms and PHP,” for more details.

**3.** Create the inputs for the price, quantity, discount, and tax:

```
<p>Price: <input type="text"
→ name="price" size="5" /></p>
<p>Quantity: <input type="text"
→ name="quantity" size="5" /></p>
<p>Discount: <input type="text"
→ name="discount" size="5" /></p>
<p>Tax: <input type="text"
→ name="tax" size="3" /> (%)</p>
```

XHTML has no input type for numbers, so you create text boxes for these values. A parenthetical indicates that the tax should be entered as a percent.

Also remember that the names used for the inputs have to correspond to valid PHP variable names (letters, numbers, and the underscore only; doesn't start with a number, and so forth).

*continues on next page*

4. Add a field in which the user can select a shipping method:

```
<p>Shipping method: <select  
→ name="shipping">  
<option value="5.00">Slow and  
→ steady</option>  
<option value="8.95">Put a move  
→ on it.</option>  
<option value="19.36">I need it  
→ yesterday!</option>  
</select></p>
```

The shipping selection is made using a drop-down menu. The value of the selected option is the cost for that option. If the user selects, for example, the *Put a move on it.* option, the value of `$_POST['shipping']` in `handle_calc.php` will be 8.95.

5. Complete the HTML form:

```
<p>Number of payments to make:  
→ <input type="text"  
→ name="payments" size="3" /></p>  
<input type="submit" name="submit"  
→ value="Calculate!" />  
</form>
```

The final two input types take a number for how many payments are required and then create a submit button (labeled *Calculate!*). The closing `form` tag marks the end of the form section of the page.

6. Complete the HTML page:

```
</div>  
</body>  
</html>
```

7. Save the script as `calculator.html` and view it in your Web browser.

Because this is an HTML page, you can view it directly in a Web browser.

**Script 4.2** This PHP script executes all the standard mathematical calculations using the numbers submitted from the form.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8      <meta http-equiv="Content-Type"
9       content="text/html; charset=utf-8"/>
10 <title>Product Cost Calculator</title>
11 <style type="text/css" media="screen">
12     .number { font-weight: bold; }
13 </style>
14 </head>
15 <body>
16 <?php // Script 4.2 - handle_calc.php
17 /* This script takes values from
18 calculator.html and performs
19 total cost and monthly payment
20 calculations. */
21
22 // Address error handling, if you want.
23
24 // Get the values from the $_POST array:
25 $price = $_POST['price'];
26 $quantity = $_POST['quantity'];
27 $discount = $_POST['discount'];
28 $tax = $_POST['tax'];
29 $shipping = $_POST['shipping'];
30 $payments = $_POST['payments'];
31
32 // Calculate the total:
33 $total = $price * $quantity;
34 $total = $total + $shipping;
35 $total = $total - $discount;
36
37 // Determine the tax rate:
38 $taxrate = $tax/100;
39 $taxrate = $taxrate + 1;
40
41 // Factor in the tax rate:
42 $total = $total * $taxrate;
43
44 // Calculate the monthly payments:
45 $monthly = $total / $payments;
```

*code continues on next page*

## Performing Arithmetic

Just as you learned in grade school, basic mathematics involves the principles of addition, subtraction, multiplication, and division. These are performed in PHP using the most obvious operators:

- Addition (+)
- Subtraction (-)
- Multiplication (\*)
- Division (/)

To use these operators, you'll create a PHP script that calculates the total cost for the sale of some widgets. This handling script could be the basis of a shopping cart application—a very practical Web page feature (although in this case the relevant number values will come from **calculator.html**).

When you're writing this script, be sure to note the use of comments (**Script 4.2**) to illuminate the different lines of code and the reasoning behind them.

### To create your sales cost calculator:

1. Create a new document in your text editor or IDE, to be named **handle\_calc.php** (Script 4.2):

```
<!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" xml:lang="en"
  lang="en">
<head>
    <meta http-equiv="Content-Type"
        content="text/html;
        charset=utf-8"/>
    <title>Product Cost Calculator
        </title>
```

*continues on next page*

```

<style type="text/css"
→ media="screen">
    .number { font-weight: bold; }
</style>
</head>
<body>

```

The head of the document defines one CSS class called ***number***. Any element within the page that has that class value will be given extra font weight. In other words, when the numbers from the form, and the results of the various calculations, are printed in the script's output, they'll be made more obvious.

2. Insert the PHP tags and address error handling, if desired:

```

<?php // Script 4.2 -
→ handle_calc.php

```

Depending on your PHP configuration, you may or many not want to add a couple of lines that turn on ***display\_errors*** and adjust the level of error reporting. See Chapter 3 for specifics.

3. Assign the ***\$\_POST*** elements to local variables:

```

$price = $_POST['price'];
$quantity = $_POST['quantity'];
$discount = $_POST['discount'];
$tax = $_POST['tax'];
$shipping = $_POST['shipping'];
$payments = $_POST['payments'];

```

The script will receive all the form data in the predefined ***\$\_POST*** variable. To access individual form values, refer to ***\$\_POST['index']***, replacing *index* with the corresponding form element's ***name*** value. These values are assigned to individual local variables here, to make it easier to use them throughout the rest of the script.

Note that each variable is given a descriptive name and is written entirely in lowercase letters.

#### Script 4.2 continued

```

41 // Print out the results:
42 print "<p>You have selected to
        purchase:<br />
43 <span class=\"number\">$quantity
        </span> widget(s) at <br />
44 $<span class=\"number\">$price</span>
        price each plus a <br />
45 $<span class=\"number\">$shipping
        </span> shipping cost and a <br />
46 <span class=\"number\">$tax</span>
        percent tax rate.<br />
47 After your $<span class=\"number\">
        $discount</span> discount, the total
        cost is
48 $<span class=\"number\">$total
        </span>.<br />
49 Divided over <span class=\"number\">
        $payments</span> monthly payments,
        that would be $<span class=\"number\">
        $monthly</span> each.</p>";
50
51 ?>
52 </body>
53 </html>

```

**4.** Begin calculating the total cost:

```
$total = $price * $quantity;  
$total = $total + $shipping;  
$total = $total - $discount;
```

The asterisk (\*) indicates multiplication in PHP, so the total is first calculated as the number of items purchased (**\$quantity**) multiplied by the price. Then the shipping cost is added to the total value (remember that the shipping cost correlates to the **value** attribute of each shipping drop-down menu's **option** tags), and the discount is subtracted.

Note that it's perfectly acceptable to determine a variable's value in part by using that variable's existing value (as is done in the last two lines).

**5.** Calculate the tax rate and the new total:

```
$taxrate = $tax/100;  
$taxrate = $taxrate + 1;  
$total = $total * $taxrate;
```

The tax rate should be entered as a percent—for example, 8 or 5.75. This number is then divided by 100 to get the decimal equivalent of the percent (.08 or .0575). Finally, you calculate how much something costs with tax by adding 1 to the percent and then multiplying that new rate by the total. This is the mathematical equivalent of multiplying the decimal tax rate times the total and then adding this result to the total (for example, a 5 percent tax on \$100 is \$5, making the total \$105, which is the same as multiplying \$100 times 1.05).

**6.** Calculate the monthly payment:

```
$monthly = $total / $payments;
```

As an example of division, assume that the widgets can be paid for over the course of many months. Hence, you divide the total by the number of payments to find the monthly payment.

**7.** Print the results:

```
print "<p>You have selected to  
→ purchase:<br />  
<span class=\"number\">$quantity  
→ </span> widget(s) at <br />  
$<span class=\"number\">$price  
→ </span> price each plus a <br />  
$<span class=\"number\">$shipping  
→ </span> shipping cost and a <br />  
<span class=\"number\">$tax</span>  
→ percent tax rate.<br />  
After your $<span class=\"number\">  
→ $discount</span> discount, the  
→ total cost is  
$<span class=\"number\">$total  
→ </span>.<br />  
Divided over <span class=\"number\">  
→ $payments</span> monthly  
→ payments, that would be $<span  
→ class=\"number\">$monthly</span>  
→ each.</p>";
```

The **print** statement sends every value to the Web browser along with some text. To make it easier to read, **<br />** tags are added to format the browser result; in addition, the **print** function operates over multiple lines to make the PHP code cleaner. Each variable's value will be highlighted in the browser by wrapping it within **span** tags that have a **class** attribute of **number** (see Step 1).

**8.** Close the PHP section and complete the HTML page:

```
?>  
</body>  
</html>
```

**9.** Save the script as **handle\_calc.php** and place it in the proper directory for your PHP-enabled server.

Make sure that **calculator.html** is in the same directory.

*continues on next page*

- 10.** Test the script in your Web browser by filling out **A** and submitting **B** the form.

Not to belabor the point, but make sure you start by loading the HTML form through a URL (`http://something`) so that when it's submitted, the PHP script is also run through a URL.

You can experiment with these values to see how effectively your calculator works. If you omit any values, the resulting message will just be a little odd but the calculations should still work **C**.

**TIP** As you'll certainly notice, the calculator comes up with numbers that don't correspond well to real dollar values (see **B** and **C**). In the next section, "Formatting Numbers," you'll learn how to address this issue.

**TIP** If you want to print the value of the total before tax or before the discount (or both), you can do so in two ways. You can insert the appropriate print statements immediately after the proper value has been determined but before the `$total` variable has been changed again. Or, you can use new variables to represent the values of the subsequent calculations (for example, `$total_with_tax` and `$total_less_discount`).

**TIP** Attempting to print a dollar sign followed by the value of a variable, such as `$10` (where `10` comes from a variable), has to be handled carefully. You can't use the syntax `$$variable`, because the combination of two dollar signs creates a type of variable that's too complex to discuss in this book. One solution is to put something—a space or an HTML tag, as in this example—between the dollar sign and the variable name. Another option is to escape the first dollar sign:

```
print "The total is \$\$total";
```

A third option is to use concatenation, which is introduced in the next chapter.

Fill out this form to calculate the total cost:

Price:

Quantity:

Discount:

Tax:  (%)

Shipping method:

Number of payments to make:

**A** The HTML form...

You have selected to purchase:  
6 widget(s) at  
\$19.95 price each plus a  
\$5.00 shipping cost and a  
6 percent tax rate.  
After your \$10.00 discount, the total cost is \$121.582.  
Divided over 12 monthly payments, that would be \$10.1318333333 each.

**B** ...and the resulting calculations.

You have selected to purchase:  
6 widget(s) at  
\$19.95 price each plus a  
\$5.00 shipping cost and a  
percent tax rate.  
After your \$ discount, the total cost is \$124.7.  
Divided over 12 monthly payments, that would be \$10.3916666667 each.

**C** You can omit or change any value and rerun the calculator. Here the tax and discount values have been omitted.

**TIP** This script performs differently, depending on whether the various fields are submitted. The only truly problematic field is the number of monthly payments: If this is omitted, you'll see a division-by-zero warning. Chapter 6, "Control Structures," will cover validating form data before it's used.

**TIP** HTML 5 is expected to have one or more inputs that restrict the user to entering numeric values.

# Formatting Numbers

Although the calculator is on its way to being practical, it still has one legitimate problem: You can't ask someone to make a monthly payment of \$10.13183333! To create more usable numbers, you need to format them.

There are two appropriate functions for this purpose. The first, `round()`, rounds a value to a specified number of decimal places. The function's first argument is the number to be rounded. This can be either a number or a variable that has a numeric value. The second argument is optional; it represents the number of decimal places to which to round. If omitted, the number will be rounded to the nearest integer. For example:

```
round (4.30); // 4
round (4.289, 2); // 4.29
$num = 236.26985;
round ($num); // 236
```

The other function you can use in this situation is `number_format()`. It works like `round()` in that it takes a number (or a variable with a numeric value) and an optional decimal specifier. This function has the added benefit of formatting the number with commas, the way it would commonly be written:

```
number_format (428.4959, 2); // 428.50
number_format (428, 2); // 428.00
number_format (123456789);
→ // 123,456,789
```

Let's rewrite the PHP script to format the numbers appropriately.

## To format numbers:

1. Open **handle\_calc.php** in your text editor or IDE, if it is not already open (Script 4.2).
2. After all the calculations but before the **print** statement, add the following (Script 4.3):

```
$total = number_format ($total, 2);
$monthly = number_format
    → ($monthly, 2);
```

To format these two numbers, apply this function after every calculation has been made but before they're sent to the Web browser. The second argument (the 2) indicates that the resulting number should have exactly two decimal places; this setting rounds the numbers and adds zeros at the end, as necessary.

**Script 4.3** The **number\_format()** function is applied to the values of two number variables, so they are more appropriate.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8      <meta http-equiv="Content-Type"
9       content="text/html; charset=utf-8"/>
10     <title>Product Cost Calculator</title>
11     <style type="text/css" media="screen">
12         .number { font-weight: bold; }
13     </style>
14 </head>
15 <body>
16 <?php // Script 4.3 - handle_calc.php #2
17 /* This script takes values from
18 calculator.html and performs
19 total cost and monthly payment
20 calculations. */
21
22 // Address error handling, if you want.
23
24 // Get the values from the $_POST array:
25 $price = $_POST['price'];
26 $quantity = $_POST['quantity'];
27 $discount = $_POST['discount'];
28 $tax = $_POST['tax'];
29 $shipping = $_POST['shipping'];
30 $payments = $_POST['payments'];
31
32 // Calculate the total:
33 $total = $price * $quantity;
34 $total = $total + $shipping;
35 $total = $total - $discount;
36
37 // Determine the tax rate:
38 $taxrate = $tax/100;
39 $taxrate = $taxrate + 1;
40
41 // Factor in the tax rate:
42 $total = $total * $taxrate;
43
44 // Calculate the monthly payments:
45 $monthly = $total / $payments;
46
47 // Apply the proper formatting:
48 $total = number_format ($total, 2);
49 $monthly = number_format ($monthly, 2);
```

*code continues on next page*

### Script 4.3 continued

```
45 // Print out the results:  
46 print "<p>You have selected to  
purchase:<br />  
47 <span class=\"number\">$quantity</span>  
widget(s) at <br />  
48 $<span class=\"number\">$price</span>  
price each plus a <br />  
49 $<span class=\"number\">$shipping</span>  
shipping cost and a <br />  
50 <span class=\"number\">$tax</span> percent  
tax rate.<br />  
51 After your $<span class=\"number\">  
$discount</span> discount, the total  
cost is  
52 $<span class=\"number\">$total</span>.<br />  
53 Divided over <span class=\"number\">  
$payments</span> monthly payments, that  
would be $<span class=\"number\">$monthly  
</span> each.</p>";  
54  
55 ?>  
56 </body>  
57 </html>
```

Fill out this form to calculate the total cost:

Price:

Quantity:

Discount:

Tax:  (%)

Shipping method:

Number of payments to make:

**A** Another form entry.

You have selected to purchase:  
4 widget(s) at  
\$99.00 price each plus a  
\$8.95 shipping cost and a  
5.5 percent tax rate.  
After your \$25.00 discount, the total cost is \$400.85.  
Divided over 24 monthly payments, that would be \$16.70 each.

**B** The updated version of the script returns more appropriate number values thanks to the `number_format()` function.

- Save the file, place it in the same directory as `calculator.html`, and test it in your browser **A** and **B**.

**TIP** Another, much more complex way to format numbers is to use the `printf()` and `sprintf()` functions. Because of their tricky syntax, they're not discussed in this book; see the PHP manual for more information.

**TIP** Non-Windows versions of PHP also have a `money_format()` function, which can be used in lieu of `number_format()`.

**TIP** For complicated reasons, the `round()` function rounds exact halves (.5, .05, .005, and so on) down half the time and up half the time.

**TIP** In PHP, function calls can have spaces between the function name and its parentheses or not. Both of these are fine:

```
round ($num);  
round($num);
```

**TIP** The `number_format()` function takes two other optional arguments that let you specify what characters to use to indicate a decimal point and break up thousands. This is useful, for example, for cultures that write 1,000.89 as 1.000,89. See the PHP manual for the correct syntax, if you want to use this option.

# Understanding Precedence

Inevitably, after a discussion of the various sorts of mathematical operators comes the discussion of precedence. *Precedence* refers to the order in which a series of calculations are executed. For example, what is the value of the following variable?

```
$number = 10 - 4 / 2;
```

Is `$number` worth 3 (10 minus 4 equals 6, divided by 2 equals 3) or 8 (4 divided by 2 equals 2, subtracted from 10 equals 8)? The answer here is 8, because division takes precedence over subtraction.

Appendix B, “Resources and Next Steps,” shows the complete list of operator precedence for PHP (including operators that haven’t been covered yet). However, instead of attempting to memorize a large table of peculiar characters, you can bypass the whole concept by using parentheses. Parentheses always take precedence over any other operator. Thus:

```
$number = (10 - 4) / 2; // 3
$number = 10 - (4 / 2); // 8
```

Using parentheses in your calculations ensures that you never see peculiar results due to precedence issues. Parentheses can also be used to rewrite complex calculations in fewer lines of code. Let’s rewrite the `handle_calc.php` script, combining multiple lines into one by using parentheses, while maintaining accuracy.

**Script 4.4** By using parentheses, calculations made over multiple lines (see Script 4.3) can be condensed without affecting the script’s mathematical accuracy.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2  1.0 Transitional//EN"
3  "http://www.w3.org/TR/xhtml1/DTD/
4  xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6  xhtml" xml:lang="en" lang="en">
7  <head>
8      <meta http-equiv="Content-Type"
9      content="text/html; charset=utf-8"/>
10     <title>Product Cost Calculator</title>
11     <style type="text/css" media="screen">
12         .number { font-weight: bold; }
13     </style>
14 </head>
15 <body>
16 // Script 4.4 - handle_calc.php #3
17 /* This script takes values from
18 calculator.html and performs
19 total cost and monthly payment
20 calculations. */
21
22 // Address error handling, if you want.
23
24 // Get the values from the $_POST array:
25 $price = $_POST['price'];
26 $quantity = $_POST['quantity'];
27 $discount = $_POST['discount'];
28 $tax = $_POST['tax'];
29 $shipping = $_POST['shipping'];
30 $payments = $_POST['payments'];
31
32 // Calculate the total:
33 $total = ($price * $quantity) +
34     $shipping) - $discount;
35
36 // Determine the tax rate:
37 $taxrate = ($tax/100) + 1;
38
39 // Factor in the tax rate:
40 $total = $total * $taxrate;
41
42 // Calculate the monthly payments:
43 $monthly = $total / $payments;
44
45 // Apply the proper formatting:
46 $total = number_format ($total, 2);
47 $monthly = number_format ($monthly, 2);
```

code continues on next page

#### Script 4.4 continued

```
42 // Print out the results:  
43 print "<p>You have selected to  
purchase:<br />  
44 <span class=\"number\">$quantity</span>  
widget(s) at <br />  
45 $<span class=\"number\">$price</span>  
price each plus a <br />  
46 $<span class=\"number\">$shipping</span>  
shipping cost and a <br />  
47 <span class=\"number\">$tax</span> percent  
tax rate.<br />  
48 After your <span class=\"number\">$discount  
</span> discount, the total cost is  
49 $<span class=\"number\">$total</span>.<br />  
50 Divided over <span class=\"number\">  
$payments</span> monthly payments, that  
would be <span class=\"number\">$monthly  
</span> each.</p>";  
51  
52 ?>  
53 </body>  
54 </html>
```

Fill out this form to calculate the total cost:

Price:

Quantity:

Discount:

Tax:  (%)

Shipping method:

Number of payments to make:

A Testing  
the form one  
more time.

You have selected to purchase:  
250 widget(s) at  
\$1.50 price each plus a  
\$19.36 shipping cost and a  
6 percent tax rate.  
After your \$0 discount, the total cost is \$418.02.  
Divided over 2 monthly payments, that would be \$209.01 each.

B Even though the calculations have been condensed, the math works out the same. If you see different results or get an error message, double-check your parentheses for balance (an equal number of opening and closing parentheses).

#### To manage precedence:

1. Open **handle\_calc.php** in your text editor or IDE, if it is not already open (Script 4.3).
2. Replace the three lines that initially calculate the order total with the following (Script 4.4):

```
$total = (($price * $quantity) +  
→ $shipping) - $discount;
```

There's no reason not to make all the calculations in one step, as long as you use parentheses to ensure that the math works properly. The other option is to memorize PHP's rules of precedence for multiple operators, but using parentheses is a lot easier.

3. Change the two lines that calculate and add in the tax to this:

```
$taxrate = ($tax/100) + 1;
```

Again, the tax calculations can be made in one line instead of two separate ones.

4. Save the script, place it in the same directory as **calculator.html**, and test it in your browser A and B.

**TIP** Be sure that you match your parentheses consistently as you create your formulas (every opening parenthesis requires a closing parenthesis). Failure to do so will cause parse errors.

**TIP** Granted, using the methods applied here, you could combine all the total calculations into just one line of code (instead of three)—but there is such a thing as oversimplifying.

# Incrementing and Decrementing a Number

PHP, like Perl and most other programming languages, includes some shortcuts that let you avoid ugly constructs such as

```
$tax = $tax + 1;
```

When you need to increase the value of a variable by 1 (called an *incremental* adjustment) or decrease the value of a variable by 1 (a *decremental* adjustment), you can use `++` and `--`, respectively:

```
$var = 20; // 20
$var++; // 21
$var++; // 22
$var--; // 21
```

Solely for the sake of testing this concept, you'll rewrite the `handle_calc.php` script one last time.

## To increment the value of a variable:

1. Open `handle_calc.php` in your text editor or IDE, if it is not already open (Script 4.4).
2. Change the tax rate calculation from Script 4.3 to read as follows (Script 4.5):

```
$taxrate = $tax/100;
$taxrate++;
```

The first line calculates the tax rate as the `$tax` value divided by 100. The second line increments this value by 1 so that it can be multiplied by the total to determine the total with tax.

**Script 4.5** Incrementing or decrementing a number is a common operation using `++` or `--`, respectively.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8      <meta http-equiv="Content-Type"
9       content="text/html; charset=utf-8"/>
10 <title>Product Cost Calculator
11 </title>
12 <style type="text/css" media="screen">
13   .number { font-weight: bold; }
14 </style>
15 </head>
16 <body>
17 <?php // Script 4.3 - handle_calc.php #4
18 /* This script takes values from
19 calculator.html and performs
20 total cost and monthly payment
21 calculations. */
22
23 // Address error handling, if you want.
24
25 // Get the values from the $_POST array:
26 $price = $_POST['price'];
27 $quantity = $_POST['quantity'];
28 $discount = $_POST['discount'];
29 $tax = $_POST['tax'];
30 $shipping = $_POST['shipping'];
31 $payments = $_POST['payments'];
32
33 // Calculate the total:
34 $total = (($price * $quantity) +
35           $shipping) - $discount;
36
37 // Determine the tax rate:
38 $taxrate = $tax/100;
39 $taxrate++;
40
41 // Factor in the tax rate:
42 $total = $total * $taxrate;
43
44 // Calculate the monthly payments:
45 $monthly = $total / $payments;
46
47 // Apply the proper formatting:
48 $total = number_format ($total, 2);
49 $monthly = number_format ($monthly, 2);
50
```

code continues on next page

#### Script 4.5 continued

```
43 // Print out the results:  
44 print "<p>You have selected to  
purchase:<br />  
45 <span class=\"number\">$quantity</span>  
widget(s) at <br />  
46 $<span class=\"number\">$price</span>  
price each plus a <br />  
47 $<span class=\"number\">$shipping</span>  
shipping cost and a <br />  
48 <span class=\"number\">$tax</span>  
percent tax rate.<br />  
49 After your $<span class=\"number\">  
$discount</span> discount, the total  
cost is  
50 $<span class=\"number\">$total</span>.<br />  
51 Divided over <span class=\"number\">  
$payments</span> monthly payments, that  
would be $<span class=\"number\">  
$monthly</span> each.</p>";  
52  
53 ?>  
54 </body>  
55 </html>
```

Fill out this form to calculate the total cost:

Price:

Quantity:

Discount:

Tax:  (%)

Shipping method:

Number of payments to make:

**A** The last execution of the form.

You have selected to purchase:  
100 widget(s) at  
\$5.00 price each plus a  
\$5.00 shipping cost and a  
7.5 percent tax rate.  
After your \$10.00 discount, the total cost is \$532.13.  
Divided over 10 monthly payments, that would be \$53.21 each.

**B** It won't affect your calculations if you use the long or short version of incrementing a variable (compare Scripts 4.4 and 4.5).

- Save the script, place it in the same directory as `calculator.html`, and test it in your browser **A** and **B**.

**TIP** Although functionally it doesn't matter whether you code `$taxrate = $taxrate + 1;` or the abbreviated `$taxrate++`, the latter method (using the increment operator) is more professional and common.

**TIP** In Chapter 6, "Control Structures," you'll see how the increment operator is commonly used in conjunction with loops.

## Arithmetic Assignment Operators

PHP also supports a combination of mathematical and assignment operators. These are `+=`, `-=`, `*=`, and `/=`. Each will assign a value to a variable by performing a calculation on it. For example, these next two lines both add 5 to a variable:

```
$num = $num + 5;  
$num += 5;
```

This means the `handle_calc.php` script could determine the tax rate using this:

```
$tax = $_POST['tax']; // Say, 5  
$tax /= 100; // Now $tax is .05  
$tax += 1; // 1.05
```

You'll frequently see these shorthand ways of performing arithmetic.

# Creating Random Numbers

The last function you'll learn about in this chapter is `rand()`, a random-number generator. All it does is output a random number:

```
$n = rand(); // 31  
$n = rand(); // 87
```

The `rand()` function can also take minimum and maximum parameters, if you prefer to limit the generated number to a specific range:

```
$n = rand(0, 10);
```

These values are inclusive, so in this case 0 and 10 are feasible returned values.

As an example of generating random numbers, let's create a simple "Lucky Numbers" script.

## To generate random numbers:

1. Begin a new document in your text editor or IDE, to be named `random.php` (Script 4.6):

```
<!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" xml:lang="en"  
→ lang="en">  
<head>  
    <meta http-equiv="Content-Type"  
    → content="text/html;  
    → charset=utf-8"/>  
    <title>Lucky Numbers</title>  
</head>  
<body>
```

2. Include the PHP tags and address error management, if you need to:

```
<?php // Script 4.6 - random.php
```

**Script 4.6** The `rand()` function generates a random number.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
2   1.0 Transitional//EN"  
3   "http://www.w3.org/TR/xhtml1/DTD/  
4   xhtml1-transitional.dtd">  
5   <html xmlns="http://www.w3.org/1999/  
6   xhtml" xml:lang="en" lang="en">  
7   <head>  
8     <meta http-equiv="Content-Type"  
9     content="text/html; charset=utf-8"/>  
10    <title>Lucky Numbers</title>  
11  </head>  
12  <body>  
13  <?php // Script 4.6 - random.php  
14  /* This script generates 3 random  
15  numbers. */  
16  // Address error handling, if you want.  
17  // Create three random numbers:  
18  $n1 = rand(1, 99);  
19  $n2 = rand(1, 99);  
20  $n3 = rand(1, 99);  
21  // Print out the numbers:  
22  print "<p>Your lucky numbers are:<br />  
23  $n1<br />  
24  $n2<br />  
25  $n3</p>";  
26  ?>  
27  </body>  
28  </html>
```

Your lucky numbers are:

32  
68  
71

- A** The three random numbers created by invoking the `rand()` function.

Your lucky numbers are:

23  
81  
2

- B** Running the script again produces different results.

## Other Mathematical Functions

PHP has a number of built-in functions for manipulating mathematical data. This chapter introduced `round()`, `number_format()`, and `rand()`.

PHP has broken `round()` into two other functions. The first, `ceil()`, rounds every number to the next highest integer. The second, `floor()`, rounds every number to the next lowest integer.

Another function the calculator page could make good use of is `abs()`, which returns the absolute value of a number.

In case you don't remember your absolute values, the function works like this:

```
$number = abs(-23); // 23
$number = abs(23); // 23
```

In layman's terms, the absolute value of a number is always a positive number.

Beyond these functions, PHP supports all the trigonometry, exponent, base conversion, and logarithm functions you'll ever need. See the PHP manual for more information.

- 3.** Create three random numbers:

```
$n1 = rand (1, 99);
$n2 = rand (1, 99);
$n3 = rand (1, 99);
```

This script prints out a person's lucky numbers, like those found on the back of a fortune cookie. These numbers are generated by calling the `rand()` function three separate times and assigning each result to a different variable.

- 4.** Print out the numbers:

```
print "<p>Your lucky numbers
are:<br />
$n1<br />
$n2<br />
$n3</p>";
```

The `print` statement is fairly simple. The numbers are printed, each on its own line, by using the HTML break tag.

- 5.** Close the PHP code and the HTML page:

```
?>
</body>
</html>
```

- 6.** Save the file as `random.php`, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **A**. Refresh the page to see different numbers **B**.

**TIP** The `getrandmax()` function returns the largest possible random number that can be created using `rand()`. This value differs by operating system.

**TIP** PHP has another function that generates random numbers: `mt_rand()`. It works similarly to (but, arguably, better than) `rand()` and is the smarter choice for sensitive situations like cryptography. Also see the PHP manual's page for the `mt_rand()` function for more discussion of generating random numbers as a whole.

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- What are the four primary arithmetic operators?
- Why will the following code not work?

```
print "The total is $$total";
```

What must be done instead?
- Why must an HTML page that contains a form that's being submitted to a PHP script be loaded through a URL?
- What functions can be used to format numerical values? How do you format numbers to a specific number of decimals?
- What is the importance of operator precedence?
- What are the incremental and decremental operators?
- What are the arithmetic assignment operators?

## Pursue

- Look up the PHP manual page for one of the new functions mentioned in this chapter. Use the links on that page to investigate a couple of other number-related functions PHP has.
- Create another HTML form for taking numeric values. Then create the PHP script that receives the form data, performs some calculations, formats the values, and prints the results.

# 5

# Using Strings

As introduced in Chapter 2, “Variables,” a second category of variables used by PHP is strings—a collection of characters enclosed within either single or double quotation marks. A string variable may consist of a single letter, a word, a sentence, a paragraph, HTML code, or even a jumble of nonsensical letters, numbers, and symbols (which might represent a password). Strings may be the most common variable type used in PHP.

This chapter covers PHP’s most basic built-in functions and operators for manipulating string data, regardless of whether the string originates from a form or is first declared within the script. Some common techniques will be introduced—joining strings together, trimming strings, and encoding strings. Other uses for strings are illustrated in subsequent chapters.

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## In This Chapter

Creating the HTML Form	92
Concatenating Strings	95
Handling Newlines	98
HTML and PHP	100
Encoding and Decoding Strings	103
Finding Substrings	107
Replacing Parts of a String	111
Review and Pursue	114

---

# Creating the HTML Form

As in Chapter 3, let's begin by creating an HTML form that sends different values—in the form of string variables—to a PHP script. The theoretical example being used is an online bulletin board or forum where users can post a message, their email address, and their first and last names **A**.

## To create the HTML form:

1. Begin a new HTML document in your text editor or IDE, to be named **posting.html** (Script 5.1):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="Content-Type"
    → content="text/html;
    → charset=utf-8"/>
  <title>Forum Posting</title>
</head>
<body>
  <!-- Script 5.1 - posting.html -->
  <div><p>Please complete this form
    → to submit your posting:</p>
```

2. Create the initial **form** tag:

```
<form action="handle_post.php"
→ method="post">
```

This form will send its data to the **handle\_post.php** script and will use the POST method.

Please complete this form to submit your posting:

First Name:

Last Name:

Email Address:

**A** This HTML form is the basis for most of the examples in this chapter.

**Script 5.1** This form sends string data to a PHP script.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
XHTML 1.0 Transitional//EN"
2   "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="Content-Type"
content="text/html; charset=utf-8"/>
6    <title>Forum Posting</title>
7  </head>
8  <body>
9  <!-- Script 5.1 - posting.html -->
10 <div><p>Please complete this form to
submit your posting:</p>
11
12 <form action="handle_post.php"
method="post">
13
14   <p>First Name: <input type="text"
name="first_name" size="20" /></p>
15
16   <p>Last Name: <input type="text"
name="last_name" size="20" /></p>
17
18   <p>Email Address: <input type="text"
name="email" size="30" /></p>
19
20   <p>Posting: <textarea name="posting"
rows="9" cols="30"></textarea></p>
21
22   <input type="submit" name="submit"
value="Send My Posting" />
23
24 </form>
25 </div>
26 </body>
27 </html>
```

3. Add inputs for the first name, last name, and email address:

```
<p>First Name: <input type="text"
name="first_name" size="20" /></p>
<p>Last Name: <input type="text"
name="last_name" size="20" /></p>
<p>Email Address: <input type=
"text" name="email"
size="30" /></p>
```

These are all basic text input types, which were covered in Chapter 3. Remember that the various inputs' name values should adhere to the rules of PHP variable names (no spaces; must not begin with a number; must consist only of letters, numbers, and the underscore).

4. Add an input for the posting:

```
<p>Posting: <textarea
name="posting" rows="9"
cols="30"></textarea></p>
```

The posting field is a **textarea**, which is a larger type of text input box.

5. Create a submit button and close the form:

```
<input type="submit" name="submit"
value="Send My Posting" />
</form>
```

Every form must have a submit button (or a submit image).

6. Complete the HTML page:

```
</div>
</body>
</html>
```

*continues on next page*

7. Save the file as `posting.html`, place it in the appropriate directory on your PHP-enabled server, and view it in your Web browser A.

This is an HTML page, so it doesn't have to be on a PHP-enabled server in order for you to view it. But because it will eventually send data to a PHP script, it's best to go ahead and place the file on your server.

**TIP** Technically speaking, all form data, aside from uploaded files, is sent to the handling script as strings. This includes numeric data entered into text boxes, options selected from drop-down menus, checkbox or radio button values, and so forth. Even the form in Chapter 4, "Using Numbers," sent strings with numeric values to the handling script.

**TIP** Many forum systems written in PHP are freely available for your use. This book doesn't discuss how to fully develop one, but a multilingual forum is developed in my *PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide* (Peachpit Press, 2007).

**TIP** This book's Web site has a forum where readers can post questions and other readers (and the author) answer questions. You can find it at [www.LarryUllman.com/forum/list.php?30](http://www.LarryUllman.com/forum/list.php?30).

# Concatenating Strings

*Concatenation* is an unwieldy term but a useful concept. It refers to the appending of one item onto another. Specifically, in programming, you concatenate *strings*. The period (.) is the operator for performing this action, and it's used like so:

```
$s1 = 'Hello, ';  
$s2 = 'world!';  
$greeting = $s1 . $s2;
```

The end result of this concatenation is that the **\$greeting** variable has a value of *Hello, world!*.

Because of the way PHP deals with variables, the same effect could be accomplished using

```
$greeting = "$s1$s2";
```

This code works because PHP replaces variables within double quotation marks with their value. However, the formal method of using the period to concatenate strings is more commonly used and is recommended (it will be more obvious what's occurring in your code).

Another way of performing concatenation involves the concatenation assignment operator:

```
$greeting = 'Hello, ';  
$greeting .= 'world!';
```

This second line roughly means “assign to **\$greeting** its current value plus the concatenation of *world!*” The end result is **\$greeting** having the value *Hello, world!* once again.

The **posting.html** script sends several string variables to the **handle\_post.php** page. Of those variables, the first and last names could logically be concatenated. It's quite common, and even recommended, to take a user's first and last names as separate inputs, as this form does. On the other hand, it would be advantageous to be able to refer to the two together as one name. You'll write the PHP script with this in mind.

## To use concatenation:

1. Begin a new document in your text editor or IDE, to be named `handle_post.php` (Script 5.2):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="Content-Type"
    → content="text/html;
  charset=utf-8"/>
  <title>Forum Posting</title>
</head>
<body>
```

2. Create the initial PHP tag, and address error management, if necessary:

```
<?php // Script 5.2 -
→ handle_post.php
```

If you don't have `display_errors` enabled, or if `error_reporting` is set to the wrong level, see Chapter 3 for the lines to include here to alter those settings.

3. Assign the form data to local variables:

```
$first_name = $_POST['first_name'];
$last_name = $_POST['last_name'];
$posting = $_POST['posting'];
```

The form uses the POST method, so all the form data will be available in `$_POST`.

This example doesn't have a line for the email address because you won't be using it yet, but you can replicate this code to reference that value as well.

4. Create a new `$name` variable using concatenation:

```
$name = $first_name . ' ' .
→ $last_name;
```

**Script 5.2** This PHP script demonstrates *concatenation*, one of the most common manipulations of a string variable. Think of it as addition for strings.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="Content-Type"
        content="text/html; charset=utf-8"/>
6      <title>Forum Posting</title>
7  </head>
8  <body>
9  <?php // Script 5.2 - handle_post.php
10 /* This script receives five values
from posting.html:
11 first_name, last_name, email, posting,
submit */
12 // Address error management, if you
want.
13 // Get the values from the $_POST
array:
14 $first_name = $_POST['first_name'];
15 $last_name = $_POST['last_name'];
16 $posting = $_POST['posting'];
17
18 // Create a full name variable:
21 $name = $first_name . ' ' .
→ $last_name;
22
23 // Print a message:
24 print "<div>Thank you, $name, for
your posting:
25 <p>$posting</p></div>";
26
27 ?>
28 </body>
29 </html>
```

Please complete this form to submit your posting:

First Name:

Last Name:

Email Address:

Posting

A The HTML form in use...

Thank you, Jeremy Messersmith, for your posting.  
This is my posting. It could be more original.

B ...and the resulting PHP page.

**TIP** You can link as many strings as you want using concatenation. You can even join numbers to strings:

```
$new_string = $s1 . $s2 . $number;
```

This works because PHP is *weakly typed*, meaning that its variables aren't locked in to one particular format. Here, the \$number variable will be turned into a string and appended to the value of the \$new\_string variable.

**TIP** Concatenation can be used in many ways, even when you're feeding arguments to a function. An uncommon but functional example would be

```
$text = nl2br($heading . $body);
```

The nl2br() function, first mentioned in Chapter 1, "Getting Started with PHP," will be discussed in detail next.

This act of concatenation takes two variables plus a space and joins them all together to create a new variable, called \$name. Assuming you entered Elliott and Smith as the names, then \$name would be equal to Elliott Smith.

- Print out the message to the user:

```
print "<div>Thank you, $name, for  
→ your posting:  
<p>$posting</p></div>";
```

This message reports back to the user what was entered in the form.

- Close the PHP section and complete the HTML page:

```
?>  
</body>  
</html>
```

- Save your script as `handle_post.php`, place it in the same directory as `posting.html` (on your PHP-enabled server), and test both the form and the script in your Web browser A and B.

As a reminder, you must load the form through a URL (`http://something`) so that, when the form is submitted, the handling PHP script is also run through a URL.

**TIP** If you used quotation marks of any kind in your form and saw extraneous slashes in the printed result, see the sidebar "Magic Quotes" in Chapter 3 for an explanation of the cause and for the fix.

**TIP** As a reminder, it's important to understand the difference between single and double quotation marks in PHP. Characters within single quotation marks are treated literally; characters within double quotation marks are interpreted (for example, a variable's name will be replaced by its value). See Chapter 3 for a refresher.

# Handling Newlines

A common question beginning PHP developers have involves handling newlines in strings. The `textarea` form element allows a user to enter text over multiple lines by pressing Return/Enter. Each use of Return/Enter equates to a newline in the resulting string. These newlines work within a `textarea` but have no effect on a rendered PHP page **A** and **B**.

To create the equivalent of newlines in a rendered Web page, you use the break tag: `<br />`. Fortunately, PHP has the `nl2br()` function, which automatically converts newlines into break tags:

```
$var = nl2br($var);
```

Let's apply this function to `handle_post.php` so that the user's posting retains its formatting.

## To convert newlines to breaks:

1. Open `handle_post.php` (Script 5.2) in your text editor or IDE, if it is not already open.
2. Apply the `nl2br()` function when assigning a value to the `$posting` variable (Script 5.3):

```
$posting = nl2br($_POST['posting']);
```

Now `$posting` will be assigned the value of `$_POST['posting']`, with any newlines converted to HTML break tags.

Please complete this form to submit your posting:

First Name:

Last Name:

Email Address:

Here's one line.

Here's another line.

Here's a third line.

Posting:

**A** Newlines in form data like text areas...

Thank you, Rocky Votolato, for your posting

Here's one line. Here's another line. Here's a third line.

**B** ...are not rendered by the Web browser.

Thank you, Rocky Votolato, for your posting

Here's one line.

Here's another line.

Here's a third line.

**C** Now the same submitted data **A** is properly displayed over multiple lines in the Web browser.

```
<div>Thank you, Rocky Votolato, for your posting:<br><p>Here's one line.
```

```
Here's another line.
```

```
Here's a third line.</p></div></body></html>
```

**D** The HTML source, corresponding to **B**, shows the effect that newlines have in the Web browser (i.e., they add spacing within the HTML source code).

**Script 5.3** When you use the `nl2br()` function, newlines entered into the posting `textarea` are honored when displayed in the Web browser.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
   XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/
       xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
       xhtml" xml:lang="en" lang="en">
4      <head>
5          <meta http-equiv="Content-Type"
               content="text/html; charset=utf-8"/>
6          <title>Forum Posting</title>
7      </head>
8      <body>
9      <?php // Script 5.3 - handle_post.php #2
10     /* This script receives five values
           from posting.html:
11     first_name, last_name, email, posting,
           submit */
12
13     // Address error management, if you
           want.
14
15     // Get the values from the $_POST
           array:
16     $first_name = $_POST['first_name'];
17     $last_name = $_POST['last_name'];
18     $posting = nl2br($_POST['posting']);
19
20     // Create a full name variable:
21     $name = $first_name . ' ' . $last_name;
22
23     // Print a message:
24     print "<div>Thank you, $name, for your
           posting:
25     <p>$posting</p></div>";
26
27     ?>
28     </body>
29     </html>
```

3. Save the file, place it in the same directory as `posting.html` (on your PHP-enabled server), and test again in your Web browser **C**.

**TIP** Newlines can also be inserted into strings by placing the newline character—`\n`—between double quotation marks.

**TIP** Other HTML tags, like paragraph tags, also affect spacing in the rendered Web page. You can turn newlines (or any character) into paragraph tags using a replace function, but the code for doing so is far more involved than just invoking `nl2br()`.

**TIP** Newlines present in strings sent to the browser will have an effect, but only in the HTML source of the page **D**.

# HTML and PHP

As stated several times over by now, PHP is a server-side technology that's frequently used to send data to the Web browser. This data can be in the form of plain text, HTML code, or, more commonly, both.

In this chapter's primary example, data is entered in an HTML form and then printed back to the Web browser using PHP. A potential problem is that the user can enter HTML characters in the form, which can affect the resulting page's formatting **A** and **B**—or, worse, cause security problems.

You can use a couple of PHP functions to manipulate HTML tags within PHP string variables:

- `htmlspecialchars()` converts certain HTML tags into their entity versions.
- `htmlentities()` turns all HTML tags into their entity versions.
- `strip_tags()` removes all HTML and PHP tags.

The first two functions turn an HTML tag (for example, `<span>`) into an entity version like `&lt;span&gt;`. The entity version appears in the output but isn't rendered. You might use either of these if you wanted to display code without enacting it. The third function, `strip_tags()`, removes HTML and PHP tags entirely.

You ought to watch for special tags in user-provided data for two reasons. First, as already mentioned, submitted HTML would likely affect the rendered page (e.g., mess up a table, tweak the CSS, or just add formatting where there shouldn't be any). The second concern is more important. Because JavaScript is placed within HTML `script` tags, a malicious user could submit JavaScript that would be executed when it's redisplayed on the page **C**. This is how *cross-site scripting* (XSS) attacks are performed.

Please complete this form to submit your posting:

First Name:

Last Name:

Email Address:

Let's make an ordered list:

```
<ul>
<li>Something</li>
<li>Something Else</li>
<li>Something New</li>
</ul>
```

Posting:

- A** If the user enters HTML code in the posting...

Thank you, Damien Rice, for your posting:

Let's make an ordered list:

- Something
- Something Else
- Something New

- B** ...it's rendered by the Web browser when reprinted.

The page at <http://10.0.1.2:8888> says:



You just executed my JavaScript code!

- C** Displaying HTML submitted by a user in the Web browser can have terrible consequences, such as the execution of JavaScript.

**Script 5.4** This version of the PHP script addresses HTML tags in two different ways.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
2   XHTML 1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4  /xhtml1-transitional.dtd">
5   <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7   <head>
8     <meta http-equiv="Content-Type"
9       content="text/html; charset=utf-8"/>
10    <title>Forum Posting</title>
11  </head>
12  <body>
13  <?php // Script 5.4 - handle_post.php #3
14  /* This script receives five values
15  from posting.html:
16  first_name, last_name, email, posting,
17  submit */
18
19  // Address error management, if you
20  want.
21
22  // Get the values from the $_POST
23  array:
24  $first_name = $_POST['first_name'];
25  $last_name = $_POST['last_name'];
26  $posting = nl2br($_POST['posting']);
27
28  // Create a full name variable:
29  $name = $first_name . ' ' . $last_name;
30
31  // Adjust for HTML tags:
32  $html_post = htmlentities($_POST
33  ['posting']);
34  $strip_post = strip_tags($_POST
35  ['posting']);

36
37  // Print a message:
38  print "<div>Thank you, $name, for
39  your posting:
40  <p>Original: $posting</p>
41  <p>Entity: $html_post</p>
42  <p>Stripped: $strip_post</p></div>";
43
44  ?>
45  </body>
46  </html>
```

To see the impact these functions have, this next rewrite of **handle\_post.php** will use them each and display the respective results.

## To address HTML in PHP:

1. Open **handle\_post.php** (Script 5.3) in your text editor or IDE, if it is not already open.
2. Before the **print** line, add (**Script 5.4**):

```
$html_post = htmlentities
→($_POST['posting']);
$strip_post = strip_tags
→($_POST['posting']);
```

To clarify the difference between how these two functions work, apply them both to the posting text, creating two new variables in the process. Refer to **\$\_POST['posting']** here and not **\$posting** because **\$posting** already reflects the application of the **nl2br()** function, which means that break tags may have been introduced that were not explicitly entered by the user.

3. Alter the **print** statement to read as follows:

```
print "<div>Thank you, $name, for
→ your posting:
<p>Original: $posting</p>
<p>Entity: $html_post</p>
<p>Stripped: $strip_post</p></div>";
```

To highlight the different results, print out the three different versions of the posting text. First is the original posting as it was entered, after being run through **nl2br()**. Next is the **htmlentities()** version of the posting, which will show the HTML tags without rendering them. Finally, the **strip\_tags()** version will be printed; it doesn't include any HTML (or PHP) tags.

*continues on next page*

4. Save the file, place it in the same directory as `posting.html` (on your PHP-enabled server), and test it again in your Web browser **D** and **E**.

If you view the HTML source code of the resulting PHP page **F**, you'll also see the effect that applying these functions has.

**TIP** For security purposes, it's almost always a good idea to use `htmlentities()`, `htmlspecialchars()`, or `strip_tags()` to any user-provided data that's being printed to the Web browser. I don't do so through the course of this book only to minimize clutter.

**TIP** The `html_entity_decode()` function does just the opposite of `htmlentities()`, turning HTML entities into their respective HTML code.

**TIP** Another useful function for outputting strings in the Web browser is `wordwrap()`. This function wraps a string to a certain number of characters.

**TIP** To turn newlines into breaks while still removing any HTML or PHP tags, apply `nl2br()` after `strip_tags()`:

```
$posting =  
nl2br(strip_tags($_POST['posting']));
```

In that line, the `strip_tags()` function will be called first, and its result will be sent to the `nl2br()` function.

Please complete this form to submit your posting

First Name:

Last Name:

Email Address:

I don't understand why it says  
<em>something</em>.

Posting:

- D** The HTML characters entered as part of a posting will now be addressed by PHP.

Thank you, Laura Burhenn, for your posting.

Original: I don't understand why it says *something*.

Entity: I don't understand why it says <em>something</em>.

Stripped: I don't understand why it says something.

- E** The resulting PHP page shows the original post as it would look if printed without modification, the effect of `htmlentities()`, and the effect of `strip_tags()`.

```
<p>Original: I don't understand why it says <em>something</em>. </p>  
<p>Entity: I don't understand why it says &lt;em&gt;something&lt;/em&gt;. </p>  
<p>Stripped: I don't understand why it says something.</p></div></body>
```

- F** The HTML source for the content displayed in **E**.

**Script 5.5** This script encodes two variables before adding them to a link. Then the values can be successfully passed to another page.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
2   XHTML 1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8    <meta http-equiv="Content-Type"
9     content="text/html; charset=utf-8"/>
10 <title>Forum Posting</title>
11 </head>
12 <body>
13 <?php // Script 5.5 - handle_post.php #4
14 /* This script receives five values
15 from posting.html:
16 first_name, last_name, email, posting,
17 submit */
18
19 // Address error management, if you
20 want.
21
22 // Get the values from the $_POST
23 array:
24 $first_name = $_POST['first_name'];
25 $last_name = $_POST['last_name'];
26 $posting = nl2br($_POST['posting']);
27
28 // Create a full name variable:
29 $name = $first_name . ' ' . $last_name;
30
31 // Print a message:
32 print "<div>Thank you, $name, for your
33 posting:
34 <p>$posting</p></div>";
35
36 // Make a link to another page:
37 $name = urlencode($name);
38 $email = urlencode($_POST['email']);
39 print "<p>Click <a href=\" thanks.php?
40 name=$name&email=$email \">here
41 </a> to continue.</p>";
42
43 ?>
44 </body>
45 </html>
```

## Encoding and Decoding Strings

At the end of Chapter 3, the section “Manually Sending Data to a Page” demonstrated how to use the thinking behind the GET form method to send data to a page. In that example, instead of using an actual form, data was appended to the URL, making it available to the receiving script. I was careful to say that only single words could be passed this way, without spaces or punctuation. But what if you want to pass several words as one variable value or use special characters?

To safely pass any value to a PHP script through the URL, apply the `urlencode()` function. As its name implies, this function takes a string and encodes it (changes its format) so that it can properly be passed as part of a URL. Among other things, the function replaces spaces with plus signs (+) and translates special characters (for example, the apostrophe) into less problematic versions. To use this function, you might code

```
$string = urlencode($string);
```

To demonstrate one application of `urlencode()`, let’s update the `handle_post.php` page so that it also creates a link that passes the user’s name and email address to a third page.

### To use `urlencode()`:

1. Open `handle_post.php` (Script 5.4) in your text editor or IDE, if it is not already open.
2. Delete the `htmlentities()` and `strip_tags()` lines added in the previous set of steps (Script 5.5).

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3. Revert to the older version of the `print` invocation:

```
print "<div>Thank you, $name, for  
→ your posting:  
<p>$posting</p></div>";
```

4. After the `print` statement, add the following:

```
$name = urlencode($name);  
$email = urlencode($_POST['email']);
```

This script will pass these two variables to a second page. In order for it to do so, they must both be encoded.

Because the script has not previously referred to or used the `$email` variable, the second line both retrieves the email value from the `$_POST` array and encodes it in one step. This is the same as having these two separate lines:

```
$email = $_POST['email'];  
$email = urlencode($email);
```

5. Add another `print` statement that creates the link:

```
print "<p>Click <a href=\"thanks.  
→ php?name=$name&email=$email\">  
→ here</a> to continue.</p>";
```

The primary purpose of this `print` statement is to create an HTML link in the Web page, the source code of which would be something like

```
<a href="thanks.php?name=Larry+  
→ Ullman&email=larry%40example.  
→ com">here</a>
```

To accomplish this, begin by hard-coding most of the HTML and then include the appropriate variable names. Because the HTML code requires that the URL for the link be in double quotation marks—and the `print` statement already uses double quotation marks—you must escape them (by preceding them with backslashes) in order for them to be printed.

Please complete this form to submit your posting:

First Name:

Last Name:

Email Address:

Posting:

**A** Another use of the form.

Thank you, Christopher O'Reilly, for your posting:  
Nothing like a piano cover of Radiohead or Elliott Smith!  
Click [here](#) to continue.

**B** The handling script now displays a link to another page.

*continues on next page*

```
<p>Click <a href="thanks.php?name=Christopher+O%27Reilly&email=chris.oreilly%40example.com">here</a>
```

**C** The HTML source code of the page **B** shows the dynamically generated link.

6. Save the file, place it in the proper directory of your PHP-enabled server, and test it again in your Web browser **A** and **B**.

Note that clicking the link will result in a server error, as the **thanks.php** script hasn't yet been written.

7. View the HTML source code of the handling page to see the resulting link in the HTML code **C**.

**TIP** Values sent directly from a form are automatically URL-encoded prior to being sent and decoded upon arrival at the receiving script. You only need the `urlencode()` function to manually encode data (as in the example).

**TIP** The `urldecode()` function does just the opposite of `urlencode()`—it takes an encoded URL and turns it back into a standard form. You'll use it less frequently, though, as PHP will automatically decode most values it receives.

**TIP** Since you can use concatenation with functions, the new print statement could be written as follows:

```
print 'Click <a href="thanks.php?'
→ name=' . $name . '&email=' .
→ $email . '">here</a> to continue.';
```

This method has two added benefits over the original approach. First, it uses single quotation marks to start and stop the statement, meaning you don't need to escape the double quotation marks. Second, the variables used are more obvious—they aren't buried in a lot of other code.

**TIP** You do not need to encode numeric PHP values in order to use them in a URL, as they do not contain problematic characters. That being said, it won't hurt to encode them either.

**TIP** At the end of the chapter you'll be prompted to create thanks.php, which greets the user by name and email address **D**.

Thank you, Christopher O'Reilly.  
We will contact you at chris.oreilly@example.com.

**D** The third page in this process—to be created by you at the end of the chapter—prints a message based on values it receives in the URL.

## Encrypting and Decrypting Strings

Frequently, in order to protect data, programmers *encrypt* it—alter its state by transforming it to a form that's more difficult, if not impossible, to discern. Passwords are an example of a value you might want to encrypt. Depending on the level of security you want to establish, usernames, email addresses, and phone numbers are likely candidates for encryption, too.

You can use the `crypt()` function to encrypt data, but be aware that no decryption option is available (it's known as *one-way encryption*). So, a password may be encrypted using it and then stored, but the decrypted value of the password can never be determined. Using this function in a Web application, you might encrypt a user's password upon registration; then, when the user logged in, the password they entered at that time would also be encrypted, and the two protected versions of the password would be compared. The syntax for using `crypt()` is

```
$data = crypt($data);
```

A second encryption function is `mcrypt_encrypt()`, which can be decrypted using the appropriately named `mcrypt_decrypt()` function. Unfortunately, in order for you to be able to use these two functions, the Mcrypt extension must be installed with the PHP module. Its usage and syntax is also more complex (I discuss it in my *PHP 5 Advanced: Visual QuickPro Guide* [Peachpit Press, 2007]).

If the data is being stored in a database, you can also use functions built into the database application (for example, MySQL, PostgreSQL, Oracle, or SQL Server) to perform encryption and decryption. Depending on the technology you're using, it most likely provides both one- and two-way encryption tools.

## Comparing Strings

To compare two strings, you can always use the equality operator, which you'll learn about in the next chapter. Otherwise, you can use these functions:

- **strcmp()** indicates how two strings compare by returning a whole number.
- **strnatcmp()** is similar but linguistically more precise.

These also have case-insensitive companions, **strcasecmp()** and **strnatcasecmp()**.

To see if a substring is contained within another string (i.e., to find a needle in a haystack), you'll use these functions:

- **strstr()** returns the haystack from the first occurrence of a needle to the end.
- **strpos()** searches through a haystack and returns the numeric location of a particular needle.

Both of these functions also have a case-insensitive alternative: **stristr()** and **stripos()**, respectively. Each of these functions is normally used in a conditional to test whether the substring was found.

## Finding Substrings

PHP has a few functions you can use to pull apart strings, search through them, and perform comparisons. Although these functions are normally used with conditionals, discussed in Chapter 6, "Control Structures," they are important enough that they'll be introduced here; later chapters will use them more formally.

Earlier in this chapter you learned how to join strings using concatenation. Along with making larger strings out of smaller pieces, PHP easily lets you extract subsections from a string. The trick to using any method to pull out a subsection of a string is that you must know something about the string itself in order to know how to break it up.

The **strtok()** function creates a substring, referred to as a **token**, from a larger string by using a predetermined separator (such as a comma or a space). For example, if you have users enter their full name in one field (presumably with their first and last names separated by a space), you can pull out their first name with this code:

```
$first = strtok($_POST['name'], ' ');
```

That line tells PHP to extract everything from the beginning of `$_POST['name']` until it finds a blank space.

If you have users enter their full name in the format *Surname, First*, you can find their surname by writing

```
$last = strtok($_POST['name'], ', ');
```

A second way to pull out sections of a string is by referring to the *indexed position* of the characters within the string. The indexed position of a string is the numerical location of a character, counting from the beginning. However, PHP—like most programming languages—begins all indexes with the number 0. For example, to index the string *Larry*, you begin with the L at position 0, followed by a at 1, r at 2, the second r at 3, and y at 4. Even though the string length of *Larry* is 5, its index goes from 0 to 4 (i.e., indexes always go from 0 to the string's length minus 1).

With this in mind, you can call on the `substr()` function to create a substring based on the index position of the substring's characters:

```
$sub = substr($string, 0, 10);
```

The first argument is the master string from which the substring will be derived. Second, indicate where the substring begins, as its indexed position (0 means that you want to start with the first character). Third, from that starting point, state how many characters the substring should contain (10). If the master string does not have that many characters in it, the resulting substring will end with the end of the master string. This argument is optional; if omitted, the substring will also go until the end of the master string.

You can also use negative numbers to count backward from the end of the string:

```
$string = 'ardvark';
$sub = substr($string, -3, 3); // ark
```

The second line says that three characters should be returned starting at the third character from the end. With that particular example, you can again omit the third argument and have the same result:

```
$sub = substr($string, -3); // ark
```

**Script 5.6** This version of `handle_post.php` counts the number of words in the posting and trims the displayed posting down to just the first 50 characters.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
2   XHTML 1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8   <meta http-equiv="Content-Type"
9    content="text/html; charset=utf-8"/>
10 <title>Forum Posting</title>
11 </head>
12 <body>
13 <?php // Script 5.6 - handle_post.php #5
14 /* This script receives five values
15  from posting.html:
16  first_name, last_name, email, posting,
17  submit */
18
19 // Address error management, if you
20 want.
21
22 // Get the values from the $_POST
23 array:
24 $first_name = $_POST['first_name'];
25 $last_name = $_POST['last_name'];
26 $posting = nl2br($_POST['posting']);
27
28 // Create a full name variable:
29 $name = $first_name . ' ' . $last_name;
30
31 // Get a word count:
32 $words = str_word_count($posting);
33
34 // Get a snippet of the posting:
35 $posting = substr($posting, 0, 50);
36
37 // Print a message:
38 print "<div>Thank you, $name, for
39 your posting:
40 <p>$posting...</p>
41 <p>($words words)</p></div>";
42
43 ?>
44 </body>
45 </html>
```

To see how many characters are in a string, use `strlen()`:

```
print strlen('Hello, world!'); // 13
```

The count will include spaces and punctuation.

To see how many words are in a string, use `str_word_count()`. This function, along with `substr()`, will be used in this next revision of the `handle_post.php` script.

## To create substrings:

1. Open `handle_post.php` (Script 5.5) in your text editor or IDE, if it is not already open.

2. Before the `print` statement, add the following (Script 5.6):

```
$words = str_word_count($posting);
```

This version of the script will do two new things with the user's posting.

One will be to display the number of words it contains. That information is gathered here and assigned to the `$words` variable.

3. On the next line (also before the `print` statement), add

```
$posting = substr($posting, 0, 50);
```

The second new thing this script will do is limit the displayed posting to its first 50 characters. You might use this, for example, if one page shows the beginning of a post, then a link takes the user to the full posting. To implement this limit, the `substr()` function is called.

continues on next page

4. Update the `print` statement to read

```
print "<div>Thank you, $name, for  
→ your posting:  
<p>$posting...</p>  
<p>($words words)</p></div>";
```

There are two changes here. First, ellipses are added after the posting to indicate that this is just part of the whole posting. Then, within another paragraph, the number of words is printed.

5. Delete the two `urlencode()` lines and the corresponding `print` line.

I'm referring specifically to the code added in the previous incarnation of the script, linking to `thanks.php`.

6. Save the file, place it in the proper directory of your PHP-enabled server, and test it again in your Web browser

**A** and **B**.

**TIP** If you want to check whether a string matches a certain format—for example, to see if it's a valid email address—you need to use *regular expressions*. Regular expressions are an advanced concept in which you define patterns and then see if a value fits the mold. See the PHP manual or my book *PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide* (Peachpit Press, 2007).

Please complete this form to submit your posting:

First Name:

Last Name:

Email Address:

This is a longer post. This is a longer post.

Posting:

- A** Postings longer than 50 characters...

Thank you, Regina Spektor, for your posting.

This is a longer post. This is a longer post. This...

(60 words)

- B** ...will be cut short. The word count is also displayed.

## Adjusting String Case

A handful of PHP functions are used to change the case of a string's letters:

- **`ucfirst()`** capitalizes the first letter of the string.
- **`ucwords()`** capitalizes the first letter of words in a string.
- **`strtoupper()`** makes an entire string uppercase.
- **`strtolower()`** makes an entire string lowercase.

Due to the variance in people's names around the globe, there's no flawless way to automatically format names with PHP (or any programming language). In fact, I would be hesitant to alter the case of user-supplied data unless you have good cause to do so.

## Replacing Parts of a String

Instead of just finding substrings within a string, as the previous section discusses, you might find that you need to replace substrings with new values. You can do so using the **`str_ireplace()`** function:

```
$string = str_ireplace($needle,  
→ $replacement, $haystack);
```

This function replaces every occurrence of **\$needle** found in **\$haystack** with **\$replacement**. For example:

```
$me = 'Larry E. Ullman';  
$me = str_ireplace('E.', 'Edward',  
→ $me);
```

The **\$me** variable now has a value of *Larry Edward Ullman*.

That function performs a *case-insensitive* search. To be more restrictive, you can perform a *case-sensitive* search using **`str_replace()`**. In this next script, **`str_ireplace()`** will be used to eliminate "bad words" in submitted text.

There's one last string-related function I want to discuss: **`trim()`**. This function removes any white space—spaces, newlines, and tabs—from the beginning and end of a string. It's quite common for extra spaces to be added to a string variable, either because a user enters information carelessly or due to sloppy HTML code. For purposes of clarity, data integrity, and Web design, it's worth your while to delete those spaces from the strings before you use them. Extra spaces sent to the Web browser could make the page appear oddly, and those sent to a database or cookie could have unfortunate consequences at a later date (for example, if a password has a superfluous space, it might not match when it's entered without the space).

The `trim()` function automatically strips away any extra spaces from both the beginning and the end of a string (but not the middle). The format for using `trim()` is as follows:

```
$string = ' extra space before and
→ after text ';
$string = trim($string);
// $string is now equal to 'extra
→ space before and after text'.
```

### To use `str_ireplace()` and `trim()`:

1. Open `handle_post.php` (Script 5.6) in your text editor or IDE, if it is not already open.
2. Apply `trim()` to the form data (Script 5.7):

```
$first_name =
→ trim($_POST['first_name']);
$last_name =
→ trim($_POST['last_name']);
$posting = trim($_POST['posting']);

Just in case the incoming data has
extraneous white space at its beginning
or end, the trim() function is applied.
```

3. Remove the use of `substr()`:

```
$posting = substr($posting, 0, 50);
```

You'll want to see the entire posting for this example, so remove this invocation of `substr()`.

4. Before the `print` statement, add

```
$posting = str_ireplace('badword',
→ 'XXXXX', $posting);
```

This specific example flags the use of a bad word in a posting by crossing it out. Rather than an actual curse word, the code uses `badword`. (You can use whatever you want, of course.)

**Script 5.7** This final version of the handling script applies the `trim()` function and then replaces uses of `badword` with a bunch of Xs.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
4      <head>
5          <meta http-equiv="Content-Type"
content="text/html; charset=utf-8"/>
6          <title>Forum Posting</title>
7      </head>
8      <body>
9      <?php // Script 5.7 - handle_post.php #6
10     /* This script receives five values
from posting.html:
11     first_name, last_name, email, posting,
submit */
12
13     // Address error management, if you
want.
14
15     // Get the values from the $_POST
array.
16     // Strip away extra spaces using
trim():
17     $first_name = trim($_POST
['first_name']);
18     $last_name = trim($_POST
['last_name']);
19     $posting = trim($_POST['posting']);
20
21     // Create a full name variable:
22     $name = $first_name . ' ' . $last_name;
23
24     // Get a word count:
25     $words = str_word_count($posting);
26
27     // Take out the bad words:
28     $posting = str_ireplace('badword',
'XXXXX', $posting);
29
30     // Print a message:
31     print "<div>Thank you, $name, for your
posting:
32     <p>$posting</p>
33     <p>($words words)</p></div>";
34
35     ?>
36     </body>
37     </html>
```

Please complete this form to submit your posting:

First Name:

Last Name:

Email Address:

Posting:

**A** If a user enters a word you'd prefer they not use...

Thank you, Bad Poster, for your posting:  
I feel like using a XXXXX in my post!  
(9 words)

**B** ...you can have PHP replace it.

If you'd like to catch many bad words, you can use multiple lines, like so:

```
$posting = str_ireplace
→ ('badword1', 'XXXXX', $posting);
$posting = str_ireplace
→ ('badword2', 'XXXXX', $posting);
$posting = str_ireplace
→ ('badword3', 'XXXXX', $posting);
```

5. Update the `print` statement so that it no longer uses the ellipses:

```
print "<div>Thank you, $name, for
→ your posting:
<p>$posting</p>
<p>($words words)</p></div>";
```

6. Save the file, place it in the proper directory of your PHP-enabled server, and test again in your Web browser **A** and **B**.

**TIP** The `str_ireplace()` function will even catch bad words in context. For example, if you entered *I feel like using badwords*, the result would be *I feel like using XXXXs*,

**TIP** The `str_ireplace()` function can also take an array of needle terms, an array of replacement terms, and even an array as the haystack. Because you may not know what an array is yet, this technique isn't demonstrated here.

**TIP** If you need to trim excess spaces from the beginning or the end of a string but not both, PHP breaks the `trim()` function into two more specific functions: `rtrim()` removes spaces found at the end of a string variable (on its right side), and `ltrim()` handles those at the beginning (its left). They're both used just like `trim()`:

```
$string = rtrim($string);
$string = ltrim($string);
```

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- How do you create a string?
- What are the differences between using *single* and *double* quotation marks?
- What is the *concatenation* operator? What is the *concatenation assignment* operator?
- What is the impact of having a newline in a string printed to the browser? How do you convert a newline character to a break tag?
- What problems can occur when HTML is entered into form elements whose values will later be printed back to the Web browser? What steps can be taken to sanctify submitted form data?
- What function makes data safe to pass in a URL?
- How do you escape problematic characters within a string? What happens if you do not escape them?
- The characters in a string are indexed beginning at what number?
- What does the `trim()` function do?

## Pursue

- Look up the PHP manual page for one of the new functions mentioned in this chapter. Use the links on that page to examine a couple of other string-related functions PHP has.
- Check out the PHP manual page specifically for the `substr()` function. Read the other examples found on that page to get a better sense of how `substr()` can be used.
- Write the `thanks.php` script that goes along with Script 5.5. If you need help, revisit the `hello.php` script from Chapter 3 (Script 3.7).
- Rewrite the `print` statement in the final version of `handle_post.php` (Script 5.7), so that it uses single quotation marks and concatenation instead of double quotation marks.
- Create another HTML form for taking string values. Then create the PHP script that receives the form data, addresses any HTML or PHP code, manipulates the data in some way, and prints out the results.

# 6

# Control Structures

Control structures—*conditionals* and *loops*—are a staple of programming languages. PHP has two conditionals—**if** and **switch**—both of which you'll master in this chapter. Conditionals allow you to establish a test and then perform actions based on the results. This functionality provides the ability to make Web sites even more dynamic.

The discussion of **if** conditionals requires introduction of two last categories of operators: *comparison* and *logical* (you've already seen the arithmetic and assignment operators in the previous chapters). You'll commonly use these operators in your conditionals, along with the Boolean concepts of *TRUE* and *FALSE*.

Finally, this chapter introduces loops, which allow you to repeat an action for a specified number of iterations. Loops can save you programming time and help you get the most functionality out of arrays, as you'll see in the next chapter.

---

## In This Chapter

Creating the HTML Form	116
The if Conditional	119
Validation Functions	122
Using else	126
More Operators	129
Using elseif	138
The Switch Conditional	142
The for Loop	146
Review and Pursue	150

---

# Creating the HTML Form

As with the previous chapters, the examples in this chapter are based on an HTML form that sends data to a PHP page. In this case, the form is a simple registration page that requests the following information **A**:

- Email address
- Password
- Confirmation of the password
- Year of birth (to verify age)
- Favorite color (for customization purposes)
- Agreement to the site's terms  
(a common requirement)

The following steps walk through the creation of this form before getting into the PHP code.

## To create the HTML form:

1. Begin a new HTML document in your text editor or IDE, to be named **register.html** (Script 6.1):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="Content-Type"
    → content="text/html;
    → charset=utf-8"/>
  <title>Registration Form</title>
</head>
<body>
  <!-- Script 6.1 - register.html -->
  <div><p>Please complete this form
  → to register:</p>
```

Please complete this form to register:

Email Address:

Password:

Confirm Password:

Year You Were Born:

Favorite Color:

I agree to the terms (whatever they may be).

**A** The HTML form used in this chapter.

**Script 6.1** This pseudo-registration form is the basis for the examples in this chapter.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="Content-Type"
        content="text/html; charset=utf-8"/>
6      <title>Registration Form</title>
7  </head>
8  <body>
9  <!-- Script 6.1 - register.html -->
10 <div><p>Please complete this form to
register:</p>
11
12 <form action="handle_reg.php"
method="post">
13
14     <p>Email Address: <input type="text"
name="email" size="30" /></p>
15
16     <p>Password: <input type="password"
name="password" size="20" /></p>
17
18     <p>Confirm Password: <input
type="password" name="confirm"
size="20" /></p>
19
```

*code continues on next page*

### Script 6.1 continued

```
20   <p>Year You Were Born: <input  
21     type="text" name="year"  
22     value="YYYY" size="4" /></p>  
23  
24   <p>Favorite Color:  
25     <select name="color">  
26       <option value="">Pick One</option>  
27       <option value="red">Red</option>  
28       <option value="yellow">Yellow  
29         </option>  
30       <option value="green">Green</option>  
31       <option value="blue">Blue</option>  
32     </select></p>  
33  
34   <p><input type="checkbox"  
35     name="terms" value="Yes" /> I agree  
36     to the terms (whatever they may  
37     be).</p>  
38  
39   <input type="submit" name="submit"  
40     value="Register" />  
41  
42 </form>  
43  
44 </div>  
45 </body>  
46 </html>
```

Password: 

B A password input type, as it's being filled out.

2. Create the initial **form** tag:

```
<form action="handle_reg.php"  
→ method="post">
```

As with many of the previous examples, this page uses the POST method. The handling script, identified by the **action** attribute, will be **handle\_reg.php**, found in the same directory as the HTML form.

3. Create inputs for the email address and passwords:

```
<p>Email Address: <input  
→ type="text" name="email"  
→ size="30" /></p>  
<p>Password: <input  
→ type="password" name="password"  
→ size="20" /></p>  
<p>Confirm Password: <input  
→ type="password" name="confirm"  
→ size="20" /></p>
```

These lines should be self-evident. Each line is wrapped in HTML **<p></p>** tags to improve the spacing in the Web browser. Also, note that two password inputs are created—the second is used to confirm the text entered in the first. Password input types don't reveal what the user enters B, so it's a standard policy to require the user to enter passwords twice (thereby ensuring that users know exactly what password they provided).

4. Create an input for the user's birth year:

```
<p>Year You Were Born: <input  
→ type="text" name="year"  
→ value="YYYY" size="4" /></p>
```

Rather than use a drop-down menu that displays 50 or 100 years, have users enter their birth year in a text box. By presetting the **value** attribute of the input, you make the text box indicate the proper format for the year A.

*continues on next page*

5. Create a drop-down menu for the user's favorite color:

```
<p>Favorite Color:<br><select name="color"><option value="">Pick One</option><option value="red">Red</option><option value="yellow">Yellow</option><option value="green">Green</option><option value="blue">Blue</option></select></p>
```

The truth is that I'm adding this input so that it can be used for a specific example later in the chapter, but it might be used to customize the look of the site after the user logs in. Naturally, you can add as many colors as you want here.

6. Create a check box for the user to agree to the site's terms:

```
<p><input type="checkbox" name="terms" value="Yes" /><br>I agree to the terms (whatever they may be).</p>
```

Many sites have some sort of terms or licensing that the user must indicate acceptance of, normally by checking a box. This particular form doesn't have a link to where the user can read the terms, but it probably doesn't matter as no one reads them (and this is just

a hypothetical example anyway). In any case, using this element, you'll be able to see how checkboxes are treated by the handling PHP script.

7. Add a submit button and close the form:

```
<input type="submit" name="submit" value="Register" /></form>
```

8. Complete the HTML page:

```
</div></body></html>
```

9. Save the file as **register.html**, place it in the proper directory for your PHP-enabled server, and load the page in your Web browser.

**TIP** Registration pages should always have users confirm their password and possibly their username or email address (whatever information will be used to log in).

**TIP** Most registration pages use either a nickname or an email address for the username. If you use the email address as a username, it's easier for your users to remember their registration information (a user may have only a couple of email addresses but a gazillion usernames for different sites around the Web). Furthermore, email addresses are, by their nature, unique to an individual, whereas usernames are not.

# The if Conditional

The basic programming conditional is the standard **if** (what used to be called an **if-then** conditional—the **then** is now implied). The syntax for this kind of conditional is simple:

```
if (condition) {  
    statement(s);  
}
```

The *condition* must go within parentheses; then the *statement(s)* are placed within curly brackets. The statements are commands to be executed (for example, printing a string or adding two numbers together). Each separate statement (or command) must have its own semicolon indicating the end of the line, but there is no limit on the number of statements that can be associated with a conditional.

Programmers commonly indent these statements from the initial **if** line to indicate that they're the result of a conditional, but

that format isn't syntactically required. You'll also see people use this syntax:

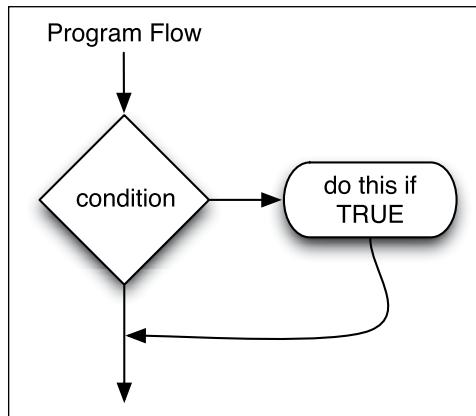
```
if (condition)  
{  
    statement(s);  
}
```

How you arrange your curly brackets is a matter of personal preference—and the source of minor online skirmishes. Just pick a style you like and stick to it.

Failure to use a semicolon after each statement, forgetting an opening or closing parenthesis or curly bracket, or using a semicolon after either of the braces will cause errors to occur. Be mindful of your syntax as you code with conditionals!

PHP uses the Boolean concepts of TRUE and FALSE when determining whether to execute the statements. If the condition is TRUE, the statements are executed; if it's FALSE, they are not executed **A**.

*continues on next page*



**A** How an IF conditional affects the program flow of a script.

Over the course of this chapter (most of it, anyway), a PHP script will be developed until it fully validates the **register.html** form data. To start, this first version of the script will just create the basic shell of the validation process, defining and using a variable with a Boolean value that will track the success of the validation process.

### To create an if conditional:

1. Begin a new document in your text editor or IDE, to be named **handle\_reg.php** (Script 6.2):

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
2   XHTML 1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8  <meta http-equiv="Content-Type"
9   content="text/html;
10  charset=utf-8"/>
11 <title>Registration</title>
12 </head>
13 <body>
14 <h1>Registration Results</h1>
15 // Address error management, if you
16 want.
17 // Flag variable to track success:
18 $okay = TRUE;
19 // If there were no errors, print a
20 // success message:
21 if ($okay) {
22   print '<p>You have been
23   successfully registered (but
24   not really).</p>';
25 }
```

2. Begin the PHP section and address error management, if necessary:

```
<?php // Script 6.2 - handle_reg.php
```

If you don't have **display\_errors** enabled, or if **error\_reporting** is set to the wrong level, see Chapter 3, "HTML Forms and PHP," for the lines to include here to alter those settings.

3. Create a *flag* variable:

```
$okay = TRUE;
```

To validate the form data, a *flag* variable will be used to represent whether or not the form was properly

**Script 6.2** This shell of a PHP script will be expanded to completely validate the form data.

completed. It's called a "flag" variable because the variable stores a simple value that indicates a status. For example: yes, the form was filled out entirely or no, it was not.

The variable is initialized with a Boolean value of *TRUE*, meaning that the assumption is that the form was completed properly. Understand that Booleans are *case-insensitive* in PHP, so you could also write *True* or *true*.

4. Print a message if everything is all right:

```
if ($okay) {  
    print '<p>You have been  
    → successfully registered  
    → (but not really).</p>';  
}
```

Over the course of this chapter, validation routines will be added to this script, checking the submitted form data. If any data fails a routine, then **\$okay** will be set to FALSE. In that case, this conditional will also be FALSE, so the message won't be printed. However, if the data passes every validation routine, then **\$okay** will still be TRUE, in which case this message will be printed.

Please complete this form to register:

Email Address:

Password:

Confirm Password:

Year You Were Born:

Favorite Color:

I agree to the terms (whatever they may be).

- B** Filling out the HTML form to any degree...

5. Complete the PHP section and the HTML page:

```
?>  
</body>  
</html>
```

6. Save the file as **handle\_reg.php**, place it in the proper directory for your PHP-enabled server (in the same directory as **register.html**), and test both in your Web browser **B** and **C**.

Of course, the fact is that this particular script will always print the success message, as no code will set **\$okay** to FALSE. You can even run the script directly and see the same result.

**TIP** If the statement area of your conditional is only one line long, you technically don't need the curly brackets. In that case, you can write the conditional using either of these formats:

**if (condition) statement;**

or

**if (condition)  
statement;**

You may run across code in these formats. However, I think it's best to always use the multiline format, with the curly brackets (as demonstrated in the syntax introduction) to improve consistency and minimize errors.

## Registration Results

You have been successfully registered (but not really).

- C** ...results in just this.

# Validation Functions

PHP has dozens of functions commonly used to validate form data. Of these functions, the three most important ones are used in this chapter's examples.

First up is the `empty()` function, which checks to see if a given variable has an “empty” value. A variable is considered to have an empty value if the variable has no value, has a value of 0, or has a value of `FALSE`. In any of these cases, the function returns `TRUE`; otherwise, it returns `FALSE`:

```
$var1 = 0;  
$var2 = 'something';  
$var3 = ' '; // An empty string  
empty($var); // TRUE, no defined value  
empty($var1); // TRUE, empty value  
empty($var2); // FALSE, non-empty value  
empty($var3); // TRUE, empty value
```

This function is perfect for making sure that text boxes in forms have been filled out. For example, if you have a text input named `email` and the user doesn't enter anything in it before submitting the form, then the `$_POST['email']` variable will exist but will have an empty value.

Next is the `isset()` function, which is almost the opposite of `empty()`, albeit with a slight difference. The `isset()` function returns `TRUE` if a variable has any value (including 0, `FALSE`, or an empty string). If the variable does not have a value, `isset()` returns `FALSE`:

```
$var1 = 0;  
$var2 = 'something';  
$var3 = ' '; // An empty string  
isset($var); // FALSE, no defined value  
isset($var1); // TRUE  
isset($var2); // TRUE  
isset($var3); // TRUE
```

**Script 6.3** Using **if** conditionals and the **empty()** function, this PHP script checks if email address and password values were provided.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
2   XHTML 1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6  xhtml" xml:lang="en" lang="en">
7  <head>
8      <meta http-equiv="Content-Type"
9      content="text/html;
10     charset=utf-8"/>
11     <title>Registration</title>
12     <style type="text/css"
13     media="screen">
14         .error { color: red; }
15     </style>
16  </head>
17  <body>
18  <h1>Registration Results</h1>
19  <?php // Script 6.3 - handle_reg.php #2
20  /* This script receives seven values
21  from register.html:
22  email, password, confirm, year, terms,
23  color, submit */
24
25  // Address error management, if you want.
26
27  // Flag variable to track success:
28  $okay = TRUE;
29
30  // Validate the email address:
31  if (empty($_POST['email'])) {
32      print '<p class="error">Please
33          enter your email address.</p>';
34      $okay = FALSE;
35  }
36
37  // If there were no errors, print a
38  // success message:
39  if ($okay) {
40      print '<p>You have been successfully
41          registered (but not really).</p>';
42  }
43  ?>
44  </body>
45  </html>
```

The **isset()** function is commonly used to validate non-text form elements like checkboxes, radio buttons, and select menus.

Finally, the **is\_numeric()** function returns **TRUE** if the submitted variable has a valid numerical value and **FALSE** otherwise. Integers, decimals, and even strings (if they're a valid number) can all pass the **is\_numeric()** test:

```
$var1 = 2309;
$var2 = '80.23';
$var3 = 'Bears';
is_numeric($var1); // TRUE
is_numeric($var2); // TRUE
is_numeric($var3); // FALSE
```

Let's start applying these functions to the PHP script to perform data validation.

## To validate form data:

1. Open **handle\_reg.php** (Script 6.2) in your text editor or IDE, if it is not already open.
2. Within the document's head, define a CSS class (Script 6.3):

```
<style type="text/css"
→ media="screen">
    .error { color: red; }
</style>
```

This CSS class will be used to format any printed registration errors.

3. Validate the email address:

```
if (empty($_POST['email'])) {
    print '<p class="error">Please
→ enter your email address.</p>';
    $okay = FALSE;
}
```

*continues on next page*

This **if** conditional uses the code `empty($_POST['email'])` as its condition. If that variable is empty, meaning it has no value, a value of 0, or a value of an empty string, the conditional is TRUE. In that case, the **print** statement will be executed and the `$okay` variable will be assigned a value of FALSE (indicating that everything is not okay).

If the variable isn't empty, then the conditional is FALSE, the **print** function is never called, and `$okay` will retain its original value.

**4.** Repeat the validation for the password:

```
if (empty($_POST['password'])) {  
    print '<p class="error">Please  
→ enter your password.</p>';  
    $okay = FALSE;  
}
```

This is a repeat of the email validation, but with the variable name and **print** statement changed accordingly. The other form inputs will be validated in time.

All of the printed error messages are placed within HTML paragraph tags that have a **class** value of `error`. By doing so, the CSS formatting will be applied (i.e., the errors will be printed in red, not that it'll be apparent in this book's figures).

**5.** Save the file as `handle_reg.php`, place it in the same directory as **register.html** (on your PHP-enabled server), and test both the form and the script in your Web browser **A** and **B**.

Please complete this form to register:

Email Address:

Password:

Confirm Password:  .....

Year You Were Born:  1901

Favorite Color:  Green

I agree to the terms (whatever they may be).

**Register**

**A** If you omit the email address or password form input...

## Registration Results

Please enter your email address.

Please enter your password.

**B** ...you'll see messages like these.

6. Resubmit the form in different states of completeness to test the results some more.

If you do provide both email address and password values, the result will be exactly like that in Figure C in the section “The if Conditional,” because the `$okay` variable will still have a value of TRUE.

**TIP** When you use functions within conditionals, as with `empty()` here, it’s easy to forget a closing parenthesis and see a parse error. Be extra careful with your syntax when you’re coding any control structure.

**TIP** One use of the `isset()` function is to avoid referring to a variable unless it exists. If PHP is set to report notices (see “Error Reporting” in Chapter 3), then, for example, using `$var` if it has not been defined will cause an error. You can avoid this by coding

```
if (isset($var)) {  
    // Do whatever with $var.  
}
```

**TIP** Even though almost all form data is sent to a PHP script as strings, the `is_numeric()` function can still be used for values coming from a form because it can handle strings that contain only numbers.

**TIP** The `isset()` function can take any number of variables as arguments:

```
if (isset($var1, $var2)) {  
    print 'Both variables exist.';  
}
```

If all the named variables are set, the function returns TRUE; if any variable is not set, the function returns FALSE.

# Using else

The next control structure we'll discuss is the **if-else** conditional. This control structure allows you to execute one or more statements when a condition is TRUE and execute one or more other statements when the condition is FALSE:

```
if (condition) {  
    statement(s);  
} else {  
    other_statement(s);  
}
```

The important thing to remember when using this construct is that unless the condition is explicitly met, the **else** statement will be executed. In other words, the statements after the **else** constitute the *default action*, whereas the statements after the **if** condition are the exception to the rule **A**.

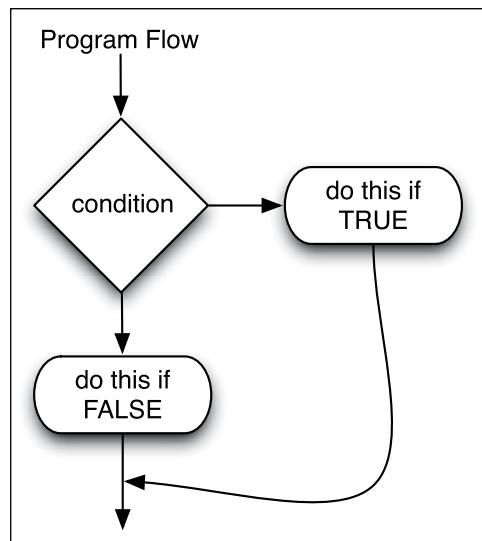
Let's rewrite the **handle\_reg.php** page, incorporating an **if-else** conditional to validate the birth year. In the process, a new variable will be created, representing the user's age.

## To use else:

1. Open **handle\_reg.php** (Script 6.3) in your text editor or IDE, if it is not already open.
2. After the password validation but before the **\$okay** conditional, begin a new conditional (**Script 6.4**):

```
if (is_numeric($_POST['year'])) {
```

Because the **year** variable should be a number, you can use the **is\_numeric()** function to check its value, rather than **empty()**. This is a basic start to this particular form element's validation; later scripts will expand on this.



**A** How an **IF-ELSE** conditional affects the program flow of a script.

**Script 6.4** By adding an **if-else** conditional, this script validates the birth year and creates a new variable in the process.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD  
XHTML 1.0 Transitional//EN"  
2      "http://www.w3.org/TR/xhtml1/DTD/  
xhtml1-transitional.dtd">  
3  <html xmlns="http://www.w3.org/1999/  
xhtml" xml:lang="en" lang="en">  
4  <head>  
5      <meta http-equiv="Content-Type"  
content="text/html;  
charset=utf-8"/>  
6      <title>Registration</title>  
7      <style type="text/css"  
media="screen">  
8          .error { color: red; }  
9      </style>  
10     </head>  
11     <body>  
12         <h1>Registration Results</h1>  
13         <?php // Script 6.4 - handle_reg.php #3  
14 /* This script receives seven values  
from register.html:  
15 email, password, confirm, year, terms,  
color, submit */  
16
```

code continues on next page

#### Script 6.4 continued

```
17 // Address error management, if you
want.
18
19 // Flag variable to track success:
20 $okay = TRUE;
21
22 // Validate the email address:
23 if (empty($_POST['email'])) {
24     print '<p class="error">Please
enter your email address.</p>';
25     $okay = FALSE;
26 }
27
28 // Validate the password:
29 if (empty($_POST['password'])) {
30     print '<p class="error">Please
enter your password.</p>';
31     $okay = FALSE;
32 }
33
34 // Validate the birth year:
35 if (is_numeric($_POST['year'])) {
36     $age = 2011 - $_POST['year'];
// Calculate age this year.
37 } else {
38     print '<p class="error">Please
enter the year you were born as
four digits.</p>';
39     $okay = FALSE;
40 }
41
42 // If there were no errors, print a
success message:
43 if ($okay) {
44     print '<p>You have been successfully
registered (but not really).</p>';
45     print "<p>You will turn $age
this year.</p>";
46 }
47 ?>
48 </body>
49 </html>
```

#### 3. Create a new variable:

```
$age = 2011 - $_POST['year'];
```

If the `$_POST['year']` variable has a numeric value (meaning that the conditional is TRUE), then the `$age` variable is assigned the value of the current year minus the provided year. For now, without knowledge of PHP's date functions, just hard-code the current year into the equation.

#### 4. Add an `else` clause:

```
} else {
    print '<p class="error">Please
→ enter the year you were born
→ as four digits.</p>';
    $okay = FALSE;
}
```

If the year does not have a numeric value, an error message is printed and the `$okay` variable is set to FALSE (as is the case if any validation routine fails).

#### 5. After the final `print` statement but within the same `$okay` conditional, also print out the value of `$age`:

```
print "<p>You will turn $age this
→ year.</p>";
```

If the `$okay` variable still has a value of TRUE, then the submitted data passed every validation routine. This means that the user's age has been calculated (in the sense of how old they'll be at some point this year), and it can be printed, too.

*continues on next page*

6. Save your script, place it in the same directory as `register.html` (on your PHP-enabled server), and test it in your Web browser again **B**, **C**, and **D**.

**TIP** Another good validation function is `checkdate()`, which you can use to confirm that a date exists (or existed in the past). You would use it like so:

```
if (checkdate($month, $day, $year)) {...
```

Please complete this form to register:

Email Address:

Password:

Confirm Password:

Year You Were Born:

Favorite Color:

I agree to the terms (whatever they may be).

- B** Test the form again, without providing a year value, and...

## Registration Results

Please enter the year you were born as four digits.

- C** ...you'll see this.

## Registration Results

You have been successfully registered (but not really).

You will turn 57 this year.

- D** If the user provides a numeric value for their birth year, the user's age will now be calculated and printed (assuming that an email address and password was also provided).

---

**TABLE 6.1** PHP's Operators

Operator	Usage	Type
+	Addition	Arithmetic
-	Subtraction	Arithmetic
*	Multiplication	Arithmetic
/	Division	Arithmetic
%	Modulus (remainder of a division)	Arithmetic
++	Incrementation	Arithmetic
--	Decrementation	Arithmetic
=	Assigns a value to a variable	Assignment
==	Equality	Comparison
!=	Inequality	Comparison
<	Less than	Comparison
>	Greater than	Comparison
<=	Less than or equal to	Comparison
>=	Greater than or equal to	Comparison
!	Negation	Logical
AND	And	Logical
&&	And	Logical
OR	Or	Logical
	Or	Logical
XOR	Or not	Logical
.	Concatenation	String

## More Operators

Previous chapters discussed most of PHP's operators along with the variable types that use them. These operators include *arithmetic* for numbers: addition (+), subtraction (-), multiplication (\*), and division (/), along with the incremental (++) and decremental (--) shortcuts for increasing or decreasing the value of a number by 1. Then there is the *assignment* operator (=), which is used to set the value of a variable, regardless of type. You've also learned about *concatenation* (.), which appends one string to another.

When it comes to creating conditionals, the *comparison* and *logical* operators are the most important. Table 6.1 lists the operators to be discussed, along with those you've already seen.

### Comparison

When the assignment operator (the equals sign) was introduced in Chapter 2, “Variables,” you learned that its meaning isn't exactly what you'd conventionally think it to be. The line

`$var = 5;`

doesn't state that `$var` is equal to 5 but that it is assigned the value of 5. This is an important distinction.

When you're writing conditionals, you'll often want to see if a variable is equal to a specific value (to match usernames or passwords, perhaps), which you can't do with the equals sign alone (because that operator is used for assigning a value, not equating values). Instead, for comparisons, use the equality operator (==):

```
$var = 5;  
if ($var == 5) { ...
```

*continues on next page*

These two lines of code together first establish the value of `$var` as 5 and then make a TRUE conditional that checks if `$var` is equal to 5. This example demonstrates the significant difference one more equals sign makes in your PHP code and why you must distinguish carefully between the assignment and comparison operators.

The next comparison operator—not equal to—is represented by an exclamation mark coupled with an equals sign (`!=`). The remaining comparison operators are identical to their mathematical counterparts: less than (`<`), greater than (`>`), less than or equal to (`<=`), and greater than or equal to (`>=`).

As a demonstration of comparison operators, you'll check that the user's birth year is before 2011 and that the confirmed password matches the original password.

## To use comparison operators:

1. Open `handle_reg.php` (Script 6.4) in your text editor or IDE, if it is not already.
2. After the password validation, check that the two passwords match (Script 6.5):

```
if ($_POST['password']
→ != $_POST['confirm']) {
    print '<p class="error">Your
→ confirmed password does
→ not match the original
→ password.</p>';
    $okay = FALSE;
}
```

To compare these two string values, use the inequality operator. Alternatively, you could use one of the string comparison functions (see Chapter 5, “Using Strings”), but `!=` is just fine.

**Script 6.5** This version of the form-handling script uses comparison operators to validate the password and year values.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8      <meta http-equiv="Content-Type"
9       content="text/html; charset=utf-8"/>
10 <title>Registration</title>
11 <style type="text/css" media="screen">
12   .error { color: red; }
13 </style>
14 </head>
15 <body>
16 <h1>Registration Results</h1>
17 <?php // Script 6.5 - handle_reg.php #4
18 /* This script receives seven values
19 from register.html:
20 email, password, confirm, year, terms,
21 color, submit */
22 // Address error management, if you want.
23 // Flag variable to track success:
24 $okay = TRUE;
25 // Validate the email address:
26 if (empty($_POST['email'])) {
27     print '<p class="error">Please enter
28         your email address.</p>';
29     $okay = FALSE;
30 }
31 // Validate the password:
32 if (empty($_POST['password'])) {
33     print '<p class="error">Please enter
34         your password.</p>';
35     $okay = FALSE;
36 }
37 // Check the two passwords for equality:
38 if ($_POST['password'] !=
39 $_POST['confirm']) {
40     print '<p class="error">Your
41         confirmed password does not match
42         the original password.</p>';
43 }
```

code continues on next page

### Script 6.5 continued

```
37     $okay = FALSE;
38 }
39
40 // Validate the birth year:
41 if (is_numeric($_POST['year'])) {
42     $age = 2011 - $_POST['year'];
        // Calculate age this year.
43 } else {
44     print '<p class="error">Please enter
        the year you were born as four
        digits.</p>';
45     $okay = FALSE;
46 }
47
48 // Check that they were born before
    this year:
49 if ($_POST['year'] >= 2011) {
50     print '<p class="error">Either you
        entered your birth year wrong or
        you come from the future!</p>';
51     $okay = FALSE;
52 }
53
54 // If there were no errors, print a
    success message:
55 if ($okay) {
56     print '<p>You have been successfully
        registered (but not really).</p>';
57     print "<p>You will turn $age this
        year.</p>";
58 }
59
60 ?>
61 </body>
62 </html>
```

3. After the year validation, report an error if the year is greater than or equal to 2011:

```
if ($_POST['year'] >= 2011) {
    print '<p class="error">Either
        → you entered your birth year
        → wrong or you come from the
        → future!</p>';
    $okay = FALSE;
}
```

If the user entered their year of birth as 2011 or later, it's presumably a mistake. (If you're reading this book after 2011, change the year accordingly).

*continues on next page*

4. Save your script, place it in the same directory as `register.html` (on your PHP-enabled server), and test it in your Web browser again **A** and **B**.

**TIP** Before you compare two string values that come from a form (like the password and confirmed password), it's a good idea to apply the `trim()` function to both, to get rid of any errant spaces. I didn't do so here, so as not to overcomplicate matters, but this habit is recommended.

**TIP** Another method of checking that a text input type has been filled out (as opposed to using the `empty()` function) is this:

```
if (strlen($var) > 0 ) {  
    // $var is okay.  
}
```

**TIP** In an `if` conditional, if you make the mistake of writing `$var = 5` in place of `$var == 5`, you'll see that the corresponding conditional statements are always executed. This happens because although the condition `$var == 5` may or may not be TRUE, the condition `$var = 5` is always TRUE.

**TIP** Some programmers advocate reverse conditionals—for example, writing

```
if (5 == $var) {
```

Although it looks awkward, if you inadvertently code `5 = $var`, an error results (allowing you to catch the mistake more easily) because the number 5 can't be assigned another value.

Please complete this form to register:

Email Address:

Password:

Confirm Password:

Year You Were Born:

Favorite Color:

I agree to the terms (whatever they may be).

**A** Run the form once again...

## Registration Results

Your confirmed password does not match the original password.

Either you entered your birth year wrong or you come from the future!

**B** ...with two new validation checks in place.

## Nesting Conditionals

Besides using logical operators to create more complex conditionals, you can use *nesting* for this purpose (the process of placing one control structure inside another). The key to doing so is to place the interior conditional as the *statement(s)* section of the exterior conditional. For example:

```
if (condition1) {
    if (condition2) {
        statement(s)2;
    } else { // condition2
else

other_statement(s)2;
    } // End of 2
} else { // condition1 else
    other_statement(s)1;
} // End of 1
```

As you can see from this example, you can cut down on the complexity of these structures by using extensive indentations and comments. As long as every conditional is syntactically correct, there are no rules as to how many levels of nesting you can have, whether you use an **else** clause or even whether a sub-conditional is part of the **if** or the **else** section of the main conditional.

## Logical

Writing conditions in PHP comes down to identifying TRUE or FALSE situations. You can do this by using functions and comparative operators, as you've already seen. *Logical* operators—the final operator type discussed in this chapter—help you create more elaborate or obvious constructs.

In PHP, one example of a TRUE condition is simply a variable name that has a value that isn't zero, an empty string, or FALSE, such as

```
$var = 5;
if ($var) { ... }
```

You've already seen this with the **\$okay** variable being used in the handling PHP script.

A condition is also TRUE if it makes logical sense:

```
if (5 >= 3) { ... }
```

A condition will be FALSE if it refers to a variable and that variable has no value (or a value of 0 or an empty string), or if you've created an illogical construct. The following condition is always FALSE:

```
if (5 <= 3) { ... }
```

In PHP, the exclamation mark (!) is the *not* operator. You can use it to invert the TRUE/FALSE status of a statement. For example:

```
$var = 'value';
if ($var) {... // TRUE
if (!$var) {... // FALSE
if (isset($var)) {... // TRUE
if (!isset($var)) {... // FALSE
if (!empty($var)) {... // TRUE
```

To go beyond simple one-part conditions, PHP supports five more types of logical operators: two versions of *and* (**AND** and **&&**), two versions of *or* (**OR** and **||**—a character called the *pipe*, put together twice), and

*continues on next page*

**or not (XOR).** When you have two options for one operator (as with *and* and *or*), they differ only in precedence. For almost every situation, you can use either version of *and* or either version of *or* interchangeably.

Using parentheses and logical operators, you can create even more complex **if** conditionals. For an **AND** conditional, every conjoined part must be TRUE in order for the whole conditional to be TRUE. With **OR**, at least one subsection must be TRUE to render the whole condition TRUE. These conditionals are TRUE:

```
if ( (5 <= 3) OR (5 >= 3) ) { ...
if ( (5 > 3) AND (5 < 10) ) { ...
```

These conditionals are FALSE:

```
if ( (5 != 5) AND (5 > 3) ) { ...
if ( (5 != 5) OR (5 < 3) ) { ...
```

As you construct your conditionals, remember two important things: first, in order for the statements that are the result of a conditional to be executed, the entire conditional must have a TRUE value; second, by using parentheses, you can ignore rules of precedence and ensure that your operators are addressed in the order of your choosing.

To demonstrate logical operators, let's add more conditionals to the **handle\_reg.php** page. You'll also nest one of the year conditionals inside another conditional (see the sidebar "Nesting Conditionals" for more).

### To use logical operators:

1. Open **handle\_reg.php** (Script 6.5) in your text editor or IDE, if it is not already open.
2. Delete the existing year validations (**Script 6.6**).

You'll entirely rewrite these conditionals as one nested conditional, so it's best to get rid of the old versions entirely.

**Script 6.6** Here the handling PHP script is changed so that the year validation routine uses both multiple and nested conditions. Also, the terms of agreement check box is now validated.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8   <meta http-equiv="Content-Type"
9    content="text/html; charset=utf-8"/>
10  <title>Registration</title>
11  <style type="text/css" media="screen">
12   .error { color: red; }
13  </style>
14  </head>
15  <body>
16  <h1>Registration Results</h1>
17  <?php // Script 6.6 - handle_reg.php #5
18  /* This script receives seven values
19  from register.html:
20  email, password, confirm, year, terms,
21  color, submit */
22  // Address error management, if you want.
23  // Flag variable to track success:
24  $okay = TRUE;
25
26  // Validate the email address:
27  if (empty($_POST['email'])) {
28      print '<p class="error">Please enter
29          your email address.</p>';
30      $okay = FALSE;
31  }
32
33  // Validate the password:
34  if (empty($_POST['password'])) {
35      print '<p class="error">Please enter
36          your password.</p>';
37      $okay = FALSE;
38  }
39
40  // Check the two passwords for equality:
41  if ($_POST['password'] !=
42      $_POST['confirm']) {
43      print '<p class="error">Your confirmed
44          password does not match the original
45          password.</p>';
46  }
```

code continues on next page

### Script 6.6 continued

```
37     $okay = FALSE;
38 }
39
40 // Validate the year:
41 if ( is_numeric($_POST['year']) AND
    (strlen($_POST['year']) == 4) ) {
42
43     // Check that they were born
    before 2011.
44     if ($_POST['year'] < 2011) {
45         $age = 2011 - $_POST['year'];
        // Calculate age this year.
46     } else {
47         print '<p class="error">Either
    you entered your birth year
    wrong or you come from the
    future!</p>';
48     $okay = FALSE;
49 } // End of 2nd conditional.
50
51 } else { // Else for 1st conditional.
52
53     print '<p class="error">Please
    enter the year you were born as
    four digits.</p>';
54     $okay = FALSE;
55
56 } // End of 1st conditional.
57
58 // Validate the terms:
59 if (!isset($_POST['terms'])) {
60     print '<p class="error">You must
    accept the terms.</p>';
61     $okay = FALSE;
62 }
63
64 // If there were no errors, print a
// success message:
65 if ($okay) {
66     print '<p>You have been successfully
    registered (but not really).</p>';
67     print "<p>You will turn $age this
    year.</p>";
68 }
69 ?>
70 </body>
71 </html>
```

3. Check that the year variable is a four-digit number:

```
if ( is_numeric($_POST['year']) AND
    (strlen($_POST['year']) == 4) ) {
```

This conditional has two parts. The first you've already seen—it tests for a valid numeric value. The second part gets the length of the year variable (using the `strlen()` function) and checks if the length value is equal to 4. Because of the `AND`, this conditional is TRUE only if both conditions are met.

4. Create a subconditional to check if the year value is before 2011:

```
if ($_POST['year'] < 2011) {
    $age = 2011 - $_POST['year'];
} else {
    print '<p class="error">Either
    → you entered your birth year
    → wrong or you come from the
    → future!</p>';
    $okay = FALSE;
} // End of 2nd conditional.
```

This `if-else` conditional acts as the *statements* part of the main conditional, and is thus executed only if that condition is TRUE. This `if-else` checks whether the year variable is less than 2011 (i.e., the user must have been born before the current year). If that condition is TRUE, the user's age is calculated as before. Otherwise, an error message is printed and the `$okay` variable is set to FALSE (indicating a problem occurred).

Note that this conditional is just the opposite of the previous version: verifying that a value is less than some number instead of greater than or equal to that number.

*continues on next page*

5. Complete the main year conditional:

```
} else { // Else for 1st  
→ conditional.  
    print '<p class="error">Please  
→ enter the year you were born  
→ as four digits.</p>';  
    $okay = FALSE;  
} // End of 1st conditional.
```

This **else** section completes the conditional begun in Step 3. If at least one of the conditions set forth there is FALSE, this message is printed and **\$okay** is set to FALSE.

6. Confirm that the terms checkbox wasn't ignored:

```
if (!isset($_POST['terms'])) {  
    print '<p class="error">You must  
→ accept the terms.</p>';  
    $okay = FALSE;  
}
```

If the **\$\_POST['terms']** variable is not set, then the user failed to check that box and an error should be reported. To be more exact, this conditional could be

```
if ( !isset($_POST['terms']) AND  
→ ($_POST['terms'] == 'Yes') ) {
```

7. Those are the only changes to the script, so you can now save it again, place it in the same directory as **register.html** (on your PHP-enabled server), and test it in your Web browser again **C** and **D**.

Please complete this form to register:

Email Address:

Password:

Confirm Password:

Year You Were Born:

Favorite Color:

I agree to the terms (whatever they may be).

**C** The PHP script now catches if the year isn't a four-digit number, as will be the case with this form submission.

## Registration Results

Please enter the year you were born as four digits.

You must accept the terms.

**D** Error messages are printed if fields are incorrectly filled out or if the terms checkbox is not checked.

8. If desired, change your `year` value to be in the future and submit the form again **E**.

**TIP** It's another common programming convention—which is maintained in this book—to write the terms `TRUE` and `FALSE` in all capitals. This isn't a requirement of PHP, though. For example, the following conditional is `TRUE`:

```
if (true) {...
```

**TIP** It's very easy in long, complicated conditionals to forget an opening or closing parenthesis or curly bracket, which will produce either error messages or unexpected results. Find a system (like spacing out your conditionals and using comments) to help clarify your code. Another good technique is to create the entire conditional's structure first, and then go back to add the details.

**TIP** If you have problems getting your `if-else` statements to execute, print out the values of your variables to help debug the problem. A conditional may not be `TRUE` or `FALSE` because a variable doesn't have the value you think it does.

## Registration Results

Either you entered your birth year wrong or you come from the future!

**E** The year validation still checks that the date is before 2011.

# Using `elseif`

Similar to the `if-else` conditional is `if-elseif` (or `if-elseif-else`). This conditional acts like a running `if` statement and can be expanded to whatever complexity you require:

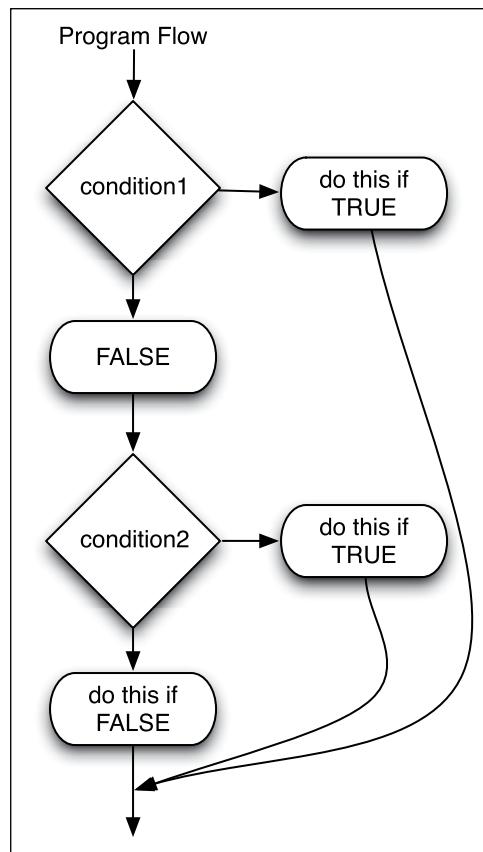
```
if (condition1) {  
    statement(s);  
} elseif (condition2) {  
    other_statement(s);  
}
```

Here's another example A:

```
if (condition1) {  
    statement(s);  
} elseif (condition2) {  
    other_statement(s);  
} else {  
    other_other_statement(s);  
}
```

If present, you must always make the `else` the last part of a conditional because it's executed unless one of the conditions to that point has been met (again, `else` represents the *default* behavior). You can, however, continue to use `elseifs` as many times as you want as part of one `if` conditional. You may also forego an `else` clause, if you don't need a default response.

As an example of this, let's create a conditional that prints a message based on the selected color value.



A How an **IF-ELSEIF-ELSE** conditional affects the program flow of a script.

**Script 6.7** This multiline **if-elseif-else** conditional validates that a submitted color has an allowed value and is used to determine what type of color the selection is.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8   <meta http-equiv="Content-Type"
9    content="text/html; charset=utf-8"/>
10 <title>Registration</title>
11 <style type="text/css" media="screen">
12 .error { color: red; }
13 </style>
14 </head>
15 <body>
16 <h1>Registration Results</h1>
17 <?php // Script 6.7 - handle_reg.php #6
18 /* This script receives seven values
19 from register.html:
20 email, password, confirm, year, terms,
21 color, submit */
22
23 // Address error management, if you want.
24
25 // Flag variable to track success:
26 $okay = TRUE;
27
28 // Validate the email address:
29 if (empty($_POST['email'])) {
30   print '<p class="error">Please enter
31   your email address.</p>';
32   $okay = FALSE;
33 }
34
35 // Validate the password:
36 if (empty($_POST['password'])) {
37   print '<p class="error">Please enter
38   your password.</p>';
39   $okay = FALSE;
40 }
41
42 // Check the two passwords for equality:
43 if ($_POST['password'] !=
44 $_POST['confirm']) {
45   print '<p class="error">Your confirmed
46   password does not match the original
47   password.</p>';
```

code continues on next page

## To use elseif:

1. Open **handle\_reg.php** (Script 6.6) in your text editor or IDE, if it is not already open.

2. Before the **\$okay** conditional, begin a new conditional (**Script 6.7**):

```
if ($_POST['color'] == 'red') {
  $color_type = 'primary';
```

The color value comes from a select menu with four possible options: *red*, *yellow*, *green*, and *blue*. This conditional will determine whether the user has selected a primary—*red*, *yellow*, or *blue*—or secondary (all others) color. The first condition checks if the value of **\$\_POST['color']** is equal to the string *red*.

Be certain to use the *equality* operator—two equals signs—and not the *assignment* operator—one—in the conditional.

3. Add an **elseif** clause for the second color:

```
} elseif ($_POST['color'] ==
  'yellow') {
  $color_type = 'primary';
```

The **elseif** continues the main conditional begun in Step 2. The condition itself is a replication of the condition in Step 2, using a new color comparison.

continues on next page

4. Add **elseif** clauses for the other two colors:

```
 } elseif ($_POST['color'] ==  
→ 'green') {  
    $color_type = 'secondary';  
} elseif ($_POST['color'] ==  
→ 'blue') {  
    $color_type = 'primary';
```

Once you understand the main concept, it's just a matter of repeating the **elseifs** for every possible color value.

5. Add an **else** clause:

```
 } else {  
    print '<p class="error">Please  
→ select your favorite  
→ color.</p>';  
    $okay = FALSE;  
}
```

If the user didn't select a color, or if they manipulated the form to submit a different color value (other than *red*, *yellow*, *green*, or *blue*), none of the conditions will be TRUE, meaning this **else** clause will take effect. That clause prints an error and assigns a value of FALSE to **\$okay**, indicating a problem.

It doesn't matter in what order the colors are checked, so long as the **else** clause comes last.

#### Script 6.7 continued

```
37     $okay = FALSE;  
38 }  
39  
40 // Validate the year:  
41 if ( is_numeric($_POST['year']) AND  
      (strlen($_POST['year']) == 4) ) {  
42  
43     // Check that they were born before  
     2011.  
44     if ($_POST['year'] < 2011) {  
45         $age = 2011 - $_POST['year'];  
         // Calculate age this year.  
46     } else {  
47         print '<p class="error">Either you  
entered your birth year wrong or  
you come from the future!</p>';  
48         $okay = FALSE;  
49     } // End of 2nd conditional.  
50  
51 } else { // Else for 1st conditional.  
52  
53     print '<p class="error">Please enter  
the year you were born as four  
digits.</p>';  
54     $okay = FALSE;  
55  
56 } // End of 1st conditional.  
57  
58 // Validate the terms:  
59 if ( !isset($_POST['terms']) AND  
      ($_POST['terms'] == 'Yes') ) {  
60     print '<p class="error">You must  
accept the terms.</p>';  
61     $okay = FALSE;  
62 }  
63  
64 // Validate the color:  
65 if ($_POST['color'] == 'red') {  
66     $color_type = 'primary';  
67 } elseif ($_POST['color'] == 'yellow') {  
68     $color_type = 'primary';  
69 } elseif ($_POST['color'] == 'green') {  
70     $color_type = 'secondary';  
71 } elseif ($_POST['color'] == 'blue') {  
72     $color_type = 'primary';  
73 } else { // Problem!  
74     print '<p class="error">Please  
select your favorite color.</p>';  
75     $okay = FALSE;  
76 }
```

code continues on next page

### Script 6.7 continued

```
77  
78 // If there were no errors, print a  
    success message:  
79 if ($okay) {  
80     print '<p>You have been successfully  
        registered (but not really).</p>';  
81     print "<p>You will turn $age this  
        year.</p>";  
82     print "<p>Your favorite color is a  
        $color_type color.</p>";  
83 }  
84 ?>  
85 </body>  
86 </html>
```

## Registration Results

You have been successfully registered (but not really).  
You will turn 12 this year.  
Your favorite color is a secondary color.

- B** The script now prints a message acknowledging the user's color choice.

## Registration Results

Please select your favorite color.

- C** Failure to select a color results in this error message.

6. Within the `$okay` conditional, print the user's favorite color type:

```
print "<p>Your favorite color is  
→ a $color_type color.</p>";
```

7. Save the script, place it in the same directory as `register.html` (on your PHP-enabled server), and test it in your Web browser again, using different color options **B** and **C**.

**TIP** One thing most beginner developers don't realize is that it's possible—in fact, quite easy—for a hacker to submit data to your PHP script without using your intended HTML form. For this reason, it's important that you validate the existence of expected variables (i.e., that they are set), their type, and their values.

**TIP** PHP also allows you to write `elseif` as two words, if you prefer:

```
if (condition1) {  
    statement(s);  
} else if (condition2) {  
    statement(s2);  
}
```

# The Switch Conditional

Once you get to the point where you have longer **if-elseif-else** conditionals, you may find that you can save programming time and clarify your code by using a **switch** conditional instead. The **switch** conditional takes only one possible condition, normally just a variable:

```
switch ($var) {  
    case value1:  
        statement(s)1;  
        break;  
    case value2:  
        statement(s)2;  
        break;  
    default:  
        statement(s)3;  
        break;  
}
```

You must understand how a **switch** conditional works in order to use it properly. After the keyword **switch**, a variable is identified within parentheses. PHP will then look at each case in order, trying to identify a matching value. Note that, as with any other use of strings and numbers in PHP, numeric values would not be quoted; string values should be. After the **case value** section, a **colon** (not a semicolon) prefacing the associated statements, which are normally indented beginning on the following line.

Once PHP finds a case that matches the value of the conditional variable, it executes the subsequent statements. Here's the tricky part: once PHP has found a matching case, it will continue going through the **switch** until it either comes to the end of the **switch** conditional (the closing curly bracket) or hits a **break** statement, at which point it exits the **switch** construct. Thus, it's imperative that you

**Script 6.8** Switch conditionals can simplify complicated **if-elseif** conditionals.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
2   1.0 Transitional//EN"  
3   "http://www.w3.org/TR/xhtml1/DTD/  
4   xhtml1-transitional.dtd">  
5   <html xmlns="http://www.w3.org/1999/  
6   xhtml" xml:lang="en" lang="en">  
7   <head>  
8       <meta http-equiv="Content-Type"  
9         content="text/html; charset=utf-8"/>  
10      <title>Registration</title>  
11      <style type="text/css" media="screen">  
12          .error { color: red; }  
13      </style>  
14  </head>  
15  <body>  
16  <h1>Registration Results</h1>  
17  <?php // Script 6.8 - handle_reg.php #7  
18  /* This script receives seven values  
19  from register.html:  
20  email, password, confirm, year, terms,  
21  color, submit */  
22  // Address error management, if you want.  
23  // Flag variable to track success:  
24  $okay = TRUE;  
25  // Validate the email address:  
26  if (empty($_POST['email'])) {  
27      print '<p class="error">Please enter  
28      your email address.</p>';  
29      $okay = FALSE;  
30  }  
31  // Validate the password:  
32  if (empty($_POST['password'])) {  
33      print '<p class="error">Please enter  
34      your password.</p>';  
35      $okay = FALSE;  
36  }  
37  // Check the two passwords for equality:  
38  if ($_POST['password'] !=  
39      $_POST['confirm']) {  
40      print '<p class="error">Your confirmed  
41      password does not match the original  
42      password.</p>';  
43      $okay = FALSE;  
44  }
```

code continues on next page

### Script 6.8 continued

```
39
40 // Validate the year:
41 if ( is_numeric($_POST['year']) AND
42      (strlen($_POST['year']) == 4) ) {
43
44     // Check that they were born before
45     // 2011.
46     if ($_POST['year'] < 2011) {
47         $age = 2011 - $_POST['year'];
48         // Calculate age this year.
49     } else {
50         print '<p class="error">Either you
51             entered your birth year wrong or
52             you come from the future!</p>';
53         $okay = FALSE;
54     } // End of 2nd conditional.
55
56 } else { // Else for 1st conditional.
57
58     print '<p class="error">Please enter
59             the year you were born as four
60             digits.</p>';
61     $okay = FALSE;
62 }
63
64 // Validate the terms:
65 if ( !isset($_POST['terms']) AND
66      ($_POST['terms'] == 'Yes') ) {
67     print '<p class="error">You must
68             accept the terms.</p>';
69     $okay = FALSE;
70 }
71
72 // Validate the color:
73 switch ($_POST['color']) {
74     case 'red':
75         $color_type = 'primary';
76         break;
77     case 'yellow':
78         $color_type = 'primary';
79         break;
80     case 'green':
81         $color_type = 'secondary';
82         break;
83     case 'blue':
84         $color_type = 'primary';
85         break;
86     default:
```

code continues on next page

close every case—even the **default** case, for consistency's sake—with a **break** (the sidebar “Break, Exit, Die, and Continue” discusses this keyword in more detail).

This previous **switch** conditional is like a rewrite of:

```
if ($var == value1) {
    statement(s)1;
} elseif ($variable == value2) {
    statement(s)2;
} else {
    statement(s)3;
}
```

Because the **switch** conditional uses the value of **\$var** as its condition, it first checks to see if **\$var** is equal to **value1** and, if so, executes **statement(s)1**. If not, it checks to see if **\$var** is equal to **value2** and, if so, executes **statement(s)2**. If neither condition is met, the default action of the **switch** conditional is to execute **statement(s)3**.

With this in mind, let's rewrite the colors conditional as a **switch**.

### To use a **switch** conditional:

1. Open **handle\_reg.php** (Script 6.7) in your text editor or IDE, if it is not already open.
2. Delete the extended colors conditional (Script 6.8).
3. Begin the **switch**:

```
switch ($_POST['color']) {
```

As mentioned earlier, a **switch** conditional takes only one condition: a variable's name. In this example, it's **\$\_POST['color']**.

*continues on next page*

4. Create the first case:

```
case 'red':  
    $color_type = 'primary';  
    break;
```

The first case checks to see if `$_POST['color']` has a value of `red`. If so, then, the same statement is executed as before. Next you include a `break` statement to exit the `switch`.

5. Add a case for the second color:

```
case 'yellow':  
    $color_type = 'primary';  
    break;
```

6. Add cases for the remaining colors:

```
case 'green':  
    $color_type = 'secondary';  
    break;  
case 'blue':  
    $color_type = 'primary';  
    break;
```

Script 6.8 *continued*

```
79     print '<p class="error">Please  
80         select your favorite color.</p>';  
81     $okay = FALSE;  
82 } // End of switch.  
83  
84 // If there were no errors, print a  
85 success message:  
86 if ($okay) {  
87     print '<p>You have been successfully  
88         registered (but not really).</p>';  
89     print "<p>You will turn $age this  
90         year.</p>";  
91     print "<p>Your favorite color is a  
92         $color_type color.</p>";  
93 }  
94 ?>  
95 </body>  
96 </html>
```

## Break, Exit, Die, and Continue

PHP includes many *language constructs*—tools that aren't functions but still do something in your scripts. For example, `print` is a language construct. Another example is `break`, which is demonstrated in the `switch`. `break` exits the current structure, be it a `switch`, an `if-else` conditional, or a loop.

Similar to this is `continue`, which terminates the current iteration of a loop. Any remaining statements within the loop aren't executed, but the loop's condition is checked again to see if the loop should be entered.

`exit` and `die` are more potent versions of `break` (and they're synonymous). Instead of exiting the current structure, these two language constructs terminate the execution of the PHP script. Therefore, all PHP code after a use of `exit` or `die` is never executed. For that matter, any HTML after these constructs is never sent to the Web browser. You'll see `die` used most frequently as a heavy-handed error handling tool. `exit` is often used in conjunction with the `header()` function.

## Registration Results

You have been successfully registered (but not really).  
You will turn 47 this year.  
Your favorite color is a primary color.

- A** The handling script still works the same, whether the user selects a color...

## Registration Results

Please select your favorite color.

- B** ...or fails to.

- 7.** Add a **default** case and complete the switch:

```
default:  
    print '<p class="error">Please  
    → select your favorite  
    → color.</p>';  
    $okay = FALSE;  
    break;  
} // End of switch.
```

This **default** case is the equivalent of the **else** clause used in the original conditional.

- 8.** Save your script, place it in the same directory as `register.html` (on your PHP-enabled server), and test it in your Web browser again **A** and **B**.

**TIP** A **default** case isn't required in your switch conditional (you could set it up so that if the value isn't explicitly met by one of the cases, nothing happens), but if it's used, it should be the last case.

**TIP** If you're using a string in your switch conditional as the case value, keep in mind that it's **case sensitive**, meaning that *Value* won't match *value*.

# The for Loop

Loops are the final type of control structure discussed in this chapter. As suggested earlier, loops are used to execute a section of code repeatedly. You may want to print something a certain number of times, or you may want to do something with each value in an array (i.e., a list of values). For either of these cases, and many more, you can use a loop. (The latter example is demonstrated in the next chapter.)

PHP supports three kinds of loops: **for**, **while**, and **foreach**. **The while loop is similar to for, but it's used most frequently when retrieving values from a database or reading from a text file (it's introduced in the sidebar).** **The foreach loop is related to using arrays and is introduced in the next chapter.**

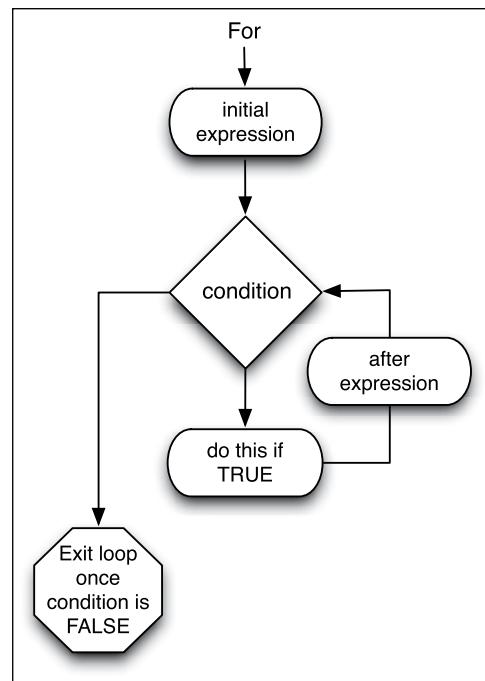
The **for** loop is designed to perform specific statements for a determined number of iterations (unlike **while**, which runs until a condition is FALSE—similar, but significantly different, concepts). You normally use a dummy variable in the loop for this purpose:

```
for (initial expression; condition;
→ closing expression) {
    statement(s);
}
```

The initial expression is executed once: the first time the loop is called. Then the condition is used to determine whether to execute the statements. The closing expression is executed each time the condition is found to be TRUE, but only after the statements are executed **A**.

Here's a simple loop that prints out the numbers 1 through 10:

```
for ($i = 1; $i <= 10; $i++) {
    print $i;
}
```



**A** This flowchart represents how a **for** loop is executed in PHP.

**Script 6.9** This script uses a PHP **for** loop to dynamically generate the day of the month drop-down menu.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
2   1.0 Transitional//EN"  
3   "http://www.w3.org/TR/xhtml1/DTD/  
4   xhtml1-transitional.dtd">  
5   <html xmlns="http://www.w3.org/1999/  
6   xhtml" xml:lang="en" lang="en">  
7   <head>  
8     <meta http-equiv="Content-Type"  
9       content="text/html; charset=utf-8"/>  
10    <title>Registration Form</title>  
11  </head>  
12  <body>  
13  <!-- Script 6.9 - register.php -->  
14  <div><p>Please complete this form to  
15  register:</p>  
16  <form action="handle_reg.php"  
17  method="post">  
18  
19  <p>Email Address: <input type="text"  
20  name="email" size="30" /></p>  
21  
22  <p>Password: <input type="password"  
23  name="password" size="20" /></p>  
24  
25  <p>Confirm Password: <input  
26  type="password" name="confirm"  
27  size="20" /></p>  
28  
29  <p>Date Of Birth:<br/>  
30  <select name="month">  
31  <option value="">Month</option>  
32  <option value="1">January</option>  
33  <option value="2">February</option>  
34  <option value="3">March</option>  
35  <option value="4">April</option>  
36  <option value="5">May</option>  
37  <option value="6">June</option>  
38  <option value="7">July</option>  
39  <option value="8">August</option>  
40  <option value="9">September</option>  
41  <option value="10">October</option>  
42  <option value="11">November</option>  
43  <option value="12">December</option>  
44  </select>  
45  <select name="day">  
46  <option value="">Day</option>  
47  <?php // Print out 31 days:
```

code continues on next page

To practice with the **for** loop, let's expand the registration form so that it asks the user for their complete birthday. A **for** loop can be used to easily create a day drop-down menu in the HTML form.

### To write a for loop:

1. Open **register.html** (Script 6.1) in your text editor or IDE, if it is not already open.
2. Remove the existing birth year prompt and input (Script 6.9).

You'll replace this one prompt with three separate elements to represent the entire birthday: month, day, and year.

3. Where the birth year prompt was, after the password confirmation and before the color option, add a prompt and a list of months:

```
<p>Date Of Birth:  
<select name="month">  
<option value="">Month</option>  
<option value="1">January</option>  
<option value="2">February</option>  
<option value="3">March</option>  
<option value="4">April</option>  
<option value="5">May</option>  
<option value="6">June</option>  
<option value="7">July</option>  
<option value="8">August</option>  
<option value="9">September</option>  
<option value="10">October</option>  
<option value="11">November</option>  
<option value="12">December</option>  
</select>
```

First is a textual prompt, telling the user to supply their entire date of birth. Next comes a select menu in which the user can pick their birth month. The value for each option is numeric; the viewed text is a string (the month's name).

*continues on next page*

4. Begin a select menu for the birth day:

```
<select name="day">
<option value="">Day</option>
```

This code starts the **select** form element for the user's birth day of the month. The list of possible values will be generated using PHP.

5. Create a new PHP section:

```
<?php
```

Because PHP can be embedded within HTML, you'll use it to populate the drop-down menu. Begin with the standard PHP tag.

6. Create a **for** loop to print out 31 days as select menu options:

```
for ($i = 1; $i <= 31; $i++) {
    print "<option value=\"$i\">$i
    → </option>\n";
}
```

The loop begins by creating a dummy variable called **\$i**. On the first use of the loop, this variable is set to 1. Then, as long as **\$i** is less than or equal to 31, the contents of the loop are executed. These contents are the **print** line, which creates code like

```
<option value="1">1</option>
```

followed by a return (created with **\n**). After this statement is executed, the **\$i** variable is incremented by 1. Then the condition (**\$i <= 31**) is checked again, and the process is repeated.

7. Close the PHP section:

```
?>
```

8. Save the file as **register.php**.

You must save the file with the **.php** extension now, in order for the PHP code to be executed.

**Script 6.9 continued**

```
39     for ($i = 1; $i <= 31; $i++) {
40         print "<option value=\"$i\">$i
        → </option>\n";
}
?
</select>
<input type="text" name="year"
value="YYYY" size="4" /></p>
45
46     <p>Favorite Color:
47     <select name="color">
48         <option value="">Pick One</option>
49         <option value="red">Red</option>
50         <option value="yellow">Yellow</option>
51         <option value="green">Green</option>
52         <option value="blue">Blue</option>
53     </select></p>
54
55     <p><input type="checkbox"
name="terms" value="Yes" /> I agree to
the terms (whatever they may be).</p>
56
57     <input type="submit" name="submit"
value="Register" />
58
59     </form>
60
61     </div>
62     </body>
63     </html>
```

Please complete this form to register:

Email Address:

Password:

Confirm Password:

Date Of Birth:

Favorite Color:

I agree to the terms (whatever they may be).

**B** The new version of the HTML form, with some dynamically generated content.

```
<option value="11">November</option>
<option value="12">December</option>
</select>
<select name="day">
<option value="">Day</option>
<option value="1">1</option>
<option value="2">2</option>
<option value="3">3</option>
<option value="4">4</option>
<option value="5">5</option>
<option value="6">6</option>
<option value="7">7</option>
```

C If you view the HTML source code for the form, you'll see the data generated by the **for** loop.

## The while Loop

The second of the three types of loops that exist in PHP—the **while** loop—is designed to continue working as long as the condition you establish is TRUE. Like the **for** loop, it checks the value of the condition before each iteration. Once the condition becomes FALSE, the **while** loop is exited:

```
while (condition) {
    statement(s);
}
```

The main difference between **for** and **while** is that **while** doesn't include a system for setting initial conditions or for executing closing expressions.

You also have the option of using the **do...while** loop, which guarantees that the statements are executed at least once (this isn't necessarily true of the **while** loop):

```
do {
    statement(s);
} while (condition);
```

Although there is a fair amount of overlap regarding when you can use the two major loop constructs (**while** and **for**), you'll discover as you program that sometimes one is more logical than the other. The **while** loop is frequently used in the retrieval of data from a database (see Chapter 12, “Intro to Databases”).

9. Place the file in the proper directory for your PHP-enabled server and test it in your Web browser B.

As long as this script is in the same directory as **handle\_reg.php**, you can even fill out and submit the form as you would with the plain HTML version.

10. If desired, view the HTML source code to see the PHP-generated options C.

**TIP** It's conventional to use simple variables as the counters within **for** loops: \$i, \$j, \$k, etc.

**TIP** Just as you can write the **if** conditional on one line if you have only one statement, you can do the same with the **while** and **for** loops. Again, though, this isn't recommended.

**TIP** Loops can be nested inside each other. You can also place conditionals within loops, loops within conditionals, and so forth.

**TIP** Pay close attention to your loop's condition so that the loop ends at some point. Otherwise, you'll create an infinite loop, and the script will run and run and run.

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- Why is it important to have a user confirm their password during the registration process?
- What is the basic structure of an `if` conditional in PHP? An `if-else` conditional? An `if-elseif`? An `if-elseif-else`?
- What are the differences between the `empty()` and `isset()` functions?
- What is the `assignment` operator? What is the `equality` operator?
- Without knowing anything about `$var`, will the following conditional be TRUE or FALSE? Why?

```
if ($var = 'donut') {
```
- What do these operators mean?
  - ▶ `&&`
  - ▶ `||`
  - ▶ `!`
- What is the syntax of a `switch` conditional? When is a `switch` most commonly used?
- What is the syntax of a `for` loop?

## Pursue

- Check out the PHP manual's pages for the various operators.
- Rewrite `handle_reg.php` so that it uses a variable for the current year, instead of hard-coding that value.
- For debugging purposes, add code to the beginning of the `handle_reg.php` script that prints out the values of the received variables. Hint: There's a short and a long way to do this.
- Rewrite one of the versions of `handle_reg.php` so that it prints the user's favorite color selection in the user's favorite color. Hint: You'll want to use CSS and concatenation.
- Update `handle_reg.php` so that it validates the user's birthday by looking at the three individual form elements: month, day, and year. Create a variable that represents the user's birthday in the format `XX/DD/YYYY` (again, you'll use concatenation for this).



# 7

# Using Arrays

The next—and last—variable type you’ll learn about in this book is the *array*. Arrays are significantly different from numbers or strings, and you can’t make the most of programming in PHP without understanding them.

Because of their unique nature, this chapter will cover arrays more deliberately and slowly than the other variable types. The chapter begins with an introduction to the concept, along with the basics of creating and using arrays. Then it covers multidimensional arrays and some of the array-related functions. The chapter concludes with array-string conversions and a demonstration on how to create an array from an HTML form.

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## In This Chapter

What Is an Array?	152
Creating an Array	154
Adding Items to an Array	158
Accessing Array Elements	161
Creating Multidimensional Arrays	164
Sorting Arrays	168
Transforming Between Strings and Arrays	172
Creating an Array from a Form	176
Review and Pursue	182

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# What Is an Array?

Arrays constitute a complicated but very useful notion. Whereas numbers and strings are *scalar* variables (meaning they always have only a single value), an array is a collection of multiple values assembled into one overriding variable. An array can consist of numbers and/or strings (and/or other arrays), which allows this one variable to hold exponentially more information than a simple string or number can. For example, if you wanted to create a grocery list using strings, your code would look something like this:

```
$item1 = 'apples';
$item2 = 'bananas';
$item3 = 'oranges';
```

For each added item, you'd need to create a new string. This approach is cumbersome, and it makes it difficult to refer back to the entire list or any specific value later in your code. You can greatly simplify matters by placing your entire list into one array (say, `$items`), which contains everything you need (**Table 7.1**).

As an array, your list can be added to, sorted, searched, and so forth. With this context in mind, let's look into the syntax of arrays.

---

**TABLE 7.1** Grocery List Array

Item Number	Item
1	apples
2	bananas
3	oranges

---

## Superglobals and You

Throughout this book, you've already dealt with some arrays: `$_SERVER`, `$_GET`, and `$_POST`. These are all special arrays called *superglobals*, along with `$_COOKIE`, `$_SESSION`, and `$_ENV`.

As you know, the `$_POST` array receives all the data sent to the page from a form that uses the POST method. Its indexes are the names of the form elements, and its values are the values of those form elements. Therefore, `$_POST['name']` refers to the value typed in a form input created by the code

```
<input type="text" name="name" />
```

Similarly, `$_GET` refers to data sent from a form using the GET method or from data otherwise passed in the URL. `$_COOKIE` refers to data stored in a cookie, and `$_SESSION` refers to data stored in a session (you'll encounter these two in Chapter 9, "Cookies and Sessions"). `$_ENV` is like `$_SERVER`, containing values pertaining to the computer on which PHP is running.

## Syntactical rules for arrays

The other variable types you've dealt with—numbers and strings—have a variable name and a corresponding value (for example, `$first_name` could be equal to *Larry*). Arrays also have a name, derived using the same conventions:

- They begin with a dollar sign.
- They continue with a letter or underscore.
- They finish with any combination of letters, numbers, or the underscore.

But arrays differ in that they contain multiple *elements* (think of each row in Table 7.1 as an element). An element consists of an *index* or *key* (the two words can be used interchangeably) and a value. In Table 7.1, the Item Number is the key, and the Item is the value.

An array's index is used as a reference point to the values. An array can use either numbers or strings as its keys (or both), depending on how you set it up.

Generally, when you use an array it looks the same as any other variable, except that you include a key in square brackets ([ ]) to reference particular values. Whereas `$items` refers to the array as a whole, `$items[1]` points to a specific element in the array (in this example, *apples*).

# Creating an Array

The formal method of creating an array is to use the `array()` function. Its syntax is:

```
$list = array ('apples', 'bananas',
→ 'oranges');
```

Arrays automatically begin their indexing at 0, unless otherwise specified. In that example—which doesn’t specify an index for the elements—the first item, *apples*, is automatically indexed at 0, the second item at 1, and the third at 2.

You can assign the index when using `array()`:

```
$list = array (1 => 'apples', 2 =>
→ 'bananas', 3 => 'oranges');
```

Because PHP is very liberal when it comes to blank space in your scripts, you can make this structure easier to read by writing it over multiple lines:

```
$list = array (
1 => 'apples',
2 => 'bananas',
3 => 'oranges'
);
```

Finally, the index value you specify doesn’t have to be a number—you can use strings as well. This indexing technique is practical for making more meaningful lists. As an example, you could create an array that records the soup of the day for each day of the week, as in the following script. This example will also demonstrate how you can, and cannot, print out an array (which has already been demonstrated but is worth rehashing).

**Script 7.1** The `$soups` array contains three elements and uses strings for its keys.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
   XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/
       xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
       xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="Content-Type"
            content="text/html;
            charset=utf-8"/>
6      <title>No Soup for You!</title>
7  </head>
8  <body>
9  <h1>Mmm...soups</h1>
10 <?php // Script 7.1 - soups1.php
11 /* This script creates and prints out
   an array. */
12 // Address error management, if you
   want.
13
14 // Create the array:
15 $soups = array (
16 'Monday' => 'Clam Chowder',
17 'Tuesday' => 'White Chicken Chili',
18 'Wednesday' => 'Vegetarian'
19 );
20
21 // Try to print the array:
22 print "<p>$soups</p>";
23
24 // Print the contents of the array:
25 print_r ($soups);
26
27 ?>
28 </body>
29 </html>
```

## To create an array:

1. Begin a new document in your text editor or IDE, to be named `soups1.php` (**Script 7.1**):

```
<!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" xml:lang="en"
       lang="en">
<head>
    <meta http-equiv="Content-Type"
        content="text/html;
        charset=utf-8"/>
    <title>No Soup for You!</title>
</head>
<body>
<h1>Mmm...soups</h1>
```

2. Begin the PHP section of the script and address error handling, if necessary:

```
<?php // Script 7.1 - soups1.php
```

If you don't have `display_errors` enabled, or if `error_reporting` is set to the wrong level, see Chapter 3, "HTML Forms and PHP," for the lines to include here to alter those settings.

3. Use the `array()` function to create an array:

```
$soups = array (
'Monday' => 'Clam Chowder',
'Tuesday' => 'White Chicken Chili',
'Wednesday' => 'Vegetarian'
);
```

*continues on next page*

This is the proper format for initializing (creating and assigning a value to) an array in PHP, using strings as the indices. Because both the keys and values are strings, you surround them with quotation marks. As with all strings, you can use either single or double quotation marks, so long as you're mindful of other quotation marks that might be found within the string.

4. Attempt to print the array:

```
print "<p>$soups</p>";
```

As you've already seen, arrays are also different in that they can't be printed the way you'd print other (scalar) variables.

5. Use the `print_r()` function to print out the array differently:

```
print_r ($soups);
```

In Chapter 2, “Variables,” you learned how to use `print_r()` to show the contents and structure of any variable. Use it here so that you can see the difference between the way this function and `print` work with arrays.

6. Close the PHP and the HTML sections:

```
?>  
</body>  
</html>
```

7. Save your document as `soups1.php`, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **A**.

Remember to run the PHP script through a URL.

## Mmm...soups

Array

Array ( [Monday] => Clam Chowder [Tuesday] => White Chicken Chili [Wednesday] => Vegetarian )

**A** Because an array is structured differently than other variable types, a request to print an array results in the word *Array*. On the other hand, the `print_r()` function prints the array's contents and structure.

**TIP** The practice of beginning any index at 0 is standard in PHP and most other programming languages. As unnatural as this counting system may seem, it's here to stay, so you have two possible coping techniques. First, manually start all your arrays indexed at position 1. Second, unlearn a lifetime of counting from 1. You can decide which is easier, but most programmers just get used to this odd construct.

**TIP** You must refer to an array's elements via the same index used to create the array. In the \$soups example, \$soups[0] has no value even though the array obviously has a first element (the first element normally being indexed at 0 numerically).

**TIP** If you use the `array()` function to define an index, you can associate the first index, and the others will follow sequentially. For example:

```
$list = array (1 => 'apples',
               'bananas', 'oranges');
```

Now *bananas* is indexed at 2 and *oranges* at 3.

**TIP** The `range()` function can also be used to create an array of items based on a range of values. Here are two examples:

```
$ten = range (1, 10);
$alphabet = range ('a', 'z');
```

**TIP** As of PHP version 5, the `range()` function includes a `step` parameter that lets you specify increments:

```
$evens = range (0, 100, 2);
```

**TIP** If you use the `var_dump()` function in your script in lieu of `print_r()`, it shows not only the contents of the array but also its structure in a more detailed format. **B**.

**TIP** An array whose keys are numbers is called an *indexed array*. If the keys are strings, it's referred to as an *associative array*. Other languages refer to associative arrays as *hashes*.

```
array(3) { ["Monday"]=> string(12) "Clam Chowder" ["Tuesday"]=> string(19) "White Chicken Chili" ["Wednesday"]=> string(10) "Vegetarian" }
```

**B** The `var_dump()` function (used with Script 7.1 instead of the `print_r()` function) shows how many elements are in an array and how long each string value is.

# Adding Items to an Array

In PHP, once an array exists, you can add extra elements to the array with the assignment operator (the equals sign), in a way similar to how you assign a value to a string or a number. When doing so, you can specify the key of the added element or not specify it, but in either case, you must refer to the array with the square brackets. To add two items to the existing `$list` array, you'd write

```
$list[] = 'pears';
$list[] = 'tomatoes';
```

If you don't specify the key, each element is appended to the existing array, indexed with the next sequential number. Assuming this is the same array from the preceding section, which was indexed at 1, 2, and 3, `pears` is now located at 4 and `tomatoes` at 5.

If you do specify the index, the value is assigned at that location. Any existing value already indexed at that point is overwritten, like so:

```
$list[3] = 'pears';
$list[4] = 'tomatoes';
```

Now, the value of the element in the fourth position of the array is `tomatoes`, and no element of `$list` is equal to `oranges` (that value was overwritten by `pears`). With this in mind, unless you intend to overwrite any existing data, you'll be better off not naming a specific key when adding values to your arrays. However, if the array uses strings for indices, you'll probably want to specify keys so that you don't end up with an unusual combination of string and numeric keys.

To test this process, in the following task you'll rewrite `soups1.php` to add more elements to the array. To see the difference adding more elements makes, you'll print out the number of elements in the array before and after the new additions. Just as you can find the length of a string—how

## Deleting Arrays and Array Elements

You won't frequently need to delete an individual item from an array, but it's possible to do using the `unset()` function. This function eliminates a variable and frees up the memory it used. When applied to an array element, that element is deleted:

```
unset($array[4]);
unset($array['name']);
```

If you apply `unset()` to an entire array or any other variable type, the whole variable is deleted:

```
unset($array);
unset($string);
```

You can also reset an array (empty it without deleting the variable altogether) using the `array()` function:

```
$array = array();
```

This has the effect of initializing the variable: making it exist and defining its type without assigning a value.

**Script 7.2** You can directly add elements to an array one at a time by assigning each element a value with the assignment operator. The `count()` function will help you keep track of how many elements the array contains.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
2   XHTML 1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8   <meta http-equiv="Content-Type"
9    content="text/html; charset=utf-8"/>
10 <title>No Soup for You!</title>
11 </head>
12 <body>
13 <h1>Mmm...soups</h1>
14 <?php // Script 7.2 - soups2.php
15 /* This script creates and prints out
16 an array. */
17 // Address error management, if you want.
18
19 // Create the array:
20 $soups = array (
21 'Monday' => 'Clam Chowder',
22 'Tuesday' => 'White Chicken Chili',
23 'Wednesday' => 'Vegetarian'
24 );
25
26 // Count and print the current number
27 // of elements:
28 $count1 = count ($soups);
29 print "<p>The soups array originally
30 had $count1 elements.</p>";
31
32 // Add three items to the array:
33 $soups['Thursday'] = 'Chicken
34 Noodle';
35 $soups['Friday'] = 'Tomato';
36 $soups['Saturday'] = 'Cream of Broccoli';
37
38 // Count and print the number of
39 // elements again:
40 $count2 = count ($soups);
41 print "<p>After adding 3 more soups,
42 the array now has $count2 elements.</p>";
43
44 // Print the contents of the array:
45 print_r ($soups);
46
47 ?>
48 </body>
49 </html>
```

many characters it contains—by using `strlen()`, you can determine the number of elements in an array by using `count()`:

```
$how_many = count($array);
```

## To add elements to an array:

1. Open `soups1.php` in your text editor or IDE, if it is not already.
2. After the array is initialized using `array()`, add the following (**Script 7.2**, to be named `soups2.php`):

```
$count1 = count ($soups);
print "<p>The soups array originally
→ had $count1 elements.</p>";
```

The `count()` function determines how many elements are in `$soups`. By assigning that value to a variable, you can easily print out the number.

3. Add three more elements to the array:

```
$soups['Thursday'] = 'Chicken Noodle';
$soups['Friday'] = 'Tomato';
$soups['Saturday'] = 'Cream of
→ Broccoli';
```

This code adds three more soups—indexed at *Thursday*, *Friday*, and *Saturday*—to the existing array.

4. Recount how many elements are in the array, and print this value:

```
$count2 = count ($soups);
print "<p>After adding 3 more
→ soups, the array now has
→ $count2 elements.</p>";
```

This second `print` call is a repetition of the first, showing how many elements the array now contains.

5. Delete this line:

```
print "<p>$soups</p>";
```

This line isn't needed anymore, so you can get rid of it (you now know that you can't print an array that easily).

*continues on next page*

6. Save your script as `soups2.php`, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **A**.

## Merging Arrays

PHP has a function that allows you to append one array onto another. Think of it as concatenation for arrays. The function, `array_merge()`, works like so:

```
$new_array = array_merge  
→ ($array1, $array2);
```

You could also write the `soups2.php` page using this function:

```
$soups2 = array (  
    'Thursday' => 'Chicken Noodle',  
    'Friday' => 'Tomato',  
    'Saturday' => 'Cream of  
    → Broccoli'  
);  
$soups = array_merge($soups,  
→ $soups2);
```

You could even accomplish this result with the plus sign (thus adding two arrays together):

```
$soups = $soups + $soups2;  
or  
$soups += $soups2;
```

**TIP** Be very careful when you directly add elements to an array. There's a correct way to do it—

```
$array[] = 'Add This';
```

or

```
$array[1] = 'Add This';
```

—and an incorrect way:

```
$array = 'Add This';
```

If you forget to use the brackets, the new value will replace the entire existing array, leaving you with a simple string or number.

**TIP** The code

```
$array[] = 'Value';
```

creates the `$array` variable if it doesn't yet exist.

**TIP** While working with these arrays, I'm using single quotation marks to enclose both the keys and the values. Nothing needs to be interpolated (like a variable), so double quotation marks aren't required. It's perfectly acceptable to use double quotation marks, though, if you want to.

**TIP** You don't (and, in fact, shouldn't) quote your keys if they're numbers, variables, or constants (you'll learn about constants in Chapter 8, "Creating Web Applications"). For example:

```
$day = 'Sunday';  
$soups[$day] = 'Mushroom';
```

**TIP** The `sizeof()` function is an alias to `count()`. It also returns the number of elements in an array.

## Mmm...soups

The soups array originally had 3 elements.

After adding 3 more soups, the array now has 6 elements.

```
Array ( [Monday] => Clam Chowder [Tuesday] => White Chicken Chili  
[Wednesday] => Vegetarian [Thursday] => Chicken Noodle [Friday] => Tomato  
[Saturday] => Cream of Broccoli )
```

**A** A direct way to ensure that the new elements were successfully added to the array is to count the number of elements before and after you make the additions.

# Accessing Array Elements

Regardless of how you establish an array, there's only one way to retrieve a specific element (or value) from it, and that is to refer to its index:

```
print "The first item is $array[0]";
```

If the array uses strings for indexes, which should be quoted, you must adjust for the quotation marks you'd use around the index, because they conflict with the `print` syntax. This line will cause problems A:

```
print "<p>Monday's soup is  
→ $soups['Monday'].</p>";
```

To combat this issue, you can wrap the whole array construct within curly brackets B:

```
print "<p>Monday's soup is  
→ {$soups['Monday']}</p>";
```

Ironically, the feature that makes arrays so useful—being able to store multiple values in one variable—also gives it a limitation

the other variable types don't have: You must know the keys of the array in order to access its elements. If the array was set using strings, like the `$soups` array, then referring to `$soups[1]` points to nothing C.

For that matter, because *indexes are case-sensitive*, `$soups['monday']` is meaningless because *Clam Chowder* was indexed at `$soups['Monday']`.

The fastest and easiest way to access all the values of an array is to use a `foreach` loop. This construct loops through every element of an array:

```
foreach ($array as $key => $value) {  
    print "<p>Key is $key. Value  
→ is $value</p>";  
}
```

With each iteration of the loop, the current array element's key will be assigned to the `$key` variable and the value to `$value`. Note that you can use any variable here: `$k` and `$v` are likely choices, too.

You can now write a new soups script to use this knowledge.

**Parse error:** syntax error, unexpected T\_ENCAPSED\_AND\_WHITESPACE, expecting T\_STRING or T\_VARIABLE or T\_NUM\_STRING in /Users/larryullman/Sites/phpvqs4/soups2.php on line 37

A Referencing a specific element in an associative array will cause parse errors within double quotation marks.

```
Monday's soup is Clam Chowder.
```

B Wrapping an array element reference in curly brackets is one way to avoid parse errors.

**Notice:** Undefined offset: 1 in /Users/larryullman/Sites/phpvqs4/soups2.php on line 37

C Referring to an array index that does not exist will create an *Undefined offset* or *Undefined Index* notice.

## To print the values of any array:

1. Begin a new document in your text editor or IDE (**Script 7.3, to be named soups3.php**):

```
<!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" xml:lang="en" lang="en">
<head>
  <meta http-equiv="Content-Type"
    → content="text/html;
    → charset=utf-8"/>
  <title>No Soup for You!</title>
</head>
<body>
  <h1>Mmm...soups</h1>
```

2. Start the PHP section of the page and address error management, if you need:

```
<?php // Script 7.3 - soups3.php
```

3. Create the **\$soups** array:

```
$soups = array (
'Monday' => 'Clam Chowder',
'Tuesday' => 'White Chicken Chili',
'Wednesday' => 'Vegetarian',
'Thursday' => 'Chicken Noodle',
'Friday' => 'Tomato',
'Saturday' => 'Cream of Broccoli'
);
```

Here the entire array is created at once, although you could use the same method (creating the array in steps) as in the preceding script, if you'd rather.

**Script 7.3** A **foreach** loop is the easiest way to access every element in an array.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
XHTML 1.0 Transitional//EN"
2    "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="Content-Type"
      content="text/html;
      charset=utf-8"/>
6    <title>No Soup for You!</title>
7  </head>
8  <body>
9    <h1>Mmm...soups</h1>
10   <?php // Script 7.3 - soups3.php
11  /* This script creates and prints out
an array. */
12
13 // Address error management, if you
want.
14
15 // Create the array:
16 $soups = array (
17   'Monday' => 'Clam Chowder',
18   'Tuesday' => 'White Chicken Chili',
19   'Wednesday' => 'Vegetarian',
20   'Thursday' => 'Chicken Noodle',
21   'Friday' => 'Tomato',
22   'Saturday' => 'Cream of Broccoli'
23 );
24
25 // Print each key and value:
26 foreach ($soups as $day => $soup) {
27   print "<p>$day: $soup</p>\n";
28 }
29
30 ?>
31 </body>
32 </html>
```

4. Create a **foreach** loop to print out each day's soup:

```
foreach ($soups as $day => $soup)
{
    print "<p>$day: $soup</p>\n";
}
```

The **foreach** loop iterates through every element of the **\$soups** array, assigning each index to **\$day** and each value to **\$soup**. These values are then printed out within HTML paragraph tags. The **print** statement concludes with a newline character (created by **\n**), which will make the HTML source code of the page more legible.

5. Close the PHP section and the HTML page:

```
?>
</body>
</html>
```

6. Save the page as **soups3.php**, place it in the proper directory for your PHP-enabled server, and test it in your Web browser ⑩.

## Mmm...soups

Monday: Clam Chowder

Tuesday: White Chicken Chili

Wednesday: Vegetarian

Thursday: Chicken Noodle

Friday: Tomato

Saturday: Cream of Broccoli

**TIP** One option for working with arrays is to assign a specific element's value to a separate variable using the assignment operator:

```
$total = $array[1];
```

By doing this, you can preserve the original value in the array and still manipulate the value separately as a variable.

**TIP** If you only need to access an array's values (and not its keys), you can use this **foreach** structure:

```
foreach ($array as $value) {
    // Do whatever.
}
```

**TIP** Another way to access all of an array's elements is to use a **for** loop:

```
for ($n = 0; $n < count($array);
$n++) {
    print "The value is $array[$n]";
}
```

**TIP** The curly brackets are used to avoid errors when printing array values that have strings for keys. Here are two examples where using quotation marks is not problematic, so the curly brackets aren't required:

```
$name = trim ($array['name']);
$total = $_POST['qty'] *
$_POST['price'];
```

**TIP** Curly brackets can also be used to separate a variable reference from a dollar sign or other characters:

```
print "The total is ${$total}.";
```

⑩ The execution of the loop for every element in the array generates this page. The **foreach** construct allows the script to access each key and value without prior knowledge of what they are.

# Creating Multidimensional Arrays

Multidimensional arrays are both simple and complicated at the same time. The structure and concept may be somewhat difficult to grasp, but creating and accessing multidimensional arrays in PHP is surprisingly easy.

You use a multidimensional array to create an array containing more information than a standard array. You accomplish this by using other arrays for values instead of just strings and numbers. For example:

```
$fruits = array ('apples', 'bananas',
→ 'oranges');
$meats = array ('steaks',
→ 'hamburgers', 'pork chops');
$groceries = array (
'fruits' => $fruits,
'meats' => $meats,
'other' => 'peanuts',
'cash' => 30.00
);
```

This array, **\$groceries**, now consists of one string (*peanuts*), one floating-point number (30.00), and two arrays (**\$fruits** and **\$meats**).

Pointing to an element in an array within an array can seem tricky. The key (pardon the pun) is to continue adding indices in square brackets as necessary, working from the outer array inward. With that example, *bananas* is at **\$groceries['fruits'][1]**. First, you point to the element (in this case, an array) in the **\$groceries** array by using **['fruits']**. Then, you point to the element in that array based on its position—it's the second item, so you use the index **[1]**.

In this next task, you'll write a script that creates another multidimensional array example.

**Script 7.4** The multidimensional **\$books** array stores a lot of information in one big variable.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
XHTML 1.0 Transitional//EN"
2   "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
4  <head>
5   <meta http-equiv="Content-Type"
content="text/html;
charset=utf-8"/>
6   <title>Larry Ullman's Books and
Chapters</title>
7  </head>
8  <body>
9   <h1>Some of Larry Ullman's Books</h1>
10 <?php // Script 7.4 - books.php
11 /* This script creates and prints out
a multidimensional array. */
12 // Address error management, if you
want.
13
14 // Create the first array:
15 $phpvqs = array (1 => 'Getting Started
with PHP', 'Variables', 'HTML Forms
and PHP', 'Using Numbers');
16
17 // Create the second array:
18 $phpadv = array (1 => 'Advanced
PHP Techniques', 'Developing Web
Applications', 'Advanced Database
Concepts', 'Security Techniques');
19
20 // Create the third array:
21 $phpmysql = array (1 => 'Introduction
to PHP', 'Programming with PHP',
'Creating Dynamic Web Sites',
'Introduction to MySQL');
22
23 // Create the multidimensional array:
24 $books = array (
25 'PHP VQS' => $phpvqs,
26 'PHP Advanced VQP' => $phpadv,
27 'PHP and MySQL VQP' => $phpmysql
28 );
29
```

code continues on next page

#### Script 7.4 continued

```
30 // Print out some values:  
31 print "<p>The third chapter of  
my first book is <i>{$books['PHP  
VQS'][3]}</i>.</p>";  
32 print "<p>The first chapter of my  
second book is <i>{$books['PHP  
Advanced VQP'][1]}</i>.</p>";  
33 print "<p>The fourth chapter of  
my fourth book is <i>{$books['PHP  
and MySQL VQP'][4]}</i>.</p>";  
34  
35 // See what happens with foreach:  
36 foreach ($books as $key => $value) {  
37     print "<p>$key: $value</p>\n";  
38 }  
39  
40 ?>  
41 </body>  
42 </html>
```

#### To use multidimensional arrays:

1. Begin a new document in your text editor or IDE, to be named **books.php** (Script 7.4):

```
<!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" xml:lang="en" lang="en">  
<head>  
    <meta http-equiv="Content-Type"  
        → content="text/html;  
        → charset=utf-8"/>  
    <title>Larry Ullman's Books and  
        → Chapters</title>  
</head>  
<body>  
    <h1>Some of Larry Ullman's  
        → Books</h1>
```

2. Create the initial PHP tags, and address error management, if necessary:

```
<?php // Script 7.4 - books.php
```

3. Create the first array:

```
$phpvqs = array (1 => 'Getting  
→ Started with PHP', 'Variables',  
→ 'HTML Forms and PHP', 'Using  
→ Numbers');
```

To build up the multidimensional array, you'll create three standard arrays and then use them as the values for the larger array. This array (called **\$phpvqs**, which is short for *PHP for the Web: Visual QuickStart Guide*) uses numbers for the keys and strings for the values. The numbers begin with 1 and correspond to the chapter numbers. The values are the chapter titles.

*continues on next page*

4. Create the next two arrays:

```
$phpadv = array (1 => 'Advanced  
→ PHP Techniques', 'Developing Web  
→ Applications', 'Advanced  
→ Database Concepts', 'Security  
→ Techniques');  
$phpmysql = array (1 =>  
→ 'Introduction to PHP',  
→ 'Programming with PHP',  
→ 'Creating Dynamic Web Sites',  
→ 'Introduction to MySQL');
```

For each array, add only the book's first four chapters for simplicity's sake.

5. Create the main, multidimensional array:

```
$books = array (  
'PHP VQS' => $phpvqs,  
'PHP Advanced VQP' => $phpadv,  
'PHP and MySQL VQP' => $phpmysql  
);
```

The **\$books** array is the master array for this script. It uses strings for keys (which are shortened versions of the book titles) and arrays for values. Use the **array()** function to create it, as you would any other array.

6. Print out the name of the third chapter of the *PHP Visual QuickStart Guide* book:

```
print "<p>The third chapter of  
→ my first book is <i>{$books['PHP  
→ VQS']}[3]</i>.</p>";
```

Following the rules stated earlier, all you need to do to access any individual chapter name is to begin with **\$books**, follow that with the first index (**['PHP VQS']**), and follow that with the next index (**[3]**). Because you're placing this in a **print** call, you enclose the whole construct in curly brackets to avoid parse errors.

7. Print out two more examples:

```
print "<p>The first chapter of  
→ my second book is <i>{$books  
→ ['PHP Advanced VQP'][1]}</i>.</p>";  
print "<p>The fourth chapter of  
→ my fourth book is <i>{$books  
→ ['PHP and MySQL VQP'][4]}</i>.</p>";
```

8. Run the **\$books** array through a **foreach** loop to see the results:

```
foreach ($books as $key => $value)  
{  
    print "<p>$key: $value</p>\n";  
}
```

## Some of Larry Ullman's Books

The third chapter of my first book is *HTML Forms and PHP*.

The first chapter of my second book is *Advanced PHP Techniques*.

The fourth chapter of my fourth book is *Introduction to MySQL*.

PHP VQS: Array

PHP Advanced VQP: Array

PHP and MySQL VQP: Array

**A** The first three lines are generated by **print** statements. The last three show the results of the **foreach** loop (and the notices come from attempting to print an array).

## PHP VQS

Chapter 1 is Getting Started with PHP  
Chapter 2 is Variables  
Chapter 3 is HTML Forms and PHP  
Chapter 4 is Using Numbers

## PHP Advanced VQP

Chapter 1 is Advanced PHP Techniques  
Chapter 2 is Developing Web Applications  
Chapter 3 is Advanced Database Concepts  
Chapter 4 is Security Techniques

## PHP and MySQL VQP

Chapter 1 is Introduction to PHP  
Chapter 2 is Programming with PHP  
Chapter 3 is Creating Dynamic Web Sites  
Chapter 4 is Introduction to MySQL

- B** One `foreach` loop within another can access every element of a two-dimensional array.

```
Array
(
    [PHP VQS] => Array
        (
            [1] => Getting Started with PHP
            [2] => Variables
            [3] => HTML Forms and PHP
            [4] => Using Numbers
        )

    [PHP Advanced VQP] => Array
        (
            [1] => Advanced PHP Techniques
            [2] => Developing Web Applications
            [3] => Advanced Database Concepts
            [4] => Security Techniques
        )

    [PHP and MySQL VQP] => Array
        (
            [1] => Introduction to PHP
            [2] => Programming with PHP
            [3] => Creating Dynamic Web Sites
            [4] => Introduction to MySQL
        )
)
```

- C** The `print_r()` function shows the structure and contents of the `$books` array.

The `$key` variable will be assigned each abbreviated book title, and the `$value` variable ends up containing each chapter array.

- 9.** Close the PHP section and complete the HTML page:

```
?>
</body>
</html>
```

- 10.** Save the file as `books.php`, place it in the proper directory for your PHP-enabled server, and test it in your browser **A**.

**TIP** To access every element of every array, you can nest two `foreach` loops like this **B**:

```
foreach ($books as $title =>
    → $chapters) {
    print "<p>$title";
    foreach ($chapters as $number =>
        → $chapter) {
        print "<br />Chapter $number
        → is $chapter";
    }
    print '</p>';
}
```

**TIP** Using the `print_r()` or `var_dump()` function (preferably enclosed in HTML `<pre>` tags for better formatting), you can view an entire multidimensional array **C**.

**TIP** You can create a multidimensional array in one statement by using a series of nested `array()` calls (instead of using several steps as in this example). However, doing so isn't recommended, because it's all too easy to make syntactical errors as a statement becomes more and more nested.

**TIP** Although all the subarrays in this example have the same structure (numbers for indexes and four elements), that isn't required with multidimensional arrays.

**TIP** To learn about the greater "Larry Ullman Collection," including the three books referenced here, head to [www.LarryUllman.com](http://www.LarryUllman.com).

# Sorting Arrays

PHP supports a variety of ways to sort an array (*sort* refers to an alphabetical sort if the values being sorted are strings, or a numerical sort if the values being sorted are numbers). When you're sorting an array, you must keep in mind that an array consists of pairs of *keys* and *values*. Thus, an array can be sorted based on the keys or the values. This is further complicated by the fact that you can sort the values and keep the corresponding keys aligned, or you can sort the values and have them be assigned new keys.

To sort the values without regard to the keys, you use `sort()`. To sort these values (again, without regard to the keys) in reverse order, you use `rsort()`. The syntax for every sorting function is:

```
function($array);
```

So, `sort()` and `rsort()` are used as follows:

```
sort($array);
rsort($array);
```

To sort the values while maintaining the correlation between each value and its key, you use `asort()`. To sort the values in reverse while maintaining the key correlation, you use `arsort()`.

To sort by the keys while maintaining the correlation between the key and its value, you use `ksort()`. Conversely, `krsort()` sorts the keys in reverse. Table 7.2 lists all these functions.

Finally, `shuffle()` randomly reorganizes the order of an array.

As an example of sorting arrays, you'll create a list of students and the grades they received on a test, and then sort this list first by grade and then by name.

**TABLE 7.2 Array Sorting Functions**

Function	Sorts By	Maintains Key-Values?
<code>sort()</code>	Values	No
<code>rsort()</code>	Values (inverse)	No
<code>asort()</code>	Values	Yes
<code>arsort()</code>	Values (inverse)	Yes
<code>ksort()</code>	Keys	Yes
<code>krsort()</code>	Keys (inverse)	Yes

**Script 7.5** PHP provides a number of different functions for sorting arrays, including `arsort()` and `ksort()`.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
   XHTML 1.0 Transitional//EN"
2    "http://www.w3.org/TR/xhtml1/DTD/
     xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
  xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="Content-Type"
      content="text/html;
      charset=utf-8"/>
6  <title>My Little Gradebook</title>
7  </head>
8  <body>
9  <?php // Script 7.5 - sort.php
10 /* This script creates, sorts, and
  prints out an array. */
11
12 // Address error management, if you
  want.
13
14 // Create the array:
15 $grades = array(
16   'Richard' => 95,
17   'Sherwood' => 82,
18   'Toni' => 98,
19   'Franz' => 87,
20   'Melissa' => 75,
21   'Roddy' => 85
22 );
23
24 // Print the original array:
25 print '<p>Originally the array looks
  like this: <br />';
26 foreach ($grades as $student =>
  $grade) {
27   print "$student: $grade<br />\n";
28 }
29 print '</p>';
30
31 // Sort by value in reverse order,
  then print again:
32 arsort ($grades);
33 print '<p>After sorting the array by
  value using arsort(), the array looks
  like this: <br />';
```

*code continues on next page*

## To sort an array:

1. Begin a new document in your text editor or IDE, to be named `sort.php` (Script 7.5):

```
<!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" xml:lang="en"
  → lang="en">
<head>
  <meta http-equiv="Content-Type"
    → content="text/html;
    charset=utf-8"/>
  <title>My Little Gradebook</
  title>
</head>
<body>
```

2. Begin the PHP section, and address error handling, if desired:

```
<?php // Script 7.5 - sort.php
```

3. Create the array:

```
$grades = array(
  'Richard' => 95,
  'Sherwood' => 82,
  'Toni' => 98,
  'Franz' => 87,
  'Melissa' => 75,
  'Roddy' => 85
);
```

The `$grades` array consists of six students' names along with their corresponding grades. Because the grades are numbers, they don't need to be quoted when assigning them.

*continues on next page*

4. Print a caption, and then print each element of the array using a **foreach** loop:

```
print '<p>Originally the array  
→ looks like this: <br />;  
foreach ($grades as $student =>  
→ $grade) {  
    print "$student: $grade<br />\n";  
}  
print '</p>';
```

As the **\$grades** array will be printed three times, captions indicating each state of the array will be useful. At first, the script prints the array in the original order. To do that, use a **foreach** loop, where each index (the student's name) is assigned to **\$student**, and each value (the student's grade) is assigned to **\$grade**. The final **print** call closes the HTML paragraph.

5. Sort the array in reverse order by value to determine who has the highest grade:

```
arsort ($grades);
```

To determine who has the highest grade, you need to use **arsort()** instead of **asort()**. The latter, which sorts the array in numeric order, would order the grades 75, 82, 85, and so on, rather than the desired 98, 95, 87.

You also must use **arsort()** and not **rsort()** in order to maintain the key-value relationship (**rsort()** would eliminate the student's name associated with each grade).

6. Print the array again (with a caption), using another loop:

```
print '<p>After sorting the array  
→ by value using arsort(), the  
→ array looks like this: <br />;  
foreach ($grades as $student =>  
→ $grade) {  
    print "$student: $grade<br />\n";  
}  
print '</p>';
```

#### Script 7.5 continued

```
34 foreach ($grades as $student =>  
→ $grade) {  
35     print "$student: $grade<br />\n";  
36 }  
37 print '</p>';  
38  
39 // Sort by key, then print again:  
40 ksort ($grades);  
41 print '<p>After sorting the array by  
key using ksort(), the array looks  
like this: <br />;  
42 foreach ($grades as $student =>  
→ $grade) {  
43     print "$student: $grade<br />\n";  
44 }  
45 print '</p>';  
46  
47 ?>  
48 </body>  
49 </html>
```

Originally the array looks like this:

Richard: 95  
Sherwood: 82  
Toni: 98  
Franz: 87  
Melissa: 75  
Roddy: 85

After sorting the array by value using `arsort()`, the array looks like this:

Toni: 98  
Richard: 95  
Franz: 87  
Roddy: 85  
Sherwood: 82  
Melissa: 75

After sorting the array by key using `ksort()`, the array looks like this:

Franz: 87  
Melissa: 75  
Richard: 95  
Roddy: 85  
Sherwood: 82  
Toni: 98

**A** You can sort an array in a number of ways with varied results. Pay close attention to whether you want to maintain your key-value association when choosing a sort function.

- Sort the array by key to put the array in alphabetical order by student name:

`ksort ($grades);`

The `ksort()` function organizes the array by key (in this case, alphabetically) while maintaining the key-value correlation.

- Print a caption and the array one last time:

```
print '<p>After sorting the array  
→ by key using ksort(), the array  
→ looks like this: <br />';  
foreach ($grades as $student =>  
→ $grade) {  
    print "$student: $grade<br />\n";  
}  
print '</p>';
```

- Complete the script with the standard PHP and HTML tags:

```
?>  
</body>  
</html>
```

- Save your script as `sort.php`, place it in the proper directory for your PHP-enabled server, and test it in your Web browser A.

**TIP** Because each element in an array must have its own unique key, the `$grades` array will only work using unique student names.

**TIP** The `natsort()` and `natcasesort()` functions sort a string (while maintaining key-value associations) using *natural order*. The most obvious example of natural order sorting is that it places `name2` before `name12`, whereas `sort()` orders them `name12` and then `name2`.

**TIP** The `usort()`, `uasort()`, and `ursort()` functions let you sort an array using a user-defined comparison function. These functions are most often used with multidimensional arrays.

# Transforming Between Strings and Arrays

Now that you have an understanding of both strings and arrays, this next section introduces two functions for switching between the formats. The first, `implode()`, turns an array into a string. The second, `explode()`, does just the opposite. Here are some reasons to use these functions:

- To turn an array into a string in order to pass that value appended to a URL (which you can't do as easily with an array)
- To turn an array into a string in order to store that information in a database
- To turn a string into an array to convert a comma-delimited text field (say a keyword search area of a form) into its separate parts

The syntax for using `explode()` is as follows:

```
$array = explode(separator, $string);
```

The `separator` refers to whatever character(s) define where one value ends and another begins. Commonly this is a comma, a tab, or a blank space. Thus your code might be

```
$array = explode(',', $string);
```

or

```
$array = explode(' ', $string);
```

To go from an array to a string, you need to define what the separator (aka the *glue*) should be, and PHP does the rest.

```
$string = implode(glue, $array);
```

```
$string = implode(',', $array);
```

or

```
$string = implode(' ', $array);
```

To demonstrate how to use `explode()` and `implode()`, you'll create an HTML form that takes a space-delimited string of names from the user A. The PHP script will then turn the string into an array so that it can sort the list. Finally, the code will create and return the alphabetized string B.

Enter the words you want alphabetized with each individual word separated by a space:

Brian Sommar Eric Mark Shauna Allison Mike

Alphabetize!

A This HTML form takes a list of words, which is then alphabetized by the `list.php` script B.

An alphabetized version of your list is:

Allison  
Brian  
Eric  
Mark  
Mike  
Shauna  
Sommar

B Here's the same list, alphabetized for the user. This process is quick and easy to code, but doing so would be impossible without arrays.

**Script 7.6** This is a simple HTML form where a user can submit a list of words. Including detailed instructions for how the form should be used is a prudent Web design policy.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
2   → XHTML 1.0 Transitional//EN"
3   → "http://www.w3.org/TR/xhtml1/DTD/
4   → xhtml1-transitional.dtd">
5   <html xmlns="http://www.w3.org/1999/
6   → xhtml" xml:lang="en" lang="en">
7   <head>
8     <meta http-equiv="Content-Type"
9      → content="text/html;
10     → charset=utf-8"/>
11   <title>I Must Sort This Out!</title>
12 </head>
13 <body>
14 <!-- Script 7.6 - list.html -->
15 <div><p>Enter the words you want
16   → alphabetized with each individual word
17   → separated by a space:</p>
18 <form action="list.php" method="post">
19   <input type="text" name="words"
20     → size="60" />
21   <input type="submit" name="submit"
22     → value="Alphabetize!" />
23 </form>
24 </div>
25 </body>
26 </html>
```

## To create the HTML form:

1. Begin a new document in your text editor or IDE, to be named **list.html** (Script 7.6):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="Content-Type"
  → content="text/html;
  → charset=utf-8"/>
  <title>I Must Sort This Out!
  → </title>
</head>
<body>
<!-- Script 7.6 - list.html -->
```

2. Create an HTML form with a text input:

```
<div><p>Enter the words you
→ want alphabetized with each
→ individual word separated by
→ a space:</p>
<form action="list.php"
→ method="post">
  <input type="text" name="words"
  → size="60" />
```

It's important in cases like this to instruct the user. For example, if the user enters a comma-delimited list, the PHP script won't be able to handle the string properly (after completing both scripts, try using commas in lieu of spaces and see what happens).

*continues on next page*

3. Create a submit button, and then close the form and the HTML page:

```
<input type="submit" name="submit" value="Alphabetize!" />
</form>
</div>
</body>
</html>
```

4. Save your script as **list.html** and place it in the proper directory for your PHP-enabled server.

Now you'll write the **list.php** page to process the data generated by **list.html**.

## To convert between strings and arrays:

1. Begin a new document in your text editor or IDE, to be named **list.php** (**Script 7.7**):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="Content-Type"
→ content="text/html;
→ charset=utf-8"/>
  <title>I Have This Sorted Out
→ </title>
</head>
<body>
  <?php // Script 7.7 - list.php
```

2. Turn the incoming string, `$_POST['words']`, into an array:

```
$words_array = explode(' ',  
→ $_POST['words']);
```

This line of code creates a new array, `$words_array`, out of the string

**Script 7.7** Because the `explode()` and `implode()` functions are so simple and powerful, you can quickly and easily sort a submitted list of words (of practically any length) in just a couple of lines.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
XHTML 1.0 Transitional//EN"
2    "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="Content-Type"
content="text/html;
charset=utf-8"/>
6  <title>I Have This Sorted Out</title>
7  </head>
8  <body>
9  <?php // Script 7.7 - list.php
10 /* This script receives a string in
$_POST['words']. It then turns it into
an array,
11 sorts the array alphabetically, and
reprints it. */
12
13 // Address error management, if you
want.
14
15 // Turn the incoming string into an
array:
16 $words_array = explode(' ',  
→ $_POST['words']);
17
18 // Sort the array:
19 sort($words_array);
20
21 // Turn the array back into a string:
22 $string_words = implode('<br />',  
→ $words_array);
23
24 // Print the results:
25 print "<p>An alphabetized  
version of your list is: <br />  
$string_words</p>";
26
27 ?>
28 </body>
29 </html>
```

`$_POST['words']`. Each space between the words in `$_POST['words']` indicates that the next word should be a new array element. Hence the first word becomes `$words_array[0]`, then there is a space in `$_POST['words']`, then the second word becomes `$words_array[1]`, and so forth, until the end of `$_POST['words']`.

3. Sort the array alphabetically:

```
sort($words_array);
```

Because you don't need to maintain key-value associations in the `$words_array`, you can use `sort()` instead of `asort()`.

4. Create a new string out of the sorted array:

```
$string_words = implode('<br />',  
→ $words_array);
```

Arrays don't print as easily as strings, so turn `$words_array` into a string called `$string_words`. The resulting string starts with the value of `$words_array[0]`, followed by the HTML `<br />` tag, the value of `$words_array[1]`, and so on. Using `<br />` instead of a space or comma gives the list a more readable format when it's printed to the browser.

5. Print the new string to the browser:

```
print "<p>An alphabetized  
→ version of your list is:  
→ <br />$string_words</p>";
```

6. Close the PHP section and the HTML page:

```
?>  
</body>  
</html>
```

7. Save your page as `list.php`, place it in the same directory as `list.html`, and test both scripts in your Web browser

A and B.

**TIP** You'll also run across code written using the `join()` function, which is synonymous with `implode()`.

# Creating an Array from a Form

Throughout this chapter, you've established arrays entirely from within a PHP page. You can, however, send an array of data to a PHP script via an HTML form. In fact, every time you use `$_POST`, this is the case. But you can take this one step further by creating arrays using an HTML form. Such arrays will then be a part of the greater `$_POST` array (thereby making `$_POST` a multidimensional array).

A logical use of this capability is in dealing with checkboxes, where users might need to select multiple options from a group A. The HTML source code for a checkbox is as follows:

```
<input type="checkbox"  
name="topping" value="Ham" />
```

The problem in this particular case is that each form element must have a unique name. If you created several checkboxes, each with a name of `topping`, only the value of the last checked box would be received in the PHP script. If you were to create unique names for each checkbox—`ham`, `tomato`, `black_olives`, etc.—working with the selected values would be tedious.

The workaround is to use array syntax, as demonstrated in the next example.

Pizza Toppings:  Extra Tomato  Ham  Sausage  Pepperoni  
 Black Olives  Turnips  Kumquats

A Checkboxes in an HTML form, presenting several possible options.

**Script 7.8** This HTML form has an array for the checkbox input names.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
2   XHTML 1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8    <meta http-equiv="Content-Type"
9      content="text/html;
10     charset=utf-8"/>
11   <title>Add an Event</title>
12 </head>
13 <body>
14 <!-- Script 7.8 - event.html -->
15 <div><p>Use this form to add an
16   event:</p>
17 <form action="event.php" method="post">
18   <p>Event Name: <input type="text"
19     name="name" size="30" /></p>
20   <p>Event Days:
21     <input type="checkbox" name=
22       "days[]" value="Sunday" /> Sun
23     <input type="checkbox" name=
24       "days[]" value="Monday" /> Mon
25     <input type="checkbox" name=
26       "days[]" value="Tuesday" /> Tue
27     <input type="checkbox" name=
28       "days[]" value="Wednesday" /> Wed
29     <input type="checkbox" name=
30       "days[]" value="Thursday" /> Thu
31     <input type="checkbox" name=
32       "days[]" value="Friday" /> Fri
33     <input type="checkbox" name=
34       "days[]" value="Saturday" /> Sat
35   </p>
36   <input type="submit" name="submit"
37     value="Add the Event!" />
38 </form>
39 </div>
40 </body>
41 </html>
```

## To create an array with an HTML form:

1. Begin a new document in your text editor or IDE, to be named **event.html** (Script 7.8):

```
<!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" xml:lang="en"
  → lang="en">
<head>
  <meta http-equiv="Content-Type"
  → content="text/html;
  → charset=utf-8"/>
  <title>Add an Event</title>
</head>
<body>
<!-- Script 7.8 - event.html -->
<div><p>Use this form to add an
  → event:</p>
```

2. Begin the HTML form:

```
<form action="event.php"
  → method="post">
```

This form will be submitted to **event.php**, found in the same directory as this HTML page.

3. Create a text input for an event name:

```
<p>Event Name: <input type="text"
  → name="name" size="30" /></p>
```

This example allows the user to enter an event name and the days of the week when it takes place.

*continues on next page*

4. Create the days checkboxes:

```
<p>Event Days:  
<input type="checkbox" name=  
→ "days[]" value="Sunday" /> Sun  
<input type="checkbox" name=  
→ "days[]" value="Monday" /> Mon  
<input type="checkbox" name=  
→ "days[]" value="Tuesday" /> Tue  
<input type="checkbox" name=  
→ "days[]" value="Wednesday" /> Wed  
<input type="checkbox" name=  
→ "days[]" value="Thursday" /> Thu  
<input type="checkbox" name=  
→ "days[]" value="Friday" /> Fri  
<input type="checkbox" name=  
→ "days[]" value="Saturday" /> Sat  
</p>
```

All of these checkboxes use `days[ ]` as the `name` value, which creates a `$_POST['days']` array in the PHP script. The `value` attributes differ for each checkbox, corresponding to the day of the week.

5. Complete the HTML form:

```
<input type="submit" name=  
→ "submit" value="Add the  
→ Event!" />  
</form>
```

6. Complete the HTML page:

```
</div>  
</body>  
</html>
```

7. Save your page as `event.html` and place it in the proper directory for your PHP-enabled server.

You also need to write the `event.php` page to handle this HTML form.

**Script 7.9** This PHP script receives an array of values in `$_POST['days']`.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD
2   XHTML 1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5   <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7   <head>
8     <meta http-equiv="Content-Type"
9       content="text/html;
10      charset=utf-8"/>
11     <title>Add an Event</title>
12   </head>
13   <body>
14   <?php // Script 7.9 - event.php
15   /* This script handle the event form. */
16
17   // Address error management, if you
18   want.
19
20   // Print the text:
21   print "<p>You want to add an event
22   called <b>{$_POST['name']}</b> which
23   takes place on: <br />";
24
25   // Print each weekday:
26   if (isset($_POST['days']) AND
27     is_array($_POST['days'])) {
28
29     foreach ($_POST['days'] as $day) {
30       print "$day<br />\n";
31     }
32
33   } else {
34     print 'Please select at least one
35     weekday for this event!';
36   }
37
38   // Complete the paragraph:
39   print '</p>';
40   ?>
41   </body>
42   </html>
```

## To handle the HTML form:

1. Begin a new document in your text editor or IDE, to be named **event.php** (Script 7.9):

```
<!DOCTYPE html PUBLIC "-//W3C//DTD
→ XHTML 1.0 Transitional//EN"
→ "http://www.w3.org/TR/xhtml1/DTD/
<html xmlns="http://www.w3.org
→ /1999/xhtml" xml:lang="en" lang="en">
<head>
  <meta http-equiv="Content-Type"
→ content="text/html;
→ charset=utf-8"/>
  <title>Add an Event</title>
</head>
<body>
```

2. Create the initial PHP tag, address error management (if need be), and print an introductory message:

```
<?php // Script 7.9 - event.php
print "<p>You want to add an event
→ called <b>{$_POST['name']}</b>
→ which takes place on: <br />";
```

The `print` line prints out the value of the event's name. In a real-world version of this script, you would add a conditional to check that a name value was entered first (see Chapter 6, “Control Structures”).

3. Begin a conditional to check that at least one weekday was selected:

```
if (isset($_POST['days']) AND
→ is_array($_POST['days'])) {
  If no checkbox was clicked, then
  $_POST['days'] won't be an existing
  variable. To avoid an error caused by
  referring to a variable that does not
  exist, the first part of the conditional
  checks that $_POST['days'] is set.
```

*continues on next page*

The second part of the condition—and both must be **TRUE** for the entire condition to be **TRUE**—confirms that `$_POST['days']` is an array. **This is a good step to take because a `foreach` loop will create an error if it receives a variable that isn't an array** **B**.

4. Print each selected weekday:

```
foreach ($_POST['days'] as $day) {  
    print "$day<br />\n";  
}
```

To print out each checked weekday, run the `$_POST['days']` array through a `foreach` loop. The array contains the values (from the HTML form inputs, for example, *Monday*, *Tuesday*, and so on) for every box that was selected.

5. Complete the `is_array()` conditional:

```
} else {  
    print 'Please select at least  
    → one weekday for this event!';  
}
```

If no weekday was selected, then the `isset()` AND `is_array()` condition is `FALSE`, and this message is printed.

## The List Function

The `list()` function is used to assign array element values to individual variables. To start with an example:

```
$date = array('Thursday', 23,  
    → 'October');  
list($weekday, $day, $month) =  
    → $date;
```

Now there is a `$weekday` variable with a value of *Thursday*, a `$day` variable with a value of `23`, and a `$month` variable with a value of *October*.

There are two caveats for using `list()`. First, `list()` only works on arrays numerically indexed starting at 0. Second, when you're using the `list()` function, you must acknowledge each array element. You could not do this:

```
list($weekday, $month) = $date;  
But you can use empty values to ignore  
elements:
```

```
list ($weekday, , $month) = $date;  
or
```

```
list (, , $month) = $date;
```

The `list()` function is often used when retrieving values from a database.

**Warning:** Invalid argument supplied for `foreach()` in `/Users/larryullman/Sites/phpvqs4/event.php` on line 16

**B** Attempting to use `foreach` on a variable that is not an array is a common cause of errors.

6. Complete the main paragraph, the PHP section, and the HTML page:

```
print '</p>';  
?>  
</body>  
</html>
```

7. Save the page as **event.php**, place it in the same directory as **event.html**, and test both pages in your Web browser **C**, **D**, and **E**.

**TIP** The same technique demonstrated here can be used to allow a user to select multiple options in a drop-down menu. Just give the menu a name with a syntax like *something[]*, then the PHP script will receive every selection in `$_POST['something']`.

Use this form to add an event:

Event Name:

Event Days:  Sun  Mon  Tue  Wed  Thu  Fri  Sat

**C** The HTML form with its checkboxes.

You want to add an event called **Training Seminar** which takes place on:  
Tuesday  
Wednesday  
Thursday

**D** The results of the HTML form.

You want to add an event called **Training Seminar** which takes place on:  
Please select at least one weekday for this event!

**E** If users don't check any of the day boxes, they'll see this message.

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- What's the difference between an *indexed* array and an *associative* array?
- When should you use quotation marks for an array's key or value? When shouldn't you?
- How do you print a specific array element? How do you print every element in an array?
- What happens if you don't use the square brackets when adding an element to an array?
- What function returns the number of elements in an array?
- When must you use curly brackets for printing array elements?
- What is the difference between the `sort()` and `asort()` functions? Between `sort()` and `rsort()`?
- What is the syntax for `explode()`? For `implode()`? If you don't remember, check out the PHP manual page for either function.

## Pursue

- Check out the PHP manual's pages for the array-related functions. Look into some of the other available array functions. In particular I'd recommend familiarizing yourself with `array_key_exists()`, `array_search()`, and `in_array()`.
- Rewrite `soups2.php` so that it displays the number of elements in the array without using a separate variable. Hint: You'll need to concatenate the `count()` function call into the `print` statement.
- Create another script that creates and displays a multidimensional array (or some of it, anyway).
- Rewrite `list.php` so that it uses `foreach` instead of `implode()`, but still prints each sorted word on its own line in the browser. Also add some form validation so that it only attempts to parse and sort the string if it has a value.

# 8

# Creating Web Applications

The book to this point has covered the fundamentals of programming with PHP; now it's time to begin tying it all together into actual Web applications. In this chapter, you'll learn a number of functions and techniques for making your Web sites more professional, more feature-rich, and easier to maintain.

First, you'll learn how to use external files to break Web pages into individual pieces, allowing you to separate the logic from the presentation. Then you'll tinker with *constants*, a special data type in PHP. After that, you'll be introduced to some of the date- and time-related functions built into PHP.

Two of the chapter's topics discuss useful techniques: having the same page both display and handle an HTML form, and having a form remember user-submitted values. After that, you'll see how easy it can be to send email from PHP. The chapter concludes with the slightly more advanced topics of *output buffering* and *HTTP headers*.

---

## In This Chapter

Creating Templates	184
Using External Files	192
Using Constants	197
Working with the Date and Time	201
Handling HTML Forms with PHP, Revisited	204
Making Forms Sticky	210
Sending Email	217
Output Buffering	222
Manipulating HTTP Headers	225
Review and Pursue	230

---

# Creating Templates

Every example thus far has been a one-page script that handles an HTML form, sorts arrays, performs calculations, and so on. As you begin to develop multiple-page Web sites (which is to say, *Web applications*), it quickly becomes impractical to repeat common elements on multiple pages.

On more sophisticated Web sites, many features, such as the HTML design, will be used by every, or almost every, page within the site. You can put these elements into each individual page, but when you need to make a change, you'll be required to make that change over and over again. You can save time by creating *templates* that separate out the repeating content from the page-specific materials. For example, a Web site may have navigation, copyright, and other features that repeat across multiple pages **A** and **B**.

When you first start doing dynamic Web development, creating and using templates can be daunting. The key is to start with a basic prototype, as if you were creating a static Web page, and then divide that prototype into reusable parts. Using the PHP functions introduced in the next section of this chapter, the repeating parts can be easily included in each page while the new content is generated on a page-by-page basis. To create the template in use by this chapter's examples, let's start with the prototype. This example's layout **C** was created by James Koster of Six Shooter Media ([www.sixshootermedia.com](http://www.sixshootermedia.com)), and used with his kind permission.

This screenshot shows the book's page on the publisher's website. The left sidebar contains a table of contents and a 'Buy This Book' button. The right sidebar includes an 'About DMC Insights, Inc.' section and a 'Subscribe to Larry's New' newsletter section.

- A** The home page for the third edition of this book has its page-specific content in the left column and common elements in the right.

This screenshot shows the table of contents page. It features a sidebar with common elements like a search bar and a 'Buy This Book' button, while the main content area lists chapters and their sub-topics.

- B** The table of contents page uses some of the same common elements as the home page **A**, thanks to the templates.

This screenshot shows a single, static HTML page titled 'Raise High the Roof Beam!'. It includes a header with a logo and navigation links, a main content area with text and images, and a sidebar with a 'Favorite Quotes' section.

- C** The design for this chapter's examples, as a single, static HTML page.

**Script 8.1** This script represents the basic look each page in the site should have.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
1.1//EN" "http://www.w3.org/TR/xhtml11/  
DTD/xhtml11.dtd">  
2  <html xmlns="http://www.w3.org/1999/  
xhtml" xml:lang="en">  
3  <head>  
4      <title>Raise High the Roof Beam!  
A J.D. Salinger Fan Club</title>  
5      <meta http-equiv="content-type"  
content="text/html; charset=utf-8" />  
6      <link rel="stylesheet"  
href="css/1.css" type="text/css"  
media="screen,projection" />  
7  </head>  
8  <body>  
9  <div id="wrapper">  
10     <div id="header">  
11         <p class="description">A J.D.  
Salinger Fan Club</p>  
13         <h1><a href="index.php">Raise High  
the Roof Beam!</a></h1>  
14         <ul id="nav">  
15             <li><a href="books.php">  
Books</a></li>  
16             <li><a href="#">Stories</a></li>  
17             <li><a href="#">Quotes</a></li>  
18             <li><a href="login.php">  
Login</a></li>  
19             <li><a href="register.php">  
Register</a></li>  
20         </ul>  
21     </div><!-- header -->  
22  
23     <div id="sidebar">  
24         <h2>Favorite Quotes</h2>  
25         <p class="news">I don't exactly  
know what I mean by that, but  
I mean it.<br />- <em>The  
Catcher in the Rye</em></p>  
26         <p class="news">I privately say  
to you, old friend... please  
accept from me this unpretentious  
bouquet of early-blooming  
parentheses: (((()))).<br />- <em>  
Raise High the Roof Beam,  
Carpenters and Seymour: An  
Introduction</em></p>  
27     </div><!-- sidebar -->  
28
```

code continues on next page

## To create the layout model:

1. Begin a new HTML document in your text editor or IDE, to be named **template.html** (Script 8.1):

```
<!DOCTYPE html PUBLIC "-//W3C//DTD  
→ XHTML 1.1//EN" "http://www.  
→ w3.org/TR/xhtml11/DTD/xhtml11.dtd">  
<html xmlns="http://www.w3.org/  
→ 1999/xhtml" xml:lang="en">  
<head>  
    <title>Raise High the Roof  
    → Beam! A J.D. Salinger Fan  
    → Club</title>  
    <meta http-equiv="content-type"  
    → content="text/html;  
    → charset=utf-8" />
```

The first step in developing any template system is to create a model document—an example of what a basic page should look like. Once you've created this, you can break it down into its parts.

2. Add the CSS code:

```
<link rel="stylesheet"  
→ href="css/1.css" type="text/css"  
→ media="screen,projection" />
```

This example uses CSS for most of the formatting and layout controls. The CSS itself is stored in an external file that becomes part of this page through the **link** tag. The file itself is named simply **1.css**, and is to be stored in a folder named **css**.

Note that you'll need to download the CSS file from the book's corresponding Web site ([www.LarryUllman.com](http://www.LarryUllman.com)). You'll find it as part of the book's downloadable code.

*continues on next page*

3. Close the HTML head, begin the body, and create a *wrapper* **div** tag:

```
</head>
<body>
<div id="wrapper">

    Many of today's designs wrap the entire
    page content within a primary div, so
    that all of the content can easily be
    formatted within the browser window.
```

4. Create the page's header:

```
<div id="header">
    <p class="description">A J.D.
        → Salinger Fan Club</p>
    <h1><a href="index.php">Raise
        → High the Roof Beam!</a></h1>
    <ul id="nav">
        <li><a href="books.php">
            → Books</a></li>
        <li><a href="#">Stories</a></li>
        <li><a href="#">Quotes</a></li>
        <li><a href="login.php">
            → Login</a></li>
        <li><a href="register.php">
            → Register</a></li>
    </ul>
</div><!-- header -->
```

The *header* area (also defined in the CSS code) creates the banner and the primary navigation links to the other pages in the Web application. The specific links reference four PHP scripts, all of which will be developed in this chapter.

**Script 8.1** continued

```
29   <div id="content">
30     <!-- BEGIN CHANGEABLE CONTENT. -->
31     <h2>Welcome to a J.D. Salinger Fan
         Club</h2>
32     <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.</p>
33     <h2>Another Header</h2>
34     <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.</p>
35     <!-- END CHANGEABLE CONTENT. -->
36   </div><!-- content -->
37
38   <div id="footer">
39     <p>Template design by <a
         href="http://www.sixshootermedia.
         com">
         Six Shooter Media</a>.</p>
40     <p>© 2011</p>
41   </div><!-- footer -->
42
43 </div><!-- wrapper -->
44 </body>
45 </html>
```

**5.** Create the page's sidebar:

```
<div id="sidebar">
  <h2>Favorite Quotes</h2>
  <p class="news">I don't
    → exactly know what I mean
    → by that, but I mean it.
    → <br />- <em>The Catcher in
    → the Rye</em></p>
  <p class="news">I privately
    → say to you, old friend...
    → please accept from me this
    → unpretentious bouquet of
    → early-blooming parentheses:
    → (((()))).<br />- <em>Raise
    → High the Roof Beam,
    → Carpenters and Seymour:
    → An Introduction</em></p>
</div><!-- sidebar -->
```

In the original template, the sidebar can be used for latest news, secondary links, a search box, and so forth. In this site's template, a couple of quotes are highlighted.

**6.** Begin, and mark, the start of the page-specific content:

```
<div id="content">
<!-- BEGIN CHANGEABLE CONTENT. -->
```

Everything up until this comment will remain the same for every page in the Web application. To indicate where the page-specific content begins (for your own benefit), include an HTML comment. In fact, looking back at the template so far, you'll see a number of HTML comments, helping to indicate what each piece of the page is for. You cannot overcomment your HTML or PHP code!

Just before that, the *content* area is begun. This area is defined in the CSS code and properly formats the main content part of the page. In other words, on every page, that page's content will go within the one **div** that has an **id** of **content**.

**7.** Create the page's content:

```
<h2>Welcome to a J.D. Salinger
  → Fan Club</h2>
<p>Lorem ipsum dolor sit
  → amet...</p>
```

For the prototype, the content is just a couple of headers and a whole lot of text (there's more in the actual script than I've included in this step).

**8.** Mark the end of the changeable content:

```
<!-- END CHANGEABLE CONTENT. -->
</div><!-- content -->
```

The code in Step 7 is the only text that will change on a page-by-page basis. Just as an HTML comment indicates where that section starts, one here indicates where it ends.

**9.** Add the footer:

```
<div id="footer">
  <p>Template design by <a href=
    → "http://www.sixshootermedia.
    → com">Six Shooter Media</a>.</p>
  <p>&copy; 2011</p>
</div><!-- footer -->
```

The footer includes a credit and an indication of copyright.

**10.** Finish the HTML page:

```
</div><!-- wrapper -->
</body>
</html>
```

To make the template easier to modify and maintain, you'll notice that HTML comments indicate which **divs** are being closed.

**11.** Save the file as **template.html** and test it in your Web browser .

Once you've completed a prototype that you like, you can break it into its various parts to generate the template system.

## To create the header file:

1. Open **template.html** (Script 8.1) in your text editor or IDE, if it isn't already open.
2. Select everything from the initial HTML code to the **<!-- BEGIN CHANGEABLE CONTENT -->** HTML comment **D**.

Part of the benefit of identifying the start of the page-specific content with an HTML comment is that it simplifies breaking the model into its parts.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN" "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">
<head>
    <title>Raise High the Roof Beam! A J.D. Salinger Fan Club</title>
    <meta http-equiv="content-type" content="text/html; charset=utf-8" />
    <link rel="stylesheet" href="css/1.css" type="text/css" media="screen,projecti
</head>
<body>
<div id="wrapper">

    <div id="header">
        <p class="description">A J.D. Salinger Fan Club</p>
        <h1><a href="index.php">Raise High the Roof Beam!</a></h1>
        <ul id="nav">
            <li><a href="books.php">Books</a></li>
            <li><a href="#">Stories</a></li>
            <li><a href="#">Quotes</a></li>
            <li><a href="login.php">Login</a></li>
            <li><a href="register.php">Register</a></li>
        </ul>
    </div><!-- header -->

    <div id="sidebar">
        <h2>favorite Quotes</h2>
        <p class="news">I don't exactly know what I mean by that, but I mean i
        <p class="news">I privately say to you, old friend... please accept fr
    </div><!-- sidebar -->

    <div id="content">
        <!-- BEGIN CHANGEABLE CONTENT. -->
        <h2>Welcome to a J.D. Salinger Fan Club</h2>
        <p>Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod
        <h2>Another Header</h2>
        <p>Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod
        <!-- END CHANGEABLE CONTENT. -->
    </div><!-- content -->

    <div id="footer">
        <p>Template design by <a href="http://www.sixshootermedia.com">Six Shooter
        &copy; 2011</p>
    </div><!-- footer -->

</div><!-- wrapper -->
</body>
</html>
```

- D** Using the prototype file, select and copy the initial lines of code to create the header.

**Script 8.2** This is a basic header file that creates the HTML head information, includes the CSS file, and begins the body.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.1//EN" "http://www.w3.org/TR/xhtml11/
3   DTD/xhtml11.dtd">
4  <html xmlns="http://www.w3.org/1999/
5   xhtml" xml:lang="en">
6  <head>
7    <title>Raise High the Roof Beam!
8      A J.D. Salinger Fan Club</title>
9    <meta http-equiv="content-type"
10       content="text/html; charset=utf-8" />
11   <link rel="stylesheet"
12     href="css/1.css" type="text/css"
13     media="screen,projection" />
14  </head>
15  <body>
16  <div id="wrapper">
17
18    <div id="header">
19      <p class="description">A J.D.
20        Salinger Fan Club</p>
21      <h1><a href="index.php">Raise High
22        the Roof Beam!</a></h1>
23      <ul id="nav">
24        <li><a href="books.php">Books
25          </a></li>
26        <li><a href="#">Stories</a></li>
27        <li><a href="#">Quotes</a></li>
28        <li><a href="login.php">Login
29          </a></li>
30        <li><a href="register.php">
31          Register</a></li>
32      </ul>
33    </div><!-- header -->
34
35    <div id="sidebar">
36      <h2>Favorite Quotes</h2>
37      <p class="news">I don't exactly
38        know what I mean by that,
39        but I mean it.<br />- <em>The
40        Catcher in the Rye</em></p>
41      <p class="news">I privately say to
42        you, old friend... please accept
43        from me this unpretentious
44        bouquet of early-blooming
45        parentheses: (((()))).<br />-
46        <em>Raise High the Roof Beam,
47        Carpenters and Seymour: An
48        Introduction</em></p>
49    </div><!-- sidebar -->
50
51    <div id="content">
52      <!-- BEGIN CHANGEABLE CONTENT. -->
53      <!-- Script 8.2 - header.html -->
54  
```

**3. Copy this code.**

Using your Edit menu or keyboard shortcut (Ctrl+C on Windows, Command+C on the Macintosh), copy all of the highlighted code to your computer's temporary memory (the clipboard).

**4. Create a new, blank document in your text editor or IDE, to be named **header.html**.**

**5. Paste the copied text into the document (**Script 8.2**).**

Using your Edit menu or keyboard shortcut (Ctrl+V on Windows, Command+V on the Macintosh), paste all of the highlighted code into this new document.

**6. Save the file as **header.html**.**

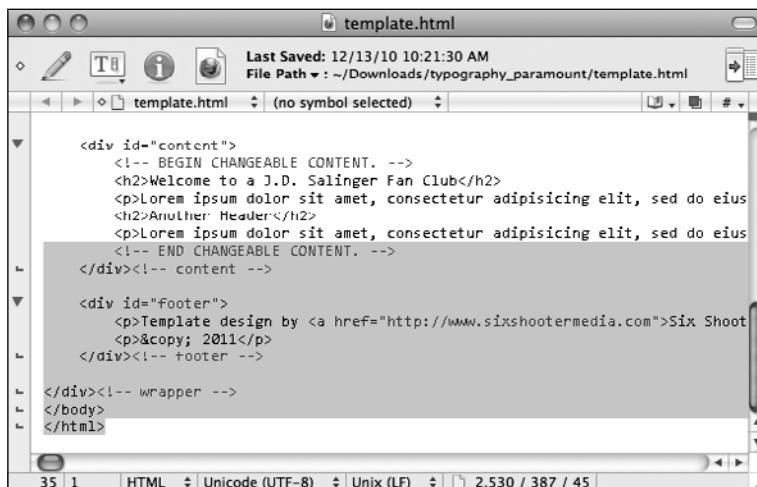
Now that the header file has been created, you'll make the footer file using the same process.

## To create the footer file:

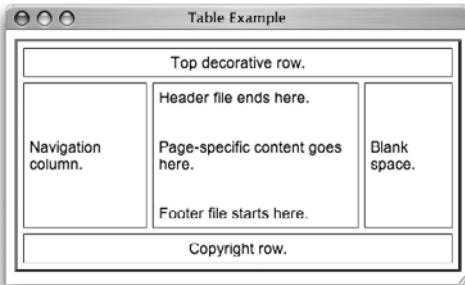
1. Open **layout.html** (Script 8.1) in your text editor or IDE, if it isn't already open.
2. Select everything from the `<!-- END CHANGEABLE CONTENT -->` HTML comment to the end of the script **E**.
3. Copy this code.
4. Create a new, blank document in your text editor, to be named **footer.html**.
5. Paste the copied text into the document (**Script 8.3**).
6. Save the file as **footer.html**.

**Script 8.3** This is a basic footer file that concludes the HTML page.

```
1      <!-- Script 8.3 - footer.html -->
2      <!-- END CHANGEABLE CONTENT. -->
3      </div><!-- content -->
4
5      <div id="footer">
6          <p>Template design by <a href="http://www.sixshootermedia.com">Six Shooter Media</a>.</p>
7          <p>&copy; 2011</p>
8      </div><!-- footer -->
9
10     </div><!-- wrapper -->
11     </body>
12     </html>
```



- F** Again using the prototype file, select and copy the concluding lines of code for the footer.



F This mundane example shows how a table can be used with template files to create a design.

**TIP** There are many far more complex template systems you can use in PHP to separate the design from the logic. The best known of these is probably Smarty ([www.smarty.net](http://www.smarty.net)).

**TIP** Although this example uses CSS for its layout, you can certainly use tables instead. F Your header file might begin the HTML page and the table. Each content page would then create its own specific content, and the footer file would complete the table and the HTML page. To turn such a design into a template, copy all of the code up to *Page-specific content goes here.* into a header file and everything after that into a footer file.

## CSS Templates

Cascading Style Sheets (CSS) have been an increasingly important part of the World Wide Web for some time. Their initial usage was focused on cosmetics (font sizes, colors, and so on), but now CSS is frequently used in lieu of tables to control the layout of pages. The Web application in this chapter uses this approach.

This example defines four areas of the page—*header*, *sidebar*, *content*, and *footer*. The *content* area will change for each page. The other areas contain standard items, such as navigation links, that appear on each page of the site.

Just to be clear: The relationship between PHP and CSS is the same as that between PHP and HTML—PHP runs on the server and HTML and CSS are significant to the browser. As with HTML, you can use PHP to generate CSS, but in this example, the CSS is hard-coded into a separate file.

# Using External Files

As the preceding section stated, you can save development time by creating separate pages for particular elements and then incorporating them into the main PHP pages using specific functions. Two of these functions are `include()` and `require()`:

```
include ('file.php');
require ('file.html');
```

Both functions work the same way, with one relatively insignificant difference: If an `include()` function fails, the PHP script generates a warning **A** but continues to run. Conversely, if `require()` fails, it terminates the execution of the script **B**.

But what do these two functions do? Both `include()` and `require()` incorporate the referenced file into the main file (for clarity's sake, the file that has the `include()` or `require()` line is the *including* or *parent* file). The result is the same as if the included code were part of the parent file in the first place.

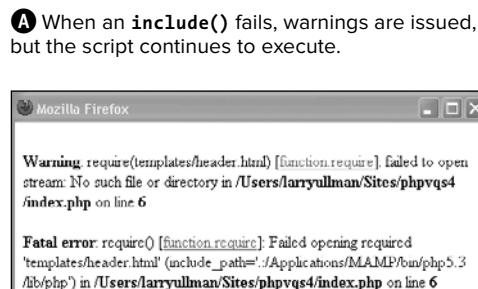
Understanding that basic idea—including a file makes it as if that file's contents were in the parent script to begin with—is key to making the most out of this feature. This means that any code within the included file not within PHP tags is treated as HTML. And this is true regardless of what extension the included file has (because it's the extension of the *including* file that counts).

There are many reasons to use included files. You could put your own defined functions into a common file (see Chapter 10, “Creating Functions,” for information on writing your own functions). You might also want to place your database access information into a configuration file. First, however, let's include the template files created in the preceding section of the chapter in order to make pages abide by a consistent design.



## Welcome to a J.D. Salinger Fan Club

Lore 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 exercitatio ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate



**B** When a `require()` function call fails, warnings and errors are issued, and the script stops running.

**Script 8.4** Once the two included files have been created, the `include()` function incorporates them into the parent file to create the complete HTML page on the fly.

```
1 <?php // Script 8.4 - index.php
2 /* This is the home page for this site.
3 It uses templates to create the
4 layout. */
5
6 // Include the header:
7 include('templates/header.html');
8 // Leave the PHP section to display lots
9 of HTML:
10 ?>
11
12 <h2>Welcome to a J.D. Salinger Fan Club</h2>
13 <p>Lorem ipsum dolor sit amet,
14 consectetur adipisicing elit, sed do
15 eiusmod tempor incididunt ut labore
16 et dolore magna aliqua. Ut enim ad
17 minim veniam, quis nostrud exercitation
18 ullamco laboris nisi ut aliquip ex ea
19 commodo consequat. Duis aute irure dolor
20 in reprehenderit in voluptate velit esse
21 cillum dolore eu fugiat nulla pariatur.
22 Excepteur sint occaecat cupidatat non
23 proident, sunt in culpa qui officia
24 deserunt mollit anim id est laborum.</p>
25 <h2>Another Header</h2>
26 <p>Lorem ipsum dolor sit amet,
27 consectetur adipisicing elit, sed do
28 eiusmod tempor incididunt ut labore
29 et dolore magna aliqua. Ut enim ad
30 minim veniam, quis nostrud exercitation
31 ullamco laboris nisi ut aliquip ex ea
32 commodo consequat. Duis aute irure dolor
33 in reprehenderit in voluptate velit esse
34 cillum dolore eu fugiat nulla pariatur.
35 Excepteur sint occaecat cupidatat non
36 proident, sunt in culpa qui officia
37 deserunt mollit anim id est laborum.</p>
38
39 <?php // Return to PHP.
40 include('templates/footer.html');
41 // Include the footer.
42 ?>
```

## To use external files:

1. Create a new document in your text editor or IDE, to be named `index.php`.
2. Start with the initial PHP tags and add any comments (**Script 8.4**):

```
<?php // Script 8.4 - index.php
/* This is the home page for
this site.
It uses templates to create the
layout. */
```

Notice that, with the template system, the very first line of the script is the PHP tag. There's no need to begin with the initial HTML, because that is now stored in the `header.html` file.

3. Address error management, if necessary.

This topic is discussed in Chapter 3, “HTML Forms and PHP,” and may or may not need to be addressed in your scripts. See that chapter for more; this will be the last time I specifically mention it in this chapter.

4. Include the header file:

```
include('templates/header.html');
```

To use the template system, you include the header file here by invoking the `include()` function. Because the header file contains only HTML, all of its contents will be immediately sent to the Web browser as if they were part of this file. This line uses a *relative path* to refer to the included file (see the “File Navigation and Site Structure” sidebar) and assumes that the file is stored in the `templates` directory.

*continues on next page*

5. Close the PHP section and create the page-specific content:

```
?>  
<h2>Welcome to a J.D. Salinger  
→ Fan Club</h2>  
<p>Lorem ipsum dolor sit  
→ amet...</p>
```

Because the bulk of this page is standard HTML, it's easier to just exit out of the PHP section and then add the HTML (rather than using `print` to send it to the Web browser). Again, there's more blather in the actual script than I've included here.

6. Create another PHP section and require the footer file:

```
<?php  
include('templates/footer.html');  
?>
```

To finish the page, you need to include the footer file (which displays the footer and closes the HTML code). To do this, you create a new section of PHP—you can have multiple sections of PHP code within a script—and call the `include()` function again.

7. Save the file as `index.php`.

8. Create a folder called **templates** within the main Web document directory on your PHP-enabled computer or Web server.

To further separate the design elements from the main content, the header and footer files go within their own directory.

9. Place `header.html` and `footer.html` in the **templates** directory you just created.

## File Navigation and Site Structure

To be able to use external files, you need to understand file navigation on your computer or server. Just as you must correctly refer to other pages in HTML links or images in Web sites, you must properly point a parent file to the included scripts. You can do this by using *absolute* or *relative* paths. An absolute path is a complete, specific address, like the following:

```
include('C:\inetpub\wwwfiles\  
→ file.php');  
include('/Users/larry/Sites/  
→ file.php');
```

As long as the included file isn't moved, an absolute path will always work.

A relative path indicates where the included file is in relation to the parent file. These examples assume both are within the same directory:

```
include('file.php');  
include('./file.php');
```

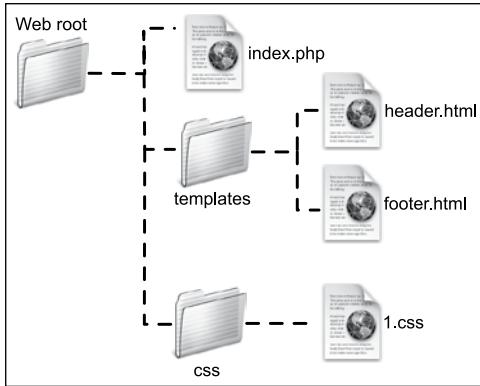
The included file can also be in a directory below the parent one, as in this chapter's example (also see C):

```
include('templates/header.html');
```

Or, the included file could be in the directory above the parent:

```
include('../file.php');
```

Finally, a note on site structure: Once you divvy up your Web application into multiple pieces, you should begin thinking about arranging the files in appropriate folders. Complex sites might have the main folder, another for images, one for administration files, and a special directory for templates and included files. As long as you properly reference the files in your `include()` or `require()` statements, structuring your applications will work fine and give the added benefit of making them easier to maintain.



**C** How the four files and two folders should be organized on your PHP-enabled server.

- 10.** Place **index.php** in the same directory as the **templates** folder.

The relative locations on the computer between the index page and the two HTML pages must be correct in order for the code to work.

- 11.** Create a folder called **css** within the main Web document directory on your PHP-enabled computer or Web server.

The CSS script will need to go in this directory.

- 12.** Place the **1.css** script, available as part of the book's downloadable code, in the **css** directory **C**.

Even though the header file includes the CSS script, the reference to that script must be relative to **index.php**. It's that page, after all, that will include **header.html**.

- 13.** Run **index.php** in your Web browser **D**.

The resulting page should look exactly like the original layout (**C** in the previous section of the chapter).

*continues on next page*



**D** This page has been dynamically generated using included files.

- 14.** View the page's source code in your Web browser.

The source code should be exactly like the source code of the `template.html` script (Script 8.1), aside from the added comments for the script names and numbers.

**TIP** All three files in this template system—`header.html`, `footer.html`, and `index.php`—must use the same *encoding* in order to avoid problems (see Chapter 1, “Getting Started with PHP,” for more on encoding). Each file’s encoding must also match the encoding established in the HTML code.

**TIP** The `require()` and `include()` functions can be used with or without parentheses:

```
require 'filename.html';
```

**TIP** You might sometimes use a variable that stores the name of the file to be included:

```
require $filename;
```

**TIP** Both `include()` and `require()` have variations: `include_once()` and `require_once()`. Each is identical to its counterpart except that it ensures that the same file can be included only one time (in a parent script). You should generally avoid using these, as they'll adversely affect the script's performance.

**TIP** If a section of PHP only executes a single command, it's common to place both it and the PHP tags on a single line:

```
<?php include 'filename.html'; ?>
```

**TIP** If you see error messages like those in A and B, the parent script can't locate an included file. This problem is most likely caused by a misspelled included filename or an error in the path (for example, using `header.html` instead of `templates/header.html`).

**TIP** If the rendered Web page does not seem to be reflecting the CSS styling, the HTML page can't find the corresponding file. Make sure you've stored the file in the proper folder, with the correct name, and that the reference is correct relative to `index.php`.

**TIP** A file’s extension is less important for included files because they aren’t intended to be run directly. As a general rule of thumb, you’ll be safe using `.html` for an included file containing only or mostly HTML (in which case the extension indicates it’s an HTML-related file) and `.php` for included files containing only or mostly PHP. Some programmers use an `.inc` extension (for include), but security risks can arise with this practice. For that reason, use the `.php` extension for any file containing sensitive information (like database access parameters). And, of course, always use the `.php` extension for any PHP script that will be executed directly.

**TIP** Another good use of an external file is to place your error settings code there so that those changes are applied to every page in the Web site.

# Using Constants

Many of PHP's data types have already been discussed in this book: primarily numbers, strings, and arrays. **Constants** are another data type, but unlike variables, their values cannot change.

Whereas variables are assigned values via the assignment operator (=), constants are assigned values using the `define()` function:

```
define('CONSTANT_NAME', value);
```

Notice that—as a rule of thumb—constants are named using all capital letters, although doing so isn't required. Most important, constants don't use the initial dollar sign as variables do (because constants are not variables). Here are two constants:

```
define ('PI', 3.14);
define ('CURRENCY', 'euros');
```

As with any value, quote those that are strings, not those that are numbers.

Referring to constants is generally straightforward:

```
print CURRENCY;
number_format(PI, 1);
```

But using constants within quotation marks is more complicated. You can't print

constants within single or double quotation marks, like this **A**:

```
print "The cost is 468 CURRENCY";
print 'The cost is 468 CURRENCY';
```

Instead, concatenation or multiple `print` statements are required:

```
print 'The cost is 468 ' . CURRENCY;
```

or

```
print 'The cost is 468 ';
print CURRENCY;
```

Along with the `define()` function for creating constants is the `defined()` function, which returns `TRUE` if the submitted constant has been defined. It's often used as the basis for a conditional:

```
if (defined('CONSTANT_NAME')) { ... }
```

As an example of working with constants, you'll give the sample application the ability to display a different title (which appears at the top of the browser window) for each page. To accomplish this, you'll define a constant in the parent script that will then be printed by the header file. This technique works because any variables or constants that exist in the parent document before the `include()` or `require()` call are available to the included file (it's as if the included file were part of the parent file).

The cost is 468 CURRENCY

**A** The value of a constant cannot be printed using the constant's name within quotation marks.

## To use constants:

1. Create a new PHP document in your text editor or IDE, to be named **books.php** (Script 8.5):

```
<?php // Script 8.5 - books.php
```

2. Define the page title as a constant:

```
define ('TITLE', 'Books by J.D.  
→ Salinger');
```

Here one constant is defined, named **TITLE**, and given the value *Books by J.D. Salinger*.

3. Include the header file:

```
include('templates/header.html');
```

This script uses the same header file as all the others, although you'll modify that file shortly to take the constant into account.

4. Close the PHP section and create the HTML:

```
?>  
<h2>J.D. Salinger's Books</h2>  
<ul>  
    <li>The Catcher in the Rye</li>  
    <li>Nine Stories</li>  
    <li>Franny and Zooey</li>  
    <li>Raise High the Roof Beam,  
        → Carpenters and Seymour: An  
        → Introduction</li>  
</ul>
```

The content here is simple but serves the page's purpose nicely.

5. Create a new PHP section that includes the footer file:

```
<?php include('templates/  
→ footer.html'); ?>
```

As mentioned earlier in a tip, since the remaining PHP code consists of just

**Script 8.5** This script uses the same template system as **index.php** (Script 8.4) but also uses a constant to identify the page's title.

```
1  <?php // Script 8.5 - books.php  
2  /* This page lists J.D. Salinger's  
   bibliography. */  
3  
4  // Set the page title and include the  
   header file:  
5  define ('TITLE', 'Books by J.D.  
   Salinger');  
6  include('templates/header.html');  
7  
8  // Leave the PHP section to display lots  
   of HTML:  
9  ?>  
10  
11 <h2>J.D. Salinger's Books</h2>  
12 <ul>  
13     <li>The Catcher in the Rye</li>  
14     <li>Nine Stories</li>  
15     <li>Franny and Zooey</li>  
16     <li>Raise High the Roof Beam,  
         Carpenters and Seymour: An  
         Introduction</li>  
17 </ul>  
18  
19 <?php include('templates/footer.html');  
?>
```

**Script 8.6** The `header.html` file is modified so that it can set the page title value based on the existence and value of a constant.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
1.1//EN" "http://www.w3.org/TR/xhtml11/  
DTD/xhtml11.dtd">  
2  <html xmlns="http://www.w3.org/1999/  
xhtml" xml:lang="en">  
3  <head>  
4      <title><?php // Print the page  
        title.  
5      if (defined('TITLE')) { // Is the  
        title defined?  
6          print TITLE;  
7      } else { // The title is not  
        defined.  
8          print 'Raise High the Roof  
            Beam! A J.D. Salinger Fan Club';  
9      }  
10     ?></title>  
11     <meta http-equiv="content-type"  
        content="text/html; charset=utf-8" />  
12     <link rel="stylesheet"  
        href="css/1.css" type="text/css"  
        media="screen,projection" />  
13   </head>  
14   <body>  
15   <div id="wrapper">  
16  
17     <div id="header">  
18         <p class="description">A J.D.  
             Salinger Fan Club</p>  
19         <h1><a href="index.php">Raise High  
             the Roof Beam!</a></h1>  
20         <ul id="nav">  
21             <li><a href="books.php">Books  
                 </a></li>  
22             <li><a href="#">Stories</a></li>  
23             <li><a href="#">Quotes</a></li>  
24             <li><a href="login.php">Login  
                 </a></li>  
25             <li><a href="register.php">  
                 Register</a></li>  
26         </ul>  
27     </div><!-- header -->  
28  
29     <div id="sidebar">  
30         <h2>Favorite Quotes</h2>  
31         <p class="news">I don't exactly  
             know what I mean by that,  
             but I mean it.<br />- <em>The  
             Catcher in the Rye</em></p>
```

code continues on next page

one line it can all be written on a single line, including the opening and closing PHP tags. Just be certain to leave a space between the executed code—the `include()`—and the tags.

#### 6. Save the file as `books.php`.

To take advantage of the constant, you now need to modify the `header.html` file.

#### To print out a constant:

1. Open `header.html` (Script 8.2) in your text editor or IDE.
2. Delete the *Raise High the Roof Beam! A J.D. Salinger Fan Club* text that appears between the `title` tags (line 4).

Now that the page title will be determined on a page-by-page basis, you don't need it to be hard-coded into the page.

3. In the place of the deleted text (between the `title` tags), add the following (Script 8.6):

```
<?php  
if (defined('TITLE')) {  
    print TITLE;  
} else {  
    print 'Raise High the Roof  
        Beam! A J.D. Salinger Fan  
        Club';  
}  
?>
```

To have PHP create the page title, you need to begin by starting a section of PHP code between the `title` tags. Then you use a conditional to see if the `TITLE` constant has been defined. If it has, print its value as the page title. If `TITLE` hasn't been defined, print a default title.

4. Save the file as `header.html`.

continues on next page

5. Upload `books.php` and `header.html` to your PHP-enabled server. The new PHP script, `books.php`, should go in the same directory as `index.php`; `header.html` should replace the previous version, in the same directory—`templates`—as `footer.html`.
6. Run `books.php` in your Web browser **B**.
7. View `index.php` (the home page) in your Web browser **C**.
8. If you want, add the constant definition line to `index.php` to change its title.

**TIP** The formal rules for naming constants are exactly like those for variables except for the omission of a dollar sign. Constant names must begin with a letter; can contain any combination of letters, numbers, and the underscore; and are case-sensitive.

**TIP** PHP runs with several predefined constants. These include `PHP_VERSION` (the version of PHP running) and `PHP_OS` (the operating system of the server).

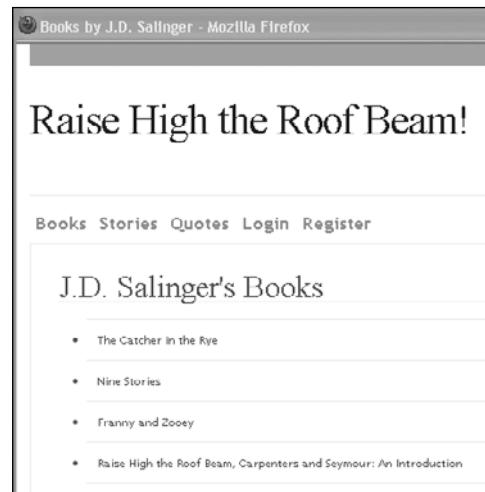
**TIP** In Chapter 9, “Cookies and Sessions,” you’ll learn about another constant, `SID` (which stands for *session ID*).

**TIP** An added benefit of using constants is that they’re *global in scope*. This concept will mean more to you after you read the section “Understanding Variable Scope” in Chapter 10.

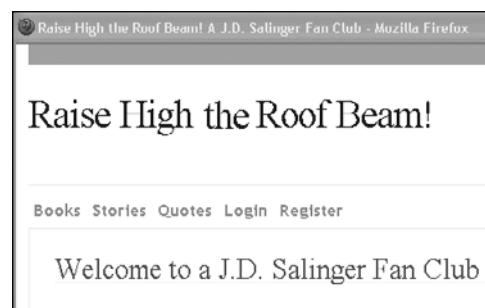
**TIP** Not only can the value of a constant never be changed, a constant can’t be deleted (`unset`, technically). Also, unlike arrays, a constant can only ever contain a single value, like a string or a number.

### Script 8.6 continued

```
32      <p class="news">I privately say  
          to you, old friend... please  
          accept from me this unpretentious  
          bouquet of early-blooming  
          parentheses: ((())).<br />-  
          <em>Raise High the Roof Beam,  
          Carpenters and Seymour: An  
          Introduction</em></p>  
33    </div><!-- sidebar -->  
34  
35    <div id="content">  
36        <!-- BEGIN CHANGEABLE CONTENT. -->  
37        <!-- Script 8.6 - header.html -->
```



**B** The books page uses a PHP constant to create its title.



**C** Because the index page didn’t have a `TITLE` constant defined in it, the default page title is used (thanks to the conditional in Script 8.6).

# Working with the Date and Time

PHP has a few functions for working with the date and time, the most important of which is `date()`. The only thing the `date()` function does is return date and time information in a format based on the arguments it's fed, but you'd be surprised

how useful that can be! The basic usage of the `date()` function is just

```
date('formatting');
```

A long list of possible options is available for formatting, as indicated in **Table 8.1** (the PHP manual lists a few more). These parameters can also be combined—for example, `date('1 F j, Y')` returns *Wednesday January 26, 2011*.

**TABLE 8.1** Date() Function Formatting

Character	Meaning	Example
Y	Year as 4 digits	2011
y	Year as 2 digits	11
L	Is it a leap year?	1 (for yes)
n	Month as 1 or 2 digits	2
m	Month as 2 digits	02
F	Month	February
M	Month as 3 letters	Feb
j	Day of the month as 1 or 2 digits	8
d	Day of the month as 2 digits	08
I (lowercase L)	Day of the week	Monday
D	Day of the week as 3 letters	Mon
w	Day of the week as a single digit	0 (Sunday)
z	Day of the year: 0 to 365	189
t	Number of days in the month	31
S	English ordinal suffix for a day, as 2 characters	rd
g	Hour; 12-hour format as 1 or 2 digits	6
G	Hour; 24-hour format as 1 or 2 digits	18
h	Hour; 12-hour format as 2 digits	06
H	Hour; 24-hour format as 2 digits	18
i	Minutes	45
s	Seconds	18
u	Microseconds	1234
a	am or pm	am
A	AM or PM	PM
U	Seconds since the epoch	1048623008
e	Timezone	UTC
I (capital i)	Is it daylight savings?	1 (for yes)
O	Difference from GMT	+0600

The `date()` function can take a second argument called a *timestamp*. A timestamp is a number representing how many seconds have passed since midnight on January 1, 1970—a moment referred to as the *epoch*. The `time()` function returns the timestamp for the current moment. The `mktime()` function can return a timestamp for a particular time and date:

```
mktime(hour, minute, second, month,  
→ day, year);
```

So the code

```
$ts = mktime(12, 30, 0, 11, 5, 2011);  
  
assigns to $ts the number of seconds  
from the epoch to 12:30 on November 5,  
2011. That number can then be fed into the  
date() function like so:  
  
date('D', $ts);
```

This returns *Sat*, which is the three-letter format for that day of the week.

As of PHP 5.1, you should establish the server's time zone prior to calling any date- or time-related function. To do so, use

```
date_default_timezone_set(timezone);
```

The *timezone* value is a string like *America/New\_York* or *Pacific/Auckland*. There are too many to list here (Africa alone has over 50), but see the PHP manual for them all. If you don't take this step, you might see errors **A**.

To demonstrate the `date()` function, let's update the header file so that it shows the current date and time in the sidebar **B**.

### To use `date()`:

1. Open `header.html` (Script 8.6) in your text editor or IDE.
2. Before the closing `sidebar </div>` tag, add the following (**Script 8.7**):

```
<p><?php
```

Warning: date() [`function.date`]: It is not safe to rely on the system's timezone settings. You are \*required\* to use the `date.timezone` setting or the `date_default_timezone_set()` function. In case you used any of those methods and you are still getting this warning, you most likely misspelled the timezone identifier. We selected 'America/New\_York' for 'EST/-5.0/no DST' instead in /Users/larryullman/Sites/phpvqs4/templates/header.html on line 38

**A** As of PHP 5.1, notices will be generated when a date or time function is used without the time zone being set.

### Favorite Quotes

I don't exactly know what I mean by that, but I mean it.

— *The Catcher in the Rye*

I privately say to you, old friend... please accept from me this unpretentious bouquet of early-blooming parentheses: ((((( ))))).

— *Raise High the Roof Beam, Carpenters and Seymour: An Introduction*

11:58 am Monday December 13

**B** The Web site now displays the date and time in the sidebar, thanks to the `date()` function.

**Script 8.7** The altered `header.html` file uses the `date()` function to print the current date and time.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML  
1.1//EN" "http://www.w3.org/TR/xhtml11/  
DTD/xhtml11.dtd">  
2  <html xmlns="http://www.w3.org/1999/  
xhtml" xml:lang="en">  
3  <head>  
4      <title><?php // Print the page title.  
5      if (defined('TITLE')) { // Is the title  
defined?  
6          print TITLE;  
7      } else { // The title is not defined.  
8          print 'Raise High the Roof Beam!  
A J.D. Salinger Fan Club';  
9      }  
10     ?></title>  
11     <meta http-equiv="content-type"  
content="text/html; charset=utf-8" />
```

code continues on next page

### Script 8.7 continued

```
12    <link rel="stylesheet"
13      href="css/1.css" type="text/css"
14      media="screen,projection" />
15  </head>
16  <body>
17  <div id="wrapper">
18
19    <div id="header">
20      <p class="description">A J.D.
21        Salinger Fan Club</p>
22      <h1><a href="index.php">Raise High
23        the Roof Beam!</a></h1>
24      <ul id="nav">
25        <li><a href="books.php">
26          Books</a></li>
27        <li><a href="#">Stories</a></li>
28        <li><a href="#">Quotes</a></li>
29        <li><a href="login.php">
30          Login</a></li>
31        <li><a href="register.php">
32          Register</a></li>
33      </ul>
34    </div><!-- header -->
35
36    <div id="sidebar">
37      <h2>Favorite Quotes</h2>
38      <p class="news">I don't exactly
39        know what I mean by that,
40        but I mean it.<br />- <em>The
41        Catcher in the Rye</em></p>
42      <p class="news">I privately say
43        to you, old friend... please
44        accept from me this unpretentious
        bouquet of early-blooming
        parentheses: ((())).<br />-
        <em>Raise High the Roof Beam,
        Carpenters and Seymour: An
        Introduction</em></p>
        <p><?php // Print the current
        date and time...
        // Set the timezone:
45        date_default_timezone_set
46        ('America/New_York');
47
48        // Now print the date and time:
49        print date('g:i a l F j');
50        ?></p>
51    </div><!-- sidebar -->
52
53    <div id="content">
54      <!-- BEGIN CHANGEABLE CONTENT. -->
55      <!-- Script 8.7 - header.html -->
```

The initial HTML paragraph tag will wrap the date and time. Then open a PHP section so that you can call the `date()` function.

#### 3. Establish the time zone:

```
date_default_timezone_set
  ('America/New_York');
```

Before calling `date()`, the time zone has to be set. To find yours, see [www.php.net/timezones](http://www.php.net/timezones).

#### 4. Use the `date()` function to print out the current date and time:

```
print date('g:i a l F j');
```

Using the formatting parameters from Table 8.1, the `date()` function will return a value like *4:15 pm Tuesday February 22*. This value will immediately be printed.

#### 5. Close the PHP section and finish the HTML code:

```
?></p>
```

#### 6. Save the file as `header.html`, place it in the `templates` directory of your PHP-enabled server, and test it in your Web browser B.

**TIP** Because PHP is a server-side technology, these functions reflect the date and time on the server. To get the time on the client (in other words, on the computer where the Web browser viewing the page is located), you must use JavaScript.

**TIP** The server's time zone can also be set in the PHP configuration file (see Appendix A, "Installation and Configuration"). Establishing the time zone there is generally a better idea than doing so on a script-by-script basis.

**TIP** Added to PHP 5.3 are new ways to create and manipulate dates and times using the `DateTime` class. While useful, this new tool requires familiarity with object-oriented programming, therefore making it beyond the scope of this beginner's book.

# Handling HTML Forms with PHP, Revisited

All the examples in this book so far have used two separate scripts for handling HTML forms: one that displayed the form and another that received and processed the form's data. There's certainly nothing wrong with this method, but there are advantages to coding the entire process in one script. To make a page both display and handle a form, use a conditional **A**:

```
if /* form has been submitted */ {
    // Handle the form.
} else {
    // Display the form.
}
```

There are many ways to determine if a form has been submitted. One option is to check whether any of the form's variables are set:

```
if (isset($_POST['something'])) { ... }
```

However, if the user submitted the form without completing it, that variable may not be set (depending on the corresponding form element type). A more reliable solution I've used in the past is to add a hidden input to a form so that it can be checked:

```
<input type="hidden"
→ name="submitted" value="true" />
```

Again, the only purpose of this hidden input is to reliably indicate that the form has been submitted, even if the user did nothing to complete the form. To check for that, the handling PHP code would use this conditional:

```
if (isset($_POST['submitted'])) { ... }
```

```
<?php
include('template/header.html');

if /* form has been submitted */ {
```

validation

```
} else {
```



form

```
}
```

```
include('template/footer.html');
?>
```

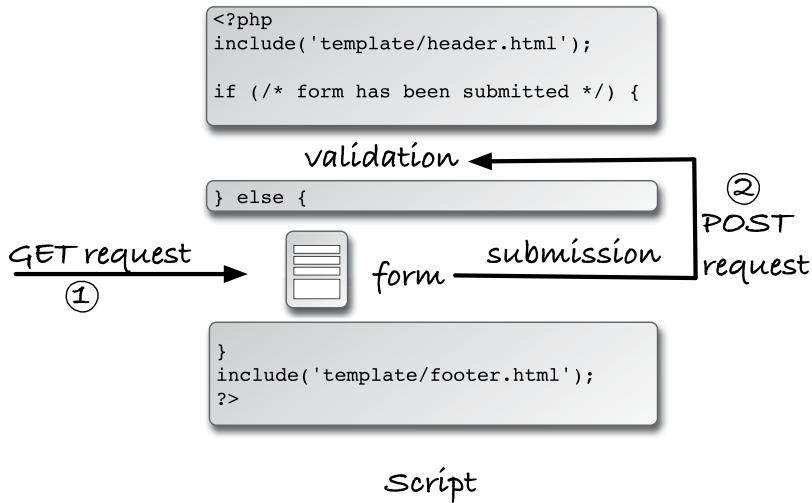
Script

**A** This flowchart represents how the same PHP script can both display and handle an HTML form.

Another way of checking for a form's submission is to examine *how the page was accessed*. When you have a form that will be submitted back to the same page, two different types of requests will be made of that script **B**. The first request, which loads the form, will be a GET request. This is the standard request made of most Web pages. When the form is submitted, and its `action` attribute points to the same page, a second request of the script will be made, this time a POST request (assuming the form uses the POST method). With this in mind, you can test for a form's submission by checking the request type, found in the `$_SERVER` array:

```
if ($_SERVER['REQUEST_METHOD'] ==  
    → 'POST') { ... }
```

As an example of this, you'll create the basics of a login form.



**B** When the same PHP script both displays and handles an HTML form, the script will be requested using two different methods.

## To use one page to display and handle a form:

1. Begin a new PHP document in your text editor or IDE, to be named `login.php` (**Script 8.8**):

```
<?php // Script 8.8 - login.php
```

2. Define the page title as a constant and include the header file:

```
define('TITLE', 'Login');
include('templates/header.html');
```

Using the constant system developed earlier in the chapter, give this page its own unique page title.

3. Add some introductory text:

```
print '<h2>Login Form</h2>
<p>Users who are logged in can
→ take advantage of certain
→ features like this, that, and
→ the other thing.</p>';
```

This text, which appears outside of the main conditional, will always show in the Web browser, whether the form is being displayed or has been submitted. Because the core of this script revolves around a PHP conditional, it's arguably clearer to print out HTML from PHP rather than exit out of the PHP code as you did in the previous two examples (`index.php` and `books.php`).

4. Begin the conditional to check whether the form has been submitted:

```
if ($_SERVER['REQUEST_METHOD'] ==
→ 'POST') {
```

To test whether the form has been submitted, check whether `$_SERVER['REQUEST_METHOD']` equals `POST` (case-sensitive).

**Script 8.8** The login page serves two purposes: It displays the login form and handles its submission.

```
1  <?php // Script 8.8 - login.php
2  /* This page lets people log into the
   site (in theory). */
3
4  // Set the page title and include the
   header file:
5  define('TITLE', 'Login');
6  include('templates/header.html');
7
8  // Print some introductory text:
9  print '<h2>Login Form</h2>
10   <p>Users who are logged in can take
      advantage of certain features like
      this, that, and the other thing.</p>';
11
12 // Check if the form has been submitted:
13 if ($_SERVER['REQUEST_METHOD'] ==
→ 'POST') {
14
15   // Handle the form:
16   if ( (!empty($_POST['email'])) &&
→ (!empty($_POST['password']))) {
17
18     if ( (strtolower($_POST
→ ['email']) == 'me@example.com') &&
→ ($_POST['password'] ==
→ 'testpass') ) { // Correct!
19
20       print '<p>You are logged
      in!<br />Now you can blah,
      blah, blah...</p>';
21
22     } else { // Incorrect!
23
24       print '<p>The submitted
      email address and password
      do not match those on
      file!<br />Go back and try
      again.</p>';
25
26   }
27
28 } else { // Forgot a field.
29
30   print '<p>Please make sure you
      enter both an email address
      and a password!<br />Go back
      and try again.</p>';
31
```

code continues on next page

**Script 8.8** continued

```
32  }
33
34 } else { // Display the form.
35
36 print '<form action="login.php"
37 method="post">
38 <p>Email Address: <input
39 type="text" name="email"
40 size="20" /></p>
41 <p>Password: <input
42 type="password" name="password"
43 size="20" /></p>
44 <p><input type="submit" name=
45 "submit" value="Log In!" /></p>
46 </form>';
47
48 }
49
50 include('templates/footer.html');
51 // Need the footer.
52 ?>
```

5. Create a nested pair of conditionals to process the form data:

```
if ( (!empty($_POST['email'])) &&
→ (!empty($_POST['password']))) {
  if ( (strtolower($_POST['email'])
→ == 'me@example.com') &&
→ ($_POST['password'] ==
→ 'testpass') ) {
    print '<p>You are logged
→ in!<br />Now you can blah,
→ blah, blah...</p>';
  } else { // Incorrect!
    print '<p>The submitted email
→ address and password do not
→ match those on file!<br />
→ Go back and try again.</p>';
  }
} else {
  print '<p>Please make sure you
→ enter both an email address
→ and a password!<br />Go back
→ and try again.</p>';
}
```

These conditionals handle the form data. The first conditional checks that both the email address and password variables have values. If they don't, a message is displayed (*Please make sure...*). Within that first conditional, another conditional checks whether the email address is equal to **me@example.com** and the password is equal to **testpass**. If so, let's say the user is logged in (it would be too advanced at this juncture to store and retrieve user information to create a real login system). Otherwise, a message indicates that the wrong values were entered.

*continues on next page*

Be certain to use the equals operator (`==`) here and not the assignment operator (`=`) in this conditional, which is a common mistake. Also, in case the user enters their address as `Me@example.com`, or any other capitalized permutation, the `strtolower()` function is first applied to the email address, prior to checking for equality.

6. Complete the main conditional:

```
 } else { // Display the form.  
     print '<form action="login.php"  
           → method="post">  
         <p>Email Address: <input  
           → type="text" name="email"  
           → size="20" /></p>  
         <p>Password: <input type=  
           → "password" name="password"  
           → size="20" /></p>  
         <p><input type="submit" name=  
           → "submit" value="Log In!" /></p>  
     </form>;  
 }
```

This concludes the main conditional, which checks whether the form has been submitted. If it hasn't been, then the form is displayed. The form itself is very simple C.

To clarify a point of possible confusion, even though the form's `method` attribute has a value of `post` (all lowercase), to check for the form's submission, the request method value is still `POST` (all uppercase).

## Login Form

Users who are logged in can take advantage of certain features like this, that, and the other thing.

Email Address:

Password:

C This simple login page takes an email address and a password.

## Login Form

Users who are logged in can take advantage of certain features like this, that, and the other thing.

You are logged in!  
Now you can blah, blah, blah...

- D Upon successfully logging in, the user sees this message.

## Login Form

Users who are logged in can take advantage of certain features like this, that, and the other thing.

Please make sure you enter both an email address and a password!  
Go back and try again.

- E Failure to submit either an email address or a password results in this message.

## Login Form

Users who are logged in can take advantage of certain features like this, that, and the other thing.

The submitted email address and password do not match those on file!  
Go back and try again.

- F If either the email address or the password doesn't match that in the script, the user sees this error message.

7. Require the footer file and complete the PHP page:

```
include('templates/footer.html');  
?>
```

8. Save the file as **login.php**, place it in the same directory as **index.php**, and test it in your Web browser D, E, and F.

**TIP** In the real world, you would add some CSS formatting to the error messages so that they stand out. The next section of the chapter will include this feature.

**TIP** This trick of checking for the presence of a hidden input can be confusing. It works because the same script—**login.php**—will be accessed twice by the user. The first time the form will not have been submitted, so a conditional checking if `$_POST['submitted']` is set will be FALSE and the form will be displayed. Then the page will be accessed again after the user clicks submit, at which point the conditional becomes TRUE.

**TIP** If you want a page to handle a form and then immediately display the form again, use this:

```
if ($_SERVER['REQUEST_METHOD'] ==  
    → 'POST') {  
    // Handle the form.  
}  
// Display the form.
```

# Making Forms Sticky

A *sticky* form remembers values entered into it. A common example is a search engine, which often displays your terms in the search box, even when showing the results of the search. You might also want to use sticky forms on occasions where the user failed to complete a form accurately and therefore must resubmit it **A**.

From a technological standpoint, sticky forms work by having their form element values predetermined. You can make this happen by setting the **value** attribute of text inputs:

```
<input type="text" name="first_name"
→ value="Stephanie" />
```

To have PHP preset that value, print the appropriate variable between the quotation marks:

```
<input type="text" name="first_name"
→ value="<?php print $_POST
→ ['first_name']; ?>" />
```

The first time the form is run, the PHP code prints nothing (because the variable has no value). If the form is displayed again after submission, values that the user originally entered in the form input will be displayed there automatically. That's the basic idea, but a more professional implementation would address two things...

```
<p>First Name: <input type="text" name="first_name" size="20" value=""<br />
<b>Notice</b>: Undefined index: first_name in <b>/Users/larryullman/Sites/phpvqs4/register.php</b>
" /></p>
```

**B** The HTML source of the page shows the PHP error caused by referring to a variable that does not exist.

## Registration Form

Register so that you can take advantage of certain features like this, that, and the other thing.

Please enter your last name!

Please enter your email address!

Please enter a password!

Please try again!

First Name:

Last Name:

**A** Creating sticky forms makes it easier for users to correct omissions in incomplete form submissions.

## Registration Form

Register so that you can take advantage of certain features like this, that, and the other thing.

First Name:

Last Name:

Email Address:

Password:

Confirm Password:

C The registration form as the user first sees it.

First, it's best not to refer to variables that don't exist. Doing so creates PHP warnings, and with the PHP code buried in a form element's attribute, the warning itself will only be fully visible in the HTML source code ❶. To avoid that, check that the variable is set before printing it:

```
<input type="text" name="first_name"
→ value=<?php if (isset($_POST
→ ['first_name'])) { print $_POST
→ ['first_name']; } ?>" />
```

Second, certain characters that could be in a submitted value will cause problems if printed as a form element's value. To prevent such problems, apply the `htmlspecialchars()` function (discussed in Chapter 5, "Using Strings"). With this in mind, a longer but better version of this code is as follows:

```
<input type="text" name="first_name"
→ value=<?php if (isset($_POST
→ ['first_name'])) { print
→ htmlspecialchars($_POST['first_
→ name']); } ?>" />
```

To demonstrate, you'll create the shell of a registration form C.

## To make a sticky form:

1. Create a new PHP script in your text editor or IDE, to be named **register.php** (Script 8.9):  
**<?php // Script 8.9 - register.php**
2. Set the page title and include the HTML header:  
**define('TITLE', 'Register');**  
**include('templates/header.html');**

3. Add some introductory text and define a CSS class:

```
print '<h2>Registration Form</h2>
<p>Register so that you can
→ take advantage of certain
→ features like this, that, and
→ the other thing.</p>';
print '<style type="text/css"
→ media="screen">
.error { color: red; }
</style>';
```

So that the error messages, generated by improperly completing the registration form, stand out, a CSS class is defined that colors the applicable text in red.

Although CSS is normally defined in the page's head, you can put it anywhere.

4. Check whether the form has been submitted:

```
if ($_SERVER['REQUEST_METHOD'] ==
'POST') {
```

Like the login page, this one script both displays and handles the registration form. To check if the form has been submitted, the same code previously explained is used here.

**Script 8.9** The registration form uses a so-called **sticky** feature so that it recalls the values previously entered into it

```
1  <?php // Script 8.9 - register.php
2  /* This page lets people register for
   the site (in theory). */
3
4  // Set the page title and include the
   header file:
5  define('TITLE', 'Register');
6  include('templates/header.html');
7
8  // Print some introductory text:
9  print '<h2>Registration Form</h2>
10    <p>Register so that you can
       take advantage of certain
       features like this, that, and
       the other thing.</p>';
11
12 // Add the CSS:
13 print '<style type="text/css"
media="screen">
14   .error { color: red; }
15 </style>';
16
17 // Check if the form has been submitted:
18 if ($_SERVER['REQUEST_METHOD'] == 'POST') {
19
20   $problem = FALSE; // No problems
   so far.
21
22   // Check for each value...
23   if (empty($_POST['first_name'])) {
24     $problem = TRUE;
25     print '<p class="error">Please
       enter your first name!</p>';
26   }
27
28   if (empty($_POST['last_name'])) {
29     $problem = TRUE;
30     print '<p class="error">Please
       enter your last name!</p>';
31   }
32
33   if (empty($_POST['email'])) {
34     $problem = TRUE;
35     print '<p class="error">Please
       enter your email address!</p>';
36   }
37
38   if (empty($_POST['password1'])) {
```

code continues on next page

### Script 8.9 continued

```
39     $problem = TRUE;
40     print '<p class="error">Please
41         enter a password!</p>';
42
43     if ($_POST['password1'] != $_POST
44         ['password2']) {
45         $problem = TRUE;
46         print '<p class="error">Your
47             password did not match your
48             confirmed password!</p>';
49
50     if (!$problem) { // If there weren't
51         any problems...
52
53         // Print a message:
54         print '<p>You are now registered!
55             <br />Okay, you are not really
56             registered but...</p>';
57
58         // Clear the posted values:
59         $_POST = array();
60
61     } else { // Forgot a field.
62
63         print '<p class="error">Please try
64             again!</p>';
65
66     }
67
68 } // End of handle form IF.
69
70 // Create the form:
71 ?>
72 <form action="register.php"
73 method="post">
74
75     <p>First Name: <input type="text"
76         name="first_name" size="20"
77         value=<?php if (isset($_POST
78             ['first_name'])) { print
79                 htmlspecialchars($_POST['first_
80                 name']); } ?>" /></p>
81
82     <p>Last Name: <input type="text"
83         name="last_name" size="20"
84         value=<?php if (isset($_POST
85             ['last_name'])) { print
86                 htmlspecialchars($_POST['last_
87                 name']); } ?>" /></p>
```

code continues on next page

### 5. Create a flag variable:

```
$problem = FALSE;
```

The **\$problem** variable will be used to indicate whether a problem occurred. Specifically, you want to make sure that every form input has been filled out before you formally register the user. Initially, this variable is set to **FALSE**, because no problems have occurred.

This is the same approach used in Chapter 6, “Control Structures.”

### 6. Check that a first name was entered:

```
if (empty($_POST['first_name'])) {
    $problem = TRUE;
    print '<p class="error">Please
        → enter your first name!</p>';
}
```

As a simple test to determine whether the user has entered a first name value, check that the variable isn’t empty. (This technique was first discussed in Chapter 6.) If the variable is empty, then indicate a problem by setting that variable to **TRUE** and print an error message. The error message has a class type of **error**, so that the CSS formatting is applied.

### 7. Repeat the validation for the last name and email address:

```
if (empty($_POST['last_name'])) {
    $problem = TRUE;
    print '<p class="error">Please
        → enter your last name!</p>';
}
if (empty($_POST['email'])) {
    $problem = TRUE;
    print '<p class="error">Please
        → enter your email address!</p>';
}
```

Both of these checks are variations on the username validation routine.

continues on next page

**8.** Validate the passwords:

```
if (empty($_POST['password1'])) {  
    $problem = TRUE;  
    print '<p class="error">Please  
→ enter a password!</p>';  
}  
if ($_POST['password1'] != $_POST  
→ ['password2']) {  
    $problem = TRUE;  
    print '<p class="error">Your  
→ password did not match your  
→ confirmed password!</p>';  
}
```

The password validation requires two conditionals. The first checks whether the `$_POST['password1']` variable is empty. The second checks whether the `$_POST['password1']` variable isn't equal to the `$_POST['password2']` variable. You don't need to see if `$_POST['password2']` is empty because if it is and `$_POST['password1']` isn't, the second conditional will catch that problem. If `$_POST['password1']` and `$_POST['password2']` are both empty, the first conditional will catch the mistake.

**9.** Check whether a problem occurred:

```
if (!$problem) {  
    print '<p>You are now  
→ registered!<br />Okay,  
→ you are not really registered  
→ but...</p>';  
    $_POST = array();
```

If there were no problems, the `$problem` variable is still **FALSE**, and the initial condition here is **TRUE** (the condition is that `$problem` has a value of **FALSE**). In that case, the registration process would take place. The formal registration process, where the data is stored in a file or database, has not yet been developed, so a simple message appears in its stead here.

**Script 8.9 continued**

```
71  
72     <p>Email Address: <input  
    type="text" name="email"  
    size="20" value="<?php if  
    (isset($_POST['email'])) { print  
    htmlspecialchars($_POST['email']);  
    } ?>" /></p>  
73  
74     <p>Password: <input  
    type="password" name="password1"  
    size="20" value="<?php if  
    (isset($_POST['password1']))  
    { print htmlspecialchars($_POST  
    ['password1']); } ?>" /></p>  
75     <p>Confirm Password: <input  
    type="password" name="password2"  
    size="20" value="<?php if  
    (isset($_POST['password2']))  
    { print htmlspecialchars($_POST  
    ['password2']); } ?>" /></p>  
76  
77     <p><input type="submit" name="submit"  
    value="Register!" /></p>  
78  
79     </form>  
80  
81     <?php include('templates/footer.html');  
    // Need the footer. ?>
```

Next, the `$_POST` variable is assigned the value of `array()`. This line has the effect of wiping out the contents of the `$_POST` variable (i.e., resetting it as an empty array). This step is taken only upon a successful (theoretical) registration so that the values are not redisplayed in the registration form (e.g., see Step 12).

**10.** Complete the conditionals:

```
    } else { // Forgot a field.  
        print '<p class="error">  
            → Please try again!</p>';  
    }  
} // End of handle form IF.
```

The `else` clause applies if a problem occurred, in which case the user is asked to complete the form again.

**11.** Begin the HTML form:

```
?>  
<form action="register.php"  
→ method="post">
```

Unlike the login example, this page always displays the form. Therefore, the form isn't part of any conditional. Also, because there's a lot of HTML to be generated, it'll be easier to leave the PHP section of the page and just output the HTML directly.

**12.** Create the sticky first name input:

```
<p>First Name: <input type="text"  
→ name="first_name" size="20"  
→ value=<?php if (isset($_POST  
→ ['first_name'])) { print  
→ htmlspecialchars($_POST  
→ ['first_name']); } ?>" /></p>
```

To make the first name input sticky, preset its `value` attribute by printing out the `$_POST['first_name']` variable, but only if it's set. The conditional is therefore put within PHP tags within the HTML's `value` section of the form element. As already mentioned, the `htmlspecialchars()` function is used to handle any potentially problematic characters.

Note that if the user filled out the form properly, the entire `$_POST` array will have been reset, making this PHP conditional false.

**13.** Repeat the process for the last name and email address:

```
<p>Last Name: <input type="text"  
→ name="last_name" size="20"  
→ value=<?php if (isset($_POST  
→ ['last_name'])) { print  
→ htmlspecialchars($_POST  
→ ['last_name']); } ?>" /></p>  
<p>Email Address: <input  
→ type="text" name="email"  
→ size="20" value=<?php if  
→ (isset($_POST['email'])) { print  
→ htmlspecialchars($_POST  
→ ['email']); } ?>" /></p>
```

These are variations on Step 12, switching the variable names as appropriate.

**14.** Add the rest of the form:

```
<p>Password: <input type=  
→ "password" name="password1"  
→ size="20" value=<?php if  
→ (isset($_POST['password1']))  
→ { print htmlspecialchars  
→ ($_POST['password1']); } ?>" /></p>  
<p>Confirm Password: <input  
→ type="password" name="password2"  
→ size="20" value=<?php if  
→ (isset($_POST['password2']))  
→ { print htmlspecialchars  
→ ($_POST['password2']); }  
→ ?>" /></p>  
<p><input type="submit" name=  
→ "submit" value="Register!" /></p>  
</form>
```

It used to be the case that you couldn't preset a value for a password input, but some browsers now support this feature. Then there is the submit button and the closing `form` tag.

*continues on next page*

**15.** Complete the PHP page:

```
<?php include('templates/  
→ footer.html'); ?>
```

The last step is to include the HTML footer.

**16.** Save the file as **register.php**, place it in the proper directory on your PHP-enabled server, and test it in your Web browser **D** and **E**.

**TIP** According to (X)HTML rules, you must quote all attributes in form inputs. Specifically, you should use double quotation marks. If you don't quote your values, any spaces in them mark the end of the value (for example, *Larry Ullman* will display as just *Larry* in the form input). Although quoting attributes will not be a requirement of HTML5, I still recommend doing so.

**TIP** To preset the status of radio buttons or check boxes as checked, add the code `checked="checked"` to the `input` tag:

```
<input type="checkbox" name=  
→ "interests[]" value="Skiing"  
→ checked="checked" />
```

Of course, you'd need to use a PHP conditional to see if that text should be added to the element's definition.

**TIP** To preselect a pull-down menu, use `select-ed="selected"`:

```
<select name="year">  
<option value="2011">2011</option>  
<option value="2012" select-ed=  
→ "selected">2012</option>  
</select>
```

Again, you'd need to use a PHP conditional to see if that text should be added to the element's definition.

**TIP** To preset the value of a text area, place the value between the `textarea` tags:

```
<textarea name="comments" rows="10"  
→ cols="50">preset value</textarea>
```

## Registration Form

Register so that you can take advantage of certain features like this, that, and the other thing.

Please enter your last name!

Please enter your email address!

Your password did not match your confirmed password!

Please try again!

First Name:

Last Name:

Email Address:

Password:

Confirm Password:

**D** The registration form indicates any problems and retains the form values.

## Raise High the Roof Beam!

Books Stories Quotes Login Register

### Registration Form

Register so that you can take advantage of certain features like this, that, and the other thing.

You are now registered!

Okay, you are not really registered but...

First Name:

Last Name:

Favorite C

I don't exactly know what I mean by it.  
- The Catcher in the Rye

I privately say to myself that I accept from me the early-blooming flowers.  
- Raise High the Roof Beam, Seymour: An American Childhood

2:14 pm Friday, Jan 18, 2013

**E** The registration form after the user successfully fills it out.

Email Address:
me@example.com,you@example.edu,whomever@example.net

- A A user could easily attempt to send emails to multiple recipients through a form like this.

## Sending Email

Sending email using PHP is *theoretically* simple, merely requiring only PHP's `mail()` function. This function uses the server's email application (such as `sendmail` on Unix or Mac OS X) or an SMTP (Simple Mail Transfer Protocol) server to send out the messages. The basic usage of this function is as follows:

```
mail(to, subject, body);
```

The first argument is the email address (or *addresses*, separated by commas) to which the email should be sent. The second argument establishes the message's subject line, and the third argument creates the message's content.

This function can take another argument through which you can add more details (*additional headers*) to the email, including a `From` address, email priority, and carbon-copy addresses.

```
mail('someone@example.com', 'Test  
→ Email', 'This is a test email',  
→ 'From: 'email@example.com');
```

Although doing so is easy in theory, using this function in real-world code can be far more complex. For starters, setting up your own computer to send out email can be a challenge (see the sidebar “Configuring Your Server to Send Email”).

Second, you should take steps to prevent malicious people from using your forms to send out spam. In our next example, an email will be sent to the provided email address. If a conniving user supplies multiple addresses A, an email will be sent to each one. There are many ways of safeguarding against this. For the level of this book, one simple option is to confirm

*continues on next page*

that there's only a single @ present in the provided address (i.e., it's only one email address). You can count how many times a substring is present in a string using the aptly named `substr_count()` function:

```
if (substr_count($_POST['email'],  
    '@') == 1) {...
```

With those caveats, let's add a `mail()` function call to the registration page so that you get a sense of how the function might be used.

## To send email with PHP:

1. Open `register.php` (Script 8.9) in your text editor or IDE.
2. Change the email validation so that it also checks for a single “at” symbol (**Script 8.10**):

```
if (empty($_POST['email']) ||  
    (substr_count($_POST['email'],  
        '@') != 1) ) {
```

Now the email address validation fails if the value is empty or if it doesn't contain exactly one @. This doesn't constitute thorough validation—far from it—but the emails address becomes less of a security risk to use. See the tips for ways to improve upon this.

3. After the registration message (line 51), add the following:

```
$body = "Thank you for registering  
with the J.D. Salinger fan  
club! Your password is  
'${_POST['password1']}';  
mail($_POST['email'], 'Registration  
Confirmation', $body, 'From:  
admin@example.com');
```

*continues on page 220*

**Script 8.10** In PHP, you can send email by calling the `mail()` function.

```
1  <?php // Script 8.10 - register.php #2  
2  /* This page lets people register for  
   the site (in theory). */  
3  
4  // Set the page title and include the  
   header file:  
5  define('TITLE', 'Register');  
6  include('templates/header.html');  
7  
8  // Print some introductory text:  
9  print '<h2>Registration Form</h2>  
10     <p>Register so that you can take  
       advantage of certain features like  
       this, that, and the other thing.</p>';  
11  
12 // Add the CSS:  
13 print '<style type="text/css" media="screen">  
14   .error { color: red; }  
15 </style>';  
16  
17 // Check if the form has been submitted:  
18 if ($_SERVER['REQUEST_METHOD'] == 'POST')  
{  
19  
20     $problem = FALSE; // No problems so far.  
21  
22     // Check for each value...  
23     if (empty($_POST['first_name'])) {  
24         $problem = TRUE;  
25         print '<p class="error">Please  
           enter your first name!</p>';  
26     }  
27  
28     if (empty($_POST['last_name'])) {  
29         $problem = TRUE;  
30         print '<p class="error">Please  
           enter your last name!</p>';  
31     }  
32  
33     if (empty($_POST['email']) ||  
34         (substr_count($_POST['email'],  
35             '@') != 1) ) {  
36         $problem = TRUE;  
37         print '<p class="error">Please  
           enter your email address!</p>';  
38     }  
39  
39     if (empty($_POST['password1'])) {  
40         $problem = TRUE;
```

*code continues on next page*

**Script 8.10** continued

```
40      print '<p class="error">Please enter a password!</p>';
41  }
42
43  if ($_POST['password1'] != $_POST['password2']) {
44      $problem = TRUE;
45      print '<p class="error">Your password did not match your confirmed password!</p>';
46  }
47
48  if (!$problem) { // If there weren't any problems...
49
50      // Print a message:
51      print '<p>You are now registered!<br />Okay, you are not really registered but...</p>';
52
53      // Send the email:
54      $body = "Thank you for registering with the J.D. Salinger fan club! Your password
55      is '{$_POST['password1']}';
56      mail($_POST['email'], 'Registration Confirmation', $body, 'From: admin@example.com');
57
58      // Clear the posted values:
59      $_POST = array();
60
61  } else { // Forgot a field.
62
63      print '<p class="error">Please try again!</p>';
64  }
65
66 } // End of handle form IF.
67
68 // Create the form:
69 ?>
70 <form action="register.php" method="post">
71
72     <p>First Name: <input type="text" name="first_name" size="20" value="<?php if (isset($_POST
73     ['first_name'])) { print htmlspecialchars($_POST['first_name']); } ?>" /></p>
74
75     <p>Last Name: <input type="text" name="last_name" size="20" value="<?php if (isset($_POST
76     ['last_name'])) { print htmlspecialchars($_POST['last_name']); } ?>" /></p>
77
78     <p>Email Address: <input type="text" name="email" size="20" value="<?php if (isset($_POST
79     ['email'])) { print htmlspecialchars($_POST['email']); } ?>" /></p>
80
81     <p>Password: <input type="password" name="password1" size="20" value="<?php if (isset($_POST
82     ['password1'])) { print htmlspecialchars($_POST['password1']); } ?>" /></p>
83     <p>Confirm Password: <input type="password" name="password2" size="20" value="<?php if
84     (isset($_POST['password2'])) { print htmlspecialchars($_POST['password2']); } ?>" /></p>
85
86     <p><input type="submit" name="submit" value="Register!" /></p>
87
88 </form>
89
90 <?php include('templates/footer.html'); // Need the footer. ?>
```

Sometimes the easiest way to use this function is to establish the body as a variable and then feed it into the `mail()` function (as opposed to writing the email's body within the function call). The message itself is sent to the address with which the user registered, with the subject *Registration Confirmation*, from the address `admin@example.com`. If you'll be running this script on a live server, you should use an actual email address for that site as the `from` value.

4. Save the file, place it in the proper directory of your PHP- and email-enabled server, and test it in your Web browser **B**.
5. Upon successfully completing the form, check your email for the message **C**.

**TIP** The “Review and Pursue” section at the end of this chapter points you in the direction of an excellent tool for validating email addresses, provided you’re using version 5.2 or later of PHP.

**TIP** In my *PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide* (Peachpit Press, 2007) and online in my forums ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)), I discuss other ways to secure the emails that get sent by a PHP script.

**TIP** If you have problems receiving the PHP-sent email, start by confirming that the mail server works on its own without involving PHP. Then make sure you’re using a valid `from` address. Finally, try using different recipient addresses and keep an eye on your spam folder to see that the message isn’t getting put there (if applicable).

## Registration Form

Register so that you can take advantage of certain features like this, that, and the other thing.

Please enter your email address!

Please try again!

First Name:

Last Name:

Email Address:

- B** If the user provides multiple email addresses **A**, they’ll see an error message.



- C** This email was sent by the PHP script upon successful pseudo-registration.

## Configuring Your Server to Send Email

Sending email with PHP is easy, as long as your Web server (or computer) is set up to send email. If you're using a Web hosting service or your own Unix computer (like Linux), this shouldn't be a problem at all. If you do have a problem, contact the hosting company for support.

If you're running your own server (e.g., if you're developing locally), the ability to send email could be a sticking point. If you're using an all-in-one installer, such as MAMP or XAMPP (see Appendix A), it should also have an email server as part of the package. If you don't receive the email after registering, check the associated software's documentation for what you may need to do to enable email.

If you're using a Web server built into the operating system, such as Apache on Mac OS X, you may or may not already be set up to send email. To start, go ahead and try this example using a valid email address. If you don't receive the email, see Appendix A for information about getting `mail()` to work.

I'll also add that I almost never worry about getting PHP on my own computer to send out emails because I'll never be running live Web sites from my computer. In other words, why waste time getting something to work that you'll never end up using (whereas getting PHP to send out email on a live server does matter)?

**TIP** It's possible to send email with attachments or HTML email, although doing so requires far more sophisticated coding (normally involving classes and objects). Fortunately, a number of programmers have already developed workable solutions that are available for use. See Appendix B, "Resources and Next Steps," for Web sites that may be of assistance.

**TIP** The `mail()` function returns a value (1 or 0) indicating its successful use. This value only indicates whether PHP was able to attempt to send the email (by using whatever email system is in place). There's no easy way to use PHP to see whether an email address is valid or whether the end user received the message.

**TIP** To send an email to multiple addresses, either use the `CC` parameter or separate each `TO` address with a comma.

**TIP** To create new lines within the email body, either create the message over multiple lines or use the newline character (`\n`) within double quotation marks.

**TIP** If you want to send multiple headers in addition to the `From` address, separate them with a combination of `\r\n`:

```
mail ('email@example.com', 'Testing',
→ $body, "From:email@example.org\r\n"
→ nBcc:hidden@example.net,third@
→ example.com");
```

# Output Buffering

There are a handful of functions that you'll use in this chapter and the next that can only be called if nothing has been sent to the Web browser. These functions include `header()`, `setcookie()`, and `session_start()`. If you use them after the Web browser has already received some text, HTML, or even a blank space, you'll get a dreaded "*headers already sent*" error message **A**.

One solution that I recommend for beginning PHP developers is to make use of *output buffering* (also called *output control*). In a normal PHP script, any HTML outside of the PHP tags is immediately sent to the Web browser. This is also true when any `print` statement is executed. With output buffering, the HTML and printed data—the output—will instead be placed into a buffer (i.e., memory). At the end of the script, the buffer will then be sent to the Web browser, or if appropriate, the buffer can be cleared without being sent to the Web browser. There are many reasons to use output buffering, but for beginners, one benefit is that you can use certain functions without worrying about *headers already sent* errors. Although you haven't dealt with any of the named functions yet, this chapter

introduces output buffering now. Using this feature will greatly reduce errors when you begin using headers (in the next section of this chapter), cookies (in the next chapter), and sessions (also in the next chapter).

To begin output buffering, use the `ob_start()` function at the very top of your page. Once you call it, every `print` and similar function will send data to a memory buffer rather than to the Web browser. Conversely, HTTP calls, like `header()` and `setcookie()`, won't be buffered and will operate as usual.

At the conclusion of the script, call the `ob_end_flush()` function to send the accumulated buffer to the Web browser. Or use the `ob_end_clean()` function to delete the buffered data without passing it along. Both functions also turn off output buffering for that script.

From a programmer's perspective, output buffering allows you to structure a script in a more linear form, without concern for HTTP headers. Let's remake `header.html` and `footer.html` so that every page uses output buffering. You won't appreciate the benefits yet, but the number of errors you won't see over the rest of this book will go a long way toward preserving your programming sanity.

**Warning:** Cannot modify header information - headers already sent by (output started at /Users/larryullman/Sites/phpvqs4/templates/header.html:4) in /Users/larryullman/Sites/phpvqs4/login.php on line 22

**A** If the browser receives any HTML prior to a `header()` call, you'll see this error message.

**Script 8.11** Add output buffering to the Web application by calling the `ob_start()` function at the top of the `header.html` script.

```
1  <?php // Script 8.11 - header.html #4
2
3  // Turn on output buffering:
4  ob_start();
5
6  ?>!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
1.1//EN" "http://www.w3.org/TR/xhtml11/
DTD/xhtml11.dtd"
7  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en">
8  <head>
9      <title><?php // Print the page title.
10     if (defined('TITLE')) { // Is the title
defined?
11         print TITLE;
12     } else { // The title is not defined.
13         print 'Raise High the Roof Beam! A
J.D. Salinger Fan Club';
14     }
15     ?></title>
16     <meta http-equiv="content-type"
content="text/html; charset=utf-8" />
17     <link rel="stylesheet"
href="css/1.css" type="text/css"
media="screen,projection" />
18 </head>
19 <body>
20 <div id="wrapper">
21
22     <div id="header">
23         <p class="description">A J.D.
Salinger Fan Club</p>
24         <h1><a href="index.php">Raise High
the Roof Beam!</a></h1>
25         <ul id="nav">
26             <li><a href="books.php">
Books</a></li>
27             <li><a href="#">Stories</a></li>
28             <li><a href="#">Quotes</a></li>
29             <li><a href="login.php">
Login</a></li>
30             <li><a href="register.php">
Register</a></li>
31         </ul>
32     </div><!-- header -->
33
34     <div id="sidebar">
35         <h2>Favorite Quotes</h2>
36         <p class="news">I don't exactly
know what I mean by that,
but I mean it.<br />- <em>The
Catcher in the Rye</em></p>
```

## To use output buffering:

1. Open `header.html` (Script 8.7) in your text editor or IDE.
2. At the very top of the page, before any HTML code, add the following (Script 8.11):

```
<?php
ob_start();
?>
```

The key to using output buffering is to call the `ob_start()` function as early as possible in a script. In this example, you create a special section of PHP prior to any HTML and call `ob_start()` there. By turning on output buffering in your header file and turning it off in your footer file, you buffer every page in the Web application.

3. Open `footer.html` (Script 8.8) in your text editor or IDE.

*continues on next page*

### Script 8.11 continued

```
37     <p class="news">I privately say
to you, old friend... please
accept from me this unpretentious
bouquet of early-blooming
parentheses: ((())).<br />-
<em>Raise High the Roof Beam,
Carpenters and Seymour: An
Introduction</em></p>
38     <p><?php // Print the current
date and time...
39     // Set the timezone:
40     date_default_timezone_set
('America/New_York');
41
42     // Now print the date and time:
43     print date('g:i a l F j');
44     ?></p>
45     </div><!-- sidebar -->
46
47     <div id="content">
48     <!-- BEGIN CHANGEABLE CONTENT. -->
```

4. At the end of the script, after all of the HTML, add (Script 8.12):

```
<?php  
ob_end_flush();  
?>
```

This code turns off output buffering and sends the accumulated buffer to the Web browser. In other words, all the HTML is sent at this point.

5. Save both files and place them in the **templates** directory of your PHP-enabled server.  
6. Test any page in your Web browser (B).

**TIP** As a reminder, PHP code can be placed in a file with an .html extension—as in these two examples here—if that file is being included by a PHP script (like index.php).

**TIP** For some time now, output buffering has been automatically enabled in PHP's default configuration.

**TIP** You can set the maximum buffer size in php.ini (PHP's configuration file). The default is 4,096 bytes.

**TIP** The ob\_get\_length() function returns the length (in number of characters) of the current buffer contents.

**TIP** The ob\_get\_contents() function returns the current buffer so that it can be assigned to a variable, should the need arise.

**TIP** The ob\_flush() function sends the current contents of the buffer to the Web browser and then discards them, allowing a new buffer to be started. This function lets your scripts maintain more moderate buffer sizes.

**TIP** The ob\_clean() function deletes the current contents of the buffer without stopping the buffer process.

**TIP** PHP automatically runs ob\_end\_flush() at the conclusion of a script if it isn't otherwise done. But it's still a good idea to call it yourself.

**Script 8.12** Output buffering is completed at the end of the footer file using **ob\_end\_flush()**, which sends the accumulated buffer to the Web browser.

```
1      <!-- END CHANGEABLE CONTENT. -->  
2      </div><!-- content -->  
3  
4      <div id="footer">  
5          <p>Template design by <a href=  
6              "http://www.sixshootermedia.com">  
7              Six Shooter Media</a>.</p>  
8          <p>&copy; 2011</p>  
9      </div><!-- footer -->  
10     </div><!-- wrapper -->  
11     </body>  
12     </html><?php // Script 8.12 - footer.html #2  
13     // Send the buffer to the browser and  
14     // turn off buffering:  
15     ob_end_flush();  
16 ?>
```



**B** The site works the same as it did previously, but it will be easier to work with when you use HTTP headers in the next section of this chapter.

# Manipulating HTTP Headers

Most interactions between a server and a Web browser (the client) take place over HTTP (Hypertext Transfer Protocol). This is why the addresses for Web pages begin with *http://*. But the Web server often needs to communicate with a browser in other ways, beyond just sending HTML, images, and the like. These additional communications can be accomplished using HTTP *headers*. There are dozens of uses for HTTP headers, all of which you can do using PHP's `header()` function.

Here, you'll learn a very common use of the `header()` function: redirecting the user from one page to another. To redirect the user's browser with PHP, you send a *location* header:

```
header('Location: page.php');
```

Normally, the `header()` function is followed by `exit()`, to cancel the execution of the script (because the browser has been redirected to another page):

```
header('Location: page.php');
exit();
```

The most important thing to understand about using `header()` is that the function must be called before anything else is sent to the Web browser—otherwise, you'll see the all-too-common “*headers already sent*” error message (see ① in the section “Output Buffering”). If your Web page receives *any* HTML or even blank space, the `header()` function won't work.

*continues on next page*

Fortunately, you learned about output buffering in the previous section. Because output buffering is turned on in the Web application, nothing is sent to the Web browser until the very last line of the footer script (when `ob_end_flush()` is called). By using this method, you can avoid the dreaded “headers already sent” error message.

To practice redirection, you’ll rewrite the login page to take the user to a welcome page upon successful login.

### To use the `header()` function:

1. Open `login.php` in your text editor or IDE (Script 8.8).
2. Delete the *You are logged in...* `print` statement (Script 8.13).

Because the user is redirected to another page, there’s no need to include this message.

**Script 8.13** The new version of the login page redirects the user to another page using the `header()` function.

```
1  <?php // Script 8.13 - login.php #2
2  /* This page lets people log into the
   site (in theory). */
3
4  // Set the page title and include the
   header file:
5  define('TITLE', 'Login');
6  include('templates/header.html');
7
8  // Print some introductory text:
9  print '<h2>Login Form</h2>
10    <p>Users who are logged in can take
      advantage of certain features like
      this, that, and the other thing.</p>';
11
12 // Check if the form has been submitted:
13 if ($_SERVER['REQUEST_METHOD'] == 'POST') {
14
15    // Handle the form:
16    if ( (!empty($_POST['email'])) &&
        (!empty($_POST['password']))) {
17
18      if ( (strtolower($_POST['email'])
        == 'me@example.com') && ($_
        POST['password'] == 'testpass') ) {
19        // Correct!
20
21        ob_end_clean(); // Destroy
22          the buffer!
23        header ('Location:
24          welcome.php');
25        exit();
26
27      } else { // Incorrect!
28
29        print '<p>The submitted email
      address and password do not
      match those on file!<br />Go
      back and try again.</p>';
30    }
}
```

*code continues on next page*

**Script 8.13** continued

```
31 } else { // Forgot a field.  
32  
33     print '<p>Please make sure you  
34         enter both an email address and  
35         a password!<br />Go back and try  
36         again.</p>';  
37 } else { // Display the form.  
38  
39     print '<form action="login.php"  
40         method="post">  
41         <p>Email Address: <input type="text"  
42             name="email" size="20" /></p>  
43         <p>Password: <input type="password"  
44             name="password" size="20" /></p>  
45         <p><input type="submit" name="submit"  
46             value="Log In!" /></p>  
47     </form>;  
48 }  
49  
50 include('templates/footer.html');  
51 // Need the footer.  
52 ?>
```

3. Where the `print` statement was, add the following:

```
ob_end_clean();  
header ('Location: welcome.php');  
exit();
```

The first line destroys the page buffer (because the accumulated buffer won't be used). This isn't strictly required but is a good idea. The next line redirects the user to `welcome.php`. The third line terminates the execution of the rest of the script.

4. Save the file and place it in the proper directory for your PHP-enabled server (along with the other scripts from this chapter).

Now you need to create the `welcome.php` page to which the user will be redirected.

## To write welcome.php:

1. Begin a new PHP document in your text editor or IDE, to be named **welcome.php** (Script 8.14):

```
<?php // Script 8.14 - welcome.php
```

2. Define the page title and include the header:

```
define('TITLE', 'Welcome to the  
→ J.D. Salinger Fan Club!');  
include('templates/header.html');
```

3. Create the page content:

```
?>  
<h2>Welcome to the J.D. Salinger  
→ Fan Club!</h2>  
<p>You've successfully logged  
→ in and can now take advantage  
→ of everything the site has to  
→ offer.</p>
```

**Script 8.14** The welcome page greets the user after they've logged in.

```
1  <?php // Script 8.14 - welcome.php  
2  /* This is the welcome page. The user is redirected here  
3  after they successfully log in. */  
4  
5  // Set the page title and include the header file:  
6  define('TITLE', 'Welcome to the J.D. Salinger Fan Club!');  
7  include('templates/header.html');  
8  
9  // Leave the PHP section to display lots of HTML:  
10 ?>  
11  
12 <h2>Welcome to the J.D. Salinger Fan Club!</h2>  
13 <p>You've successfully logged in and can now take advantage of everything the site has to  
offer.</p>  
14 <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.</p>  
15  
16 <?php include('templates/footer.html'); // Need the footer. ?>
```

## Login Form

Users who are logged in can take advantage of certain features like this, that, and the other thing.

Email Address:

Password:

**A** The login form...



**B** ...and the redirection if the user properly logged in.

## Login Form

Users who are logged in can take advantage of certain features like this, that, and the other thing.

The submitted email address and password do not match those on file!  
Go back and try again.

**C** If the user didn't properly log in, they remain on the login page.

4. Return to PHP and include the footer:

```
<?php include('templates/  
→ footer.html'); ?>
```

5. Save the script as **welcome.php**, place it in the same directory as the new version of **login.php**, and test it in your Web browser **A**, **B**, and **C**.

**TIP** The `headers_sent()` function returns TRUE if the page has already received HTTP headers and the `header()` function can't be used.

**TIP** Using the GET method trick, you can pass values from one page to another using `header()`:

```
$var = urlencode('Pass this text');  
header ("Location: page.php?  
→ message=$var");
```

**TIP** The `header()` function should technically use a full path to the target page when redirecting. For example, it should be

```
header ('Location: http://www.  
→ example.com/welcome.php');
```

or

```
header ('Location: http://localhost/  
→ welcome.php');
```

**TIP** In my book *PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide*, I show some code for dynamically generating an absolute URL based on the location of the current script.

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book’s supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- What is the difference between `include()` and `required()`?
- Why can you put PHP code into an included file even when it uses an `.html` extension?
- What are the differences between *relative* and *absolute* references to a file?
- How do you define a constant? Are constant names case-sensitive or case-insensitive? How do you check if a constant has been defined?
- What is the *epoch*? What is a *timestamp*?
- What is the significance of `$_SERVER['REQUEST_METHOD']`?
- How do you have a form element “remember” previously submitted values?
- How can you see a PHP error that occurs within a form element (e.g., when presetting a form’s element’s value)?
- What does the “*headers already sent*” error mean? How can it be prevented?

## Pursue

- Create a new prototype design for this chapter’s examples, and then create new header and footer files. View any of the site’s pages again (you should not need to change any of the PHP scripts).
- Change the parameters to the `date()` function in `header.html` to display the date and/or time in a different manner.
- Rewrite the password conditionals found in `register.php` as a nested pair of conditionals. Hint: See Chapter 6 for examples.
- If you’re using PHP 5.2 or later, check out the PHP manual pages for the *Filter* extension. Then incorporate the `filter_var()` function to validate the email address in `register.php`.
- Change the subject and body of the email sent upon (pseudo-) registration to something more interesting and informative.

# 9

# Cookies and Sessions

Chapter 8, “Creating Web Applications,” covered a number of techniques for developing more fully realized Web sites. One missing piece—the focus of this chapter—is how to maintain “state” as the user traverses a multipage Web site. The Hypertext Transfer Protocol (HTTP) is a *stateless* technology, meaning that it has no built-in method for tracking a user or remembering data from one page of an application to the next. This is a serious problem, because e-commerce applications, user registration and login systems, and other common online services rely on being able to follow the same user from page to page. Fortunately, maintaining state is quite simple with PHP.

This chapter discusses the two primary methods for tracking data: *cookies* and *sessions*. You’ll start by learning how to create, read, modify, and delete cookies. Then you’ll see how easy it is to master sessions, a more potent option for maintaining state.

---

## In This Chapter

What Are Cookies?	232
Creating Cookies	234
Reading from Cookies	239
Adding Parameters to a Cookie	242
Deleting a Cookie	245
What Are Sessions?	248
Creating a Session	249
Accessing Session Variables	252
Deleting a Session	254
Review and Pursue	256

---

# What Are Cookies?

Prior to the existence of cookies, traversing a Web site was a trip without a history.

Although the browser tracks the pages you visit, allowing you to use the Back button to return to previously visited pages and indicating visited links in a different color, the server does not follow what individual users see and do. This is still true for sites that don't use cookies, as well as for users who have disabled cookies in their Web browsers **A**.

Why is that a problem? If the server can't track a user, there can be no shopping carts for making purchases online. If cookies didn't exist (or if they're disabled in the Web browser), people wouldn't be able to use popular sites that require user registration. In short, without cookies, there would be no Amazon or Facebook or any of the other most popular or useful sites (not in their current incarnations, at least).

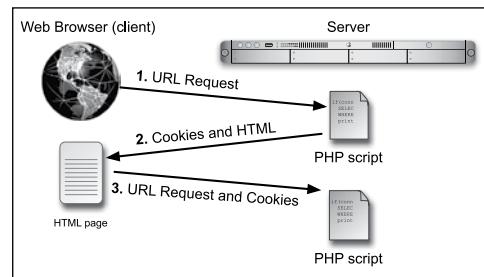
Cookies are simply a way for a server to store information on the user's computer. By doing so, the server can remember the user over the course of a visit or through several visits. Think of a cookie like a name tag: You tell the server your name, and it gives you a name tag. Then it can know who you are by referring back to the name tag.

This brings up another point about the security issues involved with cookies.

Cookies have gotten a bad rap because users believe cookies allow a server to know too much about them. However, a cookie can only be used to store information that you give it, so it's as secure as you want it to be. And, as previously mentioned, it's very easy in modern browsers to customize the cookie handling as desired.



**A** Most Web browsers let users set the cookie-handling preferences. This is Internet Explorer 8's Advanced Privacy Settings tab.



**B** How cookies are sent back and forth between the server and the client.

PHP has very good support for cookies. In this chapter, you'll learn how to set a cookie, retrieve information from a cookie, and then delete the cookie. You'll also see some of the optional parameters you can use to apply limits to a cookie's existence.

Before moving on, there are two more things you ought to know about cookies. The first is how to debug cookie-related problems. You'll inevitably need to know how to do that, so the topic is discussed in the sidebar "Debugging Cookies." The second is how a cookie is transmitted and received **B**. **Cookies are stored in the Web**

browser, but only the site that originally sent a cookie can read it. Also, the cookies are read by the site when the page on that site is requested by the Web browser. In other words, when the user enters a URL in the address bar and clicks Go (or whatever), the site reads any cookies it has access to and then serves up the requested page. This order is important because it dictates when and how cookies can be accessed.

**TIP** **The ability to send, read, and delete cookies is one of the few overlaps between server-side PHP and browser-side JavaScript.**

## Debugging Cookies

When you begin working with cookies in PHP, you'll need to know how to debug your cookie-related scripts when difficulties arise. Three areas might cause you problems:

- Sending the cookie with PHP
- Receiving the cookie in your Web browser
- Accessing a cookie in a PHP script

The first and last issues can be debugged by printing out the variable values in your PHP scripts (as you'll soon learn). The second issue requires that you know how to work with cookies in your Web browser. For debugging purposes, you'll want your Web browser to notify you when a cookie is being sent.

With Internet Explorer on Windows, you can do this by choosing Internet Options under the Tools menu. Then click the Privacy tab, followed by the Advanced button under Settings. Click "Override automatic cookie handling," **A** and then choose Prompt for both First-party and Third-party Cookies (you can actually block the third-party cookies, if you'd rather). Other versions of Internet Explorer may use different variations on this process. Internet Explorer also has a Developer Tools window (linked under the Tools menu) that can be useful.

The best way to debug cookies when using Firefox on any platform is to install one of the many cookie-related extensions, like *Firecookie*. The *Firebug* extension, which every developer must use, also shows cookie-related information. But at the very least, if you select "Use custom settings for history" on the Privacy panel (in the Options/Preferences window), you'll be able to establish custom cookie behavior, such as being prompted.

Safari on Mac OS X and Windows doesn't give you as many cookie choices; you can find the available options on the Security tab of the Preferences window.

Some browsers also let you browse through the existing cookies to see their names and values. Doing so is a great asset in the debugging war.

# Creating Cookies

An important thing to understand about cookies is that they must be sent from the server to the client prior to any other information. This means a script should send cookies before any `print` statement, before including an external file that contains HTML, and so forth.

Should the server attempt to send a cookie after the Web browser has already received HTML—even an extraneous white space—an error message will result and the cookie won't be sent **A**. This is by far the most common cookie-related error.

Cookies are sent using the `setcookie()` function:

```
setcookie(name, value);
setcookie('CookieName', 'This is the
→ cookie value.');
```

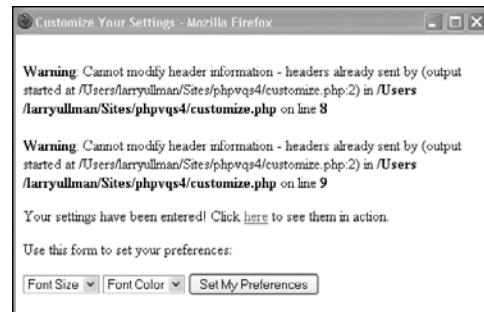
That line of code sends to the browser a cookie with the name `CookieName` and the value `This is the cookie value.` **B**.

You can continue to send more cookies to the browser with subsequent uses of the `setcookie()` function, although you're limited by the Web browser as to how many cookies can be sent from the same site.

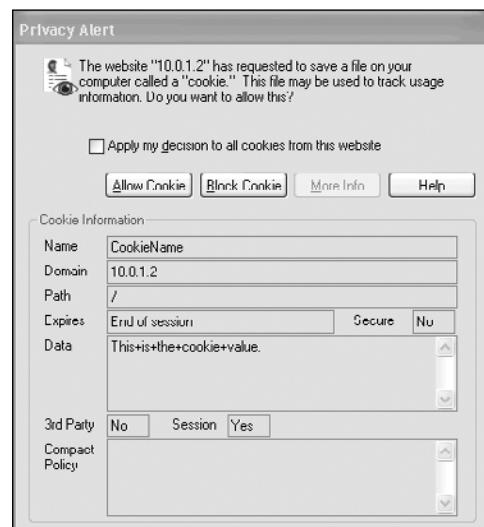
```
setcookie('name2', 'some value');
setcookie('name3', 'another value');
```

Finally, when creating cookies, you can—as you'll see in this example—use a variable for the name or value attribute of your cookies:

```
setcookie($cookie_name, $cookie_value);
```



**A** A message like this is what you'll see if the `setcookie()` function is called after anything, even a blank line or space, has already been sent to the Web browser.



**B** If the browser is set to prompt the user for cookies, a message like this will appear for each cookie sent. (Note that the window, from Internet Explorer 8, shows the value in a URL-encoded format.)

Use this form to set your preferences:

**C** This form is used to select the font size and color for use on another PHP page.

Your settings have been entered! Click [here](#) to see them in action.

Use this form to set your preferences:

**D** After submitting the form, the page shows a message and a link to another page (where the user's preferences will be used). That page will be created next.

**Script 9.1** Two cookies will be used to store the user's choices for the font size and color. This page both displays and handles the form.

```

1 <?php // Script 9.1 - customize.php
2
3 // Handle the form if it has been
4 submitted:
5 if (isset($_POST['font_size'],
6     $_POST['font_color'])) {
7
8     // Send the cookies:
9     setcookie('font_size',
10            $_POST['font_size']);
11    setcookie('font_color',
12            $_POST['font_color']);
13
14    // Message to be printed later:
15    $msg = '<p>Your settings have
16    been entered! Click <a href=
17        "view_settings.php">here</a>
18    to see them in action.</p>';
19
20 } // End of submitted IF.
21 ?>!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
22 1.0 Transitional//EN"
23     "http://www.w3.org/TR/xhtml1/DTD/
24         xhtml1-transitional.dtd">
25 <html xmlns="http://www.w3.org/1999/
26         xhtml" xml:lang="en" lang="en">
```

code continues on next page

For an example of setting cookies, you'll create a script that allows the user to specify the default font size and color for a page. The page displays a form for choosing these values **C** and then handles the form submission **D**. A separate page, created in the next section of this chapter, will use these settings.

## To send cookies:

1. Create a new PHP document in your text editor or IDE, to be named **customize.php (Script 9.1)**:

<?php // **Script 9.1 - customize.php**

The most critical issue with cookies is that they're created before anything is sent to the Web browser. To accomplish this, the script begins with a PHP section that handles the sending of cookies.

Also be certain not to have any extraneous spaces or lines before the initial PHP tag.

2. Check whether the form has been submitted:

```
if (isset($_POST['font_size'],
    $_POST['font_color'])) {
```

This page will both display and handle the form. It could use the same method explained in the previous chapter—checking if the **\$\_SERVER['REQUEST\_METHOD']** variable has a value of **POST**, but as an alternative approach, the script will perform basic, minimal validation as the test for a form submission. The conditional checks for the existence of two variables: **\$\_POST['font\_size']** and **\$\_POST['font\_color']**. If both are set, the form submission will be addressed.

continues on next page

**3.** Create the cookies:

```
setcookie('font_size',
→$_POST['font_size']);
setcookie('font_color',
→$_POST['font_color']);
```

These two lines create two separate cookies. One is named *font\_size* and the other *font\_color*. Their values will be based on the selected values from the HTML form, which are stored in the `$_POST['font_size']` and `$_POST['font_color']` variables.

In a more fully developed application, you should first confirm that the variables both have acceptable values.

**4.** Create a message and complete the conditional and the PHP section:

```
$msg = '<p>Your settings
→ have been entered! Click
→ <a href="view_settings.
→ php">here</a> to see them in
→ action.</p>';
} // End of submitted IF.
?>
```

When the form has been submitted, the cookies will be sent and the `$msg` variable will be assigned a string value. This variable will be used later in the script to print a message. This approach is necessary, as you can't print the message at this juncture (because not even the HTML head has been created).

**5.** Create the HTML head and opening body tag:

```
<!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" xml:lang="en"
→ lang="en">
```

**Script 9.1** continued

```
17  <head>
18    <meta http-equiv="Content-Type"
19      content="text/html; charset=utf-8"/>
20  </head>
21  <body>
22  <?php // If the cookies were sent, print
23    a message.
24  if (isset($msg)) {
25    print $msg;
26  ?>
27
28  <p>Use this form to set your
29  preferences:</p>
30  <form action="customize.php"
31    method="post">
32    <select name="font_size">
33      <option value="">Font Size</option>
34      <option value="xx-small">xx-small
35        </option>
36      <option value="x-small">x-small
37        </option>
38      <option value="small">small
39        </option>
40      <option value="medium">medium
41        </option>
42      <option value="large">large
43        </option>
44      <option value="x-large">x-large
45        </option>
46      <option value="xx-large">xx-large
47        </option>
48    </select>
49    <select name="font_color">
50      <option value="">Font Color
51        </option>
52      <option value="999">Gray</option>
53      <option value="0c0">Green</option>
54      <option value="00f">Blue</option>
55      <option value="c00">Red</option>
56      <option value="000">Black</option>
57    </select>
58    <input type="submit" name="submit"
59      value="Set My Preferences" />
60  </form>
61
62  </body>
63  </html>
```

```

<head>
  <meta http-equiv="Content-Type"
    → content="text/html;
    → charset=utf-8"/>
  <title>Customize Your Settings
  → </title>
</head>
<body>

```

All of this code must come after the `setcookie()` lines. Not to overstate the fact, but no text, HTML, or blank spaces can be sent to the Web browser prior to the `setcookie()` calls.

6. Create another PHP section to report on the cookies being sent:

```

<?php
if (isset($msg)) {
  print $msg;
}
?>

```

This code prints out a message if the cookies have been sent. The first time the user comes to the page, the cookies haven't been sent, so `$msg` is not set, making this conditional `FALSE`, and this `print` invocation never runs. Once the form has been submitted, `$msg` has been set by this point, so this conditional is `TRUE` D.

7. Begin the HTML form:

```

<p>Use this form to set your
→ preferences:</p>
<form action="customize.php"
→ method="post">
  <select name="font_size">
    <option value="">Font Size
    → </option>
    <option value="xx-small">
    → xx-small</option>
    <option value="x-small">
    → x-small</option>
    <option value="small">small
    → </option>

```

```

    <option value="medium">medium
    → </option>
    <option value="large">large
    → </option>
    <option value="x-large">x-large
    → </option>
    <option value="xx-large">
    → xx-large</option>
  </select>

```

The HTML form itself is very simple C. The user is given one drop-down menu to select the font size. The value for each corresponds to the CSS code used to set the document's font size: from `xx-small` to `xx-large`.

Because this script both displays and handles the form, the form's `action` attribute points to the same file.

8. Complete the HTML form:

```

  <select name="font_color">
    <option value="">Font Color
    → </option>
    <option value="999">Gray</option>
    <option value="0c0">Green</option>
    <option value="00f">Blue</option>
    <option value="c00">Red</option>
    <option value="000">Black</option>
  </select>
  <input type="submit" name=
  → "submit" value="Set My
  → Preferences" />
</form>

```

The second drop-down menu is used to select the font color. The menu displays the colors in text form, but the values are HTML color values. Normally such values are written using six characters plus a pound sign (e.g., `#00cc00`), but CSS allows you to use just a three-character version and the pound sign will be added on the page that uses these values.

*continues on next page*

9. Complete the HTML page:

```
</body>  
</html>
```

10. Save the file as **customize.php** and place it in the proper directory for your PHP-enabled server.

11. Make sure you've set your Web browser to prompt for each cookie, if applicable.

To guarantee that the script is working, you want the browser to prompt you for each cookie, if you can. See the “Debugging Cookies” sidebar.

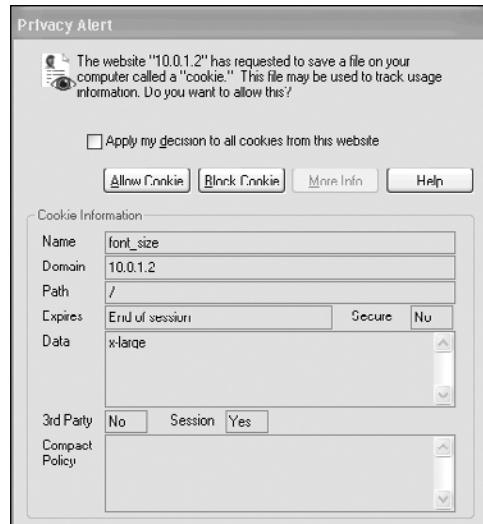
12. Run the script in your Web browser **E** and **F**.

**TIP** Cookies are one of the few areas in PHP that can behave differently from browser to browser or operating system to operating system. You should test your cookie-based applications on as many browsers and operating systems as you can.

**TIP** If you use the output buffering technique taught in Chapter 8, then you can place your `setcookie()` calls anywhere within the script (because the Web browser won't receive the data until the `ob_end_flush()` function is called).

**TIP** Cookies are limited to approximately 4 KB of total data. This is more than sufficient for most applications.

**TIP** To test whether it's safe to send a cookie, use the `headers_sent()` function. It reports on whether HTTP headers have already been sent to the Web browser.



**E** The user sees this message when the first `setcookie()` call is made, if they've opted to be prompted before accepting a cookie. This cookie is storing the value of `x-large` in a cookie named `font_size`.

Name	Value	Domain	Size	Path	Expires	HttpOnly	Security
font_color	999	10.0.1.2	13 B	/	Session		
font_size	x-large	10.0.1.2	16 B	/	Session		

**F** The Firebug extension for Firefox shows the cookies received by the browser. The second cookie that's sent by the PHP script is called `font_color` and has a value of `999`, representing the color gray.

**Script 9.2** This script sets the font size and color in CSS, using the values stored in the cookies.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6  xhtml" xml:lang="en" lang="en">
7  <head>
8      <meta http-equiv="content-type"
9       content="text/html; charset=utf-8" />
10     <title>View Your Settings</title>
11     <style type="text/css">
12         body {
13             <?php // Script 9.2 - view_settings.php
14
15             // Check for a font_size value:
16             if (isset($_COOKIE['font_size'])) {
17                 print "\t\tfont-size: " .
18                     htmlentities($_COOKIE['font_
19                     size']) . ";\n";
20             } else {
21                 print "\t\tfont-size: medium;";
22             }
23
24
25         >
26             }
27         </style>
28     </head>
29     <body>
30     <p><a href="customize.php">Customize Your
31     Settings</a></p>
32     <p><a href="reset.php">Reset Your
33     Settings</a></p>
34
35     <p>yadda yadda yadda yadda yadda
36     yadda yadda yadda yadda yadda
37     yadda yadda yadda yadda yadda
38     yadda yadda yadda yadda yadda</p>
39
40     </body>
41  </html>
```

## Reading from Cookies

Just as form data is stored in the `$_POST` array (assuming it used the POST method) and values passed to a script in the URL are stored in the `$_GET` array, the `setcookie()` function places cookie data in the `$_COOKIE` array. To retrieve a value from a cookie, you only need to refer to the cookie name as the index of this array. For example, to retrieve the value of the cookie established with the line

```
setcookie('user', 'trout');
```

you would use the variable `$_COOKIE['user']`.

Unless you change the cookie's parameters (as you'll see later in this chapter), the cookie will automatically be accessible to every other page in your Web application. You should understand, however, that a cookie is never accessible to a script immediately after it's been sent. You can't do this:

```
setcookie('user', 'trout');
print $_COOKIE['user']; // No value.
```

The reason for this is the order in which cookies are read and sent (see **B** in the first section of this chapter).

To see how simple it is to access cookie values, let's write a script that uses the preferences set in `customize.php` to specify the page's text size and color. The script relies on CSS to achieve this effect.

### To retrieve cookie data with PHP:

1. Begin a new PHP document in your text editor or IDE, to be named

`view_settings.php` (**Script 9.2**):

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

*continues on next page*

```
<html xmlns="http://www.w3.org/  
→ 1999/xhtml" xml:lang="en"  
→ lang="en">  
<head>  
  <meta http-equiv="content-type"  
    → content="text/html;  
    → charset=utf-8" />  
  <title>View Your Settings  
  → </title>
```

2. Start the CSS section:

```
<style type="text/css">  
  body {
```

The page will use CSS to enact the user's preferences. The aim is to create code like

```
body {  
  font-size: x-large;  
  color: #999;  
}
```

The two values will differ based on what the user selected in the **customize.php** page. In this step, you create the initial CSS tag.

3. Open a section of PHP code:

```
<?php // Script 9.2 -  
→ view_settings.php
```

The script will now use PHP to print out the remaining CSS, based on the cookies.

4. Use the font size cookie value, if it exists:

```
if (isset($_COOKIE['font_size'])) {  
  print "\t\tfont-size: " .  
    → htmlentities($_COOKIE  
    → ['font_size']) . ";\n";  
} else {  
  print "\t\tfont-size: medium;";  
}
```

If the script can access a cookie with a name of **font\_size**, it will print out that cookie's value as the CSS **font-size** value. The **isset()** function is

sufficient to see if the cookie exists. If no such cookie exists, PHP will print out a default size, *medium*.

For security purposes, the cookie's value is not directly printed. Instead, it's run through the **htmlentities()** function, discussed in Chapter 5, "Using Strings." This function will prevent bad things from happening should the user manipulate the value of the cookie (which is easy to do).

Also note that two tabs (\t) and a newline (\n) are added to the **print** statements so that the resulting CSS code is formatted properly. Note that this affects the functionality of the page, but...

5. Repeat this process for the font color cookie:

```
if (isset($_COOKIE['font_color'])) {  
  print "\t\tcolor: #" .  
    → htmlentities($_COOKIE  
    → ['font_color']) . ";\n";  
} else {  
  print "\t\tcolor: #000;";  
}
```

Here the CSS's **color** attribute is being assigned a value. The cookie itself is used the same as in Step 4.

6. Close the PHP section, complete the CSS code, and finish the HTML head:

```
?>  
  }  
</style>  
</head>
```

7. Start the HTML body and create links to two other pages:

```
<body>  
<p><a href="customize.php">  
  → Customize Your Settings</a></p>  
<p><a href="reset.php">Reset Your  
  → Settings</a></p>
```



- A** This page reflects the customized font choices made using the other PHP script.

```

<!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" xml:lang="en">
<head>
  <meta http-equiv="content-type" content="text/html; charset=UTF-8"/>
  <title>View Your Settings</title>
  <style type="text/css">
    body {
      font-size: x-large;
      color: #999;
    }
  </style>
</head>
<body>
<p><a href="#">Customize Your Settings</a></p>
<p><a href="#">Reset Your Settings</a></p>

<p>yadda yadda yadda yadda  

  yadda yadda yadda yadda  

  yadda yadda yadda yadda  

  yadda yadda yadda yadda  

  yadda yadda yadda yadda</p>

</body>
</html>

```

- B** By viewing the source code of the page, you can also track how the CSS values change.

These two links take the user to two other PHP pages. The first, **customize.php**, has already been written and lets the user define their settings. The second, **reset.php**, will be written later in the chapter and lets the user delete their customized settings.

**8.** Add some text:

```

<p>yadda yadda yadda yadda yadda  

  yadda yadda yadda yadda yadda</p>

```

This text exists simply to show the effects of the cookie changes.

**9.** Complete the HTML page:

```

</body>
</html>

```

**10.** Save the file as **view\_settings.php**, place it in the same directory as **customize.php**, and test it in your Web browser **A** by clicking the link on **customize.php**.

**11.** View the source of the page to see the resulting CSS code **B**.

**12.** Use the customize page to change your settings and return to this script.

Each submission of the form will create two new cookies storing the form values, thereby replacing the existing cookies.

**TIP** The value of a cookie is automatically encoded when it's sent and decoded on being received by the PHP page. The same is true of values sent by HTML forms.

# Adding Parameters to a Cookie

Although passing just the `name` and `value` arguments to the `setcookie()` function will suffice for most of your cookie uses, you ought to be aware of the other arguments available. The function can take up to five more parameters, each of which limits the operation of the cookie:

```
setcookie(name, value, expiration,  
→ path, domain, secure, httponly);
```

The `expiration` argument is used to set a specific length of time for a cookie to exist. If it isn't specified, the cookie will continue to be functional until the user closes the browser. Normally, you set the expiration time by adding a particular number of minutes or hours to the current time. You can find the current time in PHP by using the `time()` function (it returns a timestamp; see Chapter 8). Therefore, this line of code sets the expiration time of the cookie to be

one hour (60 seconds times 60 minutes) from the current moment:

```
setcookie(name, value, time() + 3600);
```

Because the expiration time will be calculated as the value of `time()` plus 3600, that argument isn't put in quotes (you don't want to literally pass `time() + 3600` as the expiration but rather the result of that calculation).

The `path` and `domain` arguments are used to limit a cookie to a specific folder in a Web site (the path) or to a specific domain. Using the `path` option, you could limit a cookie to exist only while a user is in a specific subfolder of the domain:

```
setcookie(name, value, time() + 3600,  
→ '/subfolder/');
```

Cookies are already specific to a domain, so the `domain` argument might be used to limit a cookie to a subdomain, such as `forum.example.com`.

```
setcookie(name, value, time() + 3600, '',  
→ 'forum.example.com');
```

**Script 9.3** When you add the `expiration` arguments to the two cookies, the cookies will persist even after the user has closed out of and later returned to their browser.

```
1 <?php // Script 9.3 - customize.php #2  
2  
3 // Handle the form if it has been submitted:  
4 if (isset($_POST['font_size'], $_POST['font_color'])) {  
5  
6     // Send the cookies:  
7     setcookie('font_size', $_POST['font_size'], time() + 10000000, '/');  
8     setcookie('font_color', $_POST['font_color'], time() + 10000000, '/');  
9  
10    // Message to be printed later:  
11    $msg = '<p>Your settings have been entered! Click <a href="view_settings.php">here</a> to see  
12        them in action.</p>';  
13  
14 } // End of submitted IF.  
15 ?>!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
16     "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd"  
17 <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
```

code continues on next page

### Script 9.3 continued

```
17 <head>
18   <meta http-equiv="Content-Type"
19     content="text/html; charset=utf-8"/>
20   <title>Customize Your Settings
21   </title>
22 </head>
23 <body>
24 <?php // If the cookies were sent, print
25   a message.
26 if (isset($msg)) {
27   print $msg;
28 }
29 ?>
30 <p>Use this form to set your
31 preferences:</p>
32 <form action="customize.php"
33   method="post">
34   <select name="font_size">
35     <option value="">Font Size</option>
36     <option value="xx-small">xx-small
37       </option>
38     <option value="x-small">x-small
39       </option>
40     <option value="small">small
41       </option>
42     <option value="medium">medium
43       </option>
44     <option value="large">large
45       </option>
46     <option value="x-large">x-large
47       </option>
48     <option value="xx-large">xx-large
49       </option>
50   </select>
51   <select name="font_color">
52     <option value="">Font Color</option>
53     <option value="999">Gray</option>
54     <option value="0cc">Green</option>
55     <option value="00f">Blue</option>
56     <option value="c00">Red</option>
57     <option value="000">Black</option>
58   </select>
59   <input type="submit" name="submit"
60     value="Set My Preferences" />
61 </form>
62 </body>
63 </html>
```

The `secure` value dictates that a cookie should only be sent over a secure HTTPS connection. A value of 1 indicates that a secure connection must be used, whereas 0 indicates that a secure connection isn't necessary. You could ensure a secure cookie transmission for e-commerce sites:

```
setcookie('cart', '82ABC3012',
→ time() + 3600, 'shop.example.com', 1);
```

As with all functions that take arguments, you must pass all the values in order. In the preceding example, if there's no need to specify (or limit) the path, you use empty quotes. With the `path` argument, you can also use a single slash (/) to indicate the root folder (i.e., no path restriction). By doing so, you maintain the proper number of arguments and can still indicate that an HTTPS connection is necessary.

The final argument—`httponly`—was added in PHP 5.2. It can be used to restrict access to the cookie (for example, preventing a cookie from being read using JavaScript) but isn't supported by all browsers.

Let's add an expiration date to the existing `customize.php` page so that the user's preferences will remain even after they've closed their browser and then returned to the site later.

#### To set a cookie's expiration date:

1. Open `customize.php` (Script 9.1) in your text editor or IDE.
2. Change the two `setcookie()` lines to read as follows (Script 9.3):

```
setcookie('font_size', $_POST
→ ['font_size'], time() + 100000000,
→ '/', '', 0);
setcookie('font_color', $_POST
→ ['font_color'], time() + 100000000,
→ '/', '', 0);
```

*continues on next page*

To make these cookies persist for a long time (specifically, for a couple of months), set the expiration time to be 10,000,000 seconds from now. While you're at it, set the **path** argument to the root of the site (/). Doing so may improve the consistency of sending these cookies across the various browsers.

Because the expiration date of the cookies is set months into the future, the user's preferences, which are stored in the cookies, will be valid even after the user has closed and reopened the browser. Without this expiration date, users would see the default font size and color and have to reassign their preferences with every new browser session.

3. Save the file, place it in the proper directory for your PHP-enabled server, and test it again in your Web browser

**A** and **B**.

**TIP** Not all browsers acknowledge a cookie's adjusted expiration time when the cookie is being sent from your own computer (i.e., from *localhost*).

**TIP** Here are some general guidelines for what kind of expiration date to use with your cookies: If the cookie should last as long as the user browses through the site, don't set an expiration time. If the cookie should continue to exist after the user has closed and reopened the browser, set an expiration time that's weeks or months in the future. And if the cookie can constitute a security risk, set an expiration time of an hour or a fraction thereof so that the cookie doesn't continue to exist too long after a user has left the browser.

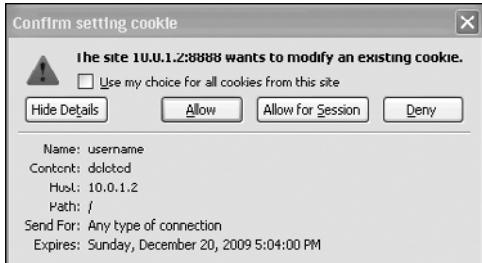
**TIP** For security purposes, you can set a 5- or 10-minute expiration time on a cookie and have the cookie re-sent with every new page the user visits. This way, the cookie will continue to persist as long as the user is active but will automatically die 5 or 10 minutes after the user's last action.



**A** The browser's cookie reporting tools (here, Firebug on Firefox) now reflects the cookie expiration dates.



**B** The new cookie parameters don't adversely affect the functionality of the application.



- A How Firefox displays the cookie information when a deletion cookie is sent.

## Deleting a Cookie

The final thing to know about cookies is how to delete them. Although a cookie automatically expires when the user's browser is closed or when the expiration date/time is met, sometimes you'll want to manually delete the cookie as well. For example, Web sites that have registered users and login capabilities generally delete any cookies when the user logs out.

The `setcookie()` function can take up to seven arguments, but only one is required—the name. If you send a cookie that consists of a name without a value, it will have the same effect as deleting the existing cookie of the same name. For example, to create the cookie `username`, you use this line:

```
setcookie('username', 'Larry');
```

To delete the `username` cookie, you code

```
setcookie('username', '');
```

or

```
setcookie('username', FALSE);
```

As an added precaution, you can also set an expiration date that's in the past (A):

```
setcookie('username', FALSE,  
→ time() - 600);
```

The only caveat when it comes to deleting a cookie is that you must use the same argument values that were used to set the cookie in the first place (aside from the value and expiration). For example, if you set a cookie while providing a `domain` value, you must also provide that value when deleting the cookie:

```
setcookie('user', 'larry', time() +  
→ 3600, '', 'forums.example.com');  
setcookie('user', '', time() -  
→ 600, '', 'forums.example.com');
```

*continues on next page*

To demonstrate this feature, let's add a **reset** page to the Web application. This PHP script will destroy the sent cookies, so that the user's preferences are forgotten.

### To delete a cookie:

1. Begin a new PHP script in your text editor or IDE, to be named **reset.php** (**Script 9.4**):

```
<?php // Script 9.4 - reset.php
```

2. Delete the existing cookies by sending blank cookies. Then complete the PHP code:

```
setcookie('font_size', '',
→time() - 600, '/');
setcookie('font_color', '',
→time() - 600, '/');
?>
```

These two lines send cookies named **font\_size** and **font\_color**, each with no value and an expiration time of 10 minutes ago. As you did when creating cookies, you must call the **setcookie()** function before anything else is sent to the Web browser.

3. Create the HTML head:

```
<!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" xml:lang="en"
→lang="en">
<head>
    <meta http-equiv="Content-Type"
    →content="text/html;
    →charset=utf-8"/>
    <title>Reset Your Settings
    →</title>
</head>
```

**Script 9.4** To delete the existing cookies, send new cookies with the same names, empty values, and expirations in the past.

```
1  <?php // Script 9.4 - reset.php
2
3  // Delete the cookies:
4  setcookie('font_size', '', time()
→ - 600, '/');
5  setcookie('font_color', '', time()
→ - 600, '/');
6
7  ?><!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
1.0 Transitional//EN"
8      "http://www.w3.org/TR/xhtml1/DTD/
xhtml1-transitional.dtd">
9  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
10 <head>
11     <meta http-equiv="Content-Type"
content="text/html; charset=utf-8"/>
12     <title>Reset Your Settings</title>
13 </head>
14 <body>
15
16 <p>Your settings have been reset! Click
<a href="view_settings.php">here</a> to
go back to the main page.</p>
17
18 </body>
19 </html>
```



# What Are Sessions?

A session, like a cookie, provides a way for you to track data for a user over a series of pages. The difference between the two—and this is significant—is that a cookie stores the data on the client (in the Web browser), whereas the session data is stored on the server. Because of this difference, sessions have numerous benefits over cookies:

- Sessions are generally more secure, because the data isn't transmitted back and forth between the client and server repeatedly.
- Sessions allow you to store more information than you can in a cookie.
- Sessions can be made to work even if the user doesn't accept cookies in their browser.

When you start a session, PHP generates a random session ID. Each user's session will have its own session ID, corresponding to the name of the text file on the server that stores the user's session data ([Script 9.5](#)).

So that every PHP script on a site can associate the same session data with a particular user, the session ID must be tracked as well. By default, this session ID is sent to the Web browser as a cookie **A**. Subsequent PHP pages will use this cookie to retrieve the session ID and access the session information.

Over the next few pages, you'll see just how easy sessions are to work with in PHP.



**A** A session cookie being sent to the Web browser.

**Script 9.5** How session data is stored in a file on the server.

```
1 email|s:14:"me@example.com";  
loggedin|i:1292883103;
```

## Choosing Between Sessions and Cookies

Sessions have many benefits over cookies, but there are still reasons why you would use the latter. Cookies have these advantages over sessions:

- Marginally easier to create and retrieve
- Require slightly less work from the server
- Normally persist over a longer period of time

As a rule of thumb, you should use cookies in situations where security is less of an issue and only a minimum of data is being stored. If security's a concern and there will be oodles of information to remember, you're best off with sessions. Understand, though, that using sessions may require a little more effort in writing your scripts.

# Creating a Session

Creating, accessing, or deleting a session begins with the `session_start()` function. This function will attempt to send a cookie the first time a session is started, so it absolutely must be called prior to any HTML or white space being sent to the Web browser. Therefore, on pages that use sessions, you should call the `session_start()` function as one of the very first lines in your script:

```
<?php  
session_start();
```

The first time a session is started, a random session ID is generated and a cookie is sent to the Web browser with a name of `PHPSESSID` (the session name) and a value like `4bcc48dc87cb4b54d63f99da23fb41e1` (see A in the previous section).

Once the session has been started, you can record data to it by assigning values to the `$_SESSION` array:

```
$_SESSION['first_name'] = 'Sam';  
$_SESSION['age'] = 4;
```

Unlike with other arrays you might use in PHP, you should always treat this array as an associative array. In other words, you should explicitly use strings for the keys, such as `first_name` and `age`.

Each time a value is assigned to the `$_SESSION` array, PHP writes that data to a temporary file stored on the server (see Script 9.5).

To begin, you'll rewrite the login script from Chapter 8, this time storing the email address in a session.

## To create a session:

1. Open **login.php** (Script 8.13) in your text editor or IDE.
2. Before the **ob\_end\_clean()** line, add the following (Script 9.6):

```
session_start();
$_SESSION['email'] = $_POST['email'];
$_SESSION['loggedin'] = time();
```

To store values in a session, begin by calling the **session\_start()** function. Although you normally have to call this function first thing in a script (because it may attempt to send a cookie), that's not required here because the header file for this script begins output buffering (see Chapter 8).

The session first stores the user's submitted email address in **\$\_SESSION['email']**. Then the timestamp of when the user logged in is assigned to **\$\_SESSION['loggedin']**. This value is determined by calling the **time()** function, which returns the number of seconds that have elapsed since the epoch (midnight on January 1, 1970).

3. Save the file as **login.php** and place it in the appropriate directory on your PHP-enabled computer.

This script should be placed in the same directory used in Chapter 8, as it requires some of those other files.

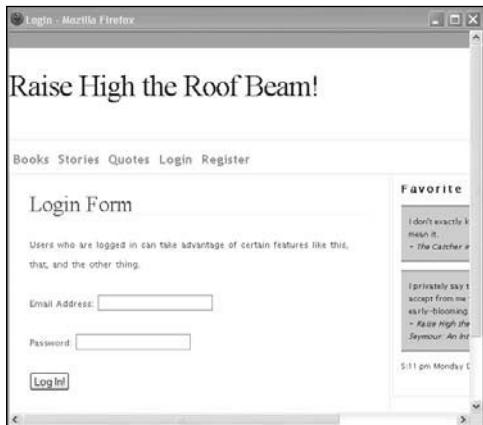
**Script 9.6** This script stores two values in the session and then redirects the user to another page, where the session values can be accessed.

```
1  <?php // Script 9.6 - login.php #3
2  /* This page lets people log into the
   site (almost!). */
3
4  // Set the page title and include the
   header file:
5  define('TITLE', 'Login');
6  include('templates/header.html');
7
8  // Print some introductory text:
9  print '<h2>Login Form</h2>
10    <p>Users who are logged in can
      take advantage of certain features
      like this, that, and the other
      thing.</p>';
11
12 // Check if the form has been
   submitted:
13 if ($_SERVER['REQUEST_METHOD'] == 'POST') {
14
15    // Handle the form:
16    if ( (!empty($_POST['email'])) &&
         (!empty($_POST['password']))) {
17
18      if ( (strtolower($_POST
         ['email']) == 'me@example.com') &&
         ($_POST['password'] ==
         'testpass') ) { // Correct!
19
20        // Do session stuff:
21        session_start();
22        $_SESSION['email'] =
         $_POST['email'];
23        $_SESSION['loggedin'] =
         time();
24
25        // Redirect the user to the
         welcome page!
26        ob_end_clean();
         // Destroy the buffer!
27        header ('Location: welcome.php');
28        exit();
29
30    } else { // Incorrect!
31
32      print '<p>The submitted email
         address and password do not
         match those on file!<br />Go
         back and try again.</p>';
```

code continues on next page

## Script 9.6 continued

```
33
34      }
35
36  } else { // Forgot a field.
37
38      print '<p>Please make sure you
39          enter both an email address and
40          a password!<br />Go back and try
41          again.</p>';
42
43  }
44
45  } else { // Display the form.
46
47      print '<form action="login.php"
48          method="post">
49          <p>Email Address: <input type="text"
50              name="email" size="20" /></p>
51          <p>Password: <input type="password"
52              name="password" size="20" /></p>
53          <p><input type="submit" name=
54              "submit" value="Log In!" /></p>
55      </form>';
56
57  }
58
59  include('templates/footer.html');
60      // Need the footer.
61
62  ?>
```



A The login form.

4. Load the form in your Web browser to ensure that it has no errors A.

Don't complete and submit the login form yet, as the welcome page needs to be updated prior to logging in.

**TIP** The `php.ini` configuration file includes many session-related settings that you can tinker with if you have administrative-level control over your server. Open the `php.ini` file in a text editor and see the manual for more information.

**TIP** You can also alter some of the session settings using the `ini_set()` function.

**TIP** The `session_name()` function lets you change the name of the session (instead of using the default `PHPSESSID`). It must be used before every `session_start()` call, like so:

```
session_name('YourVisit');
session_start();
```

**TIP** The `session_set_cookie_params()` function alters the session cookie settings, like the expiration time, the path, and the domain.

**TIP** The constant `SID`, short for `Session ID`, stores a string in the format `name=ID`. An example is `PHPSESSID=4bcc48dc87cb4b54d63f99da23fb41e1`.

**TIP** You can store any type of value—number, string, array, or object—or any combination thereof in your sessions.

# Accessing Session Variables

Now that you've stored values in a session, you need to know how to access them. The first step is to invoke the `session_start()` function. This is necessary on every page that will make use of sessions, whether it's creating a new session or accessing an existing one.

From there it's simply a matter of referencing the `$_SESSION` variable as you would any other array. With this in mind, you'll write another welcome page—similar to the one from Chapter 8—that accesses the stored `email` and `loggedin` values.

## To access session variables:

1. Create a new PHP document in your text editor or IDE, to be named `welcome.php` (Script 9.7):

```
<?php // Script 9.7 - welcome.php
```

2. Begin the session:

```
session_start();
```

Even when you're accessing session values, you should call the `session_start()` function before any data is sent to the Web browser.

3. Define a page title, and include the HTML header:

```
define('TITLE', 'Welcome to the  
→ J.D. Salinger Fan Club!');  
include('templates/header.html');
```

Because this page uses the same template system developed in Chapter 8, it also uses the same header system.

**Script 9.7** You can access stored session values using the `$_SESSION` array, as long as your script uses `session_start()` first.

```
1  <?php // Script 9.7 - welcome.php #2  
2  /* This is the welcome page. The user is  
   redirected here  
   after they successfully log in. */  
3  
4  // Need the session:  
5  session_start();  
6  
7  // Set the page title and include the  
   header file:  
8  define('TITLE', 'Welcome to the J.D.  
   Salinger Fan Club!');  
9  include('templates/header.html');  
10  
11 // Print a greeting:  
12 print '<h2>Welcome to the J.D.  
   Salinger Fan Club!</h2>';  
13  
14 print '<p>Hello, ' . $_SESSION  
   ['email'] . '!</p>';  
15  
16 // Print how long they've been  
   logged in:  
17 date_default_timezone_set('America/  
   New_York');  
18 print '<p>You have been logged  
   in since: ' . date('g:i a',  
   $_SESSION['loggedin']) . '</p>';  
19  
20 // Make a logout link:  
21 print '<p><a href="logout.php">Click here  
   to logout.</a></p>';  
22  
23 include('templates/footer.html');  
// Need the footer.  
24 ?>
```

**4.** Greet the user by email address:

```
print '<h2>Welcome to the J.D.  
→ Salinger Fan Club!</h2>';  
print '<p>Hello, ' . $_SESSION  
→ ['email'] . '!</p>';
```

To access the stored user's address, refer to `$_SESSION['email']`. Here, that value is concatenated to the rest of the string that's being printed out.

**5.** Show how long the user has been logged in:

```
date_default_timezone_set  
→ ('America/New_York');  
print '<p>You have been logged  
in since: ' . date('g:i a',  
→ $_SESSION['loggedin']) . '</p>';
```

To show how long the user has been logged in, refer to the `$_SESSION['loggedin']` variable. By using this as the second argument sent to the `date()` function, along with the appropriate formatting parameters, you make the PHP script create text like *11:22 pm*.

Before using the `date()` function, however, you need to set the default time zone (this is also discussed in Chapter 8). If you want, after setting the time zone here, you can remove the use of the same function from the footer file.

**6.** Complete the content:

```
print '<p><a href="logout.php">  
→ Click here to logout.</a></p>';
```

The next script will provide logout functionality, so a link to it is added here.

**7.** Include the HTML footer, and complete the HTML page:

```
include('templates/footer.html');  
?>
```

**8.** Save the file as `welcome.php`, place it in the proper directory for your PHP-enabled server, and test it (starting with `login.php`, Script 9.6) in your Web browser **A**.

**TIP** To see whether a particular session variable exists, use `isset($_SESSION['var'])` as you would to check if any other variable is set.

**TIP** Always remember that the data stored in a session is being stored as plain text in an openly readable text file. Don't be cavalier about what gets stored in a session and never store really sensitive information, such as credit card data, there.

**TIP** For added security, data can be encrypted prior to storing it in a session and decrypted upon retrieval. Doing so requires the Mcrypt library and more advanced PHP knowledge, however.



**A** After successfully logging in (using `me@example.com` and `testpass` in the form), the user is redirected to this page, which greets them using the session values.

# Deleting a Session

It's important to know how to delete a session, just as it's important to know how to delete a cookie: Eventually you'll want to get rid of the data you've stored. Session data exists in two places—in an array during the execution of the script and in a text file, so you'll need to delete both. But first you must begin with the `session_start()` function, as always:

```
session_start();
```

Then, you clear the session variables by resetting the `$_SESSION` array:

```
$_SESSION = array();
```

Finally, remove the session data from the server (where it's stored in temporary files). To do this, use

```
session_destroy();
```

With that in mind, let's write `logout.php`, which will delete the session, effectively logging out the user.

## To delete a session:

1. Start a new PHP script in your text editor or IDE, to be named `logout.php` (**Script 9.8**).

```
<?php // Script 9.8 - logout.php
```

2. Begin the session:

```
session_start();
```

Remember that you can't delete a session until you activate the session using this function.

3. Reset the session array:

```
$_SESSION = array();
```

As explained in Chapter 7, “Using Arrays,” the `array()` function creates a new, empty array. By assigning the result of this function call to `$_SESSION`, all the existing key-value pairs in `$_SESSION` will be erased.

**Script 9.8** Deleting a session is a three-step process: start the session, reset the array, and destroy the session data.

```
1  <?php // Script 9.8 - logout.php
2  /* This is the logout page. It
3   destroys the session information. */
4
5  // Need the session:
6  session_start();
7
8  // Delete the session variable:
9  unset($_SESSION);
10
11 // Reset the session array:
12 $_SESSION = array();
13
14 // Define a page title and include the
15 // header:
16 define('TITLE', 'Logout');
17 include('templates/header.html');
18
19 ?>
20
21 <h2>Welcome to the J.D. Salinger Fan
22 Club!</h2>
23 <p>You are now logged out.</p>
24 <p>Thank you for using this site. We
25 hope that you liked it.<br />
26 Blah, blah, blah...
27 Blah, blah, blah...</p>
28
29 <?php include('templates/
30 footer.html'); ?>
```

## Welcome to the J.D. Salinger Fan Club!

You are now logged out.

Thank you for using this site. We hope that you liked it.

blah, blah, blah... Blah, blah, blah...

- A The logout page destroys the session data.

4. Destroy the session data on the server:

```
session_destroy();
```

This step tells PHP to remove the actual session file on the server.

5. Include the HTML header, and complete this PHP section:

```
define('TITLE', 'Logout');
include('templates/header.html');
?>
```

6. Make the page content:

```
<h2>Welcome to the J.D. Salinger
Fan Club!</h2>
<p>You are now logged out.</p>
<p>Thank you for using this site.
We hope that you liked it.<br />
Blah, blah, blah...
Blah, blah, blah...</p>
```

7. Include the HTML footer:

```
<?php include('templates/footer.
html'); ?>
```

8. Save the file as **logout.php**, place it in the proper directory for your PHP-enabled server, and test it in your Web browser by clicking the link in **welcome.php A**.

**TIP** To delete an individual session value, use:

```
unset($_SESSION['var']);
```

**TIP** The PHP module on the server will automatically perform *garbage collection* based on settings in its configuration. PHP uses garbage collection to manually delete session files from the server, with the assumption that they're no longer needed.

**TIP** You can have PHP use sessions without cookies, in which case the session ID must be appended to every link in your site (so that each page receives the session ID). If you enable the `use_trans_sid` setting (in the `php.ini` file), PHP will handle this for you.

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- Where does a cookie store data? Where does a session store data? Which is generally more secure?
- Name two debugging techniques when trying to solve issues involving cookies.
- How do the **path** and **domain** arguments to the **setcookie()** function affect the accessibility of the cookie?
- How do you delete a cookie?
- What function must every page call if it needs to assign or access session data?
- Why do sessions also use cookies (by default)?

## Pursue

- Install the Firebug extension for Firefox, if you have not already. Install Firefox first, if you haven't!
- Look up the PHP manual page for the **setcookie()** function. Review the information and user comments there for added instructions on cookies.
- Rewrite **customize.php** so that the script also applies the user's preferences. Hint: You need to take into account the fact that the cookies aren't available immediately after they've been set. Instead, you would write the CSS code using the **\$\_GET** values after the form has been submitted, the **\$\_COOKIE** values upon first arriving at the page (if the cookies exist), and the default values otherwise.
- Make the form in **customize.php** *sticky*, so that it reflects the user's current choices.
- Rewrite **welcome.php** so that the **print** statement that greets the user by email address uses double quotation marks.
- For an added challenge, rewrite **welcome.php** so that the **print** statement that indicates how long the user has been logged in also uses double quotation marks. Hint: You'll need to use a variable.
- Rewrite the last three scripts so that the session uses a custom name.

# 10

# Creating Functions

Throughout this book, you've used dozens of functions that provide much-needed functionality, such as `date()`, `setcookie()`, and `number_format()`. Whereas those functions have already been defined by PHP, here you'll be creating your own. However, once created, functions you've written and built-in PHP functions are used in the same manner.

Creating functions can save you oodles of time as a programmer. In fact, they constitute a strong step in the process of creating Web applications and building a solid library of PHP code to use in future projects.

In this chapter, you'll see how to write your own functions that perform specific tasks. After that, you'll learn how to pass information to a function, use default values in a function, and have a function return a value. You'll also learn how functions and variables work together.

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## In This Chapter

Creating and Using Simple Functions	258
Creating and Calling Functions That Take Arguments	265
Setting Default Argument Values	271
Creating and Using Functions That Return a Value	274
Understanding Variable Scope	279
Review and Pursue	286

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# Creating and Using Simple Functions

As you program, you'll discover that you use certain sections of code frequently, either within a single script or over the course of several scripts. Placing these routines into a self-defined function can save you time and make your programming easier, especially as your Web sites become more complex. Once you create a function, the actions of that function take place each time the function is called, just as `print` sends text to the browser with each use.

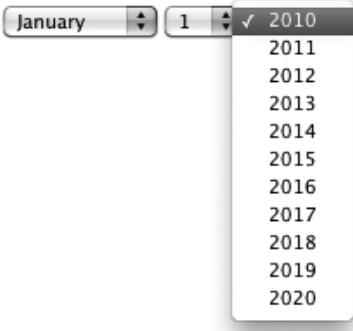
The syntax for creating a user-defined function is

```
function function_name () {  
    statement(s);  
}
```

For example:

```
function whatever() {  
    print 'whatever';  
}
```

You can use roughly the same naming conventions for functions as you do for variables, just without the initial dollar sign. Second to that is the suggestion that you create *meaningful* function names, just as you ought to write representative variable names (`create_header` would be a better function name than `function1`). Remember not to use spaces, though—doing so constitutes two separate words for the function name, which will result in error messages (the underscore is a logical replacement for the space). Unlike variables, function names in PHP are *not case-sensitive*, but you should still stick with a consistent naming scheme.



A These pull-down menus are created by a user-defined PHP function.

Any valid PHP code can go within the statement(s) area of the function, including calls to other functions. There is also no limit on the number of statements a function contains, but make sure each statement ends with a semicolon, just as you would within the rest of the PHP script. Functions can also contain any combination of control structures: conditionals and loops.

The exact formatting of a function isn't important as long as the requisite elements are there. These elements include the word *function*, the function's name, the opening and closing parentheses, the opening and closing brackets, and the statement(s). It's conventional to indent a function's statement(s) from the **function** keyword line, for clarity's sake, as you would with a loop or conditional. In any case, select a format style that you like (which is both syntactically correct and logically sound) and stick to it.

You call (or invoke) the function by referring to it just as you do any built-in function. The line of code

**whatever();**

will cause the statement part of the previously defined function—the **print** command—to be executed.

Let's begin by creating a function that generates month, day, and year pull-down menus for a form A.

## To create and call a basic function:

1. Start a new PHP document in your text editor or IDE, to be named `menus.php` (Script 10.1):

```
<!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" xml:lang="en"
→ lang="en">
<head>
    <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
    <title>Date Menus</title>
</head>
<body>
```

2. Begin the PHP section:

```
<?php // Script 10.1 - menus.php
```

3. Start defining a function:

```
function make_date_menus() {
```

The name of this function is `make_date_menus`, which is both descriptive of what the function does and easy to remember.

4. Create the month pull-down menu:

```
$months = array (1 => 'January',
→ 'February', 'March', 'April',
→ 'May', 'June', 'July', 'August',
→ 'September', 'October',
→ 'November', 'December');
print '<select name="month">';
foreach ($months as $key =>
→ $value) {
    print "\n<option value=
→ \"$key\">$value</option>";
}
print '</select>';
```

To generate a list of months, first create an array of the month names, indexed numerically beginning at 1 for *January*. When you specify the index for the first array element, the others will follow sequentially without the need to be explicit in naming them.

After the array has been created, the initial **select** tag is printed out. Then, a **foreach** loop runs through the `$months` array. For each element in the array, the HTML **option** tag is printed, using each element's key (the numbers 1 through 12) as the **option** value and each element's value (*January* through *December*) as the displayed text. Each line is also preceded by a newline character (`\n`) so that each option ends up on its own line within the HTML source.

*continues on page 262*

**Script 10.1** The function defined in this script creates three pull-down menus for a form.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6      <title>Date Menus</title>
7  </head>
8  <body>
9  <?php // Script 10.1 - menus.php
10 /* This script defines and calls a function. */
11
12 // This function makes three pull-down menus for the months, days, and years.
13 function make_date_menus() {
14
15     // Array to store the months:
16     $months = array (1 => 'January', 'February', 'March', 'April', 'May', 'June', 'July', 'August',
17                     'September', 'October', 'November', 'December');
18
19     // Make the month pull-down menu:
20     print '<select name="month">';
21     foreach ($months as $key => $value) {
22         print "\n<option value=\"$key\">$value</option>";
23     }
24     print '</select>';
25
26     // Make the day pull-down menu:
27     print '<select name="day">';
28     for ($day = 1; $day <= 31; $day++) {
29         print "\n<option value=\"$day\">$day</option>";
30     }
31     print '</select>';
32
33     // Make the year pull-down menu:
34     print '<select name="year">';
35     $start_year = date('Y');
36     for ($y = $start_year; $y <= ($start_year + 10); $y++) {
37         print "\n<option value=\"$y\">$y</option>";
38     }
39     print '</select>';
40 } // End of make_date_menus() function.
41
42 // Make the form:
43 print '<form action="" method="post">';
44 make_date_menus();
45 print '</form>';
46
47 ?>
48 </body>
49 </html>
```

5. Create the day pull-down menu:

```
print '<select name="day">';
for ($day = 1; $day <= 31; $day++) {
    print "\n<option value=
        →\"$day\">$day</option>";
}
print '</select>';
```

The day menu is a lot easier to create.  
To do so, use a simple **for** loop, running  
through the numbers 1 through 31.

6. Create the year pull-down menu:

```
print '<select name="year">';
$start_year = date('Y');
for ($y = $start_year; $y
    →<= ($start_year + 10); $y++) {
    print "\n<option value=
        →\"$y\">$y</option>";
}
print '</select>';
```

To create the year pull-down menu,  
start by using the **date()** function to get  
the current year. Then create options  
for this year plus the next 10, using a  
**for** loop.

7. Close the function:

```
} // End of make_date_menus()
→function.
```

When you're creating functions, it's easy  
to create parse errors by forgetting the  
closing curly bracket. You may want to  
add comments to help you remember  
this final step.

8. Make the **form** tags, and call the function:

```
print '<form action="" method=
    →"post">';
make_date_menus();
print '</form>';
```

The `print` statements are used to create the HTML `form` tags. Without a form, the date pull-down menus won't appear properly in the script.

Once you've created your function, you simply have to call it by name (being careful to use the exact spelling) to make the function work. Be sure to include the parentheses as well.

9. Complete the PHP and HTML:

```
?>
</body>
</html>
```

10. Save the file as `menus.php`, place it in the proper directory for your PHP-enabled server, and run it in your Web browser A.

11. If you want, check out the HTML source of the page to see what was dynamically generated B.

*continues on next page*

```
<form action="" method="post"><select name="month">
<option value="1">January</option>
<option value="2">February</option>
<option value="3">March</option>
<option value="4">April</option>
<option value="5">May</option>
<option value="6">June</option>
<option value="7">July</option>
<option value="8">August</option>
<option value="9">September</option>
<option value="10">October</option>
<option value="11">November</option>
<option value="12">December</option></select><select name="day">
<option value="1">1</option>
<option value="2">2</option>
<option value="3">3</option>
<option value="4">4</option>
<option value="5">5</option>
<option value="6">6</option>
<option value="7">7</option>
<option value="8">8</option>
<option value="9">9</option>
```

B The source of the page shows the HTML created by the `print` statements in the `make_date_menus()` function.

**TIP** If you see a “Call to undefined function: `some_function...`” error message, it means you’re trying to call a function that doesn’t exist **C**. If you’re trying to call a PHP function, either you misspelled the name or it’s not supported on your version of PHP. Check the PHP manual for more. If you’re calling a user-defined function when you see this error, either it hasn’t been defined or you’ve misspelled it. Recheck your spelling in both the definition of the function and its usage to see if you made a mistake.

**TIP** The `function_exists()` function returns TRUE or FALSE based on whether a function exists in PHP. This applies to both user-defined functions and those that can be built into PHP:

```
if (function_exists('some_function'))  
→ { ...
```

**TIP** Although you aren’t required to, I recommend that you habitually define your functions at the beginning of a script (or in an included file), rather than at the end of the script.

**TIP** Some people prefer this syntax for laying out their functions:

```
function function_name()  
{  
    statement(s);  
}
```

**TIP** User-defined functions add extra memory requirements to your PHP scripts, so you should be judicious in using them. If you find that your function merely calls another PHP function or has but one line of code, it’s probably not the best use of this capability.

```
Fatal error: Call to undefined function make_date_menu() in  
/Users/larryullman/Sites/phpvqs4/menus.php on line 44
```

**C** This error means that the PHP script does not have access to a function defined under the given name. In this case, the problem is due to a missing “s” in the function call: `make_date_menus()` vs. `make_date_menu()`.

# Creating and Calling Functions That Take Arguments

Although being able to create a simple function is useful, writing one that takes input and does something with that input is even better. The input a function takes is called an *argument* (or a *parameter*). This is a concept you've seen before: the `sort()` function takes an array as an argument, which the function then sorts.

The syntax for writing functions that take arguments is as follows:

```
function function_name($arg1,  
→ $arg2, ...){  
    statement(s);  
}
```

The function's arguments are in the form of variables that are assigned the values sent to the function when you call it. The variables are defined using the same naming rules as any other variable in PHP:

```
function make_full_name($first,  
→ $last) {  
    print $first . ' ' . $last;  
}
```

Functions that take input are called much like those that don't—you just need to remember to pass along the necessary values. You can do this either by passing variables:

```
make_full_name($fn, $ln);
```

or by sending literal values, as in

```
make_full_name('Larry', 'Ullman');
```

or some combination thereof:

```
make_full_name('Larry', $ln);
```

*continues on next page*

The important thing to note is that arguments are passed quite literally: The first variable in the function definition is assigned the first value in the call line, the second function variable is assigned the second call value, and so forth

A. Functions aren't smart enough to intuitively understand how you meant the values to be associated. This is also true if you fail to pass a value, in which case the function will assume that value is null (*null* isn't the mathematical 0, which is actually a value, but closer to the idea of the word *nothing*). The same thing applies if a function takes four arguments and you pass three—the fourth will be null, which may create an error B.

```
function make_full_name($first, $last){  
    print $first . ' ' . $last;  
}  
  
make_full_name($fn, $ln);  
  
make_full_name('Larry', 'Ullman');  
  
make_full_name('Larry', $ln);
```

A How values in function calls are assigned to function arguments.

**Warning:** Missing argument 2 for make\_text\_input(), called in /Users/larryullman/Sites/phpvqs4/sticky1.php on line 38 and defined in /Users/larryullman/Sites/phpvqs4/sticky1.php on line 14

B As with any function (user-defined or built into PHP), passing an incorrect number of arguments when calling it yields warnings.

First Name:

Last Name:

Email Address:

**Register!**

**C** These three form elements are created by a user-defined function.

First Name:

Last Name:

Email Address:

**Register!**

**D** The form elements reflect the values entered by the user.

To demonstrate functions that take arguments, let's create a more interesting example. In Chapter 8, "Creating Web Applications," you learned how to make forms "sticky": having them remember their values from previous submissions. The code for a sticky text input might be

```
First Name: <input type="text"
→ name="first_name" size="20"
→ value=<?php if (isset($_POST
→ ['first_name'])) { print
→ htmlspecialchars($_POST
→ ['first_name']); } ?>" />
```

Since many forms, such as `register.php` from Chapter 8, repeatedly use similar code, you have a good candidate for a user-defined function.

This next script will define and call a function that creates sticky text inputs. The function will take one argument for the input's name, and another for the input's label (its textual prompt). The function will be called multiple times by the script to generate multiple inputs **C**. Upon form submission, the previously entered values will be remembered **D**.

## To create and call a function that takes an argument:

1. Start a new PHP document in your text editor or IDE, to be named **sticky1.php** (Script 10.2):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
  <title>Sticky Text Inputs
  → </title>
</head>
<body>
```

2. Begin the PHP section:

```
<?php // Script 10.2 - sticky1.php
```

3. Start defining a function:

```
function make_text_input($name,
→ $label) {
```

The `make_text_input()` function requires two arguments, which will be assigned to the `$name` and `$label` variables.

4. Print an opening paragraph and a `label` tag:

```
print '<p><label>' . $label . ': ';
```

The code being generated by this function will be essentially like that just indicated (and in Chapter 8), but it will be wrapped in a paragraph tag and the input's label will be formally placed within `label` tags. The value of the label (e.g., **First Name**) will be passed to the function when the function is called.

*continues on page 270*

**Script 10.2** The `make_text_input()` function takes two arguments, for the input's name and label.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6      <title>Sticky Text Inputs</title>
7  </head>
8  <body>
9  <?php // Script 10.2 - sticky1.php
10 /* This script defines and calls a function that creates a sticky text input. */
11
12 // This function makes a sticky text input.
13 // This function requires two arguments be passed to it.
14 function make_text_input($name, $label) {
15
16     // Begin a paragraph and a label:
17     print '<p><label>' . $label . ': ';
18
19     // Begin the input:
20     print '<input type="text" name="' . $name . '" size="20" ';
21
22     // Add the value:
23     if (isset($_POST[$name])) {
24         print ' value="' . htmlspecialchars($_POST[$name]) . '"';
25     }
26
27     // Complete the input, the label and the paragraph:
28     print ' /></label></p>';
29
30 } // End of make_text_input() function.
31
32 // Make the form:
33 print '<form action="" method="post">';
34
35 // Create some text inputs:
36 make_text_input('first_name', 'First Name');
37 make_text_input('last_name', 'Last Name');
38 make_text_input('email', 'Email Address');
39
40 print '<input type="submit" name="submit" value="Register!" /></form>';
41
42 ?>
43 </body>
44 </html>
```

5. Begin the text input:

```
print '<input type="text"  
→ name="" . $name . "" size="20" ';
```

The PHP `print` statement just creates the HTML `input` tag, but the value of the tag's `name` attribute will come from the `$name` variable (assigned a value when the function is called, such as `first_name`).

6. If applicable, add the input's preset value:

```
if (isset($_POST[$name])) {  
    print ' value=' .  
   htmlspecialchars($_POST  
    → [$name]) . "";  
}
```

The code in Step 5 didn't actually complete the text input (the closing `>/` wasn't created), so another clause—specifically `value="whatever"`—can still be added. But that clause should only be added if `$_POST['input_name']` is set, so the conditional checks for that. As with the code in Chapter 8, the value is printed only after being run through `htmlspecialchars()`.

7. Complete the input, the label, the paragraph, and the function:

```
print ' /></label></p>';  
} // End of make_text_input()  
→ function.
```

8. Make the `form` tags and call the function:

```
print '<form action=""  
→ method="post">';  
make_text_input('first_name',  
→ 'First Name');
```

It's important that the form uses the `POST` method, as the function checks for existing values in `$_POST`. You can actually omit an `action` value, in which

case the form will automatically be submitted back to the same page.

To create a “first name” input, call the `make_text_input()` function, passing it the name the input should have and an appropriate label.

9. Create two more inputs:

```
make_text_input('last_name', 'Last  
→ Name');  
make_text_input('email', 'Email  
→ Address');
```

Now the script has used the same function three times, in three different ways. The result will be three distinct text inputs.

10. Complete the form:

```
print '<input type="submit"  
→ name="submit" value=  
→ "Register!" /></form>';
```

The form needs a submit button in order to test the sticky feature.

11. Complete the PHP and HTML:

```
?>  
</body>  
</html>
```

12. Save the file as `sticky1.php`, place it in the proper directory for your PHP-enabled server, and run it in your Web browser C and D.

**TIP** You can define as many functions as you want, not just one per script as the examples in this chapter portray.

**TIP** There are no limits on how many arguments a function can take.

**TIP** Once you've defined your own functions like this, you can place them in an external file and then require that file when you need access to the functions.

# Setting Default Argument Values

PHP allows functions to have *default argument values*: just assign a value to the argument in the function definition:

```
function greeting($who = 'world') {  
    print "<p>Hello, $who!</p>";  
}
```

Such a function will use the preset values unless it receives a value that then overwrites the default. In other words, by setting a default value for an argument, you render that particular argument optional when calling the function. You'd set an argument's default value if you wanted to assume a certain value but still allow for other possibilities **A**:

```
greeting();  
greeting('Zoe');
```

(Note: This isn't really a good use of a user-defined function, or a default argument value, but it's easily understood as an example.)

```
Hello, world!  
Hello, Zoe!
```

**A** Calling the function without any arguments uses the default value (the first greeting); calling it with an argument provided means that value will be used instead (the second).

```
function calculate_total($qty, $price = 20.00, $tax = 0.06) {  
    // Make the calculations.  
}  
  
calculate_total(3, 0.07);
```

**B** Because of the way function arguments work, you cannot “skip” an argument when calling a function.

The default arguments must always be written after the other standard arguments (those without default values). This is because PHP directly assigns values to arguments in the order they're received from the call line. Thus, it isn't possible to omit a value for the first argument but include one for the second. For example, suppose you have

```
function calculate_total($qty,  
→ $price = 20.00, $tax = 0.06) {...
```

If you call the function with the line

```
calculate_total(3, 0.07);
```

with the intention of setting **\$qty** to 3, leaving **\$price** at 20.00, and changing the **\$tax** to 0.07, there will be problems.

The end result will be that **\$qty** is set to 3, **\$price** is set to 0.07, and **\$tax** remains at 0.06 **B**, which isn't the desired outcome.

The proper way to achieve that effect would be to code

```
calculate_total(3, 20.00, 0.07);
```

Let's rework the `make_text_input()` function to incorporate the notion of setting default argument values.

## To write a function that uses default values:

1. Open **sticky1.php** (Script 10.2) in your text editor or IDE, if it isn't open already.
2. Add a third argument with a default value to the `make_text_input()` function (Script 10.3):

```
function make_text_input($name,  
→ $label, $size = 20) {
```

Although I like the cleanliness of having all text inputs be the same size, a person's last name and email address is often longer than their first name, so an adjustable size would be better. By taking the input's size as an argument, this will be possible. But the size will have a default value, making it an optional argument. If three arguments are sent to the function, then `$size` will be set to the third value instead of the default.

**Script 10.3** The function now takes three arguments, but only two of them are required. If no `$size` is passed to the function, its value will be 20.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
2      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">  
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">  
4  <head>  
5      <meta http-equiv="content-type" content="text/html; charset=utf-8" />  
6      <title>Sticky Text Inputs</title>  
7  </head>  
8  <body>  
9  <?php // Script 10.3 - sticky2.php  
10 /* This script defines and calls a function that creates a sticky text input. */  
11  
12 // This function makes a sticky text input.  
13 // This function requires two arguments be passed to it.  
14 // A third argument is optional (it has a default value).  
15 function make_text_input($name, $label, $size = 20) {  
16  
17     // Begin a paragraph and a label:  
18     print '<p><label>' . $label . ': ';
```

*code continues on next page*

### Script 10.3 continued

```
20 // Begin the input:  
21 print '<input type="text" name="' .  
    $name . '" size="' . $size . '" ';  
22  
23 // Add the value:  
24 if (isset($_POST[$name])) {  
25     print ' value=' . htmlspecialchars  
        ($_POST[$name]) . "";  
26 }  
27  
28 // Complete the input, the label and  
// the paragraph:  
29 print ' /></label></p>';  
30  
31 } // End of make_text_input() function.  
32  
33 // Make the form:  
34 print '<form action="" method="post">';  
35  
36 // Create some text inputs:  
37 make_text_input('first_name', 'First  
Name');  
38 make_text_input('last_name', 'Last  
Name', 30);  
39 make_text_input('email', 'Email  
Address', 50);  
40  
41 print '<input type="submit" name="submit"  
value="Register!" /></form>';  
42  
43 ?>  
44 </body>  
45 </html>
```

3. Change the creation of the input so that it uses the `$size` variable:

```
print '<input type="text"  
→ name="' . $name . '"  
→ size="' . $size . '" ';
```

4. Change the function calls to vary the sizes:

```
make_text_input('first_name',  
→ 'First Name');  
make_text_input('last_name',  
→ 'Last Name', 30);  
make_text_input('email', 'Email  
Address', 50);
```

Now the first input will use the default size, and the others will be longer.

5. Save the script as `sticky2.php`, place it in the proper directory of your PHP-enabled server, and test it in your Web browser C.

**TIP** To pass no value to a function for a particular argument, use an empty string ('') or the word `NULL` (without quotes). Either of these values will override the default value, if one is established.

**TIP** As mentioned way back in Chapter 1, “Getting Started with PHP,” the PHP manual marks optional function arguments using square brackets. For example, when you use the `number_format()` function, the number of decimals to round to is optional:

```
string number_format(float number  
→ [, int decimals])
```

First Name:

Last Name:

Email Address:

C Now the function is capable of changing the size of the input, based on an argument. If no value is provided for that argument, the default size is used instead (the first input).

# Creating and Using Functions That Return a Value

Functions do more than take arguments; they can also return values. Doing so requires just two more steps. First, you use the `return` statement within the function. Second, you use the output somehow when you call the function. Commonly, you'll assign the returned value to a variable, but you can also, for example, directly print the output. Here is the basic format for a function that takes two arguments and returns a value:

```
function make_full_name($first,  
→ $last) {  
    $name = $first . ' ' . $last;  
    return $name;  
}
```

This function could be used like so:

```
$full_name = make_full_name($fn, $ln);
```

There the returned value of the function is assigned to a variable. Here it's printed immediately:

```
print make_full_name($fn, $ln)
```

To best demonstrate this concept, let's create a function that performs a simple calculation and formats the result. This script will display an HTML form where a user enters a quantity and price **A**. When the form is submitted (back to this same page), a total value will be calculated and printed **B**.

Quantity:

Price:

**A** This simple form takes two values on which calculations will be made.

Your total comes to **\$572.39**.

Quantity:

Price:

**B** The result of the calculation, which takes place within a user-defined function.

## To create and use a function that returns a value:

1. Create a new PHP document in your text editor or IDE, to be named **calculator.php** (Script 10.4):

```
<!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" xml:lang="en"
→ lang="en">
<head>
    <meta http-equiv="Content-Type"
→ content="text/html;
→ charset=utf-8"/>
    <title>Cost Calculator</title>
</head>
<body>
```

*continues on next page*

**Script 10.4** This script both displays and handles an HTML form in order to perform some basic calculations. The script uses a function that takes two arguments and returns a single value.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
6      <title>Cost Calculator</title>
7  </head>
8  <body>
9  <?php // Script 10.4 - calculator.php
10 /* This script displays and handles an HTML form.
11 It uses a function to calculate a total from a quantity and price. */
12
13 // This function performs the calculations.
14 function calculate_total ($quantity, $price) {
15
16     $total = $quantity * $price; // Calculation
17     $total = number_format ($total, 2); // Formatting
18
19     return $total; // Return the value.
20
21 } // End of function.
22
```

*code continues on next page*

**2.** Begin the PHP code:

```
<?php // Script 10.4 -  
→ calculator.php
```

**3.** Define the function:

```
function calculate_total  
→ ($quantity, $price) {  
    $total = $quantity * $price;  
    $total = number_format  
→ ($total, 2);  
    return $total;  
}
```

This function takes two arguments—a quantity and a price—and multiplies them to create a total. The total value is then formatted before it's returned by the function.

Although this may seem like a silly use of a function, the benefits of putting even a one-step calculation into a function are twofold: First, the

**Script 10.4** *continued*

```
23 // Check for a form submission:  
24 if ($_SERVER['REQUEST_METHOD'] == 'POST') {  
25  
26     // Check for values:  
27     if ( is_numeric($_POST['quantity']) AND is_numeric($_POST['price']) ) {  
28  
29         // Call the function and print the results:  
30         $total = calculate_total($_POST['quantity'], $_POST['price']);  
31         print "<p>Your total comes to <span style=\"font-weight: bold;\">$total</span></p>";  
32  
33     } else { // Inappropriate values entered.  
34         print '<p style="color: red;">Please enter a valid quantity and price!</p>';  
35     }  
36  
37 }  
38 ?>  
39 <form action="calculator.php" method="post">  
40     <p>Quantity: <input type="text" name="quantity" size="3" /></p>  
41     <p>Price: <input type="text" name="price" size="5" /></p>  
42     <input type="submit" name="submit" value="Calculate!" />  
43 </form>  
44 </body>  
45 </html>
```

## Returning Multiple Values

User-defined functions frequently return just a single value but can return multiple values by using arrays. Here's how you go about this:

```
function some_function($a1, $a2) {  
    // Do whatever.  
    return array($v1, $v2);  
}
```

Then, to call this function, use the `list()` function to assign the array elements to individual variables:

```
list($var1, $var2) =  
    → some_function($p1,$p2);
```

The end result is that `$v1` from the function is assigned to `$var1` in the PHP script, and `$v2` from the function is assigned to `$var2`.

calculation will be easier to find and modify at a later date with your function located at the beginning of your script instead of hidden in the rest of the code; and second, should you want to repeat the action again in a script, you can do so without duplicating code.

4. Begin the conditional to see if the form was submitted:

```
if ($_SERVER['REQUEST_METHOD'] ==  
    → 'POST') {
```

Because this page both displays and handles the HTML form, it has a conditional that checks how the page is being requested. If it's a POST request, that means the form has been submitted.

5. Validate the form data and use the function:

```
if ( is_numeric($_POST['quantity'])  
    → AND is_numeric($_POST['price']) ) {  
    $total = calculate_total  
    → ($_POST['quantity'],  
    → $_POST['price']);  
    print "<p>Your total comes  
    → to $<span style=\"font-weight:  
    → bold;\">$total</span>.</p>";
```

This part of the PHP code—which handles the form if it has been submitted—first checks that a numeric quantity and price were entered. If so, the total is determined by calling the `calculate_total()` function and assigning the result to the `$total` variable. This result is then printed out.

*continues on next page*

**6.** Complete the conditionals:

```
    } else {
        print '<p style="color:
→ red;">Please enter a valid
→ quantity and price!</p>';
    }
}
```

If either of the form variables was not properly submitted, a message is printed indicating that. The final curly bracket closes the form submission conditional.

A little CSS is applied to both printed messages (here and in Step 5).

**7.** Display the HTML form:

```
?>
<form action="calculator.php"
→ method="post">
    <p>Quantity: <input type="text"
→ name="quantity" size="3" /></p>
    <p>Price: <input type="text"
→ name="price" size="5" /></p>
    <input type="submit"
→ name="submit"
→ value="Calculate!" />
</form>
```

The form itself is quite simple, requesting two different values from the user **A**. Because this form is created outside of the main submission conditional, the form will always be displayed by the page **B**.

**8.** Complete the HTML page:

```
</body>
</html>
```

**9.** Save the page as **calculator.php**, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **B**.

**TIP** You can have only one return statement **executed** in a function, but the same function can have multiple return statements. As an example, you may want to write a function that checks for a condition and returns a value indicating whether the condition was satisfied. In such a case, the function might contain:

```
if (condition) {
    return TRUE;
} else {
    return FALSE;
}
```

**TIP** The result returned by the function is either TRUE or FALSE, indicating whether the stated condition was met.

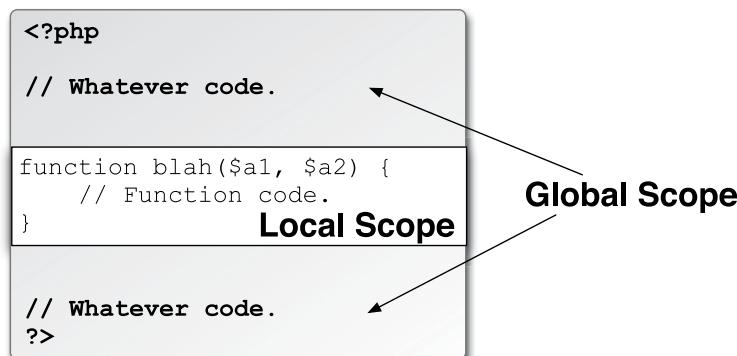
# Understanding Variable Scope

The concept of *variable scope* wasn't introduced earlier because without an understanding of functions, scope makes little sense. Now that you are acquainted with functions, this section will revisit the topic of variables and discuss in some detail just how variables and functions work together.

As you saw in the second section of this chapter, "Creating and Calling Functions That Take Arguments," you can send variables to a function by passing them as arguments. However, you can also reference an external variable from within a function using the `global` statement. This is possible because of variable scope. The scope of a variable is the realm in which it exists. By default, the variables you write in a script exist for the life of that script. Conversely, environment variables such as `$_SERVER['PHP_SELF']`, exist throughout every PHP script on the server.

Functions, though, create a new level of scope. Function variables—the arguments of a function as well as any variables defined within the function—exist only within that function and aren't accessible outside of it (that is, they're *local variables* with *local scope*). Likewise, a variable from outside a function is not available within the function, by default **A**. Even when a variable is used as an argument to a function call, that variable's *value* is being passed to the function, not the variable itself.

You can, however, make a variable external to a function available within the function by using the `global` statement. The `global` statement roughly means, "I want this variable within the function to refer to the same named variable outside of the function." In other words, the `global` statement turns a local variable with local scope into a global variable with global scope. Any changes made to the variable within the function are also reflected by the variable outside of the function, without using the `return` command (assuming the function is called, that is).



**A** Adding function definitions to a script adds another area of variable scope.

The syntax of the `global` statement is as follows:

```
function function_name($args) {  
    global $variable;  
    statement(s);  
}
```

There is another issue regarding functions and variables: Because of variable scope, a local variable within a function is a different entity (perhaps with a different value) than a variable outside of the function, even *if the two variables use the exact same name*. Let's look at this more explicitly...

Say you have:

```
function test($arg) {  
    // Do whatever.  
}  
  
$var = 1;  
test($var);
```

When the function is called, the value of `$var` will be assigned `$arg`, so their values are the same but their names are different and they are different variables. However, if the name of the argument in the function is also `$var`—

```
function test($var) {  
    // Do whatever.  
}  
  
$var = 1;  
test($var);
```

—then the `$var` variable within the function is assigned the same value as the original `$var` outside of the function—but *they're still two separate variables*. The one has a scope within the function, and the other has a scope outside of it. This means that you can use the same name for variables in the function as exist outside of the function without conflict. Just remember they aren't the same variable. What happens

```
$n equals 1  
Added one!  
$n equals 1
```

**B** Changes to a local variable inside a function have no effect on a similarly named global variable.

```
$n equals 1  
Added one!  
$n equals 2
```

**C** Changes made to a global variable inside of a function will impact the variable outside of that function.

to a variable's value within a function only affects that variable within the function. As an example **B**:

```
function add_one($n) {  
    $n++;  
    print 'Added one!<br />';  
}  
$n = 1;  
print "\$n equals $n<br />";  
add_one($n);  
print "\$n equals $n<br />";
```

This is all true unless you use the **global** statement, which does make the two variables the same **C**:

```
function add_one() {  
    global $n; // Same!  
    $n++;  
    print 'Added one!<br />';  
}  
$n = 1;  
print "\$n equals $n<br />";  
add_one();  
print "\$n equals $n<br />";
```

Note that in this case, the variable's value no longer needs to be passed to the function either.

To demonstrate variable scope, let's rework the **calculator.php** script using the **global** statement.

## To use the global statement:

1. Open **calculator.php** (Script 10.4) in your text editor or IDE, if it is not already open.
2. Before the function definition, add the following (**Script 10.5**):

```
$tax = 8.75;
```

This line creates a **\$tax** variable with a set value that will be used in the cost calculations. It's assigned a value outside of the function because it will be used later in the main body of the script.

**Script 10.5** The function in this script can use the **\$tax** variable—even though it hasn't been passed to the function—thanks to the **global** statement.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
6    <title>Cost Calculator</title>
7  </head>
8  <body>
9  <?php // Script 10.5 - calculator.php #2
10 /* This script displays and handles an HTML form.
11 It uses a function to calculate a total from a quantity, price, and tax rate. */
12
13 // Define a tax rate:
14 $tax = 8.75;
15
16 // This function performs the calculations.
17 function calculate_total ($quantity, $price) {
18
19   global $tax;
20
21   $total = $quantity * $price; // Calculation
22   $taxrate = ($tax / 100) + 1;
23   $total = $total * $taxrate; // Add the tax.
24   $total = number_format ($total, 2); // Formatting
25
26   return $total; // Return the value.
27
28 } // End of function.
29
```

*code continues on next page*

3. Within the function definition, add a **global** statement:

```
global $tax;
```

This statement tells the function to incorporate the same **\$tax** variable as the one that exists outside of the function.

4. Before the **\$total** in the function is formatted, recalculate the value using the tax rate:

```
$taxrate = ($tax / 100) + 1;  
$total = $total * $taxrate;
```

To add the tax to the total value, you start by dividing the tax by 100 to create a percentage. Then you add 1 to this value to get a multiplier. This result is then multiplied by the total to come up with the new, final total.

*continues on next page*

**Script 10.5** continued

```
30 // Check for a form submission:  
31 if (isset($_POST['submitted'])) {  
32  
33     // Check for values:  
34     if ( is_numeric($_POST['quantity']) AND is_numeric($_POST['price']) ) {  
35  
36         // Call the function and print the results:  
37         $total = calculate_total($_POST['quantity'], $_POST['price']);  
38         print "<p>Your total comes to $<span style=\"font-weight: bold;\">$total</span>,  
            including the $tax percent tax rate.</p>";  
39  
40     } else { // Inappropriate values entered.  
41         print '<p style="color: red;">Please enter a valid quantity and price!</p>';  
42     }  
43  
44 }  
45 ?>  
46 <form action="calculator.php" method="post">  
47     <p>Quantity: <input type="text" name="quantity" size="3" /></p>  
48     <p>Price: <input type="text" name="price" size="5" /></p>  
49     <input type="submit" name="submit" value="Calculate!" />  
50     <input type="hidden" name="submitted" value="true" />  
51 </form>  
52 </body>  
53 </html>
```

Notice that you use a `$taxrate` variable (based on `$tax`) to perform these calculations. This is because you'll print out the value of `$tax` later, and any changes made to it here will be reflected (because it's a global variable).

5. Alter the main `print` line (after the function call) so that it prints the tax rate as well:

```
print "<p>Your total comes to  
→ $<span style=\"font-weight:  
→ bold;\">$total</span>, including  
→ the $tax percent tax rate.</p>";
```

The `$tax` variable defined at the beginning of the script is printed out at the end. If you hadn't used the `$taxrate` variable within the function and made the alterations to the global `$tax` instead, those calculations would be reflected in the value printed here.

6. Save the script, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **D** and **E**.

Quantity:	<input type="text" value="15"/>
Price:	<input type="text" value="129.63"/>
<input type="button" value="Calculate!"/>	

**D** Run the form again...

Your total comes to **\$2,114.59**, including the 8.75 percent tax rate.

Quantity:	<input type="text"/>
Price:	<input type="text"/>
<input type="button" value="Calculate!"/>	

**E** ...and the calculation now makes use of a global `$tax` variable.

## Function Design Theory

Understanding the syntax for defining your own functions is important, but you also need to understand good function design theory. A proper user-defined function should be easily reusable, and be likely to be reused (i.e., if a Web site **only ever calls a function once, there's no need for it**). There should also be a “black box” mentality about the function: A programmer shouldn’t need to know about the internals of a function in order to use it properly. As an example of this, think of any PHP function: You probably don’t know what the underlying function code does specifically, but you can still tap into its power.

In support of the “black box” approach, proper function design suggests that you should be extremely cautious when using global variables. Arguably (pun!), a function should be passed all the information it needs, so that global variables—including the superglobals and constants—are not required.

**Functions should also not make assumptions either, like `make_text_input()`, which assumes the form was submitted using the POST method.**

**By writing functions that neither rely upon global variables nor make assumptions as to what outside of the function is true, you make the function more independent and portable—in short, better.**

**TIP** Constants and the superglobal arrays (`$_GET`, `$_POST`, `$_COOKIE`, and `$_SESSION`) have the added benefit that they’re always available inside functions without requiring the `global` statement (which is why they are called **superglobals**).

**TIP** Each function has its own, separate local scope.

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- What is the basic syntax of a user-defined function?
- What naming rules must your own functions abide by?
- What naming rules must function arguments abide by?
- How do you provide a default value for a function's argument?
- In the example code in the “Understanding Variable Scope” section of the chapter, why does the code use `\$n`? What would happen if that backslash wasn't there?
- What is variable scope? What scope does a function argument variable have?
- What scope does a variable in an included file have? Note: This is a tricky one!

## Pursue

- Make the function in `menus.php` take arguments to indicate the starting year and the number of years to generate. Make the later argument have a default value. Then rewrite the function body so that it uses these values in the year `for` loop.
- Rewrite the `make_text_input()` function so that it can be told whether to look for an existing value in either `$_POST` or `$_GET`.
- Create a variation on the `make_text_input()` function that can create a text input or a password input, depending upon how the function is called.
- Come up with an idea for, create, and use your own custom function.

# 11

# Files and Directories

Taking your Web applications to the next level requires a method of storing and retrieving data. You have two primary options in PHP: using files (and directories) or databases. This chapter will discuss the former, and the next chapter will introduce the latter. It's worth your time to learn both methods: Although a database can be more powerful and secure than a file-based system, you may be surprised at what's possible by writing and reading simple text documents on the server.

In this chapter, you'll learn about file permissions, a topic that you must grasp first. Then you'll learn to write to, read from, and lock files. After that, you'll see how to handle file uploads with PHP, how to create directories, and an alternate method for reading data from a file. These last two examples will also demonstrate a simple file-based registration and login system that you can use in your Web applications.

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## In This Chapter

File Permissions	288
Writing to Files	293
Locking Files	301
Reading from Files	304
Handling File Uploads	307
Navigating Directories	315
Creating Directories	320
Reading Files Incrementally	327
Review and Pursue	332

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# File Permissions

Before attempting to write to and read from a file, you must have an understanding of *file permissions*. The topic is large enough that you may want to pursue it further, but this quick introduction will get you started. Up front I will say that most of the information in this chapter applies to only non-Windows users. In my experience, the preparatory steps to be taken aren't necessary when running PHP on a Windows computer (although such things can change from one version of an operating system to the next). Still, having an understanding of permissions as a whole is a good idea, especially if you might later be running your PHP scripts on a non-Windows server.

Permissions identify who can do what with a file or directory. The options are *read*, *write*, and *execute* (actually, files can be designated *executable*, whereas directories are made *searchable*). Each of these options can be set for three types of users:

- The *owner* of the file (the person who created it or put it on the server)
- Members of a particular *group*, which a server administrator determines and which includes the owner
- *Others* (those who don't fall into the previous two categories)

There is also the implied *everyone* level, which includes all three user types.

As an example, if you use FTP to transfer a file to a server, the account used to connect to the server will be the owner of the file. The default file permissions will likely be that everyone can read the file but that only the owner can modify it (i.e., write to it).

## The Web Root Directory

When discussing files, directories, and security, an important concept is that of the *Web root directory*. To grasp this concept, first consider that a file on a Web server is available in two ways. First, it exists in the file system. For example, this might be `C:\inetpub\wwwroot\filename.php` on your own computer, or `/var/web/sitename/htdocs/filename.php` on a remote server (that path would be applicable to \*nix systems).

Second, files placed within the proper directories for a Web server are also available through HTTP, such as `http://www.example.com/filename.php` or `http://localhost/filename.php`.

With this in mind, the *Web root directory* is the folder in the file system where the base URL—such as `www.example.com`—points. Without further restrictions imposed, a Web browser can access all the files found within the Web root directory and below (i.e., in subfolders). A Web browser cannot, however, access files found outside of the Web root directory.

When creating writable files and directories, it's more secure to place them outside of the Web directory. In other words, if your Web pages go in `C:\inetpub\wwwroot` or `/Users/username/Sites`, then if you place items in `C:\inetpub` or `/Users/username`, they should be accessible to the locally running PHP but not to others over the Internet. The examples in this chapter follow this structure, and you should do so as well.

In general, the security concern here is more important for directories than for files.

A catch is that in most cases, PHP will be running through a Web server application, which counts as a different server user. Therefore, PHP and the Web server would be able to read files you put onto the server (and consequently make them available for viewing in a Web browser), but PHP would not, by default, be able to modify those files.

For the examples in this chapter, PHP needs to be able to write to some files and directories. This means that you must know how, and be able, to adjust the permissions a file or directory has. That being said, making a file or directory writable (i.e., making the permissions less restrictive) can be a security issue and should be done only when absolutely necessary.

Finally, a common point of confusion has to do with what, exactly, a “user” is. A user is an account created on a computer. On your own computer, there may be just one user—you—or several. Servers normally have multiple users, although most user

accounts aren’t associated with people who will log in, but rather with different processes running on the server. For example, there may be one user whose processes handle all Web requests and another user through which the database application runs. (Most importantly, know that a “user” is not a person on another computer and that “everyone” means “everyone on the server.”) Just because you’ve made a file or directory writable by any user doesn’t mean it’s writable by anyone over the Internet. The user must be a recognized account on the server.

## Creating the text file

In the chapter’s first example, you’ll work with a text file, `quotes.txt`, that’s located on the server. If the file doesn’t have the correct permissions to do what your PHP script is asking it to, you might see an error message like A. Before proceeding, you should create `quotes.txt` on the server and establish its permissions.

**Warning:** fopen(..../quotes.txt) [function.fopen]: failed to open stream:  
Permission denied in  
`/Users/larryullman/Sites/phpvqs4/add_quote.php` on line 20

A The ...failed to open stream: Permission denied... message is the result of attempting to do something to a file that isn’t allowed by the server. Here the server is denying the `fopen()` function that is attempting to open `quotes.txt` for the purpose of writing to it.

## To create quotes.txt:

1. Open your text editor or IDE and create a new, blank document.
2. Without typing anything into the file, save it as **quotes.txt**.
3. Move the file just outside of the Web root directory of your PHP-enabled server **B**.

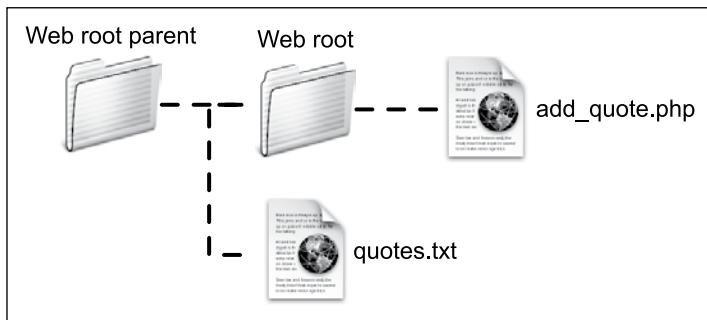
The sidebar “The Web Root Directory” explains where you should put the file with respect to your Web directory and why.

**TIP** The `file_exists()` function returns `TRUE` if a provided file or directory exists on the server. This can be used to test for the presence of a file before doing anything with it.

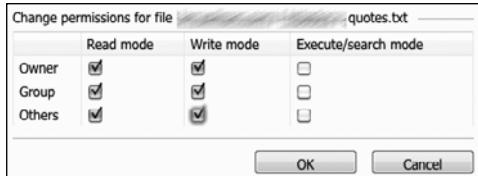
```
if (file_exists('somefile.ext')) { ...
```

**TIP** Assuming that PHP has write permissions on a directory, you can create a blank document within that directory using PHP. This is accomplished using the `touch()` function:

```
touch('somefile.ext');
```



**B** The `quotes.txt` file should ideally be placed in the same directory as your Web documents folder (i.e., not in the directory with the actual Web documents).



C This control panel, provided by a hosting company, lets you adjust a file's permissions.



D The Transmit FTP application uses this pop-up window to allow you to set a file's permissions.

## Setting a file's permissions

The preceding sequence may seem like an odd series of steps, but in order to set the permissions on a file, the file must first exist. You do want the file to be blank, though, because you'll use PHP to write data to it later.

The desired end result for this example is to give either *others* or *everyone* permission to *read* and *write* (but not *execute*) **quotes.txt**. How you accomplish this depends on:

- Whether you're running PHP on your own computer or on a remote server
- The operating system of the PHP-enabled computer

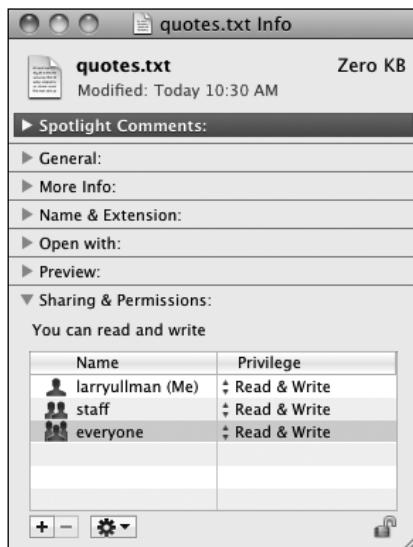
Unfortunately, it would be impossible to offer steps for how every user should set the permissions under any circumstances, but here are some rough guidelines and steps to get you going.

### To set a file's permissions on a remote server:

- Most ISPs offer users a Web-based control panel where they can set file permissions C as well as set other hosting parameters.
- You may be able to change a file's permissions using your FTP client D.

## To set a file's permissions on your computer:

- If you're working on your own Windows computer, you may not need to change the permissions. To test this theory, try each example first. If a PHP script can't write to the file or directory in question, use the next suggestion to rework the permissions.
- Windows users who need to change the permissions can do so by viewing the file's or directory's properties. The resulting panel will differ for each version of Windows, but basically you just need to tweak who can access the file and how.
- Mac OS X users must select the file in the Finder and choose Get Info from the File menu. From there, use the Ownership & Permissions subpanel to adjust the file's permissions **E**.
- On Unix (including users of Linux and Mac OS X), you can also use the command line **chmod 0666 quotes.txt** in a terminal window, assuming that you have authority to do so.



**TIP** Most operating systems have no *PHP* user. Instead, the *PHP* user is essentially the user the Web server application (for example, Apache or IIS) is running as. In the Unix family, Apache often runs as *nobody*. On Windows, the Web server frequently runs as the same user who is logged in (and who probably created the file), meaning there will be no need to alter a file's permissions.

**TIP** If you're already familiar with Telnet and *chmod*, you probably also understand what the 0666 number means, but here's an explanation for those of you who aren't familiar with it. The 0 is just a prefix indicating the number is written in an *octal* format. Each 6 corresponds to *read* (4) plus *write* (2) permission—first assigning 6 to the owner, then to the group, and then to others. Comparatively, 0777 allows *read* (4) plus *write* (2) plus *execute* (1) permission to all three types of users. This numbering is applicable for Unix variant operating systems (Linux, Solaris, and Mac OS X).

**TIP** PHP has several functions for changing a file or directory's permissions, including *chgrp()*, *chmod()*, and *chown()*. However, they will only work if PHP already has permission to modify the file or directory in question.

**TIP** A Web site running on a shared hosting environment has greater security risks than one running on a dedicated server as there are literally more users. For example, if you make a file or directory writable by every user, then anyone with access to that server can manipulate that file (assuming they know it exists and that other restrictions are not in place).

**E** The Mac OS X Get Info panel lets you adjust a file's ownership and permissions, among other things.

## File Paths

There are two ways of referring to any file or directory on the computer: using an *absolute* or *relative* path. An absolute path begins at the root of the computer:

- `C:\somedir\somefile.txt`  
(Windows)
- `/Users/username/somefile.txt`  
(Mac OS X)

A relative path will not start with the root of the computer—`C:\` or `/`. Instead it will be relative to the current working directory:

- `fileA.txt` (in the same directory)
- `./fileA.txt` (in the same directory)
- `dirB/fileB.txt` (inside `dirB`)
- `../fileC.txt` (inside the parent directory)
- `../../dirD/fileD.txt` (inside the parallel directory)

Two periods together represent the current directory's parent folder. A single period by itself represents the current directory. If a file's name begins with a single period, the file is hidden (on Unix, Linux, and Mac OS X).

It technically doesn't matter whether you use a relative or an absolute path to refer to a file, as long as the reference is accurate. An absolute path is easier for beginners to understand but will only be correct for that computer. A relative path can confound those new to the concept, but can continue to be correct even after moving the site from one server to another.

## Writing to Files

Because you need to write something to a file in order to read something from it, this chapter explores writing first. The easiest way to write to a file is to use the `file_put_contents()` function:

```
file_put_contents($file, $data);
```

This function, added in PHP 5, will open the file and write the data there. The first argument is the name of the file. This can be an *absolute* or *relative* path (see the sidebar "File Paths"). The second argument is the data, which can be a string, number, or array (one-dimensional, not multidimensional). Neither the file nor the data has to be represented by a variable, but it's common to do so.

If the file doesn't exist, the function will attempt to create it. If the file does exist, the file's current contents will be replaced with the new data. If you'd prefer to have the new data appended to what's already in the file, add the `FILE_APPEND` constant as a third argument:

```
file_put_contents($file, $data,  
    FILE_APPEND);
```

When appending data to a file, you normally want each piece of data to be written on its own line, so each submission should conclude with the appropriate line break for the operating system of the computer running PHP. This would be

- `\n` on Unix and Mac OS X
- `\r\n` on Windows

As with any meaningful escape sequence, these must be placed within double quotation marks in order to work.

*continues on next page*

Alternatively, you can use the special PHP constant `PHP_EOL`, which represents the correct end-of-line character sequence (e.g., `\n` or `\r\n`) for the current operating system:

```
file_put_contents($file,  
    $data . PHP_EOL, FILE_APPEND);
```

If you're not using PHP 5 or later, then the `file_put_contents()` function won't be available for you and you must use the legacy approach: first, open the file; second, write your data to it; and third, close the file:

```
$fp = fopen($file, mode);  
fwrite($fp, $data . PHP_EOL);  
fclose($fp);
```

To write to a file, you must create a *file pointer* when opening it. The file pointer returned by the `fopen()` function will be used by PHP to refer to the open file.

The most important consideration when opening the file is what *mode* you use. Depending on what you intend to do with the file, the mode dictates how to open it. The most forgiving mode is `a+`, which allows you to read or write to a file. It creates the file if it doesn't exist, and it appends—hence `a`—new data to the end of the file automatically. Conversely, `r` only allows you to read from a file. **Table 11.1** lists all the possible modes. Each mode can also be appended with a `b` flag, which forces files to be opened in binary mode. This is a safer option for files that might be read on multiple operating systems.

---

**TABLE 11.1** `fopen()` Modes

Mode	Meaning
<code>r</code>	Reading only; begin reading at the start of the file.
<code>r+</code>	Reading or writing; begin at the start of the file.
<code>w</code>	Writing only; create the file if it doesn't exist, and overwrite any existing contents.
<code>w+</code>	Reading or writing; create the file if it doesn't exist, and overwrite any existing contents (when writing).
<code>a</code>	Writing only; create the file if it doesn't exist, and append the new data to the end of the file (retain any existing data and add to it).
<code>a+</code>	Reading or writing; create the file if it doesn't exist, and append the new data to the end of the file (when writing).
<code>x</code>	Writing only; create the file if it doesn't exist, but do nothing (and issue a warning) if the file does exist.
<code>x+</code>	Reading or writing; create the file if it doesn't exist, but do nothing (and issue a warning) if the file already exists (when writing).

Enter your quotation here.

Add This Quote!

A This very simple form lets a user submit a quotation that will be written to a text file.

The **fwrite()** function writes the new data (sent as the second argument in the function call) to the file in accordance with the selected mode.

As the last step of the writing process, you close the file by once again referring to the file pointer while calling the **fclose()** function:

```
fclose($fp);
```

With this in mind, let's create a form that stores user-submitted quotations in a plain-text file A. Later in this chapter, another PHP script will retrieve and randomly display these quotations. Before we get into the code, however, there's one more function to be introduced: **is\_writable()**. This function returns a Boolean value indicating the writability of the named file:

```
if (is_writable($file)) {...
```

Invoking this function prior to attempting to write to a file (or directory) is a simple way to avoid permissions errors.

## To write to an external file:

1. Create a new PHP document in your text editor or IDE, to be named **add\_quote.php** (Script 11.1):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="content-type"
    → content="text/html;
    → charset=utf-8" />
  <title>Add A Quotation</title>
</head>
<body>
```

**Script 11.1** This script takes a user-submitted quotation and stores it in a text file.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6    <title>Add A Quotation</title>
7  </head>
8  <body>
9  <?php // Script 11.1 - add_quote.php
10 /* This script displays and handles an HTML form. This script takes text input and stores it
in a text file. */
11
12 // Identify the file to use:
13 $file = '../quotes.txt';
14
15 // Check for a form submission:
16 if ($_SERVER['REQUEST_METHOD'] == 'POST') { // Handle the form.
17
18   if ( !empty($_POST['quote']) && ($_POST['quote'] != 'Enter your quotation here.') ) { // Need
some thing to write.
19
20     if (is_writable($file)) { // Confirm that the file is writable.
21
22       file_put_contents($file, $_POST['quote'] . PHP_EOL, FILE_APPEND);
// Write the data.
```

*code continues on next page*

2. Create a section of PHP code and identify the file to be used:

```
<?php // Script 11.1 - add_quote.php  
$file = '../quotes.txt';
```

As this script will reference the same file twice, it's a good idea to identify the file as a variable. This way, should you later need to change the name or location of the file, only one line of code will need to be edited.

The file identified is **quotes.txt**, which should be located in the directory above this script (which is presumably in the Web directory root; see **B** in the previous section of the chapter). See the sidebar “File Paths” for more on this syntax.

*continues on next page*

#### **Script 11.1** continued

```
23  
24      // Print a message:  
25      print '<p>Your quotation has been stored.</p>';  
26  
27  } else { // Could not open the file.  
28      print '<p style="color: red;">Your quotation could not be stored due to a system  
29      error.</p>';  
30  }  
31 } else { // Failed to enter a quotation.  
32     print '<p style="color: red;">Please enter a quotation!</p>';  
33 }  
34  
35 } // End of submitted IF.  
36  
37 // Leave PHP and display the form:  
38 ?>  
39  
40 <form action="add_quote.php" method="post">  
41     <textarea name="quote" rows="5" cols="30">Enter your quotation here.</textarea><br />  
42     <input type="submit" name="submit" value="Add This Quote!" />  
43 </form>  
44  
45 </body>  
46 </html>
```

3. Check if the form has been submitted:

```
if ($_SERVER['REQUEST_METHOD'] ==  
→ 'POST') {
```

This page both displays and handles the HTML form. The conditional tests if the form has been submitted, in which case the quotation should be written to the text file.

4. Check that a quotation was entered:

```
if ( !empty($_POST['quote']) &&  
→ ($_POST['quote'] != 'Enter your  
→ quotation here.') ) {
```

This simple conditional validates the user-supplied data. The first part confirms that the `$_POST['quote']` variable isn't empty. The second part confirms that the variable doesn't still have the default value (as shown in A).

5. Confirm that the file can be written to

```
if (is_writable($file)) {
```

By placing this function call in a conditional, you make the PHP script attempt to write to the file only if the file is writable.

6. Write the data to the file and then print a message:

```
file_put_contents($file,  
→ $_POST['quote'] . PHP_EOL,  
→ FILE_APPEND);  
print '<p>Your quotation has been  
→ stored.</p>';
```

The first line writes the user-submitted data to the file. The `PHP_EOL` constant is concatenated to the written data, so that each submission gets stored on its own line.

If you're not using PHP 5 or later, you'll need to do this instead:

```
$fp = fopen ($file, 'ab')  
fwrite($fp, $_POST['quote'] .  
→ PHP_EOL);  
fclose($fp);
```

7. Complete the conditionals:

```
} else { // Could not open  
→ the file.  
print '<p style="color:  
→ red;">Your quotation  
→ could not be stored due  
→ to a system error.</p>';  
}  
} else { // Failed to enter a  
→ quotation.  
print '<p style="color:  
→ red;">Please enter a  
→ quotation!</p>';  
}  
} // End of submitted IF.
```

The first **else** completes the conditional that checks if PHP could open the file for writing **B**. If you see this message, there's likely a permissions issue or the file reference is incorrect. The second **else** completes the conditional that checks whether no quotation was entered **C**. The final closing curly bracket marks the end of the main submission conditional.

Because this page handles the form and then displays it again (so that the user may keep entering quotations), the form isn't displayed as part of an **else** statement as it has been in other examples in this book.

**8.** Complete the PHP section:

```
?>
```

Because the rest of this script is standard HTML, exit out of the PHP code by closing the PHP tag.

**9.** Create the HTML form:

```
<form action="add_quote.php"
  method="post">
  <textarea name="quote" rows="5"
    cols="30">Enter your quotation
    here.</textarea><br />
  <input type="submit" name=
    "submit" value="Add This
    Quote!" />
  <input type="hidden" name=
    "submitted" value="true" />
</form>
```

This HTML form presents a text box where the user can enter a quotation. The text box has a preset value of *Enter your quotation here.*, created by putting that text between the **textarea** tags.

*continues on next page*

Your quotation could not be stored due to a system error.

Enter your quotation here.

Add This Quote!

**B** If the PHP script can't find the **quotes.txt** file, or if it's not writable, the user will see this message.

Please enter a quotation!

Enter your quotation here.

Add This Quote!

**C** The script includes basic form validation.

**10.** Complete the HTML page:

```
</body>
</html>
```

**11.** Save the file as **add\_quote.php** and place it in the proper directory for your PHP-enabled server.

Again, refer back to **B** in the previous section of the chapter for how the **add\_quote.php** and **quotes.txt** should be placed on your server relative to each other. If this arrangement isn't possible for you, or if it's just too confusing, then place both documents within the same directory (the one from which you can execute PHP scripts) and change the **\$file** assignment line to

```
$file = 'quotes.txt';
```

**12.** Run the script several times in your Web browser **D** and **E**.

**13.** If you want, open the **quotes.txt** file in a text editor to confirm that the data has been written to it.

**TIP** Note that all of the file- and directory-related functions are usable only on files and directories on the same computer (i.e., server) on which PHP is running. A PHP script on a server has no access to a file on a client's computer (until the file is uploaded to the server).

**TIP** If you receive a permissions error when you run this script **B**, either the permissions aren't set properly or the PHP script couldn't access the data file. The latter can happen if you misspell the filename or incorrectly reference the file's path on the server.

**TIP** If your version of PHP is running in safe mode or has the **open\_basedir** directive set, you may be limited in using PHP to access files and directories. Check your **phpinfo()** script to see these settings for your server.

A book is like a garden carried in the pocket. (Chinese Proverb)

Add This Quote!

**D** Filling out the form...

Your quotation has been stored.

Enter your quotation here.

Add This Quote!

**E** ...and the result if all went well.

---

**TABLE 11.2** flock() Lock Types

Lock	Meaning
LOCK_SH	Shared lock for reading purposes
LOCK_EX	Exclusive lock for writing purposes
LOCK_UN	Release of a lock
LOCK_NB	Nonblocking lock

---

## Locking Files

Although the last example worked fine (hopefully), it could be improved on. If only a single user were submitting the form at one time, there would be no problems. But what if two or more users submitted different quotations simultaneously? In such a case, there could be problems when multiple instances of the PHP script attempt to write to the same text file at once (the file could become corrupted). The solution is to temporarily *lock* the file while PHP is writing to it. If you are running PHP 5.1 or greater, you can add the `LOCK_EX` constant as the third argument to `file_put_contents()`:

```
file_put_contents($file, $data,  
→ LOCK_EX);
```

To use both the `LOCK_EX` and `FILE_APPEND` constants, separate them with the binary OR operator (`|`):

```
file_put_contents($file, $data,  
→ FILE_APPEND | LOCK_EX);
```

It doesn't matter in which order you list the two constants. If you're using an earlier version of PHP and have to use `fopen()`, `fwrite()`, and `fclose()`, you can invoke the `flock()` function after opening the file:

```
$fp = fopen($file, 'a+b');  
flock($fp, locktype)
```

The different lock types are represented by the constants listed in Table 11.2. Note that you should unlock the file once the script is done with it.

As an example, to temporarily lock a file during a write, use this code:

```
$fp = fopen($file, 'a+b');  
flock ($fp, LOCK_EX);  
fwrite ($fp, $data);  
flock ($fp, LOCK_UN);
```

*continues on next page*

To demonstrate, let's update **add\_quote.php** to lock the file during the writing process.

## To use file locks:

1. Open **add\_quote.php** (Script 11.1) in your text editor or IDE, if it isn't already open.
2. Change the **file\_put\_contents()** line to the following (Script 11.2):

```
file_put_contents($file,  
→ $_POST['quote'] . PHP_EOL,  
→ FILE_APPEND | LOCK_EX);
```

This command places an exclusive lock on the file so that other scripts can't write to it at the same time.

Again, if you're not able to use **file\_put\_contents()** and **LOCK\_EX**, you'll need to apply **flock()**, as in

```
flock($fp, LOCK_EX);  
fwrite($fp, $_POST['quote'] .  
→ PHP_EOL);  
flock($fp, LOCK_UN);  
fclose($fp);
```

**Script 11.2** The modified version of the **add\_quote.php** script locks the data file for better security and reliability.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
2  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">  
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">  
4  <head>  
5      <meta http-equiv="content-type" content="text/html; charset=utf-8" />  
6      <title>Add A Quotation</title>  
7  </head>  
8  <body>  
9  <?php // Script 11.1 - add_quote.php  
10 /* This script displays and handles an HTML form. This script takes text input and stores it in  
   a text file. */  
11  
12 // Identify the file to use:  
13 $file = '../quotes.txt';  
14  
15 // Check for a form submission:  
16 if ($_SERVER['REQUEST_METHOD'] == 'POST') { // Handle the form.  
17  
18     if ( !empty($_POST['quote']) && ($_POST['quote'] != 'Enter your quotation here.') ) { // Need  
       some thing to write.
```

*code continues on next page*

Failure is the opportunity to begin again more intelligently. (Henry Ford)

**Add This Quote!**

**A** Using the form once again...

Your quotation has been stored.

Enter your quotation here.

**Add This Quote!**

**B** ...the quotation is still stored without a problem.

3. Save the file, place it in the proper directory for your PHP-enabled server, and test it again in your Web browser **A** and **B**.

**TIP** When you use `flock()`, the file will automatically be unlocked once `fclose()` is called, but it's good form to specifically unlock it once the file writing is complete.

**TIP** Technically, if a file is opened in an appending mode, as in this example, not locking it probably won't be a problem even if multiple scripts are writing to the file simultaneously. That said, better safe than sorry!

**TIP** For file locking to be reliable, every script that writes to a file needs to use locking.

#### Script 11.2 continued

```

19     if (is_writable($file)) { // Confirm that the file is writable.
20
21
22     file_put_contents($file, $_POST['quote'] . PHP_EOL, FILE_APPEND | LOCK_EX); // Write the data.
23
24     // Print a message:
25     print '<p>Your quotation has been stored.</p>';
26
27 } else { // Could not open the file.
28     print '<p style="color: red;">Your quotation could not be stored due to a system error.</p>';
29 }
30
31 } else { // Failed to enter a quotation.
32     print '<p style="color: red;">Please enter a quotation!</p>';
33 }
34
35 } // End of submitted IF.
36
37 // Leave PHP and display the form:
38 ?>
39
40 <form action="add_quote.php" method="post">
41     <textarea name="quote" rows="5" cols="30">Enter your quotation here.</textarea><br />
42     <input type="submit" name="submit" value="Add This Quote!" />
43 </form>
44
45 </body>
46 </html>
```

# Reading from Files

Now that you've created a script that writes data to a file, it's time to create one that can read the information. There are a number of ways to read from a file; which approach you take depends on what your needs are. To read an entire file in as one string, use `file_get_contents()`:

```
$data = file_get_contents($file);
```

If the file has some data on each line, as is the case with `quotes.txt`, you're better off using the `file()` function:

```
$data = file($file);
```

The `file()` function is a valuable built-in tool in PHP. It reads everything from a file and, unlike `file_get_contents()`, returns that information as an array. Each array element contains one line from the file, where each line is terminated by a newline (`\n` or `\r\n`).

If the document represented by `$file` contains two lines of information, each of which ends with a newline, the corresponding array will contain two elements. The first element will be equal to the first line of `$file`, and the second element will be equal to the second line. Once the data is stored into an array, you can easily manipulate or print it, as you learned in Chapter 7, "Using Arrays."

Next, let's use this knowledge to create a script that randomly displays one of the stored quotations.

**Script 11.3** The `view_quote.php` file retrieves all the quotations from the text file and displays one at random.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2    1.0 Transitional//EN"
3    "http://www.w3.org/TR/xhtml1/DTD/
4      xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6    xhtml" xml:lang="en" lang="en">
7  <head>
8    <meta http-equiv="content-type"
9      content="text/html; charset=utf-8" />
10 <title>View A Quotation</title>
11 /* This script displays and handles an
12   HTML form. This script reads in a file
13   and prints a random line from it. */
14 // Read the file's contents into an array:
15 $data = file('../quotes.txt');
16 // Count the number of items in the array:
17 $n = count($data);
18 // Pick a random item:
19 $rand = rand(0, ($n - 1));
20 // Print the quotation:
21 print '<p>' . trim($data[$rand]) . '</p>';
22 //?
23 </body>
24 </html>
```

## To read from a file:

1. Create a new PHP document in your text editor or IDE, to be named `view_quote.php` (Script 11.3):  
`<!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" xml:lang="en"
→ lang="en">
<head>
 <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
 <title>View A Quotation</title>
</head>
<body>
 <h1>Random Quotation</h1>`

2. Open a PHP code section:

```
<?php // Script 11.3 -
→ view_quote.php
```

3. Read the file contents and store them in an array:

```
$data = file('../quotes.txt');
```

The function reads the file data into an array called `$data`. Each element of `$data` is a string, which is the submitted quotation.

If the quotes file is not in the parent directory of this script, change the reference here accordingly.

4. Pick a random number based on the number of elements in `$data`:

```
$n = count($data);
$rand = rand(0, ($n - 1));
```

*continues on next page*

The first line counts how many elements (which is to say, how many quotations) are in the `$data` array. Then the `rand()` function selects a random number. In order for `rand()` to pick an appropriate number, a little logic is required.

If `$data` has 10 elements, they're indexed between 0 and 9, so that's the range to use for `rand()`. Therefore, to calculate the range for a variable number of lines in the text file, use 0 and 1 less than the number of elements in `$data`.

**5.** Print out the quotation:

```
print '<p>' . trim($data[$rand]) .  
    '</p>';
```

A simple `print` statement involving concatenation is used to print the random quotation. To retrieve the quotation, you refer to the `$data` array and use the generated `$rand` number as the index. The retrieved quotation is then trimmed to cut off the newline characters from the end of the quotation.

- 6.** Complete the PHP code and the HTML page:

```
?>  
</body>  
</html>
```

- 7.** Save the file as `view_quote.php`, place it on your Web server (in the same directory as `add_quote.php`), and test it in your Web browser **A**.
- 8.** Reload the page in your Web browser to view another random quote **B**.

**TIP** If you want to be extra careful, you can use the `is_readable()` function to test that PHP can read a file before you call the `file()` function (although it's rare that a file isn't readable).

**TIP** The `readfile()` function reads through a file and immediately sends the contents to the Web browser.

**TIP** Later in the chapter, you'll learn a more complex method of reading a file using `fgets()` and `fgetcsv()`.

## Random Quotation

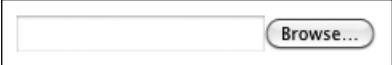
Nurture your mind with great thoughts, for you will never go any higher than you think. (Benjamin Disraeli)

**A** A random quotation is displayed each time the page is viewed.

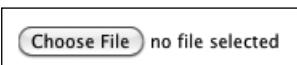
## Random Quotation

It is the mark of an educated mind to be able to entertain a thought without accepting it. (Aristotle)

**B** Subsequent viewings of the `view_quote.php` script display different quotations from the text file.



**A** This is how Firefox interprets the file input type.



**B** This is how the Safari Web browser interprets the file input type (prior to selecting a file).

## Handling File Uploads

As this book has demonstrated, handling HTML forms using PHP is a remarkably easy achievement. Regardless of the data being submitted, PHP can handle it easily and directly. The same is true when the user uploads a file via an HTML form.

To give the user the option of uploading a file, you must make three changes to the standard HTML form. First, the initial `form` tag must include the code `enctype="multipart/form-data"`, which lets the browser know to expect different types of form data.

```
<form action="script.php" enctype="multipart/form-data" method="post">
```

The form must also always use the POST method.

Second, a special hidden input type should be added to the form:

```
<input type="hidden" name="MAX_FILE_SIZE" value="30000" />
```

This tells the browser how large a file, in bytes, can be uploaded.

Third, the `file` tag is used to create the necessary form field **A** and **B**:

```
<input type="file" name="picture" />
```

The file type of form input allows the user to select a file on their computer, which, upon submission, will be uploaded to the server. Once this has occurred, you can then use PHP to handle the file.

*continues on next page*

In the PHP script, you refer to the `$_FILES` variable (think of it as the file equivalent of `$_POST`) to reference the uploaded file. The `$_FILES` array contains five elements:

- `name`, the name of the file as it was on the user's computer
- `type`, the MIME type of the file (for example, `image/jpg`)
- `size`, the size of the file in bytes
- `tmp_name`, the temporary name of the file as it's stored on the server
- `error`, an error code if something goes wrong (Table 11.3)

Note that, as strange as this may seem, there is no error code 5.

When a file is uploaded, the server first places it in a temporary directory. You can then use the `move_uploaded_file()` function to move the file to its final destination:

```
move_uploaded_file($_FILES['picture']
  ['tmp_name'], '/path/to/dest/
filename');
```

The first argument is the temporary name of the file on the server. The second argument is the full path and name of the destination.

For PHP to be able to take these steps, you must set several configurations in the `php.ini` file (see the “Configuring PHP for File Uploads” sidebar), and the Web server needs write access to both the temporary and final destination directories. (PHP should have write access to the temporary directory by default.)

---

**TABLE 11.3** `$_FILES` Error Codes

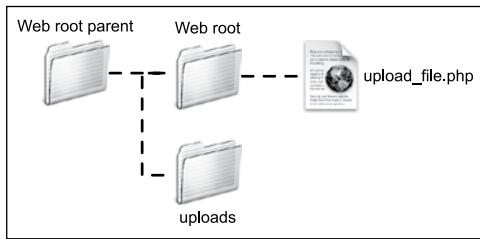
Code	Meaning
0	No error has occurred.
1	The file exceeds the <code>upload_max_size</code> setting in <code>php.ini</code> .
2	The file exceeds the <code>MAX_FILE_SIZE</code> setting in the HTML form.
3	The file was only partially uploaded.
4	No file was uploaded.
6	No temporary directory exists.
7	Failed write to disk.
8	Upload prevented by an extension.

---

Upload a file using this form:

no file selected

C This HTML form lets the user select a file on their computer to upload to the server.



D For this example, a writable **uploads** directory must exist. Here, it's placed in the same directory as the Web root folder. Thus **uploads** is in the directory above the one in which the **upload\_file.php** script resides and is not accessible via HTTP.

Next, you'll write a basic script that uploads a file and stores it on the server. Like the **add\_quote.php** script, this example also both creates the HTML form C and processes it, all in one page. First, though, you'll create a writable directory as the destination point.

### To create a writable directory:

1. Create a new folder called **uploads**, located outside of the Web directory root D.
2. Using the steps outlined in the first section of this chapter, set the permissions so that everyone can write to, read from, and search (0777 in Unix terms) the directory.

Again, if you're running Windows you likely don't need to do anything (try the next script to see for sure). If you're running another operating system, check the list of bullet points in the first section of the chapter for the suggestion that works for your situation.

## Configuring PHP for File Uploads

In order for file uploading to work, a number of settings in your **php.ini** configuration file must be set. These may or may not be enabled in your configuration, so you should check them by viewing the **php.ini** file or running a **phpinfo()** script.

For starters, **file\_uploads** must be on. Second, the **upload\_tmp\_dir** value must be set to a directory on the server where PHP can place files (in other words, it must exist and be modifiable by the Web server). If this setting has no value, that's probably fine (meaning that a hidden directory created expressly for purposes such as these will be used).

The **upload\_max\_filesize** and **post\_max\_size** settings dictate how large a file can be sent. Whereas the **MAX\_FILE\_SIZE** hidden form input is a recommendation to the Web browser, these two settings control whether the file is uploaded.

Finally, if really large files will be uploaded (many megabytes or larger), you may need to increase the **memory\_limit** and **max\_execution\_time** settings to give PHP the time and the resources to do what it needs to do.

## To use PHP for file uploads:

1. Create a new PHP document in your text editor or IDE, to be named **upload\_file.php** (Script 11.4):  

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="content-type"
    → content="text/html;
    → charset=utf-8" />
  <title>Upload a File</title>
</head>
<body>
```

2. Create a section of PHP code:  

```
<?php // Script 11.4 -
→ upload_file.php
```

*continues on page 312*

**Script 11.4** This script handles a file upload by first defining the proper HTML form and, second, invoking **move\_uploaded\_file()** to move the file to the desired location.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6    <title>Upload a File</title>
7  </head>
8  <body>
9  <?php // Script 11.4 - upload_file.php
10 /* This script displays and handles an HTML form. This script takes a file upload and stores it
on the server. */
11
12 if ($_SERVER['REQUEST_METHOD'] == 'POST') { // Handle the form.
13 }
```

*code continues on next page*

**Script 11.4** continued

```
14 // Try to move the uploaded file:  
15 if (move_uploaded_file ($_FILES['the_file']['tmp_name'], "../uploads/{$_FILES['the_file']  
['name']}")) {  
16  
17     print '<p>Your file has been uploaded.</p>';  
18  
19 } else { // Problem!  
20  
21     print '<p style="color: red;">Your file could not be uploaded because: ';  
22  
23     // Print a message based upon the error:  
24     switch ($_FILES['the_file']['error']) {  
25         case 1:  
26             print 'The file exceeds the upload_max_filesize setting in php.ini';  
27             break;  
28         case 2:  
29             print 'The file exceeds the MAX_FILE_SIZE setting in the HTML form';  
30             break;  
31         case 3:  
32             print 'The file was only partially uploaded';  
33             break;  
34         case 4:  
35             print 'No file was uploaded';  
36             break;  
37         case 6:  
38             print 'The temporary folder does not exist.';  
39             break;  
40         default:  
41             print 'Something unforeseen happened.';  
42             break;  
43     }  
44  
45     print '</p>'; // Complete the paragraph.  
46  
47 } // End of move_uploaded_file() IF.  
48  
49 } // End of submission IF.  
50  
51 // Leave PHP and display the form:  
52 ?>  
53  
54 <form action="upload_file.php" enctype="multipart/form-data" method="post">  
55     <p>Upload a file using this form:</p>  
56     <input type="hidden" name="MAX_FILE_SIZE" value="300000" />  
57     <p><input type="file" name="the_file" /></p>  
58     <p><input type="submit" name="submit" value="Upload This File" /></p>  
59 </form>  
60  
61 </body>  
62 </html>
```

3. Check whether the form has been submitted:

```
if ($_SERVER['REQUEST_METHOD'] ==  
    'POST') {
```

Once again, this script both displays and handles the HTML form. If it has been submitted, the uploaded file should be addressed.

4. Attempt to move the uploaded file to its final destination:

```
if (move_uploaded_file  
    ($_FILES['the_file']['tmp_name'],  
     '../uploads/{$_FILES['the_file']  
     ['name']}')) {
```

The `move_uploaded_file()` function attempts to move the uploaded file (identified by `$_FILES['the_file']['tmp_name']`) to its new location (`../uploads/{$_FILES['the_file']['name']}`). The location is the `uploads` directory, which is located in the folder above the one this script is in. The file's name will be the same as it was on the user's computer.

Placing this function as a condition in an `if` statement makes it easy to respond based on whether the move worked.

5. Print messages indicating the success of the operation:

```
print '<p>Your file has been  
→ uploaded.</p>';  
} else { // Problem!  
    print '<p style="color: red;">  
    → Your file could not be  
    → uploaded because: ';
```

The first `print` statement is executed if the move worked ❸. The `else` applies if it didn't work, in which case an error message is begun. This message will be made more explicit in Step 6.

Your file has been uploaded.

Upload a file using this form:

no file selected

❸ If the file was uploaded and moved successfully, a message is printed and the form is displayed again.

6. Print out the error message if the move didn't work:

```
switch ($_FILES['the_file']['error']) {  
    case 1:  
        print 'The file exceeds the  
        → upload_max_filesize setting  
        → in php.ini';  
        break;  
    case 2:  
        print 'The file exceeds the  
        → MAX_FILE_SIZE setting in  
        → the HTML form';  
        break;  
    case 3:  
        print 'The file was only  
        → partially uploaded';  
        break;  
    case 4:  
        print 'No file was uploaded';  
        break;  
    case 6:  
        print 'The temporary folder  
        → does not exist.';  
        break;  
    default:  
        print 'Something unforeseen  
        → happened.';  
        break;  
}
```

If a move doesn't work, the `$_FILES['the_file']['error']` variable contains a number indicating the

appropriate error message. When you use this in a `switch` conditional, the PHP script can print out the appropriate error message **F**.

You wouldn't normally place code like this in a public site (it's a little too much information), but it's exceptionally good for helping you debug a problem.

7. Complete the error message, and close both conditionals:

```
    print '</p>'; // Complete the  
    paragraph.  
} // End of move_uploaded_  
file() IF.  
} // End of submission IF.
```

8. Exit out of PHP and create the HTML form:

```
?>  
<form action="upload_file.php"  
→ enctype="multipart/form-data"  
→ method="post">  
    <p>Upload a file using this  
    → form:</p>  
    <input type="hidden" name="MAX_  
    → FILE_SIZE" value="300000" />  
    <p><input type="file"  
    → name="the_file" /></p>  
    <p><input type="submit"  
    → name="submit" value="Upload  
    → This File" /></p>  
</form>
```

*continues on next page*

Your file could not be uploaded because: The file exceeds the MAX\_FILE\_SIZE setting in the HTML form.

Upload a file using this form:

no file selected

**F** If a problem occurred, the script indicates the cause.

The HTML form is simple, containing only two visible elements: a file input type and a submit button. It differs from other HTML forms in this book in that it uses the `enctype` attribute and a `MAX_FILE_SIZE` hidden input type.

Be careful when giving your `file` input a name, because this value must exactly match the index used in the `$_FILES` variable. Here, you use a generic `the_file`.

9. Complete the HTML page:

```
</body>
</html>
```

10. Save the page as `upload_file.php`, place it in the proper directory for your PHP-enabled server relative to the `uploads` directory **D**, and test it in your Web browser **G**.

Only files smaller than about 300 KB should be allowed, thanks to the `MAX_FILE_SIZE` restriction.

11. Check the `uploads` directory to ensure that the file was placed there.

**TIP** If the file couldn't be moved and a permissions denied error is shown, check the permissions on the `uploads` directory. Then check that the path to the directory used in the script is correct and that there are no spelling errors.

**TIP** As you might discover, files uploaded through the Web browser are owned (in terms of permissions) by the Web server application (which put them there).

**TIP** From a security standpoint, it's better to rename an uploaded file. To do so, you'll need to devise a system that generates a new, unique filename and stores both the original and new filenames in a text file or a database.

**TIP** A script can handle multiple file uploads as long as they have different names. In such a case, you need only one `MAX_FILE_SIZE` hidden input. In the PHP script, you'd apply the `move_uploaded_file()` function to `$_FILES['filename1'], $_FILES['filename2'],` and so on.

**TIP** You can limit a file upload to a specific size or type by referencing the appropriate index (for example, `$_FILES['the_file']['size']`) in your PHP script (after the file has been uploaded).

**TIP** Use `unlink()` to delete a file without moving or copying it.

**TIP** You can use the `copy()` function to make a copy of a file on the server.

Upload a file using this form:

trout.JPG

**G** Select a file on your computer to upload.

## Directories

- ch1
- ch2
- ch3
- templates

## Files

Name	Size	Last Modified
add_quote.php	1520 bytes	December 29, 2010
list_dir.php	1562 bytes	December 28, 2010
login.php	1690 bytes	December 28, 2010
register.php	2339 bytes	December 28, 2010
upload_file.php	1844 bytes	December 29, 2010
view_quote.php	773 bytes	December 29, 2010

A The `list_dir.php` script shows the contents of a directory. The top part lists the subfolders, and the bottom table lists the files.

# Navigating Directories

The previous PHP scripts work with files, but you can also do many things with directories using PHP. In this example, you'll write a script that lists a directory's contents, but first you'll need to understand the usage and syntax of many of the functions you'll use.

To find all of the contents of a directory, the easiest option is to use the `scandir()` function:

```
$stuff = scandir($dir);
```

This function, added in PHP 5, returns an array of every item—directory or file—found within the given directory. As with the file-related functions, the value of `$dir` can be a relative or an absolute path to the directory in question.

If you're using an earlier version of PHP, you'll need to use `opendir()`, `readdir()`, and `closedir()` instead. See the PHP manual page for `readdir()` for the full syntax and usage.

This next example will make use of `scandir()`, but let's look at a couple more functions first. You'll use the `filesize()` function in this example; it determines how large a file is in bytes. This value can be assigned to a variable or be printed:

```
$size = filesize($file);
```

Similarly, the `filemtime()` function retrieves the modification time of a file. It returns a timestamp, which can be formatted using the `date()` function.

Finally, PHP includes several functions that identify attributes. This chapter has already mentioned `is_writable()` and `is_readable()`, but there are also `is_dir()` and `is_file()`. They return `TRUE` if the item in question is a directory or a file, respectively.

You'll put all of these capabilities together into one page, which will constitute a Web-based control panel for viewing a directory's contents A.

## To create the directory control panel:

1. Create a new PHP document in your text editor or IDE, to be named `list_dir.php` (Script 11.5):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
  <title>Directory Contents
→ </title>
</head>
<body>
```

*continues on page 318*

**Script 11.5** This script displays the contents of a directory. First the subdirectories are listed, followed by the files (with their sizes and modification dates) in a table.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6    <title>Directory Contents</title>
7  </head>
8  <body>
9  <?php // Script 11.5 - list_dir.php
10 /* This script lists the directories and files in a directory. */
11
12 // Set the time zone:
13 date_default_timezone_set('America/New_York');
14
15 // Set the directory name and scan it:
16 $search_dir = '.';
17 $contents = scandir($search_dir);
18
```

*code continues on next page*

**Script 11.5** continued

```
19 // List the directories first...
20 // Print a caption and start a list:
21 print '<h2>Directories</h2>
22 <ul>';
23 foreach ($contents as $item) {
24     if ( (is_dir($search_dir . '/' . $item)) AND (substr($item, 0, 1) != '.') ) {
25         print "<li>$item</li>\n";
26     }
27 }
28
29 print '</ul>; // Close the list.
30
31 // Create a table header:
32 print '<hr /><h2>Files</h2>
33 <table cellpadding="2" cellspacing="2" align="left">
34 <tr>
35 <td>Name</td>
36 <td>Size</td>
37 <td>Last Modified</td>
38 </tr>';
39
40 // List the files:
41 foreach ($contents as $item) {
42     if ( (is_file($search_dir . '/' . $item)) AND (substr($item, 0, 1) != '.') ) {
43
44         // Get the file size:
45         $fs = filesize($search_dir . '/' . $item);
46
47         // Get the file's modification date:
48         $lm = date('F j, Y', filemtime($search_dir . '/' . $item));
49
50         // Print the information:
51         print "<tr>
52             <td>$item</td>
53             <td>$fs bytes</td>
54             <td>$lm</td>
55         </tr>\n";
56
57     } // Close the IF.
58
59 } // Close the FOREACH.
60
61 print '</table>; // Close the HTML table.
62
63 ?>
64 </body>
65 </html>
```

2. Begin the PHP code and set the time zone:

```
<?php // Script 11.5 - list_dir.php  
date_default_timezone_set  
→ ('America/New_York');
```

Because this script will make use of the `date()` function, it needs to establish the time zone once. See Chapter 8, “Creating Web Applications,” for more and for the reference in the PHP manual where you can find your time zone.

3. Identify the directory to be opened, and scan in its contents:

```
$search_dir = '.';  
$contents = scandir($search_dir);
```

By establishing this value as a variable at the top of the PHP script, it will be easy to find and change as needed.

Here you use a single period to refer to the current directory. You could also use an absolute path to another directory (`/Users/larry/Documents` or `C:\myfiles\directory`) or a relative path (`../myfiles`), as long as PHP has permission to read the named directory.

The second line scans in the directory’s contents and assigns them as an array to the variable `$contents`.

4. List the subdirectories of this directory:

```
print '<h2>Directories</h2>  
<ul>;  
foreach ($contents as $item) {  
    if ( (is_dir($search_dir . '/' .  
→ $item)) AND (substr($item,  
→ 0, 1) != '.') ) {  
        print "<li>$item</li>\n";  
    }  
}  
print '</ul>;
```

This `foreach` loop accesses every item in the array, assigning each one to the `$item` variable. The script should first

list every directory, so the `is_dir()` function is called to confirm the item’s type. That same conditional also checks that the current item isn’t the current directory (marked by a single period on Unix systems) or the parent directory (marked by a double period on Unix systems). If this conditional is `TRUE`, then the item’s name is printed out, within `list` item tags, followed by a newline (to make for neater HTML source code).

So that the `is_dir()` function will work when dealing with items found in other directories, the `$search_dir` value, plus a slash, is appended to each item. If the code just referred to `$item` without adding the directory path, the code would only work for the current directory.

5. Create a new heading, and start a table for the files:

```
print '<hr /><h2>Files</h2>  
<table cellpadding="2"  
→ cellspacing="2" align="left">  
<tr>  
<td>Name</td>  
<td>Size</td>  
<td>Last Modified</td>  
</tr>;
```

The script also displays the files’ sizes and modification dates. To make this look nicer, the results are placed in an HTML table.

6. Begin looping through the files in this directory:

```
foreach ($contents as $item) {  
    if ( (is_file($search_dir . '/' .  
→ $item)) AND (substr($item,  
→ 0, 1) != '.') ) {
```

Another `foreach` loop is used to go through the directory contents again. This time, the conditional only wants items that are files (but not hidden files that begin with a single period).

## Directories

- ch11
- css
- temp
- templates

## Files

Name	Size	Last Modified
add_quote.php	1520 bytes	December 29, 2010
books.php	514 bytes	December 13, 2010
calculator.html	1094 bytes	October 16, 2008
calculator.php	1709 bytes	October 27, 2008
customize.php	1694 bytes	December 20, 2010
event.html	1043 bytes	December 7, 2010

**B** The directory listing for another folder on the server.

**TIP** Notice that you need to use double backslashes to create absolute path names on a Windows server. This is necessary because the single backslash, used in Windows path names, is the escape character. So, it must be escaped to be taken literally.

**TIP** The glob() function lets you search a directory for files whose name matches a pattern (like *something.jpg* or *filename.doc*).

**TIP** Other file functions you might appreciate include fileperms(), which returns the file's permissions; fileatime(), which returns the last time a file was accessed; and fileowner(), which returns the user who owns the file.

**TIP** The basename() and dirname() functions are useful for finding subparts of a full directory or file path.

**TIP** The finfo\_file() function is the best way to find a file's MIME type.

Again, the `$search_dir` value and a slash is prepended to each item.

7. Calculate the file's size and modification date, and then print out the information:

```
$fs = filesize($search_dir . '/' .
→ $item);
$lm = date('F j, Y', filemtime
→ ($search_dir . '/' . $item));
print "<tr>
<td>$item</td>
<td>$fs bytes</td>
<td>$lm</td>
</tr>\n";
```

The first line calls the `filesize()` function to retrieve the file's size in bytes. The second line calls the `filemtime()` function, which returns a timestamp of the file's modification time. The timestamp is then fed into the `date()` function, along with the proper formatting, to return a string like *November 24, 2011*. Finally, these two items and the file's name are printed in the appropriate columns of the table.

8. Complete the conditional and the loop:

```
}
```

9. Close the table:

```
print '</table>';
```

10. Complete the PHP code and the HTML page:

```
?>
</body>
</html>
```

11. Save the file as `list_dir.php`, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **A**.

12. If you want, change the value of `$search_dir` and retest the script in your Web browser **B**.

# Creating Directories

Understanding how to read from and write to files on the server is only part of the data storage process. It's likely you'll want to use directories for this purpose as well.

The command for creating a directory in PHP is `mkdir()`:

```
mkdir('directory_name', permissions);
```

The directory name is the name of the directory to be created. This value can be relative to the current directory (i.e., the one the script is in) or it can be a full path:

```
mkdir('C:\\inetpub\\users\\george');
```

On Windows servers, the permissions are ignored and therefore not required (as in the preceding example). On non-Windows servers, the permissions are **0777** by default (see the section “File Permissions” earlier in this chapter to learn what those numbers mean).

With this in mind, let's create a script that makes a new directory for a user when the user registers (the theory being that a user could upload files to that directory). This script also records the username and password to a text file, so that the user can be validated when logging in. You'll begin by creating the parent directory (which must be writable so that PHP can create subdirectories in it) and the **users.txt** data file.

## To create the directory and the data file:

1. Create a new folder called **users**, located outside of the Web directory root.

It could be created in the same directory as the **uploads** folder made earlier (see ① in “Handling File Uploads”).

2. Using the steps outlined in the first section of this chapter, set the permissions so that everyone can write to, read from, and search (**0777** in Unix terms) the directory.

If you're running Windows, this step will most likely not be necessary.

3. In your text editor, create a new, blank document.

4. Save this file in the **users** directory with the name **users.txt**.

5. Again using the steps outlined earlier in the chapter, set the permissions on **users.txt** so that everyone can write to and read from the file (**0666** in Unix terms).

Again, this will probably not be necessary if you're running Windows on your PHP server.

**TIP** Once you create a directory that PHP can write to, PHP should be able to automatically create a **users.txt** file in that directory to which PHP can write. However, it's best not to make assumptions about such things.

## To create the registration script:

1. Begin a new PHP document in your text editor or IDE, to be named **register.php** (Script 11.6):

```
<!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" xml:lang="en"
→ lang="en">
<head>
    <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
    <title>Register</title>
    <style type="text/css"
→ media="screen">
        .error { color: red; }
    </style>
</head>
<body>
    <h1>Register</h1>
```

In the page's head, a CSS class is defined that will be used to format errors.

*continues on page 323*

**Script 11.6** The **register.php** script serves two purposes: it records the user's information in a text file and creates a new directory for that user's stuff.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6      <title>Register</title>
7      <style type="text/css" media="screen">
8          .error { color: red; }
9      </style>
10     </head>
11     <body>
12         <h1>Register</h1>
13         <?php // Script 11.6 - register.php
```

*code continues on next page*

**Script 11.6** continued

```
14 /* This script registers a user by storing their information in a text file and creating a
   directory for them. */
15
16 // Identify the directory and file to use:
17 $dir = '../users/';
18 $file = $dir . 'users.txt';
19
20 if ($_SERVER['REQUEST_METHOD'] == 'POST') { // Handle the form.
21
22     $problem = FALSE; // No problems so far.
23
24     // Check for each value...
25     if (empty($_POST['username'])) {
26         $problem = TRUE;
27         print '<p class="error">Please enter a username!</p>';
28     }
29
30     if (empty($_POST['password1'])) {
31         $problem = TRUE;
32         print '<p class="error">Please enter a password!</p>';
33     }
34
35     if ($_POST['password1'] != $_POST['password2']) {
36         $problem = TRUE;
37         print '<p class="error">Your password did not match your confirmed password!</p>';
38     }
39
40     if (!$problem) { // If there weren't any problems...
41
42         if (is_writable($file)) { // Open the file.
43
44             // Create the data to be written:
45             $subdir = time() . rand(0, 4596);
46             $data = $_POST['username'] . "\t" . md5(trim($_POST['password1'])) . "\t" .
47                   $subdir . PHP_EOL;
48
49             // Write the data:
50             file_put_contents($file, $data, FILE_APPEND | LOCK_EX);
51
52             // Create the directory:
53             mkdir ($dir . $subdir);
54
55             // Print a message:
56             print '<p>You are now registered!</p>';
57
58         } else { // Couldn't write to the file.
59             print '<p class="error">You could not be registered due to a system error.</p>';
60         }
61
62     }
63
64 }
```

*code continues on next page*

- 2.** Begin the PHP code and create two variables:

```
<?php // Script 11.6 - register.php  
$dir = '../users/';  
$file = $dir . 'users.txt';
```

These two variables represent the directory and file being used by the example. The file will be in the directory, so its value starts with the directory's value. Change the value of `$dir` so that it's appropriate for your situation.

- 3.** Check whether the form has been submitted:

```
if ($_SERVER['REQUEST_METHOD'] ==  
→ 'POST') {
```

Once again, this page both displays and handles the HTML form. This is accomplished using a conditional that checks how the script is being requested.

*continues on next page*

**Script 11.6** continued

```
61     } else { // Forgot a field.  
62         print '<p class="error">Please go back and try again!</p>';  
63     }  
64  
65 } else { // Display the form.  
66  
67 // Leave PHP and display the form:  
68 ?>  
69  
70 <form action="register.php" method="post">  
71     <p>Username: <input type="text" name="username" size="20" /></p>  
72     <p>Password: <input type="password" name="password1" size="20" /></p>  
73     <p>Confirm Password: <input type="password" name="password2" size="20" /></p>  
74     <input type="submit" name="submit" value="Register" />  
75 </form>  
76  
77 <?php } // End of submission IF. ?>  
78 </body>  
79 </html>
```

4. Validate the registration information:

```
$problem = FALSE;  
if (empty($_POST['username'])) {  
    $problem = TRUE;  
    print '<p class="error">Please  
→ enter a username!</p>';  
}  
if (empty($_POST['password1'])) {  
    $problem = TRUE;  
    print '<p class="error">Please  
→ enter a password!</p>';  
}  
if ($_POST['password1'] != $_POST  
→ ['password2']) {  
    $problem = TRUE;  
    print '<p class="error">Your  
→ password did not match your  
→ confirmed password!</p>';  
}
```

The registration form is a simpler version of earlier registration forms developed in this book. The same validation process you previously developed is used to check the submitted username and passwords. The `$problem` variable is used as a flag to indicate whether a problem occurred.

5. Check for problems:

```
if (!{$problem}) {
```

Again, the `$problem` variable lets you know if it's okay to register the user. If no problems occurred, it's safe to continue.

6. Confirm that the `users.txt` file is writable:

```
if (is_writable($file)) {
```

Like before, the data file is first confirmed as writable in a conditional, so that the script can respond accordingly. If you're not using PHP 5.1 or greater, use

an `fopen()` line as the condition instead (see earlier in the chapter).

7. Create the data to be written to the file, and then write it:

```
$subdir = time() . rand(0, 4596);  
$data = $_POST['username'] . "\t".  
→ md5(trim($_POST['password1'])) .  
→ "\t" . $subdir . PHP_EOL;  
file_put_contents($file, $data,  
→ FILE_APPEND | LOCK_EX);
```

The name of the directory being created is a number based on the time the user registered and a random value. This system helps to guarantee that the directory created is unique and has a valid name.

Instead of storing a single string as you previously have, this script stores three separate pieces of information: the user's name; an encrypted version of the password (using the `md5()` function; see the first tip); and the directory name, created in the preceding line. The password is trimmed first, to get rid of any extraneous spaces.

To distinguish between the pieces of information, you insert a tab (created using the `\t` code). A newline is used to mark the end of the line, again using the `PHP_EOL` constant.

8. Create the user's directory, and print a message:

```
mkdir ($dir . $subdir);  
print '<p>You are now  
→ registered!</p>';
```

The `mkdir()` function creates the directory in the `users` directory. The directory is named whatever random number was generated earlier.

# Register

You could not be registered due to a system error.

**A** The result if the `users.txt` file is not writable.

# Register

Please enter a username!

Please enter a password!

Please go back and try again!

**B** The script reports any form validation errors.

**9.** Complete the conditionals:

```
 } else { // Couldn't write to  
 → the file.  
     print '<p class="error">You  
 → could not be registered due  
 → to a system error.</p>';  
 }  
 } else { // Forgot a field.  
     print '<p class="error">Please  
 → go back and try again!</p>';  
 }
```

The first `else` completes the conditional if the script couldn't open the `users.txt` file for writing **A**. The second `else` completes the conditional if the user failed to complete the form properly **B**.

**10.** Add an `else` clause to the main conditional, and exit out of PHP:

```
} else {  
?>
```

Unlike the previous examples in this chapter, this PHP script first displays the form and then handles it. Whereas the other scripts would then display the form again, this one does not, as the form creation is part of an `else` statement. Because the rest of the page is just HTML, you exit out of PHP to create the form.

**11.** Display the HTML form:

```
<form action="register.php"  
→ method="post">  
    <p>Username: <input type="text"  
    → name="username" size="20" /></p>  
    <p>Password: <input type=  
    → "password" name="password1"  
    → size="20" /></p>  
    <p>Confirm Password: <input  
    → type="password" name=  
    → "password2" size="20" /></p>  
    <input type="submit" name=  
    → "submit" value="Register" />  
</form>
```

*continues on next page*

**12.** Complete the main conditional:

```
</php } // End of submission IF. ?>
```

This final closing curly bracket closes the main submit conditional. For it to work, a new PHP section must first be created.

**13.** Complete the HTML page:

```
</body>
</html>
```

**14.** Save the file as **register.php**, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **C** and **D**.

**15.** If you want, open the **users.txt** file in your text editor to see its contents (**Script 11.7**).

**TIP** The `md5()` function creates a *hash*: a mathematically calculated representation of a string. So this script doesn't actually store the password but a representation of that password (in theory, no two strings would have the same `md5()` value). You'll soon see how the hashed password is used by a login script.

**TIP** You can also ensure that the page worked as it should by looking in the **users** directory for the new subdirectories.

**TIP** The `rmdir()` function deletes an existing directory, assuming PHP has permission to do so.

**Script 11.7** The **users.txt** file lists three tab-delimited fields of information: the username, a scrambled version of the user's password, and their associated directory name.

1	larry	1a1dc91c907325c69271ddf0c944bc72	12936537501284
2	john	0cc175b9c0f1b6a831c399e269772661	1293653788455
3	paul	92eb5ffee6ae2fec3ad71c777531578f	12936537931717
4	george	4a8a08f09d37b73795649038408b5f33	1293653799360
5	ringo	8277e0910d750195b448797616e091ad	12936538042144

## Register

Username:

Password:

Confirm Password:

**C** The registration form is quite basic but serves its purpose.

## Register

You are now registered!

**D** This is what the user sees if the registration process worked.

# Reading Files Incrementally

In the `view_quote.php` script (Script 11.3), an entire file was read into an array using the `file()` function. But what if you want to read in only a little of the file at a time? Then you need to use the `fgets()` function.

The `fgets()` function reads a string of a certain length. It's most often placed in a `while` loop that uses the `feof()` function to make sure the end of the file hasn't been reached. For example:

```
$fp = fopen($file, 'rb');
while (!feof($fp)) {
    $string = fgets($fp, 1024);
}
fclose ($fp);
```

With that code, 1,023 bytes of data at a time will be read in, as `fgets()` always reads 1 byte less than the length you specify. Or `fgets()` will stop reading once it reaches the end of the line or the end of the file. The second argument is optional, but if present, it should be a number larger than a single line of text in the file. If you want to just read to the end of the line, omit the length argument:

```
$string = fgets($fp);
```

In an example where the data is stored in a delineated format (commonly using a comma, hence a CSV—comma-separated values—format), you can use the `fgetcsv()` function instead. It breaks the string into parts, using the marked separator, and returns an array:

```
$array = fgetcsv($fp, length,
→ delimiter);
$array = fgetcsv($fp, 1024);
```

Again, the preceding function call returns 1,023 bytes of data, but it breaks the string into an array using the default delimiter—a comma—as an indicator of where to make elements. This function is the equivalent of using the `fgets()` and `explode()` functions together. If you provide a delimiter argument, you can change what character is used to delineate the data.

Finally, because these functions rely on identifying the end of a line, it's a smart extra precaution to enable PHP's `auto_detect_line_endings` setting. You can do so using the `ini_set()` function:

```
ini_set('auto_detect_line_endings', 1);
```

As an example, let's create a login script that uses the `users.txt` file created in the preceding example. It will continue to read a file until a matching username/password combination has been found.

## To read a file incrementally:

1. Begin a new PHP document in your text editor or IDE, to be named **login.php** (Script 11.8):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
  <title>Login</title>
</head>
<body>
  <h1>Login</h1>
```

2. Create the PHP section and identify the file to use:

```
<?php // Script 11.8 - login.php
$file = '../users/users.txt';
```

The value of **\$file** should be the same as that in **register.php**.

3. Check whether the form has been submitted:

```
if ($_SERVER['REQUEST_METHOD'] ==
→ 'POST') {
```

4. Create a dummy variable to use as a flag:

```
$loggedin = FALSE;
```

The **\$loggedin** variable is used to indicate whether the user entered the correct username/password combination. When the script first starts, it's assumed that the user has not entered the correct values.

*continues on page 380*

**Script 11.8** The **login.php** script uses the information stored in **users.txt** (created by Script 11.6) to validate a user.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6    <title>Login</title>
7  </head>
8  <body>
9    <h1>Login</h1>
10   <?php // Script 11.8 - login.php
11   /* This script logs a user in by check the stored values in text file. */
12
13  // Identify the file to use:
14  $file = '../users/users.txt';
15
16  if ($_SERVER['REQUEST_METHOD'] == 'POST') { // Handle the form.
17
18    $loggedin = FALSE; // Not currently logged in.
19
20    // Enable auto_detect_line_settings:
21    ini_set('auto_detect_line_endings', 1);
22
```

*code continues on next page*

**Script 11.8** continued

```
23 // Open the file:  
24 $fp = fopen($file, 'rb');  
25  
26 // Loop through the file:  
27 while ( $line = fgetcsv($fp, 200, "\t") ) {  
28  
29     // Check the file data against the submitted data:  
30     if ( ($line[0] == $_POST['username']) AND ($line[1] == md5(trim($_POST['password']))) ) {  
31  
32         $loggedin = TRUE; // Correct username/password combination.  
33  
34         // Stop looping through the file:  
35         break;  
36  
37     } // End of IF.  
38  
39 } // End of WHILE.  
40  
41 fclose($fp); // Close the file.  
42  
43 // Print a message:  
44 if ($loggedin) {  
45     print '<p>You are now logged in.</p>';  
46 } else {  
47     print '<p style="color: red;">The username and password you entered do not match those on  
48     file.</p>';  
49 }  
50 } else { // Display the form.  
51  
52 // Leave PHP and display the form:  
53 ?>  
54  
55 <form action="login.php" method="post">  
56     <p>Username: <input type="text" name="username" size="20" /></p>  
57     <p>Password: <input type="password" name="password" size="20" /></p>  
58     <input type="submit" name="submit" value="Login" />  
59 </form>  
60  
61 <?php } // End of submission IF. ?>  
62  
63 </body>  
64 </html>
```

5. Open the file for reading:

```
ini_set('auto_detect_line_
→ endings', 1);
$fp = fopen($file, 'rb');

Unlike the file() function, the
fgetcsv() function requires a file
pointer. Therefore, the users.txt file
must be opened with the fopen()
function, using the appropriate mode.
Here, that mode is rb, meaning the
file should be opened for reading in
a binary safe mode.

First, though, just to be safe, PHP's
auto_detect_line_endings setting
is enabled.
```

6. Loop through each line of the file:

```
while ( $line = fgetcsv($fp,
→ 200, "\t") ) {

This while loop reads another
200 bytes or one line of the file—
whichever comes first—with each
iteration. The data being read is broken
into an array, using the tab to indicate
the separate elements.
```

Because the **users.txt** file stores its data in the format *username tab password tab directory newline*, the **\$line** array contains three elements indexed at 0 (*username*), 1 (*password*), and 2 (*directory*).

7. Check the submitted values against the retrieved values:

```
if ( ($line[0] == $_POST['username'])
→ AND ($line[1] == md5(trim($_POST
→ ['password'])))) ) {
```

This two-part conditional checks the submitted username against the stored username (**\$line[0]**) and checks

the submitted password against the stored password (**\$line[1]**). However, because the stored password was scrambled using **md5()**, apply **md5()** to the submitted value and then make the comparison.

8. If a match was found, set **\$loggedin** to **TRUE** and exit the **while** loop:

```
$loggedin = TRUE;
break;
```

If the conditional is **TRUE**, the submitted username and password match those on file. In this case, the **\$loggedin** flag is set to **TRUE**, and the **break** statement is used to exit the **while** loop. The benefit of this system is that only as much of the file is read as is required to find a match.

9. Close the conditional, the **while** loop, and the file:

```
}
```

```
}
```

```
fclose ($fp);
```

10. Print a message to the user:

```
if ($loggedin) {
    print '<p>You are now logged
→ in.</p>';
} else {
    print '<p style="color: red;">
→ The username and password you
→ entered do not match those on
→ file.</p>';
}
```

Using the **\$loggedin** flag, the script can now say whether the user is “logged in.” You could add some functionality to this process by storing the user’s directory in a session and then sending them to a file-upload page.

## Login

Username:

Password:

**A** The login form takes a username and password.

## Login

You are now logged in.

**B** If the submitted username and password match those previously recorded, the user sees this message.

## Login

The username and password you entered do not match those on file.

**C** The result if the user submits a username and password combination that doesn't match the values previously recorded.

**11.** Continue the main submit conditional, and exit PHP:

```
} else {  
?>
```

**12.** Create the HTML form:

```
<form action="login.php"  
→ method="post">  
  <p>Username: <input type="text"  
  → name="username" size="20" /></p>  
  <p>Password: <input type=  
  → "password" name="password"  
  → size="20" /></p>  
  <input type="submit" name=  
  → "submit" value="Login" />  
</form>
```

**13.** Return to PHP to complete the main conditional:

```
<?php } // End of submission IF. ?>
```

**14.** Finish the HTML page:

```
</body>  
</html>
```

**15.** Save the file as `login.php`, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **A**, **B**, and **C**.

**TIP** As of PHP 4.3, the `fgetcsv()` function takes another optional argument: the string being used to enclose the elements.

**TIP** As of PHP 5.3, the `fgetcsv()` function takes another optional argument: the character used to escape problematic characters. Naturally, the default escape character is the backslash.

**TIP** If a line is blank, `fgetcsv()` returns an array containing a single null value.

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- What version of PHP are you running?
- What steps did you need to take to make a file or directory writable for your server?
- What is the *Web root directory* (as a concept)? What is the Web root directory for your Web site (whether on your own computer or on a live server)?
- What are two ways you can write data to a file?
- How do you append new data to existing files (as opposed to replacing any existing data)?
- How do you ensure that new data is placed on its own line?
- In order for a form to accept file uploads, what attributes must the opening `form` tag have?
- In what variable will a PHP script be able to access an uploaded file? What function is used to move the file to its final destination on the server?
- How does the `fgetcsv()` function differ from `file()` or `file_get_contents()`?

## Pursue

Check out some of the other file system related functions in the PHP manual (start at [www.php.net/manual/en/ref.filesystem.php](http://www.php.net/manual/en/ref.filesystem.php)).

Modify `add_quote.php` so that it confirms that the `quotes.txt` file exists, prior to checking if it's writable.

Make the text area in `add_quote.php` sticky.

Change `add_quote.php` so that it takes the quotation and the attribution as separate inputs and writes them separately to the text file. Then modify `view_quote.php` so that it retrieves and displays both pieces of data.

Modify `view_quote.php` so that it displays two random quotations.

Update `upload_file.php`, making it confirm that the `uploads` directory is writable.

View the PHP manual page for the `glob()` function to see what it can do and how to use it.

Update `list_dir.php` to display other information about the files in a directory.

- Create a system to guarantee unique usernames in `register.php`. Hint: Before you attempt to create the directory, use PHP to check your list of existing usernames for a match to the just-registered name. If no match is found, the new name is acceptable. If the username is already in use, then PHP can create an error message requesting a new username.
- Use the combination of writing to and reading from text files, plus either sessions or cookies, to create a real registration and login system.

# 12

# Intro to Databases

The Internet wouldn't be where it is today if not for the existence of databases. In fact, PHP probably wouldn't be as popular or as useful if not for its built-in support for numerous types of databases. This chapter will use MySQL as the example database management system (DBMS). Although MySQL—which is available for most platforms—may not be as powerful as the highest-end commercial database servers, MySQL has enough speed and functionality for most purposes. And its price—free for most uses—makes it the common choice for Web development.

This chapter walks through the development of a simple database for running a basic blog. Although you'll learn enough here to get started working with database, you will want to visit Appendix B, “Resources and Next Steps,” once you've finished this chapter to find some references where you can learn more about the topic.

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## In This Chapter

Introduction to SQL	334
Connecting to MySQL	336
MySQL Error Handling	340
Creating and Selecting a Database	343
Creating a Table	347
Inserting Data into a Database	352
Securing Query Data	358
Retrieving Data from a Database	361
Deleting Data in a Database	366
Updating Data in a Database	372
Review and Pursue	378

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# Introduction to SQL

A *database* is a collection of tables (made up of columns and rows) that stores information. Most databases are created, updated, and read using SQL (Structured Query Language). There are surprisingly few commands in SQL (**Table 12.1** lists the seven most important), which is both a blessing and a curse.

SQL was designed to be written a lot like the English language, which makes it very user friendly. But SQL is still extremely capable, even if it takes some thought to create more elaborate SQL statements with only the handful of available terms. In this chapter you'll learn how to execute all the fundamental SQL commands.

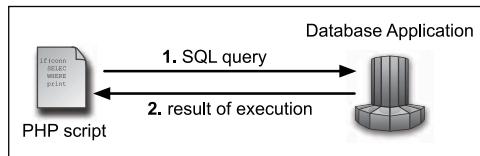
For people new to PHP, confusion can stem from PHP's relationship to HTML (i.e., **PHP can be used to generate HTML**, but **PHP code is never executed in the Web browser**). When you incorporate a database, the relationships can become even fuzzier. The process is quite simple: **PHP is used to send SQL statements to the database application, where they are executed**. The result of the execution—the creation of a table, the insertion of a record, the retrieval of some records, or even an error—is then returned by the database to the PHP script **A**.

With that in mind, PHP's `mysql_query()` function will be the most-used tool in this chapter. It sends an SQL command to MySQL:

```
$result = mysql_query($SQL command,  
                      database connection);
```

**TABLE 12.1** Common SQL Commands

Command	Purpose
ALTER	Modifies an existing table
CREATE	Creates a database or table
DELETE	Deletes records from a table
DROP	Deletes a database or table
INSERT	Adds records to a table
SELECT	Retrieves records from a table
UPDATE	Updates records in a table



**A** PHP will be used to send an SQL statement to MySQL. MySQL will execute the statement and return the result to the PHP script.

## MySQL Support in PHP

Support for the MySQL database server has to be built into PHP in order for you to use PHP's MySQL-specific functions. For most PHP installations, this should already be the case. You can confirm support for MySQL by calling the `phpinfo()` function, which reveals details of your installation.

When working through this chapter, if you see an error message saying ... *undefined function mysql\_...*, this means the version of PHP you're using doesn't have support for MySQL (or you misspelled the function name, which you should also check).

Enabling support for MySQL takes a little effort, but it can be done if you have administrative-level control over your server. For more information, see the PHP manual.

I start this chapter with this prologue because the addition of SQL and MySQL to the Web development process will complicate things. When problems occur—and undoubtedly they will—you'll need to know how solve them.

When a PHP script that interacts with a MySQL database does not perform as expected, the first step is to determine if the problem is in the query itself—number 1 in A—or in the results of the query—number 2 in A. To take this step, you can start by printing out the query being executed, using code such as the following:

```
print $query;
```

Assuming that `$query` represents the complete SQL command, often containing the values of PHP variables, this one, simple line will reveal to you the actual SQL statement being run.

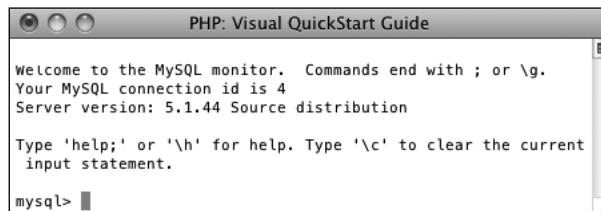
Next, you would take the printed query and execute it using another application. The two most common options are:

- The MySQL client B, a command-line tool for interacting with MySQL
- phpMyAdmin C, a PHP-based MySQL interface

One or both of these should be provided to you by your hosting company or the software you installed on your own computer. For a demonstration of using each, see Appendix A, “Installation and Configuration.”

**TIP** Technically, a DBMS, or database application, is the software that interfaces with the database proper. However, most people use the terms *database* and *DBMS* synonymously.

**TIP** Lots of other applications are available for interacting with MySQL aside from the MySQL client and phpMyAdmin. Some are free, and others cost. A quick search using Google for *MySQL, admin, and your operating system* should turn up some interesting results.



B The MySQL client comes with the MySQL database software and can be used to execute queries without the need for a PHP script.

A screenshot of the phpMyAdmin interface for the "myblog" database. The left sidebar shows "Database myblog (1)". The main area shows a table named "entries" with one row. The table structure is displayed in a grid with columns: Action, Records, Type, Collation, Size, and Overhead. Below the table, there are buttons for Print view and Data Dictionary, and a form for creating a new table with fields for Name and Number of fields.

C phpMyAdmin is perhaps the most popular software written in PHP. It provides a Web-based interface for a MySQL database.

# Connecting to MySQL

When you worked with text files in Chapter 11, “Files and Directories,” you saw that some functions, such as `fwrite()` and `fgets()`, require that you first create a file pointer using `fopen()`. This pointer then acts as a reference to that open file. You use a similar process when working with databases. First, you have to establish a connection to the database server (in this case, MySQL). This connection is then used as the access point for any future commands. The syntax for connecting to a database is

```
$dbc = mysql_connect(hostname,  
username, password);
```

The database connection (assigned to `$dbc` in the above) is established using at least three arguments: the host, which is almost always `localhost`; the username; and the password for that username.

If you’re using a database through a hosting company, the company will most likely provide you with the host name, username, and password to use. If you’re running MySQL on your own computer, see Appendix A to learn how you create a user.

Once you’re done working with a database, you can close the connection, just as you’d close an open file:

```
mysql_close($dbc);
```

The PHP script will automatically close the database connection when the script terminates, but it’s considered good form to formally close the connection once it’s no longer needed.

For the first example of this chapter, you’ll write a simple script that attempts to connect to MySQL. Once you have this connection working, you can proceed through the rest of the chapter.

**Script 12.1** Being able to connect to the MySQL server is the most important step. This script tests that process.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
2   1.0 Transitional//EN"
3   "http://www.w3.org/TR/xhtml1/DTD/
4   xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/
6   xhtml" xml:lang="en" lang="en">
7  <head>
8    <meta http-equiv="content-type"
9     content="text/html; charset=utf-8" />
10   <title>Connect to MySQL</title>
11 </head>
12 <body>
13 <?php // Script 12.1 - mysql_connect.php
14 /* This script connects to the MySQL
15   server. */
16
17 // Attempt to connect to MySQL and print
18 // out messages:
19 if ($dbc = mysql_connect('localhost',
20   'username', 'password')) {
21
22   print '<p>Successfully connected to
23   MySQL!</p>';
24
25 } else {
26
27   print '<p style="color: red;">Could
28   not connect to MySQL.</p>';
29
30 }
31
32 ?>
33 </body>
34 </html>
```

## To connect to MySQL:

1. Begin a new PHP document in your text editor or IDE, to be named `mysql_connect.php` (Script 12.1):  

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
  <title>Connect to MySQL</title>
</head>
<body>
```
2. Start the section of PHP code:  

```
<?php // Script 12.1 -
→ mysql_connect.php
```
3. Connect to MySQL, and report on the results:  

```
if ($dbc = mysql_connect
→ ('localhost', 'username',
→ 'password')) {
  print '<p>Successfully connected
→ to MySQL!</p>';
  mysql_close($dbc);
} else {
  print '<p style="color:
→ red;">Could not connect to
→ MySQL.</p>';
}
```

By placing the connection attempt as the condition in an `if-else` statement, you make it easy to report on whether the connection worked.

This chapter will continue to use `username` and `password` as values.

*continues on next page*

For your scripts, you'll need to replace these with the values provided by your Web host or set them when you add a user using the steps outlined in Appendix A.

If a connection was established, a positive message is printed and then the connection is closed. Otherwise, a message stating the opposite is printed, and there is no need to close the database connection (because it wasn't opened).

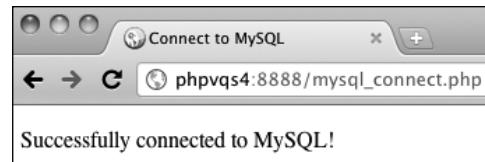
4. Complete the PHP code and the HTML page:

```
?>  
</body>  
</html>
```

5. Save the file as `mysql_connect.php`, place it in the proper directory of your PHP-enabled computer, and test it in your Web browser **A**.

If you see results like those in **B**, double-check the username and password values. They should match up with those provided to you by your Web host or those you used to create the user. You can always test your connection username and password by using them in the MySQL client (again, see Appendix A).

If you see *call to undefined function mysql\_connect...*, your version of PHP doesn't support MySQL (see the "MySQL Support in PHP" sidebar).



**A** If PHP has support for MySQL and the username/password/host combination you used was correct, you should see this simple message.



**B** If PHP couldn't connect to MySQL, you'll probably see something like this. The warning message may or may not appear, depending on your error management settings.

## MySQL Extensions

PHP can communicate with MySQL using different extensions. The first, used in this chapter, is the “standard” MySQL extension. It has been around for years and works with all versions of PHP and MySQL. All of the standard MySQL extension functions begin with *mysql*\_.

The second extension is called *MySQLi* (Improved MySQL Extension). This extension was added in PHP 5 and can be used with MySQL 4.1 or greater. These functions all begin with *mysqli*\_ and take advantage of some of the added features in MySQL. If possible, it’s preferable to use the *MySQLi* functions, but as the older extension is more universally enabled, this book uses it exclusively. See the PHP manual or my book *PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide* (Peachpit Press, 2007) for details on the *MySQLi* extension.

**TIP** The database connection (`$dbc` in this case) in most `mysql_something()` functions is optional. Regardless of that, in this book you’ll see it always used, as it’s not optional in the `mysqli_something()` functions and you should be prepared to provide the database connection when you move to those functions later (see the “MySQL Extensions” sidebar).

**TIP** The `localhost` value is used as the hostname when both the PHP script and the MySQL database reside on the same computer. You can use PHP to connect to a MySQL database running on a remote server by changing the hostname in the PHP script and creating the proper permissions in MySQL.

**TIP** PHP has built-in support for most databases, including dBase, FilePro, SQLite, MySQL, Oracle, PostgreSQL, and Sybase. If you’re using a type of database that doesn’t have direct support—for example, Access or SQL Server—you’ll need to use PHP’s ODBC (Open Database Connectivity) functions along with that database’s ODBC drivers to interface with the database.

**TIP** The combination of using PHP and MySQL is so common that you may run across terms that identify servers configured with both PHP and MySQL: *LAMP*, *MAMP*, and *WAMP*. These stand for the operating system—Linux, Mac OS X, or Windows—plus the Apache Web server, the MySQL DBMS, and PHP.

**TIP** You’ll be working with MySQL, so all the functions you use in this chapter are MySQL specific. For example, to connect to a database in MySQL the proper function is `mysql_connect()`, but if you’re using PostgreSQL, you’d instead write `pg_connect()`. If you aren’t using a MySQL DBMS, use the PHP manual (available through [www.php.net](http://www.php.net)) to find the appropriate function names.

# MySQL Error Handling

Before this chapter gets too deep into working with MySQL, it would be best to discuss some error-handling techniques up front. Common errors you'll encounter are

- Failure to connect to MySQL
- Failure to select a database
- Inability to run a query
- No results returned by a query
- Data not inserted into a table

Experience will teach you why these errors normally occur, but immediately seeing what the problem is when running your scripts can save you much debugging time. To have your scripts give informative reports about errors that occur, use the `mysql_error()` function. This function returns a textual version of the error that the MySQL server returned.

Along with this function, you may want to use some PHP tools for handling errors. Specifically, the error suppression operator (@), when used preceding a function name, suppresses any error messages or warnings the function might invoke:

```
@function_name();
```

Note that this operator doesn't stop the error from happening; it just prevents the message from being immediately displayed. You'd use it in situations where you intend to handle the error yourself, should one occur.

## To use error handling:

1. Open `mysql_connect.php` (Script 12.1) in your text editor or IDE.
2. Suppress any PHP errors created by the `mysql_connect()` function by changing the `if` conditional as follows (Script 12.2):

```
if ($dbc = @mysql_connect  
→ ('localhost', 'username',  
→ 'password')) {
```

Rather than have PHP print out an error message when the `mysql_connect()` function backfires (B in the previous section), the message will be suppressed here using the `@` symbol. The errors still occur, but they're handled by the change made in the next step.

*continues on next page*

**Script 12.2** By adding error control to the script (the `@` symbol and the `mysql_error()` function), you can more purposefully address problems that occur.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
2   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">  
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">  
4  <head>  
5    <meta http-equiv="content-type" content="text/html; charset=utf-8" />  
6    <title>Connect to MySQL</title>  
7  </head>  
8  <body>  
9  <?php // Script 12.2 - mysql_connect.php #2  
10 /* This script connects to the MySQL server. */  
11  
12 // Attempt to connect to MySQL and print out messages:  
13 if ($dbc = @mysql_connect('localhost', 'username', 'password')) {  
14  
15   print '<p>Successfully connected to MySQL!</p>';  
16  
17   mysql_close($dbc); // Close the connection.  
18 } else {  
21   print '<p style="color: red;">Could not connect to MySQL:<br />' . mysql_error() . '</p>';  
22  
23 }  
24  
25 ?>  
26 </body>  
27 </html>
```

3. Add the `mysql_error()` function to the `print` statement in the `else` section:

```
print '<p style="color: red;">Could  
→ not connect to MySQL:<br />' .  
→ mysql_error() . '</p>';
```

Instead of printing a message or relying on whatever error PHP kicks out (see **B** in the previous section), the script now prints the MySQL error within this context. You accomplish this by printing some HTML concatenated with the `mysql_error()` function.

You should note that the `mysql_error()` function, in this case, is not provided with the database connection—`$dbc`—as an argument, since no database connection was made.

4. Save the file and test it again in your Web browser **A**.

If there was a problem, this result now looks better than what would have been shown previously. If the script connected, the result is like that shown in **A** in the previous section, because neither of the error-management tools is involved.

**TIP** In this chapter, error messages are revealed to assist in the debugging process. Live Web sites should not have this level of explicit error messages shown to the user.

**TIP** You can use the `@` symbol to suppress errors, notices, or warnings stemming from any function, not just a MySQL-related one. For example:

```
@include('./filename.php');
```

**TIP** You may also see code where `die()`, which is an alias for `exit()`, is called when a connection error occurs. The thinking is that since a database connection cannot be made, there's no point in continuing. In my opinion, that's too heavy-handed of an approach.



**A** Using PHP's error-control functions, you can adjust how errors are handled.

# Creating and Selecting a Database

Before a PHP script can interact with a database, the database must first be selected. Of course, in order for you to select a database, it must exist. You can create a database using PHP, the MySQL client, phpMyAdmin, or any number of tools, as long as the MySQL hostname/username/password combination you are using has permission to do so.

Database permissions are a bit more complicated than file permissions, but you need to understand this: Different types of users can be assigned different database capabilities. For example, one DBMS user may be able to create new databases and delete existing ones (you may have dozens of databases in your DBMS), but a lower-level user may only be able to create and modify tables within a single database. The most basic user may just be able to read from, but not modify, tables.

If you're using PHP and MySQL for a live, hosted site, the hosting company will most likely give you the second type of access—control over a single database but not

the DBMS itself—and establish the initial database for you. If you're working on your own server or have administrative access, you should have the capability to create new users and databases.

To create a database with PHP, you use the `mysql_query()` function to execute a `CREATE DATABASE databasename` SQL command:

```
mysql_query('CREATE DATABASE somedb',  
→ $dbc);
```

Once you've done this, you can select the database using `mysql_select_db()`:

```
mysql_select_db('somedb', $dbc);
```

Note that you have to create a database only once, but it must always be selected before any other queries are run on it. In other words, some readers will need to perform the first step, but every reader must take the second step with every PHP script.

In this example, you'll create a new database and then select it. To repeat, creating a database requires that you have administrator access. If your Web host restricts your access, the hosting company should create the initial database for you upon request; you can just write the second part of this script, which selects the database.

## To create and select a database:

1. Open `mysql_connect.php` (Script 12.2) in your text editor or IDE.
2. After the first `print` statement, create the new database, if necessary (Script 12.3):

```
if (@mysql_query('CREATE DATABASE  
→ myblog', $dbc)) {  
    print '<p>The database has been  
→ created!</p>';  
} else {  
    print '<p style="color: red;">  
→ Could not create the database  
→ because:<br />' .  
→ mysql_error($dbc) . '</p>');  
}
```

If you need to create the database, use this construct to handle the task

**Script 12.3** Creating a new database consists of three steps: connecting to the database, running a `CREATE DATABASE` query using the `mysql_query()` function, and then closing the connection.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
2  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">  
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">  
4  <head>  
5      <meta http-equiv="content-type" content="text/html; charset=utf-8" />  
6      <title>Create the Database</title>  
7  </head>  
8  <body>  
9  <?php // Script 12.3 - create_db.php  
10 /* This script connects to the MySQL server. It also creates and selects the database. */  
11  
12 // Attempt to connect to MySQL and print out messages:  
13 if ($dbc = @mysql_connect('localhost', 'username', 'password')) {  
14  
15     print '<p>Successfully connected to MySQL!</p>';  
16  
17     // Try to create the database:  
18     if (@mysql_query('CREATE DATABASE myblog', $dbc)) {  
19         print '<p>The database has been created!</p>';  
20     } else { // Could not create it.  
21         print '<p style="color: red;">Could not create the database because:<br />' .  
22         mysql_error($dbc) . '</p>';  
23     }
```

*code continues on next page*

cleanly and effectively. The query—`CREATE DATABASE myblog`—is run using the `mysql_query()` function. The `@` symbol is used to suppress any error messages, which are instead handled by `print` in conjunction with the `mysql_error()` function in the `else` clause.

Note that this invocation of `mysql_error()` can be provided with the specific database connection: `$dbc`.

If the database has already been created for you, skip this step.

### 3. Attempt to select the database:

```
if (@mysql_select_db('myblog',
→ $dbc)) {
    print '<p>The database has been
→ selected!</p>';
} else {
    print '<p style="color: red;">
→ Could not select the database
→ because:<br />' .
→ mysql_error($dbc) . '.</p>';
}
```

*continues on next page*

#### Script 12.3 *continued*

```
24     // Try to select the database:
25     if (@mysql_select_db('myblog', $dbc)) {
26         print '<p>The database has been selected!</p>';
27     } else {
28         print '<p style="color: red;">Could not select the database because:<br />' .
→ mysql_error($dbc) . '.</p>';
29     }
30
31     mysql_close($dbc); // Close the connection.
32
33 } else {
34
35     print '<p style="color: red;">Could not connect to MySQL:<br />' . mysql_error() . '.</p>';
36
37 }
38
39 ?>
40 </body>
41 </html>
```

This conditional has the same structure as that in Step 2. If PHP can select the database, a message is printed. If it can't select the database, the specific MySQL error will be displayed instead.

**Every PHP script that runs queries on a database must connect to MySQL and select the database in order to work.**

4. If you want, change the page title to reflect this script's new purpose:

```
<title>Create the Database</title>
```

5. Save your script as `create_db.php`, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **A** and **B**.

**TIP** You probably won't create databases with any frequency and may not normally do so using a PHP script. Still, this example demonstrates both how you execute simple queries using PHP as well as the SQL command needed to create a database.

**TIP** You haven't done so in these examples, but in general it's a good idea to set your database information—hostname, username, password, and database name—as variables or constants. Then you can plug them into the appropriate functions. By doing so, you can separate the database specifics from the functionality of the script, allowing you to easily port that code to other applications.

Successfully connected to MySQL!

The database has been created!

The database has been selected!

**A** If the database could be created and selected, you'll see this result in the Web browser.

Successfully connected to MySQL!

Could not create the database because:  
Access denied for user 'username'@'localhost' to database 'myblog'.

Could not select the database because:  
Unknown database 'myblog'.

**B** If the MySQL user doesn't have the authority to create a database, you'll see a message like this. A similar result will occur if the user doesn't have permission to select the database.

# Creating a Table

Once you've created and selected the initial database, you can begin creating individual tables in it. A database can consist of multiple tables, but in this simple example you'll create one table in which all the chapter's data will be stored.

To create a table in the database, you'll use SQL—the language that databases understand. Because SQL is a lot like spoken English, the proper query to create a new table reads like this:

```
CREATE TABLE tablename (column1  
definition, column2 definition,  
etc.)
```

For each column, separated by commas, you first indicate the column name and then the column type. Common types are **TEXT**, **VARCHAR** (a variable number of characters), **DATETIME**, and **INT** (integer).

Because it's highly recommended that you create a column that acts as the *primary key* (a column used to refer to each row), a simple **CREATE** statement could be

```
CREATE TABLE my_table (  
id INT PRIMARY KEY,  
information TEXT  
)
```

A table's primary key is a special column of unique values that is used to refer to the table's rows. The database makes an index of this column in order to more quickly navigate through the table. A table can have only one primary key, which you normally set up as an automatically incremented column of integers. The first row has a key of 1, the second has a key of 2, and so forth. Referring back to the key always retrieves the values for that row.

You can visit the MySQL Web site for more information on SQL and column definitions. By following the directions in this section, though, you should be able to accomplish some basic database tasks. The table that you'll create in this example is represented by **Table 12.2**.

In this example, you'll create the database table that will be used to store information submitted via an HTML form. In the next section of the chapter, you'll write the script that inserts the submitted data into the table created here.

---

**TABLE 12.2** The entries Table

Column Name	Column Type
<b>entry_id</b>	Positive, non-null, automatically incrementing integer
<b>title</b>	Text up to 100 characters in length
<b>entry</b>	Text of any length
<b>date_entered</b>	A timestamp including both the date and the time the row was added

---

## To create a new table:

1. Begin a new PHP document in your text editor or IDE, to be named

`create_table.php (Script 12.4):`

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="content-type"
    → content="text/html;
    → charset=utf-8" />
  <title>Create a Table</title>
</head>
<body>
```

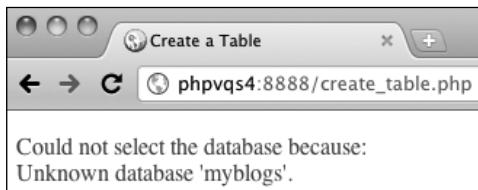
**Script 12.4** To create a database table, define the appropriate SQL statement and then invoke the `mysql_query()` function.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6      <title>Create a Table</title>
7  </head>
8  <body>
9  <?php // Script 12.4 - create_table.php
10 /* This script connects to the MySQL server, selects the database, and creates a table. */
11
12 // Connect and select:
13 if ($dbc = @mysql_connect('localhost', 'username', 'password')) {
14
15     // Handle the error if the database couldn't be selected:
16     if (!@mysql_select_db('myblog', $dbc)) {
17         print '<p style="color: red;">Could not select the database because:<br />' .
18             mysql_error($dbc) . '.</p>';
19         mysql_close($dbc);
20         $dbc = FALSE;
21     }
22 } else { // Connection failure.
23     print '<p style="color: red;">Could not connect to MySQL:<br />' . mysql_error() . '.</p>';
24 }
```

*code continues on next page*

#### Script 12.4 continued

```
25
26 if ($dbc) {
27
28     // Define the query:
29     $query = 'CREATE TABLE entries (
30         entry_id INT UNSIGNED NOT NULL
31         AUTO_INCREMENT PRIMARY KEY,
32         title VARCHAR(100) NOT NULL,
33         entry TEXT NOT NULL,
34         date_entered DATETIME NOT NULL
35     )';
36
37     // Execute the query:
38     if (@mysql_query($query, $dbc)) {
39         print '<p>The table has been
40             created!</p>';
41     } else {
42         print '<p style="color: red;">
43             Could not create the table
44             because:<br /> .
45             mysql_error($dbc) . '</p>
46             <p>The query being run was: ' .
47             $query . '</p>';
48     }
49
50     mysql_close($dbc); // Close the
51     connection.
52
53 }
54 ?>
55 </body>
56 </html>
```



**A** Between the MySQL error message and printing out the query being executed, you should be able to figure out what the problem is if the script does not work properly.

2. Begin a section of PHP code:

```
<?php // Script 12.4 -
→ create_table.php
```

3. Connect to the MySQL server, and select the database:

```
if ($dbc = @mysql_connect
→ ('localhost', 'username',
→ 'password')) {
    if (!@mysql_select_db('myblog',
→ $dbc)) {
        print '<p style="color:
→ red;">Could not select the
→ database because:<br />' .
→ mysql_error($dbc) . '</p>';
        mysql_close($dbc);
        $dbc = FALSE;
    }
} else {
    print '<p style="color:
→ red;">Could not connect to
→ MySQL:<br />' . mysql_error()
→ . '</p>';
```

}

This is an alternative version of the code used in the preceding script. The main difference is that no messages are printed if each step was successful (hopefully you have connection and database selection working by this point).

If for some reason a connection could not be made to the database, or the database could not be selected, then error messages will be displayed **A**. If a connection could be made but the database could not be selected, the connection is then closed, as the connection won't be useful. To indicate that scenario, the **\$dbc** variable, which had represented the connection, is set to **FALSE**, which will prevent the **CREATE** query from being executed (see Step 4).

*continues on next page*

4. Define the query for creating the table:

```
if ($dbc) {  
    $query = 'CREATE TABLE entries ('  
    entry_id INT UNSIGNED NOT NULL  
    → AUTO_INCREMENT PRIMARY KEY,  
    title VARCHAR(100) NOT NULL,  
    entry TEXT NOT NULL,  
    date_entered DATETIME NOT NULL  
' );
```

First, if `$dbc` still has a value, the table can be created. If not—meaning that no connection could be made or the database couldn't be selected—then none of the following code will be executed.

As for the query itself, let's break that into more recognizable parts. First, to create a new table, you write `CREATE TABLE tablename` (where `tablename` is replaced by the desired table name). Then, within parentheses, you list every column you want with each column separated by a comma. Your table and column names should be alphanumeric, with no spaces.

The first column in the table is called `entry_id`; it's an unsigned integer (`INT UNSIGNED`—which means that it can only be a positive whole number). By including the words `NOT NULL`, you indicate that this column must have a value for each row. The values automatically increase by 1 for each

row added (`AUTO INCREMENT`) and stand as the primary key.

The next two columns consist of text. One, called `title`, is limited to 100 characters. The second, `entry`, can be vast in size. Each of these fields is also marked as `NOT NULL`, making them required fields.

Finally, the `date_entered` column is a timestamp that marks when each record was added to the table.

5. Execute the query:

```
if (@mysql_query($query, $dbc)) {  
    print '<p>The table has been  
    → created.</p>';  
} else {  
    print '<p style="color:  
    → red;">Could not create the  
    → table because:<br />' .  
    → mysql_error($dbc) .  
    → '.</p><p>The query being run  
    → was: ' . $query . '</p>';  
}
```

To create the table, call the `mysql_query()` function using the `$query` variable as the first argument and the database connection as the second. If a problem occurred, the MySQL error is printed, along with the value of the `$query` variable. This last step—printing the actual query being executed—is a particularly useful debugging technique **B**.

Could not create the table because:  
CREATE command denied to user 'username'@'localhost' for table  
'entries'.

The query being run was: CREATE TABLE entries ( entry\_id INT  
UNSIGNED NOT NULL AUTO\_INCREMENT PRIMARY  
KEY, title VARCHAR(100) NOT NULL, entry TEXT NOT  
NULL, date\_entered DATETIME NOT NULL )

**B** If the query caused an error, the MySQL error will be reported and the query itself displayed (for debugging purposes).



- C If all went well, all you'll see is this message.

6. Close the database connection and complete the \$dbc conditional:

```
mysql_close($dbc);  
}
```

7. Complete the PHP code and the HTML page:

```
?>  
</body>  
</html>
```

8. Save the script as `create_table.php`, place it in the proper directory for your PHP-enabled server, and test it in your Web browser C.

**TIP** It's not necessary to write your SQL keywords in all capital letters as I do here, but doing so helps to distinguish the SQL terms from the table and column names.

**TIP** On larger Web applications, I highly recommend that you place the database connection and selection code (lines 13 through 24 here) in a separate file, located outside of the Web directory. Then, each page that requires the database can include this external file. You'll see an example of this in Chapter 13, "Putting It All Together."

**TIP** The `mysql_query()` function returns TRUE if a query was successfully run on a database. That result doesn't necessarily mean the desired result occurred.

**TIP** This chapter presents the basics of MySQL- and SQL-related knowledge (including column types). You'll want to check out other resources—listed in Appendix B—once you're comfortable with the fundamentals.

**TIP** You wouldn't normally use a PHP script to create a table, just as you wouldn't normally create a database using a PHP script, but when you're just starting with MySQL, this is an easy way to achieve the desired results.

# Inserting Data into a Database

As mentioned, this database will be used as a simple blog, an online journal. Blog entries—consisting of a title and text—will be added to the database using one page and then displayed on another page.

With the last script, you created the table, which consists of four columns: `entry_id`, `title`, `entry`, and `date_entered`. The process of adding information to a table is similar to creating the table itself in terms of which PHP functions you use, but the SQL query is different. To insert records, use the `INSERT` SQL command with either of the following syntaxes:

```
INSERT INTO tablename VALUES (value1,  
→ value2, value3, etc.)  
INSERT INTO tablename (column1_name,  
→ column2_name) VALUES (value1, value2)
```

The query begins with `INSERT INTO tablename`. Then you can either specify which columns you're inserting values for or not. The latter is more specific and is therefore preferred, but it can be tedious

if you're populating a slew of columns. In either case, you must be certain to list the right number and type of values for each column.

The values are placed within parentheses, with each value separated by a comma. Non-numeric values—strings and dates—need to be quoted, whereas numbers do not:

```
INSERT INTO example (name, age)  
→ VALUES ('Jonah', 1)
```

The query is executed using the `mysql_query()` function. Because `INSERT` queries can be complex, it makes sense to assign each query to a variable and send that variable to the `mysql_query()` function (as previously demonstrated).

To demonstrate, let's create a page that adds blog entries to the database. Like many of the examples in the preceding chapter, this one will both display and handle the HTML form. Before getting into the example, though, I'll say that this script knowingly has a security hole in it; it'll be explained and fixed in the next section of the chapter.

## Building on This Example

The focus in this chapter is on explaining and demonstrating the basics of using PHP with MySQL. This also includes the core components of SQL. However, this chapter's examples do a few things that you wouldn't want to do in a real site, such as allow anyone to insert, edit, and delete database records.

In the next chapter, a different example will be developed that is also database driven. That example will use cookies to restrict what users can do with the site.

## To enter data into a database from an HTML form:

1. Begin a new PHP document in your text editor or IDE, to be named **add\_entry**.

**php (Script 12.5):**

```
<!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" xml:lang="en"
→ lang="en">
<head>
    <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
    <title>Add a Blog Entry</title>
</head>
<body>
    <h1>Add a Blog Entry</h1>
```

*continues on next page*

**Script 12.5** The query statement for adding information to a database is straightforward enough, but be sure to match the number of values in parentheses to the number of columns in the database table.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6      <title>Add a Blog Entry</title>
7  </head>
8  <body>
9      <h1>Add a Blog Entry</h1>
10     <?php // Script 12.5 - add_entry.php
11     /* This script adds a blog entry to the database. */
12
13     if ($_SERVER['REQUEST_METHOD'] == 'POST') { // Handle the form.
14
15         // Connect and select:
16         $dbc = mysql_connect('localhost', 'username', 'password');
17         mysql_select_db('myblog', $dbc);
18
19         // Validate the form data:
20         $problem = FALSE;
21         if (!empty($_POST['title']) && !empty($_POST['entry'])) {
```

*code continues on next page*

2. Create the initial PHP section and check for the form submission:

```
<?php // Script 12.5 -
→ add_entry.php
if ($_SERVER['REQUEST_METHOD'] ==
→ 'POST') {
```

3. Connect to and select the database:

```
$dbc = mysql_connect('localhost',
→ 'username', 'password');
mysql_select_db('myblog', $dbc);
```

At this point, if you're running these examples in order, I'll assume you have a working connection and selection process down, so I'll dispense with all the conditionals and error reporting (mostly to shorten the script). If you have problems connecting to and selecting the database, apply the code already outlined in the chapter.

#### **Script 12.5 continued**

```
22      $title = trim(strip_tags($_POST['title']));
23      $entry = trim(strip_tags($_POST['entry']));
24  } else {
25      print '<p style="color: red;">Please submit both a title and an entry.</p>';
26      $problem = TRUE;
27  }
28
29  if (!$problem) {
30
31      // Define the query:
32      $query = "INSERT INTO entries (entry_id, title, entry, date_entered) VALUES
33      (0, '$title', '$entry', NOW())";
34
35      // Execute the query:
36      if (@mysql_query($query, $dbc)) {
37          print '<p>The blog entry has been added!</p>';
38      } else {
39          print '<p style="color: red;">Could not add the entry because:<br />' .
40          mysql_error($dbc) . '</p><p>The query being run was: ' . $query . '</p>';
41      }
42
43      mysql_close($dbc); // Close the connection.
44
45  } // End of form submission IF.
46
47 // Display the form:
48 ?>
49 <form action="add_entry.php" method="post">
50     <p>Entry Title: <input type="text" name="title" size="40" maxlength="100" /></p>
51     <p>Entry Text: <textarea name="entry" cols="40" rows="5"></textarea></p>
52     <input type="submit" name="submit" value="Post This Entry!" />
53 </form>
54 </body>
55 </html>
```

## Add a Blog Entry

Please submit both a title and an entry.

Entry Title:

Entry Text:

- A** The PHP script performs some basic form validation so that empty records are not inserted into the database.

4. Validate the form data:

```
$problem = FALSE;  
if (!empty($_POST['title']) &&  
    !empty($_POST['entry'])) {  
    $title = trim(strip_tags  
    → ($_POST['title']));  
    $entry = trim(strip_tags  
    → ($_POST['entry']));  
} else {  
    print '<p style="color:  
→ red;">Please submit both a  
→ title and an entry.</p>';  
    $problem = TRUE;  
}
```

Before you use the form data in an **INSERT** query, it ought to be validated. Just a minimum of validation is used here, guaranteeing that some values are provided. If so, new variables are assigned those values, after trimming away extraneous spaces and applying **strip\_tags()** (to prevent cross-site scripting attacks and other potential problems). If either of the values was empty, an error message is printed **A** and the **\$problem** flag variable is set to **TRUE** (because there is a problem).

5. Define the **INSERT** query:

```
if (!$problem) {  
    $query = "INSERT INTO entries  
    → (entry_id, title, entry,  
    → date_entered) VALUES  
    → (0, '$title', '$entry', NOW())";
```

The query begins with the necessary **INSERT INTO tablename** code. Then it lists the columns for which values will be submitted. After that is **VALUES**, followed by four values (one for each column, in order) separated by commas. When assigning this query to the **\$query** variable, use double quotation marks so that the values of the variables will

*continues on next page*

be automatically inserted by PHP. The `$title` and `$entry` variables are strings, so they must be placed within single quotation marks in the query itself.

Because the `entry_id` column has been set to `AUTO_INCREMENT`, you can use 0 as the value and MySQL will automatically use the next logical value for that column. To set the value of the `date_entered` column, use the MySQL `NOW()` function. It inserts the current time as that value.

6. Run the query on the database:

```
if (@mysql_query($query, $dbc)) {  
    print '<p>The blog entry has  
    → been added!</p>';  
} else {  
    print '<p style="color: red;">  
    → Could not add the entry  
    → because:<br />' . mysql_  
    → error($dbc) . '.</p><p>The  
    → query being run was: ' .  
    → $query . '</p>';  
}
```

The query, once defined, is run using the `mysql_query()` function. By calling this function as the condition of an `if-else` statement, you can print simple messages indicating the result of the query execution.

As an essential debugging tool, if the query didn't run properly, the MySQL error and the query being run are both printed to the Web browser ❸.

7. Close the `$problem` conditional, the database connection, and complete the main conditional and the PHP section:

```
} // No problem!  
mysql_close($dbc);  
} // End of form submission IF.  
?>
```

From here on out, the form will be displayed.

8. Create the form:

```
<form action="add_entry.php"  
→ method="post">  
    <p>Entry Title: <input type=  
    → "text" name="title" size="40"  
    → maxsize="100" /></p>  
    <p>Entry Text: <textarea  
    → name="entry" cols="40"  
    → rows="5"></textarea></p>  
    <input type="submit" name=  
    → "submit" value="Post This  
    → Entry!" />  
</form>
```

## Add a Blog Entry

Could not add the entry because:

You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 's January 1st, 2011, the first day of six weeks of writing the date incorrectly.' at line 1.

The query being run was: `INSERT INTO entries (entry_id, title, entry, date_entered) VALUES (0, 'Happy New Year!', 'It's January 1st, 2011, the first day of six weeks of writing the date incorrectly.', NOW())`

❸ If the `INSERT` query didn't work, the MySQL error is printed along with the query that was run.

**C** This is the form for adding an entry to the database.

## Add a Blog Entry

The blog entry has been added!

Entry Title:

**D** If the **INSERT** query ran properly, a message is printed and the form is displayed again.

The HTML form is very simple, requiring only a title for the blog entry and the entry itself. As a good rule of thumb, use the same name for your form inputs as the corresponding column names in the database. Doing so makes errors less likely.

**9.** Finish the HTML page:

```
</body>
</html>
```

**10.** Save the script as **add\_entry.php**, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **C** and **D**.

You should probably avoid using apostrophes in your form values or you might see results like those in **B**. Turn the page for the explanation and solution.

**TIP** MySQL allows you to insert several records at once, using this format:

```
INSERT INTO tablename (column1_name,
→ column2_name) VALUES (value1,
→ value2), (value3, value4);
```

Most other database applications don't support this construct, though.

**TIP** To retrieve the automatically incremented number created for an AUTO\_INCREMENT column, call the `mysql_insert_id()` function.

**TIP** Because of the way auto-incrementing primary keys work, this query is also fine:

```
INSERT INTO entries (title, entry,
→ date_entered) VALUES ('$title',
→ '$entry', NOW());
```

# Securing Query Data

As I mentioned in the introduction to the preceding sequence of steps, the code as written has a pretty bad security hole in it. As it stands, if someone submits text that contains an apostrophe, that data will break the SQL query A (security concerns aside, it's also a pretty bad bug). The result is obviously undesirable, but why is it insecure?

If a malicious user knows they can break a query by typing an apostrophe, they may try to run their own queries using this hole. If someone submitted '*DROP TABLE entries;*' as the blog post title, the resulting query would be

```
INSERT INTO entries (entry_id,  
→ title, entry, date_entered) VALUES  
→ (0, '';DROP TABLE entries;', '<entry  
→ text>', NOW())
```

The initial apostrophe in the provided entry title has the effect of completing the blog title value part of the query. The semicolon then terminates the **INSERT** query itself. This will make the original query syntactically invalid. Then the database will be provided with a second query—**DROP TABLE entries**, with the hope that it will be executed when the original **INSERT** query fails. This is called an *SQL injection attack*, but fortunately it's easy to prevent.

To do so, send potentially insecure data to be used in a query through the **mysql\_real\_escape\_string()** function. This function will escape—preface with a backslash—any potentially harmful characters, making the data safe to use in a query:

```
$var = mysql_real_escape_string  
→ ($var, $dbc);
```

Let's apply this function to the preceding script.

## Add a Blog Entry

Could not add the entry because:

You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near '*DROP TABLE entries;*', ', ', NOW()' at line 1.

The query being run was: `INSERT INTO entries (entry_id, title, entry, date_entered)  
VALUES (0, '';DROP TABLE entries;', '', NOW())`

A The apostrophe in the conjunction ('t's breaks the query because apostrophes (or single quotation marks) are used to delimit strings used in queries.

## Showing MySQL Errors

Even if MySQL doesn't execute an injected SQL command (normally MySQL will only run a single SQL query sent through the **mysql\_query()** function), hackers will provide bad characters in form data in the hopes that the syntactically broken query generates a database error. By seeing the database error, the hacker seeks to gain knowledge about the database that can be used for malicious purposes. For this reason, it's imperative that a live site never reveal the actual MySQL errors or queries being executed. The scripts in this chapter do so only for your own debugging purposes.

## To secure query data:

1. Open `add_entry.php` (Script 12.5) in your text editor or IDE, if it is not already open.
2. Update the assignment of the `$title` and `$entry` variables to read (Script 12.6) as follows:

```
$title = mysql_real_escape_string  
→ (trim(strip_tags($_POST  
→ ['title']))), $dbc);  
$entry = mysql_real_escape_string  
→ (trim(strip_tags($_POST  
→ ['entry']))), $dbc);
```

These two lines will greatly improve the security and functionality of the script. For both posted variables, their values are first trimmed and stripped of tags, then sent through `mysql_real_escape_string()`. The result will be safe to use in the query.

If the application of three functions to one variable is too confusing for you, you can separate the code into discrete steps:

```
$title = $_POST['title'];  
$title = trim(strip_tags($title));  
$title = mysql_real_escape_  
string($title, $dbc);
```

*continues on next page*

**Script 12.6** To better secure the Web application and the database, the `mysql_real_escape_string()` function is applied to the form data used in the query.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"  
2   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">  
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">  
4  <head>  
5    <meta http-equiv="content-type" content="text/html; charset=utf-8" />  
6    <title>Add a Blog Entry</title>  
7  </head>  
8  <body>  
9  <h1>Add a Blog Entry</h1>  
10 <?php // Script 12.6 - add_entry.php #2  
11 /* This script adds a blog entry to the database. It now does so securely! */  
12  
13 if (isset($_POST['submitted'])) { // Handle the form.  
14  
15    // Connect and select:  
16    $dbc = mysql_connect('localhost', 'username', 'password');  
17    mysql_select_db('myblog', $dbc);  
18  
19    // Validate and secure the form data:  
20    $problem = FALSE;  
21    if (!empty($_POST['title']) && !empty($_POST['entry'])) {  
22      $title = mysql_real_escape_string(trim(strip_tags($_POST['title'])), $dbc);  
23      $entry = mysql_real_escape_string(trim(strip_tags($_POST['entry'])), $dbc);  
24    } else {  
25      print '<p style="color: red;">Please submit both a title and an entry.</p>';  
26      $problem = TRUE;  
27    }  
28 }
```

*code continues on next page*

3. Save the script, place it on your PHP-enabled server, and test it in your Web browser **B** and **C**.

**TIP** If you see (later in the chapter) that the displayed blog posts have extra backslashes before apostrophes, this is likely because you're using a version of PHP with Magic Quotes enabled. (Magic Quotes automatically escapes problematic characters in form data, although not as well as `mysql_real_escape_string()`). If that's the case, you'll need to apply the `stripslashes()` function to remove the extraneous slashes from the submitted values:

```
$title = mysql_real_escape_string
→ (stripslashes(trim(strip_tags
→ ($_POST['title']))), $dbc);
```

#### Script 12.6 continued

```

29     if (!$problem) {
30
31         // Define the query:
32         $query = "INSERT INTO entries (entry_id, title, entry, date_entered) VALUES (0, '$title',
33                                     '$entry', NOW())";
34
35         // Execute the query:
36         if (@mysql_query($query, $dbc)) {
37             print '<p>The blog entry has been added!</p>';
38         } else {
39             print '<p style="color: red;">Could not add the entry because:<br />' .
40                   mysql_error($dbc) . '</p><p>The query being run was: ' . $query . '</p>';
41         }
42     } // No problem!
43
44     mysql_close($dbc); // Close the connection.
45
46 } // End of form submission IF.
47
48 // Display the form:
49 <form action="add_entry.php" method="post">
50     <p>Entry Title: <input type="text" name="title" size="40" maxsize="100" /></p>
51     <p>Entry Text: <textarea name="entry" cols="40" rows="5"></textarea></p>
52     <input type="submit" name="submit" value="Post This Entry!" />
53     <input type="hidden" name="submitted" value="true" />
54 </form>
55 </body>
56 </html>
```

## Add a Blog Entry

Entry Title: It's Another Test!

"Will these quotes and apostrophes cause problems?", you ask. I don't think so!

Entry Text:

**Post This Entry!**

**B** Now apostrophes in form data...

## Add a Blog Entry

The blog entry has been added!

**C** ...will not cause problems.

# Retrieving Data from a Database

The next process this chapter demonstrates for working with databases is retrieving data from a populated table. You still use the `mysql_query()` function to run the query, but retrieving data is slightly different than inserting data—you have to assign the query result to a variable and then use another function in order to fetch the data.

The basic syntax for retrieving data is the `SELECT` query:

```
SELECT what columns FROM what table
```

The easiest query for reading data from a table is

```
SELECT * FROM tablename
```

The asterisk is the equivalent of saying *every column*. If you only require certain columns to be returned, you can limit your query, like so:

```
SELECT name, email FROM users
```

This query requests that only the information from two columns (`name` and `email`) be gathered. Keep in mind that this structure doesn't limit what rows (or records) are returned, just what columns for those rows.

Another way to alter your query is to add a conditional restricting which rows are returned, accomplished using a `WHERE` clause:

```
SELECT * FROM users WHERE  
→ name='Larry'
```

Here you want the information from every column in the table, but only from the rows where the `name` column is equal to *Larry*.

This is a good example of how SQL uses only a few terms effectively and flexibly.

The main difference in retrieving data from a database as opposed to inserting data into a database is that you need to handle the query differently. You should first assign the results of the query to a variable:

```
$result = mysql_query($query, $dbc);
```

Just as `$dbc` is a reference to an open database connection, `$result` is a reference to a query result set. This variable is then provided to the `mysql_fetch_array()` function, which retrieves the query results:

```
$row = mysql_fetch_array($result);
```

The function fetches one row from the result set at a time, creating an array in the process. The array will use the selected column names as its indexes:

`$row['name']`, `$row['email']`, and so on. As with any array, you must refer to the columns exactly as they're defined in the database (the keys are case-sensitive). So, in this example, you must use `$row['email']` instead of `$row['Email']`.

If the query will return multiple rows, execute the `mysql_fetch_array()` function within a loop to access them all:

```
while ($row = mysql_fetch_array  
→ ($result)) {  
    // Do something with $row.  
}
```

With each iteration of the loop, the next row of information from the query (referenced by `$result`) is assigned to an array called `$row`. This process continues until no more rows of information are found. Within the loop, you would do whatever you want with `$row`.

*continues on next page*

The best way to understand this new code is to try it. You'll write a script that retrieves the posts stored in the `entries` table and displays them **A**. You may want to run through `add_entry.php` a couple more times to build up the table first.

## To retrieve data from a table:

1. Begin a new PHP document in your text editor or IDE, to be named `view_entries.php` (Script 12.7):

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="content-type"
    → content="text/html;
    → charset=utf-8" />
  <title>View My Blog</title>
</head>
<body>
  <h1>My Blog</h1>
```

**Script 12.7** The SQL query for retrieving all data from a table is quite simple; but in order for PHP to access every returned record, you must loop through the results one row at a time.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5    <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6    <title>View My Blog</title>
7  </head>
8  <body>
9    <h1>My Blog</h1>
10 <?php // Script 12.7 - view_entries.php
11 /* This script retrieves blog entries from the database. */
```

## My Blog

### It's Another Test!

"Will these quotes and apostrophes cause problems?", you ask. I don't think so!

[Edit](#) [Delete](#)

### Happy New Year!

Today is January 1st, 2011, the first day of six weeks of writing the date incorrectly.

[Edit](#) [Delete](#)

**A** This dynamic Web page uses PHP to pull data from a database.

code continues on next page

2. Begin a PHP section and connect to the database:

```
<?php // Script 12.7 -
→ view_entries.php
$dbc = mysql_connect('localhost',
→ 'username', 'password');
mysql_select_db('myblog', $dbc);
```

3. Define the **SELECT** query:

```
$query = 'SELECT * FROM entries
→ ORDER BY date_entered DESC';
```

This basic query tells the database that you'd like to fetch every column of every row in the **entries** table. The returned records should be sorted, as indicated by the **ORDER BY** clause, by

the order in which they were entered (recorded in the **date\_entered** column), starting with the most recent first. This last option is set by **DESC**, which is short for *descending*. If the query was **ORDER BY date\_entered ASC**, the most recently added record would be retrieved last.

4. Run the query:

```
if ($r = mysql_query($query,
→ $dbc)) {
```

The **SELECT** query is run like any other. However, the result of the query is assigned to a **\$result** (or, more tersely, **\$r**) variable, which will be referenced later.

*continues on next page*

#### Script 12.7 continued

```
13 // Connect and select:
14 $dbc = mysql_connect('localhost', 'username', 'password');
15 mysql_select_db('myblog', $dbc);
16
17 // Define the query:
18 $query = 'SELECT * FROM entries ORDER BY date_entered DESC';
19
20 if ($r = mysql_query($query, $dbc)) { // Run the query.
21
22     // Retrieve and print every record:
23     while ($row = mysql_fetch_array($r)) {
24         print "<p><h3>{$row['title']}

```

**5.** Print out the returned results:

```
while ($row = mysql_fetch_array  
→ ($r)) {  
    print "<p><h3>{$row['title']}    {$row['entry']}  
    <br />  
    <a href=\"edit_entry.php?id=  
→ {$row['entry_id']}\">Edit</a>  
    <a href=\"delete_entry.php?  
→ id={$row['entry_id']}\">  
    Delete</a>  
    </p><hr />\n";  
}
```

This loop sets the variable **\$row** to an array containing the first record returned in **\$r**. The loop then executes the following command (the **print** statement). Once the loop gets back to the beginning, it assigns the next row, if it exists. It continues to do this until there are no more rows of information to be obtained.

Within the loop, the array's keys are the names of the columns from the table—hence, **entry\_id**, **title**, and **entry** (there's no need to print out the **date\_entered**).

At the bottom of each post, two links are created: to **edit\_entry.php** and **delete\_entry.php**. These scripts will be written in the rest of the chapter. Each link passes the posting's database ID value along in the URL. That information will be necessary for those other two pages to edit and delete the blog posting accordingly.

**6.** Handle the errors if the query didn't run:

```
} else { // Query didn't run.  
    print '<p style="color: red;">  
→ Could not retrieve the  
→ data because:<br />' .  
→ mysql_error($dbc) . '.</p>  
→ <p>The query being run  
→ was: ' . $query . '</p>';  
} // End of query IF.
```

# My Blog

## This is the newest post!

This is so absolutely amazing that I'm downright speechless!  
[Edit](#) [Delete](#)

## It's Another Test!

"Will these quotes and apostrophes cause problems?", you ask. I don't think so!  
[Edit](#) [Delete](#)

## Happy New Year!

- B** Thanks to the **SELECT** query, which orders the returned records by the date they were entered, the most recently added entry is always listed first.

```
<h1>My Blog</h1>
<p><h3>This is the newest post!</h3>
    This is so absolutely amazing that I'm dow
    <a href="edit_entry.php?id=4">Edit</a>
    <a href="delete_entry.php?id=4">Delete</a>
    </p><hr />
<p><h3>It's Another Test!</h3>
    "Will these quotes and apostrophes cause p
so!<br />
    <a href="edit_entry.php?id=3">Edit</a>
    <a href="delete_entry.php?id=3">Delete</a>
    </p><hr />
<p><h3>Happy New Year!</h3>
    Today is January 1st, the first day
incorrectly.<br />
    <a href="edit_entry.php?id=2">Edit</a>
    <a href="delete_entry.php?id=2">Delete</a>
    </p><hr />
```

- C** Part of the HTML source of the page. Note that the two links have `?id=X` appended to each URL.

If the query couldn't run on the database, it should be printed out, along with the MySQL error (for debugging purposes).

- 7.** Close the database connection:

```
mysql_close($dbc);
```

- 8.** Complete the PHP section and the HTML page:

```
?>
</body>
</html>
```

- 9.** Save the script as **view\_entries.php**, place it in the proper directory for your PHP-enabled server, and test it in your Web browser **A**.

- 10.** If you want, add another record to the blog using the **add\_entry.php** page (Script 12.6), and run this page again **B**.

- 11.** Check the source code of the page to see the dynamically generated links **C**.

**TIP** The `mysql_fetch_array()` function takes another argument, which is a constant indicating what kind of array should be returned. `MYSQL_ASSOC` returns an associative array, whereas `MYSQL_NUM` returns a numerically indexed array.

**TIP** The `mysql_num_rows()` function returns the number of records returned by a `SELECT` query.

**TIP** It's possible to paginate returned records so that 10 or 20 appear on each page (like the way Google works). Doing so requires more advanced coding than can be taught in this book, though. See my book **PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide** (Peachpit Press, 2007), or look online for code examples and tutorials.

# Deleting Data in a Database

Sometimes you might also want to run a **DELETE** query on a database. Such a query removes records from the database. The syntax for a delete query is

```
DELETE FROM tablename WHERE  
→ column=value
```

The **WHERE** clause isn't required, but if it's omitted, you'll remove every record from the table. You should also understand that once you delete a record, there's no way to recover it (unless you have a backup of the database).

As a safeguard, if you want to delete only a single record from a table, add the **LIMIT** clause to the query:

```
DELETE FROM tablename WHERE  
→ column=value LIMIT 1
```

This clause ensures that only one record is deleted at most. Once you've defined your query, it's again executed using the **mysql\_query()** function, like any other query.

To see if a **DELETE** query worked, you can use the **mysql\_affected\_rows()** function. This function returns the number of rows affected by an **INSERT**, **DELETE**, or **UPDATE** query.

As an example, let's write the **delete\_entry.php** script, which is linked from the **view\_blog.php** page. This page receives the database record ID in the URL. It then displays the entry to confirm that the user wants to delete it **A**. If the user clicks the button, the record will be deleted **B**.

The screenshot shows a web browser window titled "Delete a Blog Entry". The URL is "phpvqs4:8888/delete\_entry.php?id=3". The main content area says "Delete an Entry" and asks "Are you sure you want to delete this entry?". Below that is a message "It's Another Test!" and a note: "'Will these quotes and apostrophes cause problems?', you ask. I don't think so!". At the bottom is a button labeled "Delete this Entry!".

- A** When the user arrives at this page, the blog entry is shown and the user must confirm that they want to delete it.

The screenshot shows a web browser window titled "Delete a Blog Entry". The URL is "phpvqs4:8888/delete\_entry.php". The main content area says "Delete an Entry" and displays the message "The blog entry has been deleted."

- B** If the delete query worked properly, the user sees this result.

## To delete data from a database:

1. Begin a new PHP document in your text editor or IDE, to be named **delete\_entry.php** (Script 12.8):

```
<!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" xml:lang="en"
→ lang="en">
<head>
    <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
    <title>Delete a Blog Entry
    → </title>
</head>
<body>
    <h1>Delete an Entry</h1>
```

2. Start the PHP code and connect to the database:

```
<?php // Script 12.8 -
→ delete_entry.php
$dbc = mysql_connect('localhost',
→ 'username', 'password');
mysql_select_db('myblog', $dbc);
```

*continues on page 369*

**Script 12.8** The **DELETE** SQL command permanently removes a record (or records) from a table.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6      <title>Delete a Blog Entry</title>
7  </head>
8  <body>
9      <h1>Delete an Entry</h1>
10 <?php // Script 12.8 - delete_entry.php
11 /* This script deletes a blog entry. */
```

*code continues on next page*

**Script 12.8** continued

```
13 // Connect and select:
14 $dbc = mysql_connect('localhost', 'username', 'password');
15 mysql_select_db('myblog', $dbc);
16
17 if (isset($_GET['id']) && is_numeric($_GET['id'])) { // Display the entry in a form:
18
19     // Define the query:
20     $query = "SELECT title, entry FROM entries WHERE entry_id={$GET['id']}";
21     if ($r = mysql_query($query, $dbc)) { // Run the query.
22
23         $row = mysql_fetch_array($r); // Retrieve the information.
24
25         // Make the form:
26         print '<form action="delete_entry.php" method="post">
27             <p>Are you sure you want to delete this entry?</p>
28             <p><h3>' . $row['title'] . '</h3> .
29             $row['entry'] . '<br />
30             <input type="hidden" name="id" value="' . $_GET['id'] . '" />
31             <input type="submit" name="submit" value="Delete this Entry!" /></p>
32         </form>';
33
34     } else { // Couldn't get the information.
35         print '<p style="color: red;">Could not retrieve the blog entry because:<br />' .
36             mysql_error($dbc) . '</p><p>The query being run was: ' . $query . '</p>';
37     }
38
39 } elseif (isset($_POST['id']) && is_numeric($_POST['id'])) { // Handle the form.
40
41     // Define the query:
42     $query = "DELETE FROM entries WHERE entry_id={$POST['id']} LIMIT 1";
43     $r = mysql_query($query, $dbc); // Execute the query.
44
45     // Report on the result:
46     if (mysql_affected_rows($dbc) == 1) {
47         print '<p>The blog entry has been deleted.</p>';
48     } else {
49         print '<p style="color: red;">Could not delete the blog entry because:<br />' .
50             mysql_error($dbc) . '</p><p>The query being run was: ' . $query . '</p>';
51     }
52
53 } else { // No ID received.
54     print '<p style="color: red;">This page has been accessed in error.</p>';
55 } // End of main IF.
56
57 mysql_close($dbc); // Close the connection.
58
59 ?>
60 </body>
61 </html>
```



- C If the script does not receive an *id* value in the URL, an error is reported.

3. If the page received a valid entry ID in the URL, define and execute a **SELECT** query:

```
if (isset($_GET['id']) && is_numeric  
→($_GET['id'])) ) {  
    $query = "SELECT title, entry  
    → FROM entries WHERE  
    → entry_id={$GET['id']}";  
    if ($r = mysql_query($query,  
    → $dbc)) {
```

To display the blog entry, the page must confirm that a numeric ID is received by the page. Because that value should first come in the URL (when the user clicks the link in `view_blog.php`, see C in the previous section), you reference `$_GET['id']`.

The query is like the **SELECT** query used in the preceding example, except that the **WHERE** clause has been added to retrieve a specific record. Also, because only the two stored values are necessary—the title and the entry itself—only those are being selected.

This query is then executed using the `mysql_query()` function.

4. Retrieve the record, and display the entry in a form:

```
$row = mysql_fetch_array($r);  
print '<form action="delete_entry.  
→ php" method="post">  
<p>Are you sure you want to  
→ delete this entry?</p>  
<p><h3>' . $row['title'] . '</h3>' .  
$row['entry'] . '<br />  
<input type="hidden" name="id"  
→ value="" . $_GET['id'] . "" />  
<input type="submit" name="submit"  
→ value="Delete this Entry!" /></p>  
</form>';
```

*continues on next page*

Instead of retrieving all the records using a `while` loop, as you did in the previous example, use one call to the `mysql_fetch_array()` function to assign the returned record to the `$row` variable. Using this array, the record to be deleted can be displayed.

The form first shows the blog entry details, much as it did in the `view_blog.php` script. When the user clicks the button, the form will be submitted back to this page, at which point the record should be deleted. In order to do so, the blog identification number, which is passed to the script as `$_GET['id']`, must be stored in a hidden input so that it exists in the `$_POST` array upon submission (because `$_GET['id']` won't have a value at that point).

5. Report an error if the query failed:

```
} else { // Couldn't get the  
→ information.  
    print '<p style="color: red;">  
→ Could not retrieve the blog  
→ entry because:<br />' .  
→ mysql_error($dbc) . '</p>  
→ <p>The query being run was:  
→ ' . $query . '</p>';  
}
```

If the `SELECT` query failed to run, the MySQL error and the query itself are printed out.

6. Check for the submission of the form:

```
} elseif (isset($_POST['id'])) &&  
→ is_numeric($_POST['id']))  
→ { // Handle the form.
```

This `elseif` clause is part of the conditional begun in Step 3. It corresponds to the second usage of this same script (the form being submitted). If this conditional is **TRUE**, the record should be deleted.

7. Define and execute the query:

```
$query = "DELETE FROM entries  
→ WHERE entry_id={$_POST['id']}
```

```
→ LIMIT 1";  
$r = mysql_query($query, $dbc);
```

This query deletes the record whose `entry_id` has a value of `$_POST['id']`. The ID value comes from the form, where it's stored as a hidden input. By adding the `LIMIT 1` clause to the query, you can guarantee that only one record, at most, is removed.

8. Check the result of the query:

```
if (mysql_affected_rows($dbc) ==  
→ 1) {  
    print '<p>The blog entry has  
→ been deleted.</p>';  
} else {  
    print '<p style="color: red;">  
→ Could not delete the blog  
→ entry because:<br />' .  
→ mysql_error($dbc) . '</p>  
→ <p>The query being run  
→ was: ' . $query . '</p>';  
}
```

The `mysql_affected_rows()` function returns the number of rows altered by the most recent query. If the query ran properly, one row was deleted, so this function should return 1. If so, a message is printed. Otherwise, the MySQL error and query are printed for debugging purposes.

9. Complete the main conditional:

```
} else { // No ID received.  
    print '<p style="color: red;">  
        → This page has been accessed  
        → in error.</p>';  
} // End of main IF.
```

If no numeric ID value was passed to this page using either the GET method or the POST method, then this `else` clause takes effect C.

10. Close the database connection, and complete the page:

```
mysql_close($dbc);  
?>  
</body>  
</html>
```

11. Save the script as `delete_entry.php`, place it in the proper directory for your PHP-enabled server, and test it in your Web browser A and B.

To test this script, you must first run `view_blog.php`. Then, click one of the Delete links to access `delete_entry.php`.

**TIP** You can empty a table of all of its records by running the query `TRUNCATE TABLE tablename`. This approach is preferred over using `DELETE FROM tablename`. `TRUNCATE` will completely drop and rebuild the table, which is better for the database.

**TIP** It's a fairly common error to try to run the query `DELETE * FROM tablename`, like a `SELECT` query. Remember that `DELETE` doesn't use the same syntax as `SELECT`, because you aren't deleting specific columns.

# Updating Data in a Database

The final type of query this chapter will cover is **UPDATE**. It's used to alter the values of a record's columns. The syntax is

```
UPDATE tablename SET column1_name=  
→ value, column2_name=value2 WHERE  
→ some_column=value
```

As with any other query, if the values are strings, they should be placed within single quotation marks:

```
UPDATE users SET first_name=  
→ 'Eleanor', age=7 WHERE user_id=142
```

As with a **DELETE** query, you should use a **WHERE** clause to limit the rows that are affected. If you don't do this, every record in the database will be updated.

To test that an update worked, you can again use the **mysql\_affected\_rows()** function to return the number of records altered.

To demonstrate, let's write a page for editing a blog entry. It will let the user alter an entry's title and text, but not the date entered or the blog ID number (as a primary key, the ID number should never be changed). This script will use a structure like that in **delete\_entry.php** (Script 12.8), first showing the entry A, and then handling the submission of that form B.

Entry Title: This is the newest post! (Edited)

Entry Text:  
This is so absolutely amazing that I'm downright speechless! I am still speechless.

Update this Entry!

- A When the user arrives at the edit page, the form is shown with the existing values.

The blog entry has been updated.

- B Upon submitting the form, the user sees a message like this.

## To update data in a database:

1. Begin a new PHP document in your text editor or IDE, to be named **edit\_entry.php** (Script 12.9).

```
<!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" xml:lang="en"
→ lang="en">
<head>
    <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
    <title>Edit a Blog Entry</title>
</head>
<body>
    <h1>Edit an Entry</h1>
```

*continues on page 375*

**Script 12.9** You can edit records in a database table by using an **UPDATE** SQL command.

```
1  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2      "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
3  <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
4  <head>
5      <meta http-equiv="content-type" content="text/html; charset=utf-8" />
6      <title>Edit a Blog Entry</title>
7  </head>
8  <body>
9      <h1>Edit an Entry</h1>
10     <?php // Script 12.9 - edit_entry.php
11     /* This script edits a blog entry using an UPDATE query. */
12
13     // Connect and select:
14     $dbc = mysql_connect('localhost', 'username', 'password');
15     mysql_select_db('myblog', $dbc);
16
17     if (isset($_GET['id']) && is_numeric($_GET['id'])) { // Display the entry in a form:
18
19         // Define the query.
20         $query = "SELECT title, entry FROM entries WHERE entry_id={$GET['id']}";
21         if ($r = mysql_query($query, $dbc)) { // Run the query.
22
23             $row = mysql_fetch_array($r); // Retrieve the information.
24
```

*code continues on next page*

**Script 12.9** continued

```
25      // Make the form:
26      print '<form action="edit_entry.php" method="post">
27      <p>Entry Title: <input type="text" name="title" size="40" maxlength="100" value="" .
28      htmlentities($row['title']) . " "></p>
29      <p>Entry Text: <textarea name="entry" cols="40" rows="5"> . htmlentities($row['entry']) . '</
30      textarea></p>
31      <input type="hidden" name="id" value="" . $_GET['id'] . "" />
32      <input type="submit" name="submit" value="Update this Entry!" />
33      </form>';
34
35  } else { // Couldn't get the information.
36      print '<p style="color: red;">Could not retrieve the blog entry because:<br />' . mysql_
37      error($dbc) . '.</p><p>The query being run was: ' . $query . '</p>';
38  }
39
40 } elseif (isset($_POST['id']) && is_numeric($_POST['id'])) { // Handle the form.
41
42     // Validate and secure the form data:
43     $problem = FALSE;
44     if (!empty($_POST['title']) && !empty($_POST['entry'])) {
45         $title = mysql_real_escape_string(trim(strip_tags($_POST['title'])), $dbc);
46         $entry = mysql_real_escape_string(trim(strip_tags($_POST['entry'])), $dbc);
47     } else {
48         print '<p style="color: red;">Please submit both a title and an entry.</p>';
49         $problem = TRUE;
50     }
51
52     if (!$problem) {
53
54         // Define the query.
55         $query = "UPDATE entries SET title='$title', entry='$entry' WHERE entry_id=
56         {$_POST['id']}";
57         $r = mysql_query($query, $dbc); // Execute the query.
58
59         // Report on the result:
60         if (mysql_affected_rows($dbc) == 1) {
61             print '<p>The blog entry has been updated.</p>';
62         } else {
63             print '<p style="color: red;">Could not update the entry because:<br />' .
64             mysql_error($dbc) . '.</p><p>The query being run was: ' . $query . '</p>';
65         }
66     }
67
68     mysql_close($dbc); // Close the connection.
69
70 ?>
71 </body>
72 </html>
```

2. Start your PHP code and connect to the database:

```
<?php // Script 12.9 -
→ edit_entry.php
$dbc = mysql_connect('localhost',
→ 'username', 'password');
mysql_select_db('myblog', $dbc);
```

3. If the page received a valid entry ID in the URL, define and execute a **SELECT** query:

```
if (isset($_GET['id'])) &&
→ is_numeric($_GET['id']) ) {
    $query = "SELECT title,
→ entry FROM entries WHERE
→ entry_id={$GET['id']}";
    if ($r = mysql_query($query,
→ $dbc)) {
```

This code is exactly the same as that in the delete page; it selects the two column values from the database for the provided ID value.

4. Retrieve the record, and display the entry in a form:

```
$row = mysql_fetch_array($r);
print '<form action="edit_entry.
→ php" method="post">
<p>Entry Title: <input type=
→ "text" name="title" size="40"
→ maxsize="100" value="' .
→ htmlentities($row['title']) .
→ '" /></p>
<p>Entry Text: <textarea name=
→ "entry" cols="40" rows="5">' .
→ htmlentities($row['entry']) .
→ '</textarea></p>
<input type="hidden" name="id"
→ value="' . $_GET['id'] . '" />
<input type="submit" name="submit"
→ value="Update this Entry!" />
</form>';
```

Again, this is almost exactly the same as in the preceding script, including the most important step of storing the ID value in a hidden form input. Here, though, the stored data isn't just printed but is actually used as the values for form elements. For security and to avoid potential conflicts, each value is run through **htmlentities()** first.

5. Report an error if the query failed:

```
} else { // Couldn't get the
→ information.
    print '<p style="color:
→ red;">Could not retrieve
→ the blog entry because:
→ <br />' . mysql_error($dbc) .
→ '</p><p>The query being run
→ was: ' . $query . '</p>';
}
```

6. Check for the submission of the form:

```
} elseif (isset($_POST['id']) &&
→ is_numeric($_POST['id'])) {
```

This conditional will be **TRUE** when the form is submitted.

7. Validate and secure the form data:

```
$problem = FALSE;
if (!empty($_POST['title']) &&
→ !empty($_POST['entry'])) {
    $title = mysql_real_escape_
→ string(trim(strip_tags($_POST
→ ['title'])), $dbc);
    $entry = mysql_real_escape_
→ string(trim(strip_tags($_POST
→ ['entry'])), $dbc);
} else {
    print '<p style="color: red;">
→ Please submit both a title
→ and an entry.</p>';
    $problem = TRUE;
}
```

*continues on next page*

This code comes from the page used to add blog postings. It performs minimal validation on the submitted data and then runs it through the `mysql_real_escape_string()` function to be safe. Because the form data can be edited, the form should be validated as if it were a new record being created.

8. Define and execute the query:

```
if (!$problem) {  
    $query = "UPDATE entries SET  
        → title='$title', entry='$entry'  
        → WHERE entry_id={$POST['id']}";  
    $r = mysql_query($query, $dbc);
```

The `UPDATE` query sets the `title` column equal to the value entered in the form's title input and the `entry` column equal to the value entered in the form's entry text area. Only the record whose `entry_id` is equal to `$_POST['id']`, which comes from a hidden form input, is updated.

9. Report on the success of the query:

```
if (mysql_affected_rows($dbc) == 1) {  
    print '<p>The blog entry has  
        → been updated.</p>';  
} else {  
    print '<p style="color: red;">  
        → Could not update the entry  
        → because:<br />' . mysql_  
        → error($dbc) . '</p><p>The  
        → query being run was: ' .  
        → $query . '</p>';  
}
```

If one row was affected, then a success message is returned. Otherwise, the MySQL error and the query are sent to the Web browser.

10. Complete the conditionals:

```
    } // No problem!  
} else { // No ID set.  
    print '<p style="color: red;">  
        → This page has been accessed  
        → in error.</p>';  
} // End of main IF.
```

If no numeric ID value was passed to this page using either the GET method or the POST method, then this `else` clause takes effect.

11. Close the database connection, and complete the page:

```
mysql_close($dbc);  
?>  
</body>  
</html>
```

12. Save the file as `edit_entry.php`, place it in the proper directory for your PHP-enabled server, and test it in your Web browser A and B.

As in the preceding example, to edit an entry, you must click its *Edit* link in the `view_blog.php` page.

13. Revisit `view_blog.php` to confirm that the changes were made C.

**TIP** The `id` is a primary key, meaning that its value should never change. By using a primary key in your table, you can change every other value in the record but still refer to the row using that column.

**TIP** The `mysql_real_escape_string()` function does not need to be applied to the ID values used in the queries, as the `is_numeric()` test confirms they don't contain apostrophes or other problematic characters.

**TIP** More thorough edit and delete pages would use the `mysql_num_rows()` function in a conditional to confirm that the `SELECT` query returned a row prior to fetching it:

```
if (mysql_num_rows($r) == 1) {...
```

**TIP** If you run an update on a table but don't change a record's values, `mysql_affected_rows()` will return 0.

**TIP** It can't hurt to add a `LIMIT 1` clause to an `UPDATE` query, to ensure that only one row, at most, is affected.



- C Reloading the `view_blog.php` script reflects the changes made to the entries.

# Review and Pursue

If you have any problems with the review questions or the pursue prompts, turn to the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- What version of MySQL are you using? What values do you personally use to connect to MySQL?
- How does a PHP script connect to a MySQL server? How does it disconnect?
- What is the error suppression operator? What does it do?
- What function returns MySQL-reported errors?
- What debugging techniques should you use when having problems with a PHP script that interacts with MySQL?
- How do you select which database to use?
- What SQL command is used to create a table? To add new records? To retrieve records? To modify records? To remove records?
- What function should string values be run through to prevent SQL injection attacks?

## Pursue

- Find the version of the MySQL manual that corresponds to your version of MySQL. Start reading!
- Move the code for connecting to and selecting the database to a separate script, then include that script in the PHP pages that interact with the database.
- Make the `add_entry.php` form sticky.
- Change the code in `view_entry.php` so that it converts newline characters in each entry into HTML break tags.

# 13

# Putting It All Together

The 12 chapters to this point have covered all the fundamentals of using PHP for Web development. In this chapter, you'll use your accumulated knowledge to create a complete and functional Web site. And even though the focus of this chapter is on applying your newfound knowledge, you'll still learn a few new tricks. In particular, you'll see how to develop a full-scale Web application from scratch.

---

## In This Chapter

Getting Started	380
Connecting to the Database	382
Writing the User-Defined Function	383
Creating the Template	385
Logging In	388
Logging Out	392
Adding Quotes	393
Listing Quotes	397
Editing Quotes	400
Deleting Quotes	406
Creating the Home Page	410
Review and Pursue	414

---

# Getting Started

The first step when starting any project is identifying the site's goals. The primary goal of this chapter is to apply everything taught in the book thus far (a lofty aim, to be sure). The example I came up with for doing so combines the models from the previous two chapters, creating a site that will store and display quotations. Instead of using a file to do so, as in Chapter 11, "Files and Directories," this site will use a MySQL database as the storage repository. But as with the blog example from Chapter 12, "Intro to Databases," the ability to create, edit, and delete quotations will be implemented. Further, the public user will be able to view the most recent quotation by default **A**, or a random one, or a random quotation previously marked as a favorite.

For improved security, the site will have an administrator who can log in and log out. And only the logged-in administrator will be allowed to create, edit, or delete quotations **B**.

The site will use a simple template to give every page a consistent look, with CSS handling all the formatting and layout. The site will also make use of one user-defined function, stored in an included file.

As in Chapter 12, you must first create the database and its one table. The database could be named *myquotes* (or something else if you'd rather). You create its one table with this SQL command:

```
CREATE TABLE quotes (
    quote_id INT UNSIGNED NOT NULL
    → AUTO_INCREMENT,
    quote TEXT NOT NULL,
    source VARCHAR(100) NOT NULL,
    favorite TINYINT(1) UNSIGNED NOT
    → NULL,
    date_entered TIMESTAMP NOT NULL
    → DEFAULT CURRENT_TIMESTAMP,
    PRIMARY KEY (quote_id)
)
```



**A** The site's simple home page.



**B** Nonadministrators are denied access to certain pages.

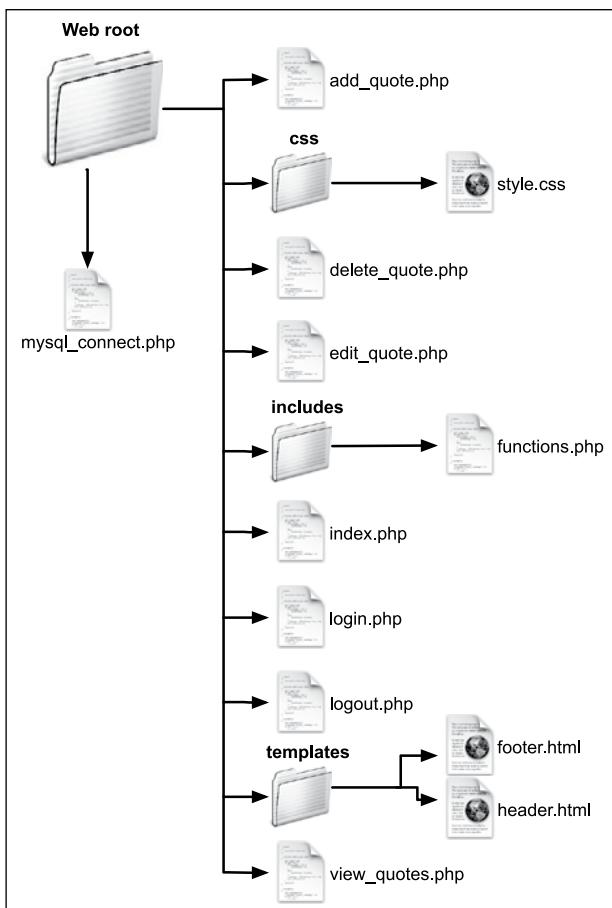
The **quote\_id** is the primary key, and it will automatically be incremented to the next logical value with each new submission. The **quote** field stores the quote itself, with the **source** field storing the attribution (unlike in Chapter 11, where the quote and the source were stored together). The **favorite** field stores a 1 or a 0, marking the quote as a favorite or not. Finally, the **date\_entered** column is a timestamp, automatically set to the current timestamp when a new record is created.

You can create this table using a PHP script, such as Script 12.4, or a third-party

application (like the MySQL client or phpMyAdmin).

Finally, a word about how the site should be organized on the server **C**. Ideally the **mysql\_connect.php** script, which establishes a database connection, would be stored outside the Web root directory. If that is not possible in your case, you can place it in the **includes** folder, then change the code in the other scripts accordingly.

Once you've created the database, the database table, and the necessary folders, you can begin coding.



**C** The structure and organization of the files on the server.

# Connecting to the Database

Unlike the scripts in Chapter 12, which connected to the database using code repeated in each script, this site will use the more common practice of placing the repeated code in a stand-alone file. Every script that interacts with the database—which will be most but not all of them—will then include this file. As you can see in Figure C in the previous section, this file should be stored outside of the Web root directory or, if that's not possible, within the **includes** folder.

## To create `mysql_connect.php`:

1. Begin a new PHP script in your text editor or IDE, to be named **mysql\_connect.php** (Script 13.1):

```
<?php
```

2. Connect to the database server:

```
$dbc = mysql_connect('localhost',
'username', 'password');
```

Naturally, you'll need to change the values used here to be appropriate for your server.

3. Select the database:

```
mysql_select_db('myquotes', $dbc);
```

If you named your database something else, change this value accordingly.

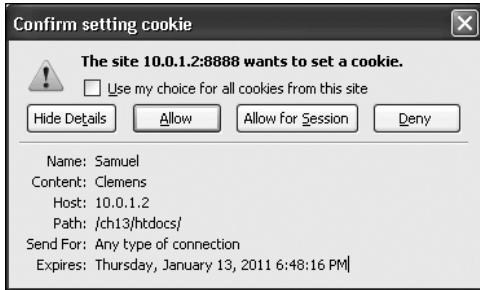
4. Complete the script:

```
?>
```

5. Save the file as **mysql\_connect.php**.

**Script 13.1** This script connects to the database server and selects the database to be used.

```
1  <?php // Script 13.1 - mysql_connect.php
2  /* This script connects to and selects
   the database. */
3
4  // Connect:
5  $dbc = mysql_connect('localhost',
   'username', 'password');
6
7  // Select:
8  mysql_select_db('myquotes', $dbc);
9
10 ?>
```



**A** This cookie will be used to identify the administrator.

## Writing the User-Defined Function

The site will have a single user-defined function. As discussed in Chapter 10, “Creating Functions,” the best time to create your own functions is when a script or a site might have repeating code. In this site there are a couple such instances, but the most obvious one is this: Many scripts will need to check whether or not the current user is an administrator. In this next script, you’ll create your own function that returns a Boolean value indicating if the user is an administrator. But what will be the test of administrative status?

Upon successfully logging in, a cookie will be sent to the administrator’s browser, with a name of *Samuel* and a value of *Clemens* **A**. This may seem odd or random, and it is. When using something simple, like a cookie, for authentication, it’s best to be obscure about what constitutes verification. If you went with something more obvious, such as a name of *admin* and a value of *true*, that’d be quite easy for anyone to guess and falsify. With this cookie in mind, this next function simply checks if a cookie exists with a name of *Samuel* and a value of *Clemens*.

## To create functions.php:

1. Begin a new PHP script in your text editor or IDE, to be named **functions.php** (Script 13.2):

```
<?php // Script 13.2 - functions.php
```

Even though, as written, the script only defines a single function, I'm naming the file using the plural—*functions*—with the understanding that more user-defined functions might be added to the script in time.

2. Begin defining a new function:

```
function is_administrator($name =  
→ 'Samuel', $value = 'Clemens') {
```

The function takes two arguments: the cookie's name and its value. Both have default values.

Since the function checks only a single cookie with a single expected value, it doesn't need to take arguments at all, let alone default ones. But by having the function take arguments, it can be used in different ways should the

site's functionality expand (e.g., if you had multiple types of authentication to perform). Still, by using default values for those arguments, function calls don't need to provide argument values when the assumed cookie name and value are being checked.

3. Return a Boolean value based on the cookie's existence and value:

```
if (isset($_COOKIE[$name]) &&  
→ ($_COOKIE[$name] == $value)) {  
    return true;  
} else {  
    return false;  
}
```

If the cookie exists and has the appropriate value, the Boolean true is returned. Otherwise the function returns false.

4. Complete the function and the script:

```
} // End of is_administrator()  
→ function.  
?>
```

5. Save the file as **functions.php**, stored in the **includes** directory.

**Script 13.2** The **is\_administrator()** function, defined in an includable script, will be called on any page that needs to verify administrator status.

```
1  <?php // Script 13.2 - functions.php  
2  /* This page defines custom functions. */  
3  
4  // This function checks if the user is an administrator.  
5  // This function takes two optional values.  
6  // This function returns a Boolean value.  
7  function is_administrator($name = 'Samuel', $value = 'Clemens') {  
8  
9      // Check for the cookie and check its value:  
10     if (isset($_COOKIE[$name]) && ($_COOKIE[$name] == $value)) {  
11         return true;  
12     } else {  
13         return false;  
14     }  
15  
16 } // End of is_administrator() function.  
17  
18 ?>
```

Site Admin

Add Quote <-> View All Quotes <-> Logout

Content © 2011

- A If the person viewing any page is an administrator, they'll see some additional links.

**Script 13.3** The header file includes the `functions.php` script and begins the HTML page.

```
1  <?php // Script 13.3 - header.html
2
3  // Include the functions script:
4  include('includes/functions.php'); ?>
5  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML
6  1.0 Transitional//EN"
7  "http://www.w3.org/TR/xhtml1/DTD/
     xhtml1-transitional.dtd">
8  <html xmlns="http://www.w3.org/1999/
xhtml" xml:lang="en" lang="en">
9   <head>
10    <meta http-equiv="content-type"
          content="text/html; charset=utf-8" />
11    <link rel="stylesheet" media="all"
          href="css/style.css" />
12    <title><?php // Print the page title.
13      if (defined('TITLE')) { // Is the title
           defined?
14        print TITLE;
15      } else { // The title is not defined.
16        print 'My Site of Quotes';
17      }
18    ?></title>
19  </head>
20  <body>
21    <div id="container">
22      <h1>My Site of Quotes</h1>
23      <br />
24      <!-- BEGIN CHANGEABLE CONTENT. -->
```

# Creating the Template

Now that the two helper files have been created, it's time to move on to the template. As illustrated in Chapter 8, "Creating Web Applications," the site's layout will be controlled by two includable files: a header and a footer. Both will be stored in the `templates` directory. The header also references a style sheet, to be stored in the `css` folder. You can find the style sheet by downloading the book's code from [www.LarryUllman.com](http://www.LarryUllman.com) (the file will be in the `ch13` folder of the download).

Besides generating the primary HTML for the site, the header file must include the functions script. The footer file should also display some administration links A, should the current user be an administrator.

## To create `header.html`:

1. Begin a new HTML document in your text editor or IDE, to be named `header.html` (**Script 13.3**).

```
<?php // Script 13.3 - header.html
include('includes/functions.php'); ?>
```

The header will start with a PHP section in order to include the `functions.php` script, which will be required by multiple pages on the site. The reference to the script is relative to the pages that will be including the header: files in the main directory.

*continues on next page*

2. Begin the HTML document:

```
<!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" xml:lang="en"
→ lang="en">
<head>
  <meta http-equiv="content-type"
→ content="text/html;
→ charset=utf-8" />
  <link rel="stylesheet" media=
→ "all" href="css/style.css" />
```

Again, the style sheet needs to be downloaded from the book's corresponding Web site. And the reference to that style sheet is relative to the scripts that include the header, all found within the main directory.

3. Print the page's title:

```
<title><?php
if (defined('TITLE')) {
  print TITLE;
} else {
  print 'My Site of Quotes';
}
?></title>
```

This code also comes from Chapter 8, printing either the default title or a custom one, if set as a constant.

4. Complete the head:

```
</head>
```

5. Begin the page's body:

```
<body>
  <div id="container">
    <h1>My Site of Quotes</h1>
    <br />
    <!-- BEGIN CHANGEABLE
    → CONTENT. -->
```

6. Save the file as **header.html**, stored in the **templates** directory.

## To create footer.html:

1. Begin a new HTML document in your text editor or IDE, to be named **footer.html** (Script 13.4):  

```
<!-- END CHANGEABLE CONTENT. -->
```
2. Check if it's appropriate to display general administration links:

```
<?php
if ( (is_administrator() &&
  → (basename($_SERVER['PHP_SELF'])
  → != 'logout.php'))
OR (isset($loggedin) &&
  → $loggedin) ) {
```

This conditional is a bit complicated. To start, most pages can confirm that the current user is an administrator by just invoking the **is\_administrator()** function. But because of how cookies work, that function will return inappropriate results on two pages: **login.php** and **logout.php**. On the **logout.php**, the script will have received the administrative cookie prior to deleting it. So on that page, it will seem like the user is an administrator (because they just were), but links to the administrative pages should not be shown as the user will be blocked from using them (because when they get to those pages, the cookie will no longer exist). Hence, the first part of the conditional requires that **is\_administrator()** return true and that the current page not be **logout.php**. The code **basename(\$\_SERVER['PHP\_SELF'])** is a reliable way to get the current script (and because the footer file is included by another script, **\$\_SERVER['PHP\_SELF']** will have the value of the *including* script).

The second part of the conditional, after the **OR**, checks if the **\$loggedin** variable is set and has a true value. This will be the case on the **login.php** page, after the user successfully logged in. The

`is_administrator()` function won't return a true value at that juncture, because the cookie will have been just sent by the script, and therefore won't be available to be read.

**3.** Create the links:

```
print '<hr /><h3>Site Admin</h3>
→ <p><a href="add_quote.php">Add
→ Quote</a> <->
<a href="view_quotes.php">View All
→ Quotes</a> <->
<a href="logout.php">Logout</a></p>';
```

Three links are created: to a page for adding new quotes, to a page for viewing every quote, and to the logout page.

- 4.** Complete the conditional and the PHP section:

```
}
```

- 5.** Complete the HTML page:

```
</div><!-- container -->
<div id="footer">Content &copy;
→ 2011</div>
</body>
</html>
```

- 6.** Save the file as `footer.html`, stored in the `templates` directory.

**Script 13.4** The footer file displays general administrative links, when appropriate, and completes the HTML page.

```
1  <!-- END CHANGEABLE CONTENT. -->
2  <?php // Script 13.4 - footer.html
3
4  // Display general admin links...
5  // - if the user is an administrator and it's not the logout.php page
6  // - or if the $loggedin variable is true (i.e., the user just logged in)
7  if ( (is_administrator() && (basename($_SERVER['PHP_SELF']) != 'logout.php'))
8  OR (isset($loggedin) && $loggedin) ) {
9
10     // Create the links:
11     print '<hr /><h3>Site Admin</h3><p><a href="add_quote.php">Add Quote</a> <->
12     <a href="view_quotes.php">View All Quotes</a> <->
13     <a href="logout.php">Logout</a></p>';
14
15 }
16
17 ?>
18     </div><!-- container -->
19     <div id="footer">Content &copy; 2011</div>
20 </body>
21 </html>
```

# Logging In

Next, it's time to create the script through which the administrator can log in. The end result will be very similar to the scripts in Chapter 9, "Cookies and Sessions," with one structural difference: that chapter used *output buffering*, allowing you to lay out your script however you want. This site does not use output buffering, so the handling of the form must be written in such a way that the cookie can be sent without generating *headers already sent* errors (see Chapter 9 if this isn't ringing a bell for you). In other words, the script must check for a form submission prior to including the header. To still be able to reflect errors and other messages within the context of the page, you must therefore use variables.

## To create login.php:

1. Begin a new PHP document in your text editor or IDE, to be named **login.php** (**Script 13.5**):

```
<?php // Script 13.5 - login.php
```

2. Define two variables with default values:

```
$loggedin = false;  
$error = false;
```

These two variables will be used later in the script. Here they are given default values, indicating that the person is not logged in and no errors have yet occurred.

3. Check if the form has been submitted:

```
if ($_SERVER['REQUEST_METHOD'] ==  
→ 'POST') {
```

**Script 13.5** The login script both displays and handles a form, sending a cookie upon a successful login attempt.

```
1  <?php // Script 13.5 - login.php  
2  /* This page lets people log into the  
site. */  
3  
4  // Set two variables with default values:  
5  $loggedin = false;  
6  $error = false;  
7  
8  // Check if the form has been submitted:  
9  if ($_SERVER['REQUEST_METHOD'] == 'POST')  
{  
10    // Handle the form:  
11    if (!empty($_POST['email']) &&  
12      !empty($_POST['password'])) {  
13      if ( (strtolower($_POST['email'])  
14        == 'me@example.com') && ($_  
15        _POST['password'] == 'testpass') ) {  
16        // Correct!  
17  
18        // Create the cookie:  
19        setcookie('Samuel', 'Clemens',  
20          time() + 3600);  
21  
22        // Indicate they are logged in:  
23        $loggedin = true;  
24  
25      } else { // Incorrect!  
26  
27        $error = 'The submitted email  
28        address and password do not  
29        match those on file!';  
30  
31    }  
32  
33  } else { // Forgot a field.  
34  
35    $error = 'Please make sure you  
36    enter both an email address and a  
37    password!';  
38  
39  }  
40}
```

*code continues on next page*

### Script 13.5 continued

```
36 // Set the page title and include the
37 define('TITLE', 'Login');
38 include('templates/header.html');
39
40 // Print an error if one exists:
41 if ($error) {
42     print '<p class="error">' . $error .
'</p>';
43 }
44
45 // Indicate the user is logged in, or
46 // show the form:
47 if ($loggedin) {
48     print '<p>You are now logged in!</p>';
49 } else {
50
51     print '<h2>Login Form</h2>
52     <form action="login.php"
53         method="post">
54         <p><label>Email Address <input type=
55             "text" name="email" /></label></p>
56         <p><label>Password <input
57             type="password" name="password" />
58             </label></p>
59         <p><input type="submit" name="submit"
60             value="Log In!" /></p>
61     </form>';
62 }
```

#### 4. Handle the form:

```
if (!empty($_POST['email']) &&
→ !empty($_POST['password'])) {
    if ( (strtolower($_POST['email'])
→ == 'me@example.com') && ($_POST
→ ['password'] == 'testpass') ) {
```

Similar to examples in Chapter 9, this script first confirms that both `$_POST['email']` and `$_POST['password']` are not empty. The second conditional compares the submitted values against what they need to be.

#### 5. Create the cookie:

```
setcookie('Samuel', 'Clemens',
→ time() + 3600);
```

The cookie has a name of *Samuel* and a value of *Clemens*. It's set to expire in an hour.

#### 6. Indicate that the user is logged in:

```
$loggedin = true;
```

This variable will be used later in this same script, and in the footer file (see Script 13.4).

#### 7. Create error messages for the two other conditions:

```
} else { // Incorrect!
    $error = 'The submitted
→ email address and
→ password do not match
→ those on file!';
}
} else { // Forgot a field.
    $error = 'Please make sure
→ you enter both an email
→ address and a password!';
}
}
```

*continues on next page*

The first **else** clause applies if an email address and password were provided but were wrong. The second **else** clause applies if no email address or password was submitted. In both cases, the message is assigned to a variable so that it may be used later in the script.

8. Set the page title and include the header file:

```
define('TITLE', 'Login');
include('templates/header.html');
```

9. Print an error if one exists:

```
if ($error) {
    print '<p class="error">' .
        →$error . '</p>';
}
```

The error itself will be determined in Step 7, but it can't be printed at that point because the HTML header will not have been included. The solution is to have this code check for a non-false **\$error** value and then print **\$error** within some HTML and CSS **A**.

## My Site of Quotes

The submitted email address and password do not match those on file!

### Login Form

Email Address

**A** Error messages are displayed after the header is included but before the HTML form.



**B** The result upon successfully logging in.

A screenshot of a web page titled "My Site of Quotes" showing a "Login Form". It contains fields for "Email Address" and "Password", and a "Log In!" button. At the bottom, there is a copyright notice "Content © 2011".

**C** The basic login form.

- 10.** Indicate that the user is logged in, or display the form:

```
if ($loggedin) {  
    print '<p>You are now logged  
    →in!</p>';  
} else {  
    print '<h2>Login Form</h2>  
<form action="login.php"  
→ method="post">  
<p><label>Email Address <input  
→ type="text" name="email" />  
→ </label></p>  
<p><label>Password <input  
→ type="password" name=  
→ "password" /></label></p>  
<p><input type="submit" name=  
→ "submit" value="Log In!" /></p>  
</form>';  
}
```

If the **\$loggedin** variable has a true value—its value is false by default—then the user just successfully logged into the site and a message saying so is displayed **B**. If the **\$loggedin** variable still has its default value, then the form should be shown **C**.

- 11.** Include the footer and complete the page:

```
include('templates/footer.html');  
?>
```

- 12.** Save the file as **login.php**.

- 13.** Test the file in your Web browser (Figures **A**, **B**, and **C**).

I purposefully omitted creating a link to the login section (as a security measure), so you'll need to enter the correct URL in your Web browser's address bar.

**TIP** Note that, as written, the script requires administrators to log back in after an hour, whether or not they continue to be active in the site.

# Logging Out

If you write a login process, there must be a logout process, too. In this case, just using cookies, it's a very simple script.

## To create `logout.php`:

1. Begin a new PHP document in your text editor or IDE, to be named `logout.php` (**Script 13.6**):

```
<?php // Script 13.6 - logout.php
```

2. Destroy the cookie, but only if it already exists:

```
if (isset($_COOKIE['Samuel'])) {  
    setcookie('Samuel', FALSE,  
              → time()-300);  
}
```

As an extra security measure, the script only attempts to delete the cookie if it exists. By making this check, the script prevents hackers from discovering the name of the cookie used by the site by accessing the logout script without having first logged in.

To delete the existing login cookie, another cookie is sent with the same name, a value of FALSE, and an expiration time in the past.

3. Define a page title and include the header:

```
define('TITLE', 'Logout');  
include('templates/header.html');
```

4. Print a message:

```
print '<p>You are now logged  
→ out.</p>';
```

5. Include the footer:

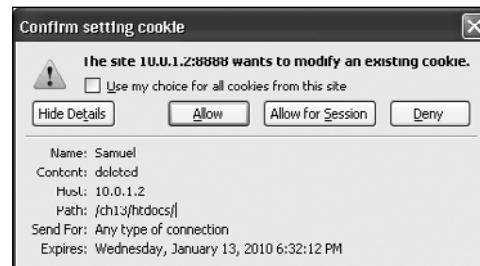
```
include('templates/footer.html');  
?>
```

6. Save the file as `logout.php`.

7. Test the file in your Web browser **A** and **B**.

**Script 13.6** The logout script deletes the administrator-identifying cookie.

```
1  <?php // Script 13.6 - logout.php  
2  /* This is the logout page. It destroys  
   the cookie. */  
3  
4  // Destroy the cookie, but only if it  
   already exists:  
5  if (isset($_COOKIE['Samuel'])) {  
6      setcookie('Samuel', FALSE,  
               time()-300);  
7  }  
8  
9  // Define a page title and include the  
   header:  
10 define('TITLE', 'Logout');  
11 include('templates/header.html');  
12  
13 // Print a message:  
14 print '<p>You are now logged out.</p>';  
15  
16 // Include the footer:  
17 include('templates/footer.html');  
18 ?>
```



**A** This cookie deletes the existing cookie.

My Site of Quotes

You are now logged out.

Content © 2011

**B** The resulting logout page.

## My Site of Quotes

### Add a Quotation

It is the mark of an educated mind to be able to entertain a thought without accepting it.

Quote

Source Aristotle

Is this a favorite?

Add This Quote!

**A** The form for adding quotations to the database.

**Script 13.7** The `add_quote.php` script allows only administrators to add new quotations to the database.

```
1 <?php // Script 13.7 - add_quote.php
2 /* This script adds a quote. */
3
4 // Define a page title and include the
5 // header:
6 define('TITLE', 'Add a Quote');
7 include('templates/header.html');
8
9 print '<h2>Add a Quotation</h2>';
10
11 // Restrict access to administrators only:
12 if (!is_administrator()) {
13     print '<h2>Access Denied!</h2><p>
14         You do not have
15         permission to access this page.</p>';
16     include('templates/footer.html');
17     exit();
18 }
19
20 // Check for a form submission:
21 if ($_SERVER['REQUEST_METHOD'] == 'POST')
22 { // Handle the form.
23
24     if ( !empty($_POST['quote']) &&
25         !empty($_POST['source']) ) {
26
27 }
```

code continues on next page

## Adding Quotes

Now that the administrator has the ability to log in, she or he should be able to start adding quotations. The script for doing so is a lot like the one for adding blog postings (from Chapter 12), but the form will have an additional checkbox for marking the quotation as a favorite **A**.

Because this script creates records in the database, security must be a primary concern. As an initial precaution, the script will make sure that only the administrator can use the page. Second, values to be used in the SQL command will be sanctified to prevent invalid queries.

### To create `add_quote.php`:

1. Begin a new PHP document in your text editor or IDE, to be named `add_quote.php` (Script 13.7):

```
<?php // Script 13.7 -
→ add_quote.php
define('TITLE', 'Add a Quote');
include('templates/header.html');
print '<h2>Add a Quotation</h2>';
```

2. Deny access to the page if the user is not an administrator:

```
if (!is_administrator()) {
    print '<h2>Access Denied!</h2>
→ <p class="error">You do not
→ have permission to access
→ this page.</p>';
    include('templates/footer.html');
    exit();
}
```

continues on next page

By invoking the `is_administrator()` function, the script can quickly test for that condition. If the user is not an administrator, an *Access Denied* error is displayed, the footer is included, and the script is terminated ❸.

3. Check for a form submission:

```
if ($_SERVER['REQUEST_METHOD'] ==  
→ 'POST') {
```

4. Check for values:

```
if ( !empty($_POST['quote']) &&  
→ !empty($_POST['source']) ) {
```

This script performs a minimum of validation, checking that the two variables aren't empty. With large blocks of text, such as a quotation, there's not much more that can be done in terms of validation.

5. Prepare the values for use in the query:

```
$quote = mysql_real_escape_  
→ string(trim(strip_tags($_POST  
→ ['quote'])), $dbc);  
$source = mysql_real_escape_  
→ string(trim(strip_tags($_POST  
→ ['source'])), $dbc);
```

To make the two textual values safe to use in the query, they're run through the `mysql_real_escape_string()` function (see Chapter 12). To make the values safe to later display in the Web page, the `strip_tags()` function is applied, too (see Chapter 5, "Using Strings").

6. Create the *favorite* value:

```
if (isset($_POST['favorite'])) {  
    $favorite = 1;  
} else {  
    $favorite = 0;  
}
```

## My Site of Quotes

### Add a Quotation

#### Access Denied!

You do not have permission to access this page.

Content © 2011

❸ Any user not logged in as an administrator is denied access to the form.

### Script 13.7 continued

```
22      // Need the database connection:  
23      include('../mysql_connect.php');  
24  
25      // Prepare the values for storing:  
26      $quote = mysql_real_escape_  
→ string(trim(strip_tags($_  
→ POST['quote'])), $dbc);  
27      $source = mysql_real_escape_  
→ string(trim(strip_tags($_  
→ POST['source'])), $dbc);  
28  
29      // Create the "favorite" value:  
30      if (isset($_POST['favorite'])) {  
31          $favorite = 1;  
32      } else {  
33          $favorite = 0;  
34      }  
35  
36      $query = "INSERT INTO quotes  
→ (quote, source, favorite) VALUES  
→ ('$quote', '$source', $favorite)";  
37      $r = mysql_query($query, $dbc);  
38  
39      if (mysql_affected_rows($dbc) ==  
→ 1) {  
40          // Print a message:  
41          print '

Your quotation has  
→ been stored.

';  
42      } else {  
43          print '

Could  
→ not store the quote because:<br  
→ />' . mysql_error($dbc) . '</p>

The query being run was:  
→ ' . $query . '</p>';


```

code continues on next page

### Script 13.7 continued

```
44     }
45
46     // Close the connection:
47     mysql_close($dbc);
48
49 } else { // Failed to enter a quotation.
50     print '<p class="error">Please
51         enter a quotation and a source!</p>';
52 }
53 } // End of submitted IF.
54
55 // Leave PHP and display the form:
56 ?>
57
58 <form action="add_quote.php"
59     method="post">
60     <p><label>Quote <textarea
61         name="quote" rows="5" cols="30">
62             </textarea></label></p>
63     <p><label>Source <input type="text"
64         name="source" /></label></p>
65     <p><label>Is this a favorite? <input
66         type="checkbox" name="favorite"
67         value="yes" /></label></p>
68     <p><input type="submit" name="submit"
69         value="Add This Quote!" /></p>
70 </form>
71
72 <?php include('templates/header.html');
73 ?>
```

In the database, a quotation's status as a favorite is indicated by a 1. Nonfavorites are represented by a 0. To determine which number to use, all the PHP script has to do is check for a `$_POST ['favorite']` value. If that variable is set, regardless of what its value is, it means the user checked the favorite checkbox. If the user didn't do that, then the variable won't be set, and the `$favorite` variable will be assigned the value 0.

#### 7. Define and execute the query:

```
$query = "INSERT INTO quotes
    → (quote, source, favorite) VALUES
    → ('$quote', '$source', $favorite)";
$r = mysql_query($query, $dbc);
```

The query specifies values for three fields and uses the variables already defined. The remaining two table columns—`quote_id` and `date_entered`—will automatically be assigned values, thanks to the table's definition.

#### 8. Print a message based on the results:

```
if (mysql_affected_rows($dbc) ==
    → 1) {
    print '<p>Your quotation has
        → been stored.</p>';
} else {
    print '<p class="error">Could
        → not store the quote because:
        → <br />' . mysql_error($dbc) .
        → '.</p><p>The query being run
        → was: ' . $query . '</p>';
}
```

If the `INSERT` query created one new row in the database, a message indicating such is displayed. Otherwise, debugging information is shown so that you can try to figure out what went wrong.

*continues on next page*

9. Complete the validation conditional:

```
 } else { // Failed to enter a  
→ quotation.  
    print '<p class="error">Please  
→ enter a quotation and a  
→ source!</p>';  
}
```

10. Complete the submission conditional and the PHP block:

```
 } // End of submitted IF.  
?>
```

11. Create the form:

```
<form action="add_quote.php"  
→ method="post">  
    <p><label>Quote <textarea  
    → name="quote" rows="5"  
    → cols="30"></textarea>  
    → </label></p>  
    <p><label>Source <input  
    → type="text" name="source" />  
    → </label></p>  
    <p><label>Is this a favorite?  
    → <input type="checkbox"  
    → name="favorite" /></label></p>  
    <p><input type="submit"  
    → name="submit" value="Add This  
    → Quote!" /></p>  
</form>
```

The form has one text area, one text input, and a checkbox (plus the submit button, of course). It is not designed to be sticky: that's a feature you could add later, if you wanted.

12. Include the footer:

```
<?php include('templates/  
→ footer.html'); ?>
```

13. Save the file as `add_quote.php` and test in your Web browser **C**.

**TIP** The ability to create (i.e., `INSERT`), retrieve (`SELECT`), update, and delete database records is collectively referred to as *CRUD*.



The screenshot shows a web page titled "My Site of Quotes". Below the title is a heading "Add a Quotation". A green message "Your quotation has been stored" is displayed. Below the message is a large, empty text area with the word "Quote" in its bottom-left corner, indicating where a user can enter a quote.

**C** The result after adding a quotation.

# My Site of Quotes

## All Quotes

*Nothing astonishes men so much as common sense and plain dealing.*

- Ralph Waldo Emerson

Quote Admin: [Edit](#) <-> [Delete](#)

*It is the mark of an educated mind to be able to entertain a thought without accepting it.*

- Aristotle [Favorite!](#)

Quote Admin: [Edit](#) <-> [Delete](#)

*In all affairs it's a healthy thing now and then to hang a question mark on the things you have long*

- A** The full list of stored quotations, with links to edit or delete each.

**Script 13.8** This script lists every quotation currently stored, providing links for the administrator to edit or delete them.

```
1  <?php // Script 13.8- view_quotes.php
2  /* This script lists every quote. */
3
4  // Include the header:
5  define('TITLE', 'View All Quotes');
6  include('templates/header.html');
7
8  print '<h2>All Quotes</h2>';
9
10 // Restrict access to administrators only:
11 if (!is_administrator()) {
12     print '<h2>Access Denied!</h2><p>
13         class="error">You do not have
14             permission to access
15             this page.</p>';
16     include('templates/footer.html');
17     exit();
18
19 // Need the database connection:
20 include('../mysql_connect.php');
```

code continues on next page

# Listing Quotes

The administrative side of the site will have a page that lists every quote stored in the database **A**. Although the same script could easily be adapted for the public side, its primary purpose is to provide quick links for the administrator to edit or delete any quote (as opposed to searching randomly through the public side for the right quote to manage).

Like the **add\_quote.php** script, this page will restrict access to just administrators.

## To create **view\_quotes.php**:

1. Begin a new PHP document in your text editor or IDE, to be named **view\_quotes.php** (**Script 13.8**):

```
<?php // Script 13.8-
→ view_quotes.php
define('TITLE', 'View All Quotes');
include('templates/header.html');
print '<h2>All Quotes</h2>';
```

2. Terminate the script if the user isn't an administrator:

```
if (!is_administrator()) {
    print '<h2>Access Denied!</h2>
→ <p class="error">You do not
→ have permission to access
→ this page.</p>';
    include('templates/footer.html');
    exit();
}
```

continues on next page

This is the exact same code as that in **add\_quote.php**. Except for the browser's title, the result for nonadministrators will be the same as in **B** in the previous section of the chapter.

3. Include the database connection and define the query:

```
include('../mysql_connect.php');
$query = 'SELECT quote_id, quote,
→ source, favorite FROM quotes
→ ORDER BY date_entered DESC';
```

```
<!-- BEGIN CHANGEABLE CONTENT --><h2>All Quo
<p><b>Quote Admin:</b> <a href="edit_quote.php?id=13">Edit</a>
<a href="delete_quote.php?id=13">Delete</a></p>
<div><blockquote>It is the mark of an educated mind to be abl
<strong>Favorite!</strong><p><b>Quote Admin:</b> <a href="ed
<a href="delete_quote.php?id=5">Delete</a></p>
<div><blockquote>In all affairs it's a healthy thing now and
mark on the things you have long taken for granted.</blockquo
<p><b>Quote Admin:</b> <a href="edit_quote.php?id=5">Edit</a>
<a href="delete_quote.php?id=5">Delete</a></p>
<div><blockquote>Nurture your mind with great thoughts, for y
<p><b>Quote Admin:</b> <a href="edit_quote.php?id=6">Edit</a>
<a href="delete_quote.php?id=6">Delete</a></p>
```

- B** The HTML source code for the page shows how the **quote\_id** value is passed in the URL to the linked pages.

**Script 13.8** *continued*

```
20 // Define the query:
21 $query = 'SELECT quote_id, quote, source, favorite FROM quotes ORDER BY date_entered DESC';
22
23 // Run the query:
24 if ($r = mysql_query($query, $dbc)) {
25
26     // Retrieve the returned records:
27     while ($row = mysql_fetch_array($r)) {
28
29         // Print the record:
30         print "<div><blockquote>{$row['quote']}</blockquote>- {$row['source']}\n";
31
32         // Is this a favorite?
33         if ($row['favorite'] == 1) {
34             print ' <strong>Favorite!</strong>';
35         }
36
37         // Add administrative links:
38         print "<p><b>Quote Admin:</b> <a href=\"edit_quote.php?id={$row['quote_id']}\">Edit</a> <-
39             <a href=\"delete_quote.php?id={$row['quote_id']}\">Delete</a></p></div>\n";
40
41     } // End of while loop.
42
43 } else { // Query didn't run.
44     print '<p class="error">Could not retrieve the data because:<br />' . mysql_error($dbc) . '</
45     p>The query being run was: ' . $query . '</p>';
46 } // End of query IF.
47
48 mysql_close($dbc); // Close the connection.
49
50 include('templates/footer.html'); // Include the footer.
51 ?>
```

The query returns four columns—all but the date entered—from the database for every record. The results will be returned in order by the date they were entered.

4. Execute the query and begin retrieving the results:

```
if ($r = mysql_query($query,
→ $dbc)) {
    while ($row = mysql_fetch_
→ array($r)) {
```

The **while** loop code was explained in Chapter 12, even though it wasn't used in that chapter. This construct is how you fetch every record returned by a query.

5. Begin printing the record:

```
print "<div><blockquote>
→ {$row['quote']}</blockquote>-
→ {$row['source']}<br>";
```

This code starts a DIV, places the quotation itself within **blockquote** tags, and then shows the quote's attribution.

6. Indicate that the quotation is a favorite, if applicable:

```
if ($row['favorite'] == 1) {
    print ' <strong>Favorite!
→ </strong>';
}
```

The value of `$row['favorite']` will be either 1 or 0. If it's 1, the word *Favorite!*, emphasized, is displayed along with the record.

7. Add administrative links for editing and deleting the quote:

```
print "<p><b>Quote Admin:</b>
→ <a href=\"edit_quote.php?id=
→ {$row['quote_id']}\">Edit</a> <-
→ <a href=\"delete_quote.php?id=
→ {$row['quote_id']}\">Delete</a>
→ </p></div><br>";
```

For each quote, two links must be created. The first is to `edit_quote.php` and the second to `delete_quote.php`. Each link must also pass the `quote_id` value along in the URL, as the code in Chapter 12 does **B**.

The end of the `print` statement closes the DIV for the specific quotation (begun in Step 5).

8. Complete the **while** loop and the `mysql_query()` conditional:

```
    } // End of while loop.
} else { // Query didn't run.
    print '<p class="error">Could
→ not retrieve the data
→ because:<br />' . mysql_
→ error($dbc) . '</p><p>The
→ query being run was: ' .
→ $query . '</p>';
} // End of query IF.
```

9. Close the database connection:

```
mysql_close($dbc);
```

10. Complete the page:

```
include('templates/footer.html');
?>
```

11. Save the view as `view_quotes.php` and test in your Web browser.

**TIP** As some of the queries in this chapter demonstrate, you can use a column or value in an ORDER BY clause even if it's not selected by the query.

# Editing Quotes

The `view_quotes.php` page (and later, `index.php`) has links to `edit_quote.php`, where the administrator can update a quote. Functionally, this script will be very similar to `edit_entry.php` from Chapter 12:

1. The script needs to receive an ID value in the URL.
2. Using the ID, the record is retrieved and used to populate a form A.
3. Upon form submission, the form data will be validated (even if only slightly).
4. If the form data passes validation, the record will be updated in the database.

For the most part, this script is just another application of what you've already seen. But one new thing you'll learn here is how to check or not check a form's checkbox element based on a preexisting value.

## To create `edit_quote.php`:

1. Begin a new PHP document in your text editor or IDE, to be named `edit_quote.php` (Script 13.9):

```
<?php // Script 13.9 -  
→ edit_quote.php  
define('TITLE', 'Edit a Quote');  
include('templates/header.html');  
print '<h2>Edit a Quotation</h2>';
```
2. Terminate the script if the user isn't an administrator:

```
if (!is_administrator()) {  
    print '<h2>Access Denied!</h2>  
→ <p class="error">You do not  
→ have permission to access  
→ this page.</p>';  
    include('templates/footer.html');  
    exit();  
}
```

The screenshot shows a web page titled "Edit a Quotation". It contains a text area with the quote "It is the mark of an educated mind to be able to entertain a thought without accepting it.", a "Source" field containing "Aristotle", and a checked "Is this a favorite?" checkbox. A button labeled "Update This Quote!" is at the bottom.

A The form's elements are prepopulated, and pre-checked, using the record's existing values.

**Script 13.9** The `edit_quote.php` script gives the administrator a way to update an existing record.

```
1  <?php // Script 13.9 - edit_quote.php  
2  /* This script edits a quote. */  
3  
4  // Define a page title and include the  
header:  
5  define('TITLE', 'Edit a Quote');  
6  include('templates/header.html');  
7  
8  print '<h2>Edit a Quotation</h2>';  
9  
10 // Restrict access to administrators only:  
11 if (!is_administrator()) {  
12     print '<h2>Access Denied!</h2>  
→ <p class="error">You do not have  
→ permission to access this page.</p>';  
13     include('templates/footer.html');  
14     exit();  
15 }  
16  
17 // Need the database connection:  
18 include('../mysql_connect.php');  
19  
20 if (isset($_GET['id']) && is_numeric  
→ ($_GET['id']) && ($_GET['id'] > 0) ) { //  
→ Display the entry in a form:  
21  
22     // Define the query.
```

code continues on next page

**3.** Include the database connection:

```
include('../mysql_connect.php');
```

Both phases of the script—displaying the form and handling the form—require a database connection, so the included file is incorporated at this point.

**4.** Validate that a numeric ID value was received in the URL:

```
if (isset($_GET['id']) &&
    is_numeric($_GET['id']) &&
    ($_GET['id'] > 0) ) {
```

This conditional is like one from Chapter 12, with the addition of checking that the ID value is greater than 0. Adding that clause doesn't do

anything for the security of the script—the `is_numeric()` test confirms that the value is safe to use in a query, but prevents the query from being executed if the ID has an unusable value.

**5.** Define and execute the query:

```
$query = "SELECT quote, source,
          favorite FROM quotes WHERE
          quote_id={$GET['id']}";
if ($r = mysql_query($query,
                     $dbc)) {
    $row = mysql_fetch_array($r);
```

The query returns three columns for a specific record.

*continues on next page*

**Script 13.9** *continued*

```
23   $query = "SELECT quote, source, favorite FROM quotes WHERE quote_id={$GET['id']}";
24   if ($r = mysql_query($query, $dbc)) { // Run the query.
25
26       $row = mysql_fetch_array($r); // Retrieve the information.
27
28       // Make the form:
29       print '<form action="edit_quote.php" method="post">
30           <p><label>Quote <textarea name="quote" rows="5" cols="30">' . htmlentities($row['quote'])
31           . '</textarea></label></p>
32           <p><label>Source <input type="text" name="source" value="' . htmlentities($row['source'])
33           . '" /></label></p>
34           <p><label>Is this a favorite? <input type="checkbox" name="favorite" value="yes"';
35
36           // Check the box if it is a favorite:
37           if ($row['favorite'] == 1) {
38               print ' checked="checked"';
39
40           // Complete the form:
41           print ' /></label></p>
42               <input type="hidden" name="id" value="' . $_GET['id'] . '" />
43               <p><input type="submit" name="submit" value="Update This Quote!" /></p>
44           </form>';
45
46       } else { // Couldn't get the information.
47           print '<p class="error">Could not retrieve the quotation because:<br />' . mysql_
48               error($dbc) . '</p><p>The query being run was: ' . $query . '</p>';
```

*code continues on next page*

6. Begin creating the form:

```
print '<form action="edit_quote.php"
→ method="post">
<p><label>Quote <textarea name=
→ "quote" rows="5" cols="30"> .
→ htmlentities($row['quote']) .
→ '</textarea></label></p>
```

```
<p><label>Source <input type=
→ "text" name="source" value="" .
→ htmlentities($row['source']) .
→ '' /></label></p>
<p><label>Is this a favorite?
→ <input type="checkbox"
→ name="favorite" value="yes" ;
```

**Script 13.9** continued

```
49 } elseif (isset($_POST['id']) && is_numeric($_POST['id']) && ($_POST['id'] > 0)) { // Handle the form.
50
51     // Validate and secure the form data:
52     $problem = FALSE;
53     if ( !empty($_POST['quote']) && !empty($_POST['source']) ) {
54
55         // Prepare the values for storing:
56         $quote = mysql_real_escape_string(trim(strip_tags($_POST['quote'])), $dbc);
57         $source = mysql_real_escape_string(trim(strip_tags($_POST['source'])), $dbc);
58
59         // Create the "favorite" value:
60         if (isset($_POST['favorite'])) {
61             $favorite = 1;
62         } else {
63             $favorite = 0;
64         }
65
66     } else {
67         print '<p class="error">Please submit both a quotation and a source.</p>';
68         $problem = TRUE;
69     }
70
71     if (!$problem) {
72
73         // Define the query.
74         $query = "UPDATE quotes SET quote='$quote', source='$source', favorite=$favorite WHERE
75         quote_id=$_POST['id']";
76         if ($r = mysql_query($query, $dbc)) {
77             print '<p>The quotation has been updated.</p>';
78         } else {
79             print '<p class="error">Could not update the quotation because:<br />' . mysql_
80             error($dbc) . '</p><p>The query being run was: ' . $query . '</p>';
81         }
82
83     } // No problem!
84
85 } else { // No ID set.
86     print '<p class="error">This page has been accessed in error.</p>';
87 } // End of main IF.
88
89 mysql_close($dbc); // Close the connection.
90 include('templates/footer.html'); // Include the footer.
91 ?>
```

The form is posted back to this same page. It starts with a text area, whose value will be prepopulated with the quote value retrieved from the database. That value is run through `htmlentities()` as a safety precaution.

Next, a text input is created, prepopulated with the quotation's source. Finally, the checkbox for the indication of the favorite is begun.

Note that this checkbox element is not completed, as the script needs to next determine whether or not to check the box (in Step 7).

7. Check the box if it is a favorite:

```
if ($row['favorite'] == 1) {  
    print ' checked="checked"';  
}
```

If the record's **favorite** value equals 1, then the administrator previously marked this quotation as a favorite. In that case, additional HTML needs to be added to the checkbox input to pre-check it. After this point in the code, the favorite checkbox's underlying HTML will be either

```
<input type="checkbox"  
→ name="favorite" value="yes"
```

or B

```
<input type="checkbox"  
→ name="favorite" value="yes"  
→ checked="checked"
```

*continues on next page*

```
<textarea name="quote" rows="5" cols="30">It is the mark of an educated mind to be ab  
<input type="text" name="source" value="Aristotle" /></label></p>  
s a favorite? <input type="checkbox" name="favorite" value="yes" checked="checked" />  
.den" name="id" value="9" />
```

- B The HTML source code for the page, upon first arriving, shows how the favorite checkbox can be pre-checked.

**8.** Complete the form:

```
print ' /></label></p>
<input type="hidden" name="id"
→ value="' . $_GET['id'] . "' />
<p><input type="submit" name=
→ "submit" value="Update This
→ Quote!" /></p>
</form>';
```

The `print` statement starts by closing the checkbox. Then the form must also store the ID value in a hidden input, so that it's available to the script upon the form submission.

**9.** Create an error if the record could not be retrieved:

```
} else { // Couldn't get the
→ information.
    print '<p class="error">Could
→ not retrieve the quotation
→ because:<br />' . mysql_
→ error($dbc) . '.</p><p>The
→ query being run was: ' .
→ $query . '</p>';
}
```

**10.** Check for a form submission:

```
} elseif (isset($_POST['id']) &&
→ is_numeric($_POST['id']) &&
→ ($_POST['id'] > 0)) {
```

This conditional begins the second phase of the script: handling the submission of the form. The validation is the same as in Step 4, but now `$_POST['id']` is referenced instead of `$_GET['id']`.

**11.** Validate the form data:

```
$problem = FALSE;
if ( !empty($_POST['quote']) &&
→ !empty($_POST['source']) ) {
```

The form validation for the edit page mirrors that in the `add_quote.php` script (Script 13.7).

**12.** Prepare the values for use in the query:

```
$quote = mysql_real_escape_string
→ (trim(strip_tags($_POST
→ ['quote'])), $dbc);
$source = mysql_real_escape_
→ string(trim(strip_tags($_POST
→ ['source'])), $dbc);
if (isset($_POST['favorite'])) {
    $favorite = 1;
} else {
    $favorite = 0;
}
```

This code is also taken straight from `add_quote.php`.

**13.** Indicate a problem if the form wasn't completed:

```
} else {
    print '<p class="error">Please
→ submit both a quotation and
→ a source.</p>';
    $problem = TRUE;
}
```

**14.** If no problem occurred, update the database:

```
if (!$problem) {
    $query = "UPDATE quotes SET
→ quote='$quote', source=
→ '$source', favorite=$favorite
→ WHERE quote_id={$_POST['id']}";
    if ($r = mysql_query($query,
→ $dbc)) {
        print '<p>The quotation has
→ been updated.</p>';
```

# My Site of Quotes

## Edit a Quotation

The quotation has been updated.

- C The result upon successfully editing a record.

The **UPDATE** query updates the values of three of the record's columns. The two string values are enclosed in single quotation marks (within the query); the numeric **\$favorite** value is not.

The **WHERE** clause, which dictates the record to be updated, is the critical piece.

Finally, a simple message indicates the success of the operation C.

15. Indicate a problem if the query failed:

```
} else {
    print '<p class="error">Could
    → not update the quotation
    → because:<br />' . mysql_
    → error($dbc) . '.</p><p>The
    → query being run was: ' .
    → $query . '</p>';
}
```

16. Complete the conditionals:

```
} // No problem!
} else { // No ID set.
    print '<p class="error">This
    → page has been accessed in
    → error.</p>';
} // End of main IF.
```

The **else** clause applies if no valid ID value is received by the page via either GET or POST.

17. Close the database connection and complete the page:

```
mysql_close($dbc);
include('templates/footer.html');
?>
```

18. Save the file and test in your Web browser (by clicking a link on **view\_quotes.php**).

# Deleting Quotes

The script for deleting existing quotations mimics `delete_entry.php` from Chapter 12. Upon first arriving, assuming that a valid record ID was passed along in the URL, the quote to be deleted is displayed **A**. If the administrator clicks the submit button, the form will be submitted back to this same page, at which point the record will be removed from the database **B**.

## To create `delete_quote.php`:

1. Begin a new PHP document in your text editor or IDE, to be named `delete_quote.php` (Script 13.10):

```
<?php // Script 13.10 -  
/* delete_quote.php */  
define('TITLE', 'Delete a Quote');  
include('templates/header.html');  
print '<h2>Delete a Quotation</h2>';
```

**Script 13.10** The `delete_quote.php` script provides the administrator with a way to delete an existing record.

```
1  <?php // Script 13.10 - delete_quote.php  
2  /* This script deletes a quote. */  
3  
4  // Define a page title and include the header:  
5  define('TITLE', 'Delete a Quote');  
6  include('templates/header.html');  
7  
8  print '<h2>Delete a Quotation</h2>';  
9  
10 // Restrict access to administrators only:  
11 if (!is_administrator()) {  
12     print '<h2>Access Denied!</h2>  
13     <p class="error">You do not have permission to access this page.</p>';  
14     include('templates/footer.html');  
15     exit();  
16 }  
17 // Need the database connection:  
18 include('../mysql_connect.php');  
19  
20 if (isset($_GET['id']) && is_numeric($_GET['id']) && ($_GET['id'] > 0) ) { // Display the quote  
in a form:
```

## My Site of Quotes

### Delete a Quotation

Are you sure you want to delete this quote?

*It is the mark of an educated mind to be able to entertain a thought without accepting it.*

- Aristotle

- A** The first step for deleting a record is confirming the record to be removed.

### Delete a Quotation

The quote entry has been deleted.

- B** Upon submission of the form, the quotation is deleted and a message is printed.

code continues on next page

- Terminate the script if the user isn't an administrator:

```
if (!is_administrator()) {
    print '<h2>Access Denied!</h2>
    ><p class="error">You do not
    >have permission to access
    >this page.</p>';
    include('templates/footer.html');
    exit();
}
```

- Include the database connection:

```
include('../mysql_connect.php');
```

*continues on next page*

#### Script 13.10 *continued*

```
21
22 // Define the query:
23 $query = "SELECT quote, source, favorite FROM quotes WHERE quote_id={$GET['id']}";
24 if ($r = mysql_query($query, $dbc)) { // Run the query.
25
26     $row = mysql_fetch_array($r); // Retrieve the information.
27
28     // Make the form:
29     print '<form action="delete_quote.php" method="post">
30     <p>Are you sure you want to delete this quote?</p>
31     <div><blockquote>' . $row['quote'] . '</blockquote>- ' . $row['source'];
32
33     // Is this a favorite?
34     if ($row['favorite'] == 1) {
35         print ' <strong>Favorite!</strong>';
36     }
37
38     print '</div><br /><input type="hidden" name="id" value="' . $GET['id'] . '" />
39     <p><input type="submit" name="submit" value="Delete this Quote!" /></p>
40     </form>';
41
42 } else { // Couldn't get the information.
43     print '<p class="error">Could not retrieve the quote because:<br />' . mysql_error($dbc) .
        '</p><p>The query being run was: ' . $query . '</p>';
44 }
45
46 } elseif (isset($_POST['id']) && is_numeric($_POST['id']) && ($_POST['id'] > 0) ) { // Handle the
form.
47
48     // Define the query:
49     $query = "DELETE FROM quotes WHERE quote_id={$POST['id']} LIMIT 1";
```

*code continues on next page*

4. Validate that a numeric ID value was received in the URL:

```
if (isset($_GET['id']) &&
→ is_numeric($_GET['id']) &&
→ ($_GET['id'] > 0) ) {
```

This is the same conditional used in `edit_quote.php`.

5. Retrieve the record to be deleted:

```
$query = "SELECT quote, source,
→ favorite FROM quotes WHERE
→ quote_id={$GET['id']}";
if ($r = mysql_query($query, $dbc))
→ { $row = mysql_fetch_array($r);
```

The standard three fields are retrieved from the database for the record.

Because only one record is being addressed in this script, the `mysql_fetch_array()` function is called once, outside of any loop.

6. Begin creating the form:

```
print '<form action="delete_quote.
→ php" method="post">
<p>Are you sure you want to
→ delete this quote?</p>
<div><blockquote>' . $row['quote'] .
→ '</blockquote>- ' .
$row['source'];
```

The form, for the most part, just displays the quotation.

7. Indicate if the quotation is a favorite:

```
if ($row['favorite'] == 1) {
    print ' <strong>Favorite!
→ </strong>';
}
```

This code is the same as that on the `view_quotes.php` page, indicating that the quote is, in fact, a favorite.

#### Script 13.10 continued

```
50     $r = mysql_query($query, $dbc); // Execute the query.
51
52     // Report on the result:
53     if (mysql_affected_rows($dbc) == 1) {
54         print '<p>The quote entry has been deleted.</p>';
55     } else {
56         print '<p class="error">Could not delete the blog entry because:<br />' . mysql_
57             error($dbc) . '</p><p>The query being run was: ' . $query . '</p>';
58     }
59 } else { // No ID received.
60     print '<p class="error">This page has been accessed in error.</p>';
61 } // End of main IF.
62
63 mysql_close($dbc); // Close the connection.
64
65 include('templates/footer.html');
66 ?>
```

**8.** Complete the form:

```
print '</div><br />
<input type="hidden" name="id"
→ value="' . $_GET['id'] . "' />
<p><input type="submit" name=
→ "submit" value="Delete this
→ Quote!" /></p>
</form>';
```

The form must contain a hidden input that will pass the quote ID back to the page upon form submission.

**9.** Complete the `mysql_query()` conditional:

```
} else { // Couldn't get the
→ information.
print '<p class="error">Could
→ not retrieve the quote
→ because:<br />' . mysql_
→ error($dbc) . '.</p><p>The
→ query being run was: ' .
→ $query . '</p>';
}
```

If the query failed, the MySQL error, and the query itself, are displayed for debugging purposes.

**10.** Check for a form submission:

```
} elseif (isset($_POST['id']) &&
→ is_numeric($_POST['id']) &&
→ ($_POST['id'] > 0) ) {
```

This conditional begins the second phase of the script: handling the submission of the form. The validation is the same as in Step 4, but now `$_POST['id']` is referenced instead of `$_GET['id']`.

**11.** Delete the record:

```
$query = "DELETE FROM quotes
→ WHERE quote_id=$_POST['id']
→ LIMIT 1";
$r = mysql_query($query, $dbc);
```

The `DELETE` query will remove the record. The `WHERE` conditional indicates which specific record is to be removed, and the `LIMIT 1` clause is applied as an extra precaution.

**12.** Report on the result:

```
if (mysql_affected_rows($dbc)
→ == 1) {
print '<p>The quote entry has
→ been deleted.</p>';
} else {
print '<p class="error">Could
→ not delete the blog entry
→ because:<br />' . mysql_
→ error($dbc) . '.</p><p>The
→ query being run was: ' .
→ $query . '</p>';
}
```

If the query succeeded, then one record will have been affected, and a message is displayed to the user **B**.

**13.** Complete the conditionals:

```
} else { // No ID received.
print '<p class="error">This
→ page has been accessed in
→ error.</p>';
} // End of main IF.
```

The `else` clause applies if no valid ID value is received by the page via either GET or POST.

**14.** Close the database connection and complete the page:

```
mysql_close($dbc);
include('templates/footer.html');
?>
```

**15.** Save the file and test in your Web browser (by clicking a link on `view_quotes.php`).

# Creating the Home Page

Last, but certainly not least, there's the home page. For this site, the home page will be the only page used by the public at large. The home page will show a single quotation, but the specific quotation can be one of the following:

- The most recent (the default)
- A random quotation
- A random favorite quotation

To achieve this effect, links will pass different values in the URL back to this same page **A**.

The script should also display administrative links—edit and delete—for the currently displayed quote, if the user is an administrator **B**.

## To create index.php:

1. Begin a new PHP document in your text editor or IDE, to be named **index.php** (Script 13.11):

```
<?php // Script 13.11 - index.php
```

2. Include the header:

```
include('templates/header.html');
```

The home page does not need a custom title, so no constant is defined before including the header.

3. Include the database connection:

```
include('../mysql_connect.php');
```

4. Begin defining the query to be run:

```
if (isset($_GET['random'])) {  
    $query = 'SELECT quote_id,  
        → quote, source, favorite FROM  
        → quotes ORDER BY RAND() DESC  
        → LIMIT 1';
```

In all affairs it's a healthy thing now and then to hang a question mark on the things you have long taken for granted.  
- Bertrand Russell

**A** Values passed in the URL trigger the execution of different queries.

Nobody made a greater mistake than the person who did nothing because they could only do a little.  
- Edmund Burke      Favorite!

**B** When an administrator views the home page, extra links are displayed.

**Script 13.11** The home page of the site shows a single quotation at a time, plus administrative links (when appropriate).

```
1  <?php // Script 13.11 - index.php  
2  /* This is the home page for this site.  
   It displays:  
3   - The most recent quote (default)  
4   - OR, a random quote  
5   - OR, a random favorite quote */  
6  
7  // Include the header:  
8  include('templates/header.html');  
9  
10 // Need the database connection:  
11 include('../mysql_connect.php');  
12  
13 // Define the query...
```

code continues on next page

If a `$_GET['random']` variable is set, the user clicked a link requesting a random quotation. It doesn't matter what value this variable has, so long as it is set.

For all of the queries, four columns—`quote_id`, the `quote`, the `source`, and `favorite`—from one row will be returned. To only retrieve one row, a `LIMIT 1` clause is used.

To select a random row in MySQL, use the `ORDER BY RAND()` clause. This code uses MySQL's `RAND()` function, short for `random`, to return the records in a random order. So this query first selects every record in random order, and then returns only the first in that set.

**5.** Define the query that selects a random favorite record:

```
} elseif (isset($_GET['favorite'])) {  
    $query = 'SELECT quote_id,  
    → quote, source, favorite FROM  
    → quotes WHERE favorite=1 ORDER  
    → BY RAND() DESC LIMIT 1';
```

This query is similar to that in Step 4, but it uses a `WHERE` clause to restrict the pool of possible quotations to just those whose `favorite` value equals 1.

**6.** Define the default query:

```
} else {  
    $query = 'SELECT quote_id,  
    → quote, source, favorite FROM  
    → quotes ORDER BY date_entered  
    → DESC LIMIT 1';  
}
```

If no value was passed in the URL, then the home page should display the most recently added quotation. To do that, the query orders all of the quotes in descending order of date entered, and then limits the results to just a single record.

**7.** Execute the query and fetch the returned record:

```
if ($r = mysql_query($query, $dbc)) {  
    $row = mysql_fetch_array($r);
```

*continues on next page*

**Script 13.11** continued

```
14 // Change the particulars depending upon values passed in the URL:  
15 if (isset($_GET['random'])) {  
16     $query = 'SELECT quote_id, quote, source, favorite FROM quotes ORDER BY RAND() DESC LIMIT 1';  
17 } elseif (isset($_GET['favorite'])) {  
18     $query = 'SELECT quote_id, quote, source, favorite FROM quotes WHERE favorite=1 ORDER BY  
19         RAND() DESC LIMIT 1';  
20 } else {  
21     $query = 'SELECT quote_id, quote, source, favorite FROM quotes ORDER BY date_entered DESC  
22         LIMIT 1';  
23 }  
24 // Run the query:  
25 if ($r = mysql_query($query, $dbc)) {  
26     // Retrieve the returned record:  
27     $row = mysql_fetch_array($r);  
28     // Print the record:  
29     print "<div><blockquote>{$row['quote']}</blockquote>- {$row['source']}</div>";  
30 }
```

*code continues on next page*

**8.** Print the quotation:

```
print "<div><blockquote>{$row
→ ['quote']}</blockquote>-
→ {$row['source']} ";
```

This code is similar to that in `view_quotes.php`, but only needs to be used once.

**9.** Indicate if the quotation is a favorite and complete the DIV:

```
if ($row['favorite'] == 1) {
    print ' <strong>Favorite!
→ </strong>';
}
print '</div>';
```

The conditional is the same as in `delete_quote.php` and `view_quotes.php`.

**10.** If the user is an administrator, create links to edit or delete this record:

```
if (is_administrator()) {
    print "<p><b>Quote Admin:</b>
→ <a href=\"edit_quote.php?
→ id={$row['quote_id']}\">Edit
→ </a> - + | + -
→ <a href=\"delete_quote.php?
→ id={$row['quote_id']}\">
→ Delete</a>
</p>\n";
}
```

If the user is an administrator, links to the edit and delete scripts will be added to the page. The links themselves have values just like those in `view_quotes.php`.

**Script 13.11** continued

```
31
32     // Is this a favorite?
33     if ($row['favorite'] == 1) {
34         print ' <strong>Favorite!</strong>';
35     }
36
37     // Complete the DIV:
38     print '</div>';
39
40     // If the admin is logged in, display admin links for this record:
41     if (is_administrator()) {
42         print "<p><b>Quote Admin:</b> <a href=\"edit_quote.php?id={$row['quote_id']}\">Edit</a> <-
43         <a href=\"delete_quote.php?id={$row['quote_id']}\">Delete</a>
44         </p>\n";
45     }
46
47 } else { // Query didn't run.
48     print '<p class="error">Could not retrieve the data because:<br />' . mysql_error($dbc) .
49     '.</p><p>The query being run was: ' . $query . '</p>';
50 } // End of query IF.
51
52 mysql_close($dbc); // Close the connection.
53
54 print '<p><a href="index.php">Latest</a> <-> <a href="index.php?random=true">Random</a> <->
55 <a href="index.php?favorite=true">Favorite</a><p>';
56
57 include('templates/footer.html'); // Include the footer.
58 ?>
```

- 11.** If the query didn't run, print an error message:

```
 } else { // Query didn't run.  
     print '<p class="error">Could  
     → not retrieve the data  
     → because:<br />' . mysql_error  
     → ($dbc) . '</p><p>The query  
     → being run was: ' . $query .  
     → '</p>';  
 } // End of query IF.
```

This code is for your own debugging purposes. You would not display a MySQL error, or the query that caused it, to the general public.

- 12.** Close the database connection:

```
mysql_close($dbc);
```

The database connection will no longer be needed, so it can be closed at this point.

- 13.** Create links to other pages:

```
print '<p><a href="index.php">  
    → Latest</a> <-> <a href=  
    → "index.php?random=true">  
    → Random</a> <-> <a href=  
    → "index.php?favorite=true">  
    → Favorite</a><p>';
```

Three public links are added to the page, each back to this same script. The first link, which passes no values in the URL, will always show the most recent quotation. The second, which passes a *random* value in the URL, will trigger the query in Step 4, thereby retrieving a random record. The third link, which passes a *favorite* value in the URL, will trigger the query in Step 5, thereby retrieving a random favorite record.

- 14.** Include the footer and complete the page:

```
include('templates/footer.html');  
?>
```

- 15.** Save the file and test in your Web browser .

**TIP** Normally the home page is one of the first scripts written, not the last. But in this case I wanted to build up to this point in the example.



 The latest quotation (note the URL).

# Review and Pursue

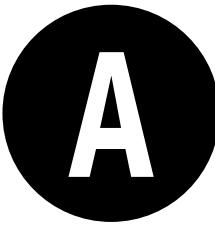
If you have any problems with the review questions or the pursue prompts, turn to the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)).

## Review

- How would the `is_administrator()` function be called to check for the same cookie—named *Samuel*—with a different value? A different cookie—not named *Samuel*—with a different value?
- Why is the reference to the style sheet in the header file `css/style.css` instead of `../css/style.css`? How else could the style sheet be referenced?
- Why is the `login.php` script structured the way it is? How could that script be organized more linearly?
- What would be some other good ideas for user-defined functions with this site?  
Hint: look for repeated code.

## Pursue

- Make the login form sticky.
- Define the login credentials—the cookie name and value—as constants in a configuration file. Then include that configuration file on every page and use those constants for creating, deleting, and confirming the value of the cookie.
- Limit the cookie's expiration to only 15 minutes, and then re-send the cookie on each page, if appropriate (i.e., if the cookie exists).
- Use sessions instead of a cookie.
- Make the `add_quote.php` and `edit_quote.php` forms sticky.
- Change `view_quotes.php` so that the administrator can list the quotes in different order. Hint: Create links back to the page like those on `index.php` and change the query accordingly.
- Before putting this site on a live server (should you do that), update all the code so that no MySQL error is ever shown to a nonadministrative user.



# A

# Installation and Configuration

There are three technical requirements for executing all of this book's examples: MySQL (the database application), PHP (the scripting language), and the Web server application (that PHP runs through). This appendix describes the installation of these tools on two different platforms—Windows XP and Mac OS X. If you are using a hosted Web site, all of this will already be provided for you, but these products are all free and easy enough to install, so putting them on your own computer still makes sense.

After the installation section, this appendix demonstrates some basics for working with MySQL and configuring PHP. The PHP and MySQL manuals cover installation and configuration in a reasonable amount of detail. You may want to also peruse them, particularly if you encounter problems.

## Installation on Windows

Although you can certainly install a Web server (like Apache, Abyss, or IIS), PHP, and MySQL individually on a Windows computer, I strongly recommend you use an all-in-one installer instead. It's simply easier and more reliable to do so.

There are several all-in-one installers out there for Windows. The two that I see mentioned most frequently are XAMPP ([www.apachefriends.org](http://www.apachefriends.org)) and WAMP ([www.wampserver.com](http://www.wampserver.com)). For this appendix, I'll use XAMPP, which runs on Windows 2000, 2003, XP, and Vista. (The XAMPP site makes no mention of Windows 7, but you should be able to use XAMPP on that version of Windows.)

Along with Apache, PHP, and MySQL, XAMPP also installs:

- PEAR (PHP Extension and Application Repository), a library of PHP code
- phpMyAdmin, the Web-based interface to a MySQL server
- A mail server (for sending email)
- Several useful extensions

As of this writing, XAMPP (Version 1.7.3) installs PHP 5.31, MySQL 5.1.41, Apache 2.2.14, and phpMyAdmin 3.2.4.

I'll run through the installation process in these next steps. Note that if you have any problems, you can use the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)), but you'll probably have more luck turning to the XAMPP site (it is their product, after all). Also, the installer works really well and isn't that hard to use, so rather than detail every single step in the process, I'll highlight the most important considerations.

## On Firewalls

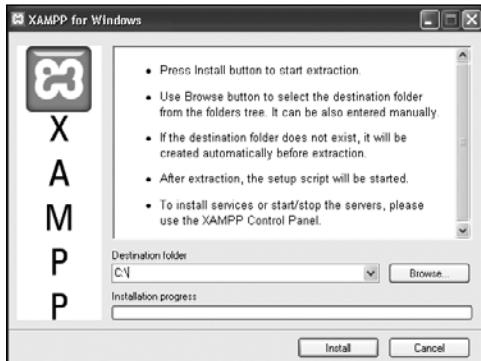
A firewall prevents communication over ports (a port is an access point to a computer). Versions of Windows starting with Service Pack 2 of XP include a built-in firewall. You can also download and install third-party firewalls. Firewalls improve the security of your computer, but they may also interfere with your ability to run Apache, MySQL, and some of the other tools used by XAMPP because they all use ports.

When running XAMPP for the first time, if you see a security prompt indicating that the firewall is blocking Apache, MySQL, or the like, choose Unblock. Otherwise, you can configure your firewall manually (for example, on Windows XP, it's done through Control Panel > Security Center). The ports that need to be open are as follows: 80 (for Apache), 3306 (for MySQL), and 25 (for the Mercury mail server). If you have any problems starting or accessing one of these, disable your firewall and see if it works then. If so, you'll know the firewall is the problem and that it needs to be reconfigured.

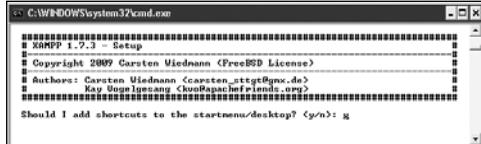
Just to be clear, firewalls aren't found just on Windows, but in terms of the instructions in this appendix, the presence of a firewall will more likely trip up a Windows user than any other.



- A** From the Apache Friends Web site, grab the latest installer for Windows.



- B** Select where XAMPP should be installed.



- C** The XAMPP console window.

## To install XAMPP on Windows:

- Download the latest release of XAMPP for Windows from [www.apachefriends.org](http://www.apachefriends.org).

You'll need to click around a bit to find the download section, but eventually you'll come to an area where you can find the download **A**. Then click *EXE*, which is the specific item you want.

- On your computer, double-click the downloaded file in order to begin the installation process.
- When prompted **B**, install XAMPP somewhere other than in the Program Files directory.

You shouldn't install it in the Program Files directory because of a permissions issue in Windows Vista. I recommend installing XAMPP in your root directory (e.g., **C:\**).

Wherever you decide to install the program, make note of that location, as you'll need to know it several other times as you work through this appendix.

- If you want, create Desktop and Start Menu shortcuts **C**.

During the installation process, XAMPP will open a console window, where you'll be prompted for additional options.

- When prompted, have XAMPP locate the paths correctly.
- When prompted, do not make a portable XAMPP without drive letters.
- Continue through the remaining prompts, reading them and pressing Enter/Return to continue.

You'll be notified that the installation is successful, what time zone was set in the PHP configuration, and so forth. Nothing that significant here.

*continues on next page*

8. After the installation process has done its thing **D**, enter 1 to start the control panel.

Upon completion of the installation, you'll be given a few options, still within the console window. One option is to start the control panel, which can also be done using the Desktop or Start Menu shortcuts, assuming you chose to create those in Step 4.

9. To start, stop, and configure XAMPP, use the XAMPP control panel **E**.
10. Using the control panel, start Apache, MySQL, and Mercury.

Apache has to be running for every chapter in this book. MySQL must be running for Chapter 12, “Intro to Databases.” Mercury is the mail server that XAMPP installs. It needs to be running in order to send email using PHP (see Chapter 8, “Creating Web Applications”).

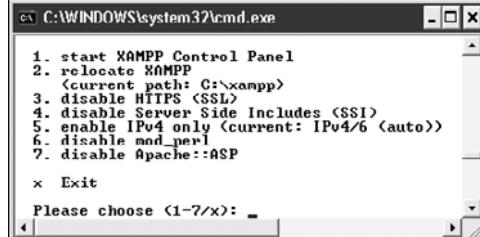
11. Immediately set a password for the root MySQL user.

How you do this is explained later in the chapter.

**TIP** The XAMPP control panel's various admin links will take you to different Web pages (on your server) and other resources **F**.

**TIP** See the “PHP Configuration” section to learn how to configure PHP by editing the `php.ini` file.

**TIP** Your Web root directory—where your PHP scripts should be placed in order to test them—is the `htdocs` folder in the directory where XAMPP was installed. Following my installation instructions, this would be `C:\xampp\htdocs`.

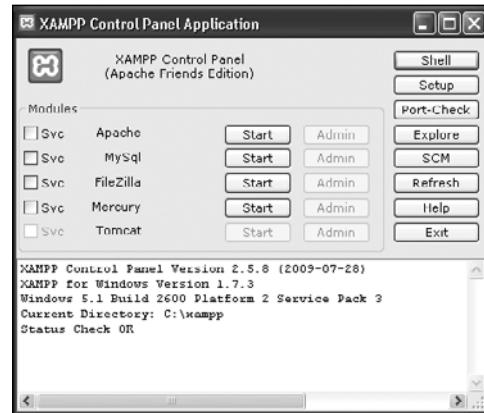


```
1. start XAMPP Control Panel
2. relocate XAMPP
  <current path: C:\xampp>
3. disable HTTPS (SSL)
4. disable Server Side Includes (SSI)
5. enable IPv4 only (current: IPv4/6 <auto>)
6. disable mod_perl
7. disable Apache::ASP

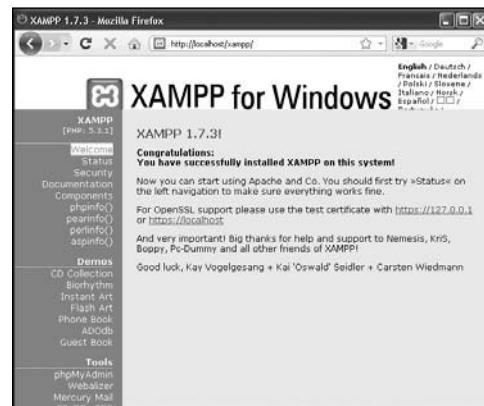
x Exit

Please choose <1-7/x>:
```

**D** The installation of XAMPP is complete!



**E** The XAMPP control panel, used to manage the software.



**F** The Web-based splash page for XAMPP, linked from the control panel.

## Installation on Mac OS X

Thanks to some ready-made packages, installing MySQL and PHP on Mac OS X used to be surprisingly easy (and may still be for you). Mac OS X already uses Apache as its Web server and comes with a version of PHP installed but not enabled. Thanks to Marc Liyanage ([www.entropy.ch](http://www.entropy.ch)), who does a ton of work supporting the Mac operating system, more current and feature-rich versions of PHP can be easily installed.

I say that installation “used to be” and “may still be” easy because it depends on the hardware and operating system you’re using. Starting with Mac OS X 10.5 (Leopard), the version of Apache included is 64-bit (assuming your computer supports it), meaning that PHP must also be 64-bit, as must every library that PHP uses. This is not easily done.

Because of the complications that have arisen from Mac OS X 10.5 using the 64-bit version of Apache (if possible), I’ve decided to take a more universally foolproof route and recommend that you use the all-in-one MAMP installer ([www.mamp.info](http://www.mamp.info)). It’s available in both free and commercial versions, is very easy to use, and won’t affect the Apache server built into the operating system.

Along with Apache, PHP, and MySQL, MAMP also installs phpMyAdmin, the Web-based interface to a MySQL server, along with lots of useful PHP extensions. As of this writing, MAMP (Version 1.9.4) installs both PHP 5.2.13 and 5.3.2, in addition to MySQL 5.1.44, Apache 2.0.63, and phpMyAdmin 3.2.5.

*continues on next page*

I'll run through the installation process in these next steps. If you have any problems, you can use the book's supporting forum ([www.LarryUllman.com/forum/](http://www.LarryUllman.com/forum/)), but you'll probably have more luck turning to the MAMP site (it is their product, after all). Also, the installer works really well and isn't that hard to use, so rather than detail every single step in the process, I'll highlight the most important considerations.

## To install MAMP on Mac OS X:

1. Download the latest release of MAMP from [www.mamp.info](http://www.mamp.info).

On the front page, click *Download*, and then click **MAMP & MAMP PRO 1.9.4 A.** (As new releases of MAMP come out, the link and filename will obviously change accordingly.)

The same downloaded file is used for both products. In fact, MAMP Pro is just a nicer interface for controlling and customizing the same MAMP software.

2. On your computer, double-click the downloaded file in order to mount the disk image B.
3. Copy the MAMP folder from the disk image to your **Applications** folder.

If you think you might prefer the commercial MAMP PRO, copy that folder as well (again, it's an interface to MAMP, so both folders are required). MAMP PRO comes with a free 14-day trial period.

Whichever folder you choose, note that you must place it within the **Applications** folder. It cannot go in a subfolder or another directory on your computer.

### Download: MAMP & MAMP PRO 1.9.4

Published: 2010-10-26

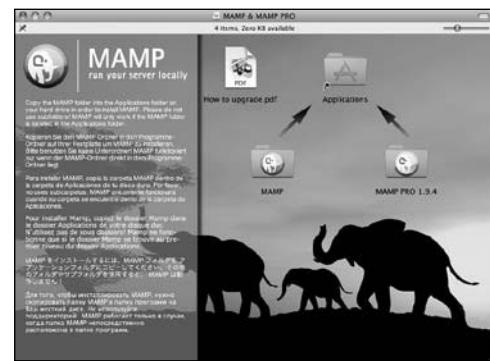
This download package contains the free MAMP and a free 14-day trial of MAMP PRO. MAMP can be used stand-alone without MAMP PRO.

The trial Version of MAMP PRO can be upgraded to the full version by buying a serial number. You can order a serial number at our shop.

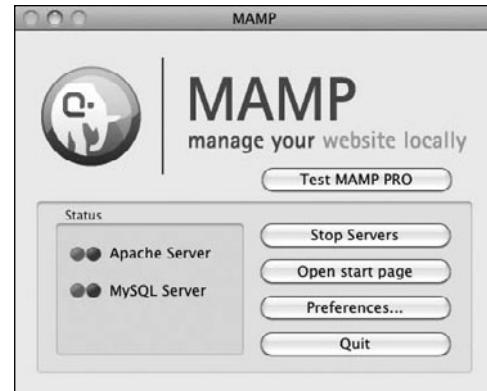
All MAMP PRO updates in the current major version (1.x) are free of charge. If you want to update MAMP PRO from e.g. 1.7.2 to 1.9.4 just use the serial number you already got.

- Requirements: min. Mac OS X 10.4 (This version of MAMP & MAMP PRO is indeed compatible with Mac OS X 10.6 Snow Leopard.)
- Platform: Universal Binary
- File type: dmg
- File size: app. 170 MB
- Translations **MAMP**: English, French, German, Italian, Japanese, Russian, Spanish
- Translations **MAMP PRO**: English, German, Japanese

- A Download MAMP from this page at [www.mamp.info](http://www.mamp.info).



- B The contents of the downloaded MAMP disk image.



- C The simple MAMP application, used to control and configure Apache, PHP, and MySQL.



**D** The MAMP PRO application, used to control and configure Apache, PHP, MySQL, and more.

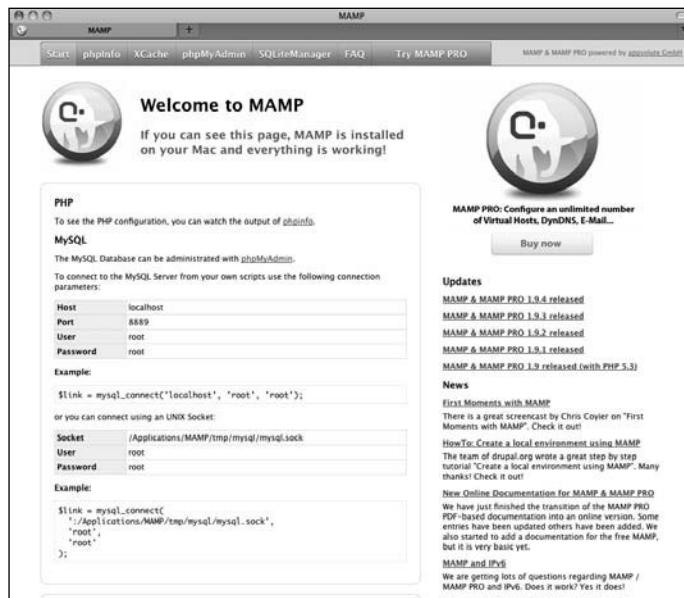
4. Open the **Applications/MAMP** (or **Applications/MAMP PRO**) folder.
5. Double-click the MAMP (or MAMP PRO) application to start the program **C**.

It may take just a brief moment to start the servers, but then you'll see a result like that in **C** for MAMP or **D** for MAMP PRO.

When starting MAMP, a start page should also open in your default Web browser **E**. Through this page you can view the version of PHP that's running, as well as how it's configured, and interface with the MySQL database using phpMyAdmin.

With MAMP PRO, you can access that same page by clicking the WebStart button **D**.

*continues on next page*



**E** The MAMP Web start page.

6. To start, stop, and configure MAMP, use the MAMP or MAMP PRO application **C** or **D**.

There's not much to the MAMP application itself (which is a good thing), but if you click Preferences, you can tweak the application's behavior **F**, set the version of PHP to run, and more.

MAMP PRO also makes it easy to create different *virtual hosts* (i.e., different sites), adjust how Apache is configured and runs, use dynamic DNS, change how email is sent, and more.

7. Immediately change the password for the root MySQL user.

How you do this is explained later in the chapter.

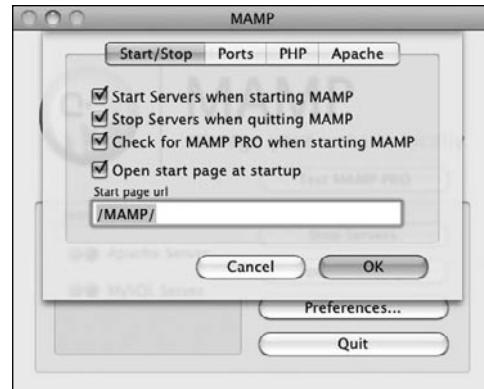
**TIP** Personally, I appreciate how great MAMP alone is, and that it's free. I also don't like spending money. But I've found the purchase of MAMP PRO to be well worth the relatively little money it costs.

**TIP** See the "PHP Configuration" section to learn how to configure PHP by editing the `php.ini` file.

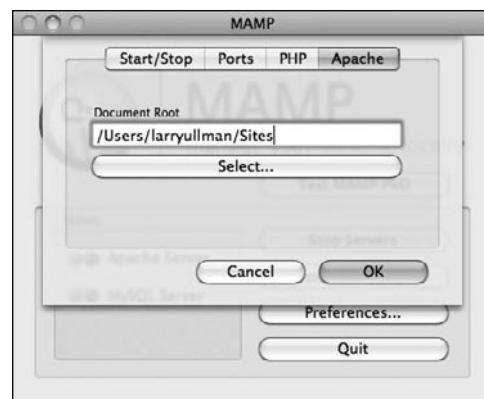
**TIP** You may want to change the Apache Document Root **C** to the `Sites` directory in your home folder. By doing so, you assure that your Web documents will backed up along with your other files (and you are performing regular backups, right?).

**TIP** MAMP also comes with a Dashboard widget you can use to control the Apache and MySQL servers.

**TIP** Your Web root directory—where your PHP scripts should be placed in order to test them—is the `htdocs` folder in the directory where MAMP was installed. For a standard MAMP installation without alteration, this would be `Applications/MAMP/htdocs`.



**F** These options dictate what happens when you start and stop the MAMP application.



**G** MAMP allows you to change where the Web documents are placed.

# PHP Configuration

One of the benefits of installing PHP on your own computer is that you can configure it however you prefer. How PHP runs is determined by the `php.ini` file, which is normally created when PHP is installed.

Two of the most important settings you may want to consider adjusting are `display_errors` and `error_reporting` (both are discussed in Chapter 3, “HTML Forms and PHP”). To change any setting, open the PHP configuration file, edit it as needed, then save it and restart the Web server.

## To alter PHP’s configuration:

1. In your Web browser, execute a script that invokes the `phpinfo()` function **A**.

The `phpinfo()` function, discussed in Chapter 1, “Getting Started with PHP,” reveals oodles of information about the PHP installation.

2. In the browser’s output, search for Loaded Configuration File.

The value next to this text is the location of the active configuration file.

This will be something like `C:\xampp\php\php.ini` or `/Library/Application Support/appolute/MAMP PRO/conf/php.ini`.

If there is no value for the Loaded Configuration File, your server has no active `php.ini` file. In that case, you’ll need to download the PHP source code, from [www.php.net](http://www.php.net), to find a sample configuration file.

*continues on next page*

System	Windows NT WINMBP 5.1 build 2600 (Windows XP Professional Service Pack 3) i506
Build Date	Nov 20 2009 17:20:57
Compiler	MSVC6 (Visual C++ 6.0)
Architecture	x86
Configure Command	<code>cscript /nologo configure.js --enable-snapshot-build</code>
Server API	Apache 2.0 Handler
Virtual Directory Support	enabled
Configuration File (php.ini) Path	no value
Loaded Configuration File	<code>C:\xampp\php\php.ini</code>
Scan this dir for additional .ini files	(none)
Additional .ini files parsed	(none)
PHP API	20090626
PHP Extension	20090626
Zend Extension	220090626
Zend Extension Build	API20090626,TS,VC6

**A** Some of the output from calling the `phpinfo()` function.

3. Open the `php.ini` file in any text editor.
4. Change the settings as you wish.

Depending on your operating system, you may need to be an administrator or enter a password to make changes to this file.

Many instructions are included in the file. Lines are commented out (made inactive) by preceding them with a semicolon.

5. Save the `php.ini` file.

6. Restart your Web server.

You don't need to restart the entire computer, just the Web server (e.g., Apache).

**TIP** You can also use the `phpinfo()` function to confirm that your configuration changes have taken effect.

**TIP** If you edit the `php.ini` file and restart the Web server but your changes don't take effect, make sure you're editing the proper `php.ini` file (you may have more than one on your computer).

**TIP** MAMP PRO on Mac OS X uses a template for the `php.ini` file that must be edited within MAMP PRO itself. To change the PHP settings when using MAMP PRO, select File > Edit Template > PHP X.X.X `php.ini`.

## Enabling Mail

The `mail()` function works only if the computer running PHP has access to sendmail or another mail server. One way to enable the `mail()` function is to set the `smtp` value in the `php.ini` file (for Windows only). This approach works, for example, if your Internet provider has an SMTP address you can use. Unfortunately, you can't use this value if your ISP's SMTP server requires authentication.

For Windows, there are also a number of free SMTP servers, like Mercury. It's installed along with XAMPP, or you can install it yourself if you're not using XAMPP.

Mac OS X comes with a mail server installed—postfix and/or sendmail—that needs to be enabled. Search Google for instructions on manually enabling your mail server on Mac OS X.

Alternatively, you can search some of the PHP code libraries to learn how to use an SMTP server that requires authentication.

# MySQL Interfaces

In Chapter 12 and Chapter 13, “Putting It All Together,” a PHP script will be used to interact with a MySQL database. As I explain in Chapter 12, being able to interact with MySQL independent of your PHP scripts is the most valuable debugging tool there is. Knowing how to use a separate MySQL interface is therefore critical information. I’ll quickly introduce the two most common options.

## Using the MySQL Client

The MySQL software comes with an important tool called the *MySQL client*. This application provides a simple interface for communicating with the MySQL server. It’s a command-line tool that must be accessed using the Terminal application on Linux and Mac OS X or through the command (DOS) prompt on Windows.

### To use the MySQL client:

1. Make sure the MySQL server is running.
2. Find the MySQL **bin** directory.

To connect to the client, you’ll need to know where it’s located. The MySQL client is found within the **bin** directory for your installation. I’ll run through the common possibilities.

If you installed MySQL yourself, the client’s location depends on where you installed the software, but it’s most likely

`C:\mysql\bin\mysql` (Windows)

or

`/usr/local/mysql/bin/mysql`  
(Mac OS X and Unix)

*continues on next page*

If you used XAMPP on Windows, it's **C:\xampp\mysql\bin\mysql** (assuming you installed XAMPP in **C:\**). If you installed MAMP on Mac OS X, the MySQL directory is **/Applications/MAMP/Library/bin/mysql**.

**3.** Access a command prompt.

On Mac OS X and Unix, you can accomplish this by running the Terminal application. On Mac OS X, it's found within the **Applications/Utilities** folder.

On Windows, click the Start menu, select Run, and then type **cmd** and press Enter or click OK at the prompt **A**.

**4.** Attempt to connect to the MySQL server.

To connect, enter the pathname identified in Step 2 plus **-u username -p**. So, the command might be

**c:\mysql\bin\mysql -u username -p**  
(Windows)

or

**/usr/local/mysql/bin/mysql -u  
username -p** (Unix and Mac OS X)

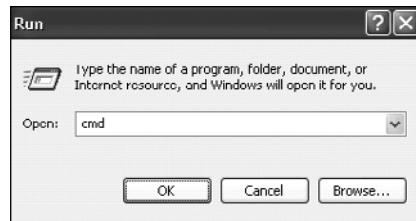
or

**C:\xampp\mysql\bin\mysql -u  
username -p** (Windows)

or

**/Applications/MAMP/Library/bin/  
mysql -u username -p** (Mac OS X)

Replace *username* with the username you want to use. If you haven't yet created any other users, this will be *root* (*root* is the supreme MySQL user). If you haven't yet established a root user password (the default behavior for XAMPP), you can omit the **-p** flag.



**A** Use the Run prompt to access a console window on Windows.

**5.** Enter the password at the prompt **B**.

The password requested is the MySQL password for the user named during the connection. You'll see this prompt only if you used the `-p` option in Step 4.

If you installed MAMP on Mac OS X, the password for the root user will be `root`. If you installed XAMPP on Windows, there is no password initially set.

**6.** List the available databases **C**:

```
SHOW DATABASES;
```

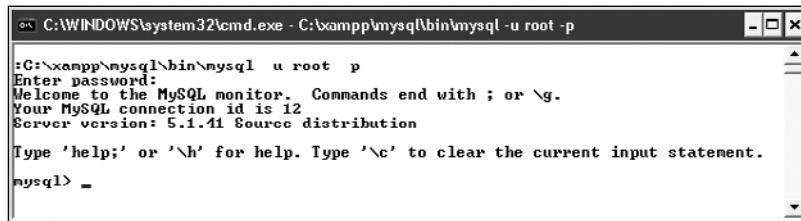
The `SHOW DATABASES` command is an SQL query that lists every database hosted on that MySQL installation that the connected user can see.

**7.** Exit the MySQL client.

To do so, type `exit` or `quit`.

**TIP** If you see a *Can't connect to local MySQL server through socket...* error message, it normally means MySQL isn't running.

**TIP** The MySQL client is one of the best tools for debugging PHP scripts that work with MySQL. You can use the MySQL client to check user permissions and to run queries outside of the PHP script.

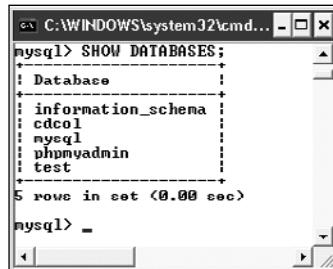


```
C:\WINDOWS\system32\cmd.exe - C:\xampp\mysql\bin\mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 12
Server version: 5.1.41 Source distribution

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> -
```

**B** Successfully accessing the MySQL client on Windows.



```
mysql> SHOW DATABASES;
+-----+
| Database |
+-----+
| information_schema |
| cdcoll |
| mysql |
| phpmyadmin |
| test |
+-----+
5 rows in set (0.00 sec)

mysql> -
```

**C** After a fresh MySQL installation, there will be only a couple of default databases.

## Using phpMyAdmin

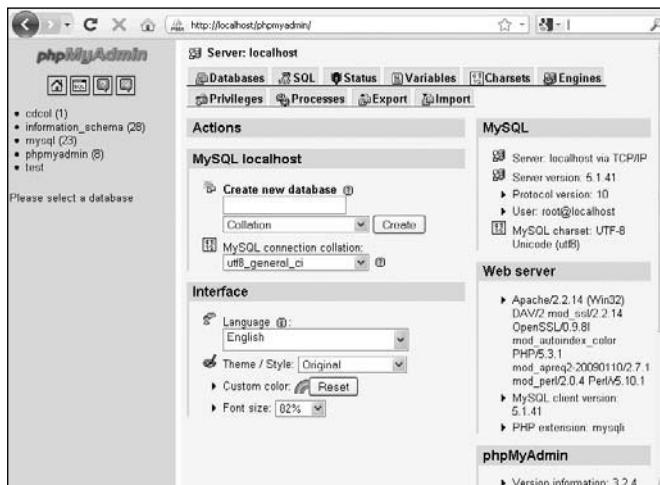
phpMyAdmin ([www.phpmyadmin.net](http://www.phpmyadmin.net)) is a Web-based interface for interacting with a MySQL server, allowing you to create tables, import and export records, and much more, without having to use a command-line interface. It is arguably the most popular Web software written in PHP, as every PHP hosting company provides it. In fact, the all-in-one XAMPP and MAMP installers include it, too. phpMyAdmin is well documented and easy to use, but I'll highlight a couple of quick points.

### To use phpMyAdmin:

1. Access phpMyAdmin in your Web browser **D**.

When using XAMPP, phpMyAdmin is available at `http://localhost/phpmyadmin/`, also found by clicking the MySQL admin link in the control panel. On MAMP, phpMyAdmin is available by first going to `http://localhost:8888/MAMP/`.

2. Click a database name in the left column to select that database.



**D** The phpMyAdmin front page.

3. Click a table name in the left column to select that table **E**.

You don't always have to select a table, but by doing so you can simplify some tasks.

4. Use the tabs and links (on the right side of the page) to perform common tasks.

For the most part, the tabs and links are shortcuts to common SQL commands.

For example, the Browse tab performs a **SELECT** query and the Insert tab creates a form for adding new records.

5. Use the SQL tab to execute any SQL command.

You can alternatively use the SQL Query Window, linked just above the list of database or table names. Using either interface, you can test queries that your PHP scripts are using, without the added complication of the script itself.

**TIP** There are many other clients for interacting with a MySQL database, but the MySQL command-line client and phpMyAdmin are the two most common.

The screenshot shows the phpMyAdmin interface within the MAMP application. The top navigation bar includes links for Start, phpInfo, phpMyAdmin, SQLiteManager, FAQ, and MAMP PRO website. The main title bar says "MAMP". On the left, there's a sidebar with icons for Home, Databases, and Tables. A dropdown menu shows "myblog (1)". Below it, a tree view shows "myblog (1)" expanded, with "entries" selected. The main content area has a breadcrumb trail: localhost > myblog > entries. It features several tabs: Browse, Structure (which is active), SQL, Search, Insert, Export, Import, Operations, Empty, and Drop. Below the tabs is a table with the following data:

Field	Type	Collation	Attributes	Null	Default	Extra	Action
entry_id	int(10)	latin1_swedish_ci	UNSIGNED	No	None	auto_increment	
title	varchar(100)	latin1_swedish_ci		No	None		
entry	text	latin1_swedish_ci		No	None		
date_entered	datetime			No	None		

Below the table are buttons for Print view, Propose table structure, Add field(s), and various insertion options like At End of Table, At Beginning of Table, and After entry\_id. A "Details..." link is also present.

- E** Selecting a database or a table, from the left column, changes the options on the right side of the page.

# Managing MySQL Users

Once you've successfully installed MySQL, you can begin creating MySQL users. A MySQL user is a fundamental security concept, limiting access to, and influence over, stored data. Just to clarify, your databases can have several different users, just as your operating system might. But MySQL users are different from operating system users. While learning PHP and MySQL on your own computer, you don't necessarily need to create new users, but live production sites need to have dedicated MySQL users with appropriate permissions.

The initial MySQL installation comes with one user (named *root*) with no password set (except when using MAMP, which sets a default password of *root*). At the very least, you should create a new, secure password for the root user after installing MySQL.

After that, you can create other users with more limited permissions. As a rule, you shouldn't use the root user for normal, day-to-day operations.

## Setting the root user password

When you install MySQL, no value—or no secure password—is established for the root user. This is certainly a security risk that should be remedied before you begin to use the server (as the root user has unlimited powers).

You can set any user's password using either phpMyAdmin or the MySQL client, so long as the MySQL server is running. If MySQL isn't currently running, start it now using the steps outlined earlier in the appendix.

Second, you must be connected to MySQL as the root user in order to be able to change the root user's password.

## To assign a password to the root user via the MySQL client:

1. Connect to the MySQL client.  
See the preceding set of steps for detailed instructions.
2. Enter the following command, replacing *thepassword* with the password you want to use **A**:

```
SET PASSWORD FOR
→ 'root'@'localhost' =
→ PASSWORD('thepassword');
```

Keep in mind that passwords in MySQL are case-sensitive, so *Kazan* and *kazan* aren't interchangeable. The term **PASSWORD** that precedes the actual quoted password tells MySQL to encrypt that string. And there cannot be a space between **PASSWORD** and the opening parenthesis.

3. Exit the MySQL client:

```
exit
```

4. Test the new password by logging into the MySQL client again.

Now that a password has been established, you need to add the **-p** flag to the connection command. You'll see an *Enter password:* prompt, where you enter the just-created password.



The screenshot shows a Windows Command Prompt window titled 'C:\WINDOWS\system32\cmd.exe - C:\xampp\mysql\bin\mysql -u root -p'. The command entered is 'mysql> SET PASSWORD FOR 'root'@'localhost' = PASSWORD('thepassword');'. The output shows 'Query OK, 0 rows affected (0.00 sec)'. The mysql> prompt is visible at the bottom.

**A** Updating the root user's password using SQL within the MySQL client.

## To assign a password to the root user via phpMyAdmin:

1. Open phpMyAdmin in your Web browser.  
See the preceding set of steps for detailed instructions.
2. On the home page, click the Privileges tab.  
You can always click the home icon, in the upper-left corner, to get to the home page.
3. In the list of users, click the Edit Privileges icon on the root user's row **B**.
4. Use the Change Password form **C**, found further down the resulting page, to change the password.
5. Change the root user's password in phpMyAdmin's configuration file, if necessary.

The result of changing the root user's password will likely be that phpMyAdmin is denied access to the MySQL server. This is because phpMyAdmin, on a local server, normally connects to MySQL as the root user, with the root user's password hard-coded into a configuration file. After following Steps 1–4, find the **config.inc.php** file in the phpMyAdmin directory—likely **/Applications/MAMP/bin/phpMyAdmin** (Mac OS X with MAMP) or **C:\xampp\phpMyAdmin** (Windows with XAMPP). Open that file in any text editor or IDE and change this next line to use the new password:

```
$cfg['Servers'][$i]['password']  
→ = 'the_new_password';
```

Then save the file and reload phpMyAdmin in your Web browser.

User overview																								
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
	User	Host	Password	Global privileges <sup>1</sup>										Grant	Action									
<input type="checkbox"/>	root	localhost	Yes	ALL PRIVILEGES										Yes										
<input type="checkbox"/>	username	localhost	Yes	SELECT, INSERT, UPDATE, DELETE, EXECUTE										No										

**B** The list of MySQL users, as shown in phpMyAdmin.

The form allows setting a password for a MySQL user. It includes fields for 'No Password' (radio button), 'Password' (input field with masked value), 'Re-type' (input field with masked value), 'Password Hashing' (radio buttons for 'MySQL 4.1+' and 'MySQL 4.0 compatible'), and a 'Generate Password' section with a 'Generate' button and an empty input field. A 'Go' button is at the bottom right.

**C** The form for updating a MySQL user's password within phpMyAdmin.

---

**TABLE A.1** MySQL Privileges

PRIVILEGE	ALLOWS
SELECT	Read rows from tables.
INSERT	Add new rows of data to tables.
UPDATE	Alter existing data in tables.
DELETE	Remove existing data from tables.
INDEX	Create and drop indexes in tables.
ALTER	Modify the structure of a table.
CREATE	Create new tables or databases.
DROP	Delete existing tables or databases.
RELOAD	Reload the grant tables (and therefore enact user changes).
SHUTDOWN	Stop the MySQL server.
PROCESS	View and stop existing MySQL processes.
FILE	Import data into tables from text files.
GRANT	Create new users.
REVOKE	Remove users' permissions.

## Creating users and privileges

After you have MySQL successfully up and running, and after you've established a password for the root user, you can add other users. To improve the security of your databases, you should always create new users to access your databases rather than using the root user at all times.

The MySQL privileges system was designed to ensure proper authority for certain commands on specific databases. This technology is how a Web host, for example, can let several users access several databases without concern. Each user in the MySQL system can have specific capabilities on specific databases from specific hosts (computers). The root user—the MySQL root user, not the system's—has the most power and is used to create subusers, although subusers can be given rootlike powers (inadvisably so).

When a user attempts to do something with the MySQL server, MySQL first checks to see if the user has permission to connect to the server at all (based on the username, the user's host, the user's password, and the information in the `mysql` database's `user` table). Second, MySQL checks to see if the user has permission to run the specific SQL statement on the specific databases—for example, to select data, insert data, or create a new table.

**Table A.1** lists most of the various privileges you can set on a user-by-user basis.

*continues on next page*

There are a handful of ways to set users and privileges in MySQL, but I'll start by discussing the **GRANT** command. The syntax goes like this:

```
GRANT privileges ON database.* TO  
→ 'username'@'hostname' IDENTIFIED  
→ BY 'password';
```

For the *privileges* aspect of this statement, you can list specific privileges from Table A.1, or you can allow for all of them by using **ALL** (which isn't prudent). The **database.\*** part of the statement specifies which database and tables the user can work on. You can name specific tables using the **database.tablename** syntax or allow for every database with **\*.\*** (again, not prudent). Finally, you can specify the username, hostname, and a password.

The username has a maximum length of 16 characters. When you're creating a username, be sure to avoid spaces (use the underscore instead), and note that usernames are case-sensitive.

The hostname is the computer from which the user is allowed to connect. This could be a domain name, such as `www.example.`

com, or an IP address. Normally, `localhost` is specified as the hostname, meaning that the MySQL user must be connecting from the same computer that the MySQL database is running on. To allow for any host, use the hostname wildcard character (%):

```
GRANT privileges ON database.*  
→ TO 'username'@'%' IDENTIFIED  
→ BY 'password';
```

But that is also not recommended. When it comes to creating users, it's best to be explicit and confining.

The password has no length limit but is also case-sensitive. The passwords are encrypted in the MySQL database, meaning they can't be recovered in a plain text format. Omitting the **IDENTIFIED BY 'password'** clause results in that user not being required to enter a password (which, once again, should be avoided).

As an example of this process, you'll create two new users with specific privileges on a new database named `temp`. Keep in mind that you can only grant permissions to users on existing databases. This next sequence will also show how to create a database.

## Creating Users in phpMyAdmin

To create users in phpMyAdmin, start by clicking the Privileges tab on the phpMyAdmin home page. On the Privileges page, click Add A New User. Complete the Add A New User form to define the user's name, host, password, and privileges. Then click Go. This creates the user with general privileges but no database-specific privileges.

On the resulting page, select the database to apply the user's privileges to and then click Go. On the next page, select the privileges this user should have on that database, and then click Go again. This completes the process of creating rights for that user on that database. Note that this process allows you to easily assign a user different rights on different databases.

Finally, click your way back to the Privileges tab on the home page and then click the reload the privileges link.

## To create new users using GRANT:

1. Log in to the MySQL client as a root user.

Use the steps already explained to do this. You must be logged in as a user capable of creating databases and other users.

2. Create a new database **D**:

```
CREATE DATABASE temp;
```

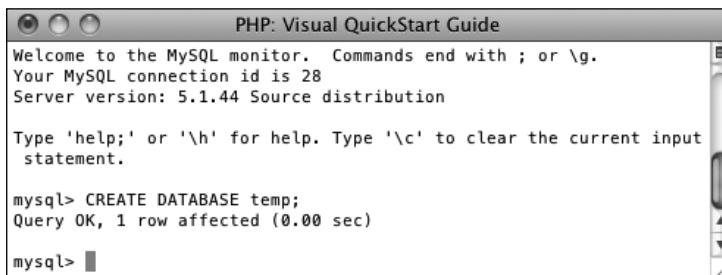
If your MySQL server doesn't yet have a **temp** database, create one using **CREATE DATABASE temp** (followed by a semicolon, as is required by the MySQL client).

3. Create a user with administrative-level privileges on the **temp** database **E**:

```
GRANT SELECT, INSERT, UPDATE,  
→ DELETE, CREATE, DROP,  
→ ALTER, INDEX ON temp.* TO  
→ 'llama'@'localhost' IDENTIFIED  
→ BY 'camel';
```

This user, *llama*, can create tables, alter tables, insert data, update data, and so forth, on the **temp** database. This essentially includes every administrative-level capability aside from creating new users. Be certain to use a password—perhaps one more clever than used here—and, preferably, specify a particular host.

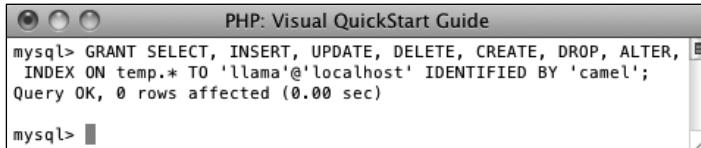
*continues on next page*



The screenshot shows a window titled "PHP: Visual QuickStart Guide". It displays the MySQL monitor interface. The text in the window reads:

```
Welcome to the MySQL monitor. Commands end with ; or \g.  
Your MySQL connection id is 28  
Server version: 5.1.44 Source distribution  
  
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.  
  
mysql> CREATE DATABASE temp;  
Query OK, 1 row affected (0.00 sec)  
  
mysql> ■
```

**D** Creating a new database.



The screenshot shows a window titled "PHP: Visual QuickStart Guide". It displays the MySQL monitor interface. The text in the window reads:

```
mysql> GRANT SELECT, INSERT, UPDATE, DELETE, CREATE, DROP, ALTER,  
INDEX ON temp.* TO 'llama'@'localhost' IDENTIFIED BY 'camel';  
Query OK, 0 rows affected (0.00 sec)  
  
mysql> ■
```

**E** Creating an administrative-level user for a single database.

4. Create a user with basic access to the databases **F**:

```
GRANT SELECT, INSERT,  
→ UPDATE, DELETE ON temp.* TO  
→ 'webuser'@'localhost' IDENTIFIED  
→ BY 'Brows1ng';
```

Now the generic webuser can browse through records (**SELECT** from tables) as well as add, edit, and delete them, but this user can't alter the structure of the database. When you're establishing users and privileges, work your way from the bottom up, allowing the bare minimum of access at all times.

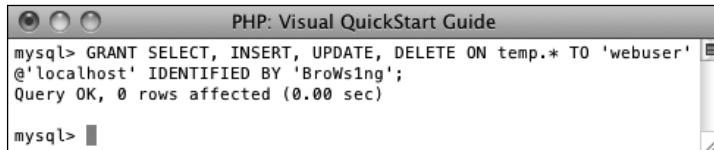
5. Apply the changes **G**:

```
FLUSH PRIVILEGES;
```

The changes just made won't take effect until you've told MySQL to reset the list of acceptable users and privileges, which is what this command does. Forgetting this step and then being unable to access the database using the newly created users is a common mistake.

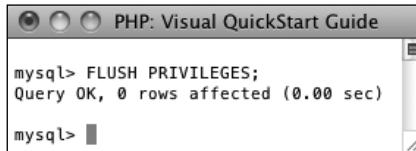
**TIP** Any database whose name begins with `test_` can be modified by any user who has permission to connect to MySQL. Therefore, be careful not to create a database named this way unless it truly is experimental.

**TIP** The REVOKE command removes users and permissions.



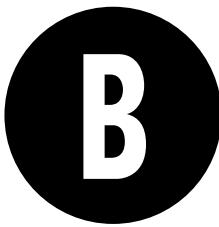
```
mysql> GRANT SELECT, INSERT, UPDATE, DELETE ON temp.* TO 'webuser'  
→ '@localhost' IDENTIFIED BY 'Brows1ng';  
Query OK, 0 rows affected (0.00 sec)
```

**F** This user has more restricted rights to the same database.



```
mysql> FLUSH PRIVILEGES;  
Query OK, 0 rows affected (0.00 sec)
```

**G** Don't forget this step before you try to access MySQL using the newly created users.



# Resources and Next Steps

This book was written to give beginning PHP programmers a good foundation on which to base their learning. A few topics have been either omitted or glossed over, as the book focuses on covering the absolute fundamentals. This appendix lists a number of useful PHP-related Internet resources; briefly discusses where to obtain more information for databases and some uncovered topics; and includes a few tables, both old and new.

Along with those sites included here, you should check out the book's companion Web site, found at [www.LarryUllman.com](http://www.LarryUllman.com). There you'll find all of the book's code, a support forum, an errata page, and more.

Before getting to it, consider that when the first edition of this book was written, few good PHP sites were available. Now there are literally dozens (and hundreds of not-so-good ones). The best, most obvious ones are included here, but a quick Internet search will always be a great resource for you.

## Online PHP Resources

If you have questions specifically about PHP, you should be able to find the answer with ease. This section of the appendix highlights the best Internet-specific tools for you to use.

### The PHP manual

All PHP programmers should familiarize themselves with, and possibly acquire, some version of the PHP manual before beginning to work with the language. The manual is available from the official PHP site—[www.php.net/docs.php](http://www.php.net/docs.php)—as well as from a number of other locations.

You can download the manual in nearly a dozen languages in different formats. The official Web site also has an annotated version of the manual available at [www.php.net/manual/en/](http://www.php.net/manual/en/) (in English), where users have added helpful notes and comments. If you're having problems with a particular function, reading the manual's page for that function will likely provide an answer.

A trick pointed out in Chapter 1, “Getting Started with PHP,” is that you can quickly access the documentation page for any specific function by going to [www.php.net/functionname](http://www.php.net/functionname). For example, the page for the `number_format()` function is [www.php.net/number\\_format](http://www.php.net/number_format).

## General PHP Web sites

This section mentions a few of the many useful Web sites you can turn to when you’re programming, but I’ll leave it up to you to discover the ones you like best. Most of these also contain links to other PHP-related sites. The first, and most obvious, site to bookmark is PHP.net ([www.php.net](http://www.php.net)), the official site for PHP.

You should familiarize yourself with Zend ([www zend com](http://www zend com)), the home page for the creators of PHP’s core. The site contains numerous downloads plus a wealth of other resources—straight from the masters, so to speak.

For information on specific topics, PHPBuilder ([www.phpbuilder.com](http://www.phpbuilder.com)) is one of many good places to turn. The site has dozens of articles explaining how to do particular tasks using PHP. On top of that, PHPBuilder provides support forums and a code library where programmers have uploaded sample scripts.

You can also find useful articles at PHP Zone (<http://php.dzone.com>) and phplarchitect ([www.phparch.com](http://www.phparch.com)), which also puts out a monthly PHP magazine.

W3Schools ([www.w3schools.com](http://www.w3schools.com)) is a good general Web development site, but it also focuses a good portion of its energies on PHP. For a cohesive look at developing dynamic Web sites using PHP, HTML, CSS, and JavaScript, this is an excellent place to turn.

When a good resource, PHP or otherwise, comes across my desk, I’ll normally reference it on my site. You can find any post related to PHP under the “PHP” category here: [www.larryullman.com/category/php/](http://www.larryullman.com/category/php/).

## Code repositories

There’s no shortage of code libraries online these days. Due to the generous (and often showy) nature of PHP programmers, many sites have scores of PHP scripts, organized and available for download. The best online code repositories are as follows:

- HotScripts ([www.hotscripts.com/PHP/](http://www.hotscripts.com/PHP/))
- PHP Resource Index (<http://php.resourceindex.com>)
- PHP Classes Repository ([www.phpclasses.org](http://www.phpclasses.org))
- PX: The PHP Code Exchange (<http://px.sklar.com>)

You can also find code examples at Zend and PHPBuilder or by searching the Web. There’s even a search engine dedicated to finding code: [www.koders.com](http://www.koders.com).

## Newsgroups and mailing lists

If you have access to newsgroups, you can use them as a great sounding board for ideas as well as a place to get your most difficult questions answered. Of course, you can always give back to the group by offering your own expertise to those in need.

The largest English-language PHP newsgroup is `comp.lang.php`. You may be able to access it through your ISP or via a pay-for-use Usenet organization. Newsgroups are also available in languages other than English.

The PHP Web site lists the available mailing lists you can sign up for at [www.php.net/mailing-lists.php](http://www.php.net/mailing-lists.php).

Before you post to any newsgroup or mailing list, it will behoove you to read Eric Steven Raymond's "How to Ask Questions the Smart Way" at [www.catb.org/~esr/faqs/smart-questions.html](http://www.catb.org/~esr/faqs/smart-questions.html). The 10 minutes spent reading that document will save you hours when you go asking for assistance.

## Database Resources

Which database resources will be most useful to you depends, obviously, on which database management system (DBMS) you're using. The most common database used with PHP is probably MySQL, but PHP supports all the standard database applications.

To learn more about using MySQL, begin with the official MySQL Web site ([www.mysql.com](http://www.mysql.com)). You can download the MySQL manual to use as a reference while you work. A handful of books are also available specifically on MySQL, including my own *MySQL: Visual QuickStart Guide, 2nd Edition* (Peachpit Press, 2006).

If you're using MySQL, don't forget to download and install phpMyAdmin ([www.phpmyadmin.net](http://www.phpmyadmin.net)). Written in PHP, this is an invaluable tool for working with a database. If you're using PostgreSQL or even Oracle, you can find similar tools available for interfacing with them. Every database application also has its own mailing lists and newsgroups.

Another area of database resources you should delve into is SQL. Web sites discussing SQL, the language used by every database application, include the following:

- SQL Course ([www.sqlcourse.com](http://www.sqlcourse.com))
- A Gentle Introduction to SQL ([www.sqlzoo.net](http://www.sqlzoo.net))
- W3Schools' SQL Tutorial ([www.w3schools.com/sql/](http://www.w3schools.com/sql/))
- SQL.org ([www.sql.org](http://www.sql.org))

*My PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide* (Peachpit Press, 2008) also discusses SQL and MySQL in much greater detail than this book.

# Top 10 Frequently Asked Questions (or Problems)

Debugging is a valuable skill that takes time and experience to fully develop. But rather than send you off on that journey ill-equipped, I've included the 10 most frequently seen problems in PHP scripts, along with the most likely causes. First, though, here are 5 of my best pieces of advice when it comes to debugging a problem:

## 1. Know what version of PHP you're running.

Some problems are specific to a version of PHP. Use the `phpinfo()` function to test the version in use whenever you go to use a server for the first time. Also make sure you know what version of MySQL you're using, if applicable; the operating system; and the Web server (e.g., Apache 2.2).

## 2. Run all PHP scripts through a URL.

If you don't run a PHP script through a URL—and this includes the submission of a form to a PHP script—the Web server will not handle the request, meaning that PHP will never execute the code.

## 3. Trust the error message!

Many beginners have more difficulty than they should in solving a problem

because they don't pay attention to the error message they see. Although some of PHP's error messages are cryptic and even a few can be misleading, if PHP says there's a problem on line 22, the problem is probably on line 22.

## 4. Avoid “trying” things to fix a problem!

If you're not sure what's causing the problem and what the proper fix is, avoid trying random things as a solution. You'll likely create new issues this way and only further confuse the original problem.

## 5. Take a break!

The best piece of advice I can offer is to step away from the computer and take a break. I've solved many, many problems this way. Sometimes a clear head is what you need.

Moving on, here are the top 10 likely problems you'll encounter in PHP:

### 1. Blank Web pages

If you see a blank screen in your Web browser after submitting a form or loading a PHP script, it's most likely because an error occurred that terminated the execution of the page. First check the HTML source code to see if it's an HTML problem. Then turn on `display_errors` in your `php.ini` configuration file or PHP script to see what PHP problem could be occurring.

## 2. Undefined variable or undefined index error **A**

These errors occur when error reporting is set on its highest level, and they may or may not indicate a problem. Check the spelling of each variable or array index to make sure it's correct. Then, either change the error reporting settings or initialize variables prior to referring to them. Also make sure, of course, that variables that should have a value actually do!

## 3. Variables that don't have a value

Perhaps you referred to a variable by the wrong name. Double-check your capitalization and spelling of variable names, and then be certain to use **`$_GET`, `$_POST`, `$_COOKIE`, and `$_SESSION`** as appropriate. If need be, use the **`print_r()`** function to see the value of any variable.

## 4. Call to undefined function... error

Such an error message means you're attempting to use a function that PHP doesn't have. This problem can be caused by a misspelling of a function name, failure

to define your own function before calling it, or using a function that's not available in your version of PHP. Check your spelling and the PHP manual for a non-user-defined function to find the problem.

## 5. Headers already sent error **B**

This error message indicates that you've used an HTTP header-related function—**`header()`, `setcookie()`, or `session_start()`**—after the Web browser has already received HTML or even a blank space. Double-check what occurs in a script before you call any of these functions. You can also make use of output buffering to prevent these errors from occurring.

## 6. Access denied error **C**

If you see this message while attempting to work with a database, then the username, password, and host combination you're using doesn't have permission to access the database. This isn't normally a PHP issue. Confirm the values that are being used, and attempt to connect to the database using a different interface (such as the MySQL client).

*continues on next page*

**Notice:** Undefined index: Name in **/Users/larryullman/Sites /phpvqs4/handle\_form.php** on line 16

Thank you, Mr. , for your comments.

**A** Errors complaining about undefined variables or indexes often come from spelling or capitalization mistakes.

**Warning:** Cannot modify header information - headers already sent by (output started at /Users/larryullman/Sites/phpvqs4/templates/header.html:4) in **/Users/larryullman /Sites/phpvqs4/login.php** on line 22

**B** Some functions create *headers already sent* errors if called at the wrong time.

## 7. Supplied argument is not a valid MySQL result resource error

This is another database-related error message. The message means that a query result is being used inappropriately. Most frequently, this is because you're trying to fetch rows from a query that didn't return any records. To solve this problem, print out the query being run and test it using another tool (such as the MySQL client or phpMyAdmin). Also check that you've been consistent with your variable names.

## 8. Preset HTML form values are cut off

You must put the value attribute of an HTML form input within double quotation marks. If you fail to do so, only the part of the value up to the first space will be set as that input's value.

## 9. Conditionals or loops behave unpredictably

These logical errors are quite common. Check that you haven't used the wrong operator (such as = instead of ==) and that you refer to the proper variables. Then use **print** statements to let you know what the script is doing.

## 10. Parse errors

Parse errors are the most ubiquitous problems you'll deal with. Even the most seasoned PHP programmer sees them occasionally. Check that every statement concludes with a semicolon and that all quotation marks, parentheses, square braces, and curly brackets are evenly paired. If you still can't find the parse error, comment out large sections of the script using the /\* and \*/ characters. Uncomment a section at a time until you see the parse error again. Then you'll know where in the script the problem is (or most likely is).



 If the MySQL access information is incorrect, you'll see a message saying that database access has been denied.

**Parse error:** syntax error, unexpected T\_ENCAPSED\_AND\_WHITESPACE, expecting T\_STRING or T\_VARIABLE or T\_NUM\_STRING in /Users/larryullman/Sites/phpvqs4/handle\_form.php on line 19

 Parse errors are all too common and prevent scripts from executing.

# Next Steps

This book will get you started using PHP, but there are a few topics that you may want to investigate further.

## Security

Web servers, operating systems, databases, and PHP security are all topics that merit their own books. Although this book demonstrates writing secure Web applications, there's always room for you to learn more in this area. Start by checking out these sites:

- A Study in Scarlet ([www.securereality.com.au/studyinscarlet.txt](http://www.securereality.com.au/studyinscarlet.txt))
- W3C Security Resources ([www.w3.org/Security/](http://www.w3.org/Security/))

The first is an article about writing secure PHP code. The second is the World Wide Web Consortium's resources page for Web-related security issues.

You should also read the relevant sections of the PHP manual and the manual for the database you're using. Searching the Internet for *PHP and security* will turn up many interesting articles as well.

## Object-oriented programming

The subject of objects and object-oriented programming (OOP) is not covered in this book for two reasons:

1. It's well beyond the scope of a beginner's guide.
2. You won't be restricted as to what you can do in PHP by not understanding objects.

When you decide you want to learn the subject, you can search the PHP sites for tutorials, check out a framework (see the next section of the appendix), or read my

*PHP 5 Advanced: Visual QuickPro Guide* (Peachpit Press, 2007). I dedicate around 150 pages of that book just to OOP (and there are still aspects of OOP that I didn't get to)!

## Frameworks

A framework is an established library of code that you can use to develop sophisticated Web applications. By reusing someone else's proven code, you can quickly build parts or all of a Web site.

There are many PHP frameworks available, starting with PEAR. The PEAR library is an immense repository of PHP code, written using objects (classes, technically). Even if you don't use objects yourself or you barely understand the concept, you can still get a lot of value out of the PEAR Web site (<http://pear.php.net>). PEAR and its Web site provide free, wonderful code and demonstrate good PHP coding style. PECL (<http://pecl.php.net>) is PEAR's more powerful sibling.

Another framework to consider is the Zend Framework (<http://framework.zend.com>). This framework was created by some of the key people behind PHP and is well documented.

My personal favorite PHP framework, as of this writing, is Yii ([www.yiiframework.com](http://www.yiiframework.com)). I write about Yii extensively on my site.

Many people love frameworks and what they offer. On the other hand, it does take some time to learn how to use a framework, and customizing the framework's behavior can be daunting.

## JavaScript and Ajax

JavaScript is a client-side technology that runs in the Web browser. It can be used to add various dynamic features to a Web site, from simple eye candy like image rollovers

to interactive menus and forms. Because it runs within the Web browser, JavaScript provides some functionality that PHP cannot. And, like PHP, JavaScript is relatively easy to learn and use. For more, see:

- [JavaScript.com](http://www.javascript.com) ([www.javascript.com](http://www.javascript.com))
- W3School's JavaScript pages ([www.w3schools.com/js/](http://www.w3schools.com/js/))

Ajax (which either means Asynchronous JavaScript and XML or doesn't, depending on whom you ask) has been all the rage in the Web development community since around 2005. This technology uses JavaScript to communicate with the server without the user knowing it. The net effect is a Web site that behaves more like a desktop application. For more, see Ajaxian ([www.ajaxian.com](http://www.ajaxian.com)) or search online.

I highly recommend you consider learning jQuery ([www.jquery.com](http://www.jquery.com)) to help you with your JavaScript, Ajax, and other dynamic Web needs. jQuery is a JavaScript framework that's easy to use, powerful, and pretty well documented.

## Other books

It is my hope that after reading this book you'll be interested in learning more about PHP and Web development in general. While I could recommend books by other writers, there's an inherent conflict there and my opinion as a rival writer would not be the same as yours as a reader. So, instead, I'll just quickly highlight a couple of my other books and how they compare to this one.

The *PHP 6 and MySQL 5 for Dynamic Web Sites: Visual QuickPro Guide* (Peachpit Press, 2008) is kind of a sequel to this one (a new edition, tentatively titled *PHP and MySQL for Dynamic Web Sites: Visual QuickPro Guide, Fourth Edition*, should be published in 2011). There is

some overlap in content, particularly in the early chapters, but the examples are different and it goes at a faster pace. MySQL and SQL in particular get a lot more coverage, and there are three different example chapters: a multilingual forum, a user registration and login system, and an e-commerce setup.

*My PHP 5 Advanced: Visual QuickPro Guide* (Peachpit Press, 2007) is kind of a sequel to the PHP and MySQL book just mentioned. This book is much more advanced, spending a lot of time on topics such as OOP and PEAR. It's not intended to be read as linearly as this one, but rather each chapter focuses on a specific topic.

*MySQL: Visual QuickStart Guide, Second Edition* (Peachpit Press, 2006) looks almost exclusively at just MySQL and SQL. Although there are four chapters covering languages used to interact with MySQL—PHP, Perl, and Java, plus a techniques chapter—this book largely addresses things like installation, administration, and maximizing your MySQL knowledge.

My newest book (written just before the one you're reading now) is *Effortless E-Commerce with PHP and MySQL* (New Riders, 2011). The book covers everything you need to know to create fully functioning e-commerce sites. The book uses two specific examples for doing so, and incorporates two different payment systems. Complete comfort with PHP and MySQL is assumed, however.

Finally, my *Building a Web Site with Ajax: Visual QuickProject Guide* (Peachpit Press, 2008) walks through the process of coding an Ajax-enabled Web site. It also uses PHP and MySQL, but those technologies aren't taught in the same way that JavaScript and Ajax are.

# Tables

This book has a handful of tables scattered about, the three most important of which are reprinted here as a convenient reference. You'll also find one new table that lists operator precedence (**Table B.1**). This partial list goes from highest to lowest (for example, multiplication takes precedence over addition).

**Table B.2** lists PHP's main operators and their types. It's most important to remember that a single equals sign (=) assigns a value to a variable, whereas two equals signs (==) are used together to check for equality.

**Table B.3** indicates the modes you can use when opening a file. Which you choose determines what PHP can do with that file—write to it, read from it, and so forth.

The various formats for the `date()` function may be one of the hardest things to remember. Keep **Table B.4** nearby when you're using the `date()` function.

---

**TABLE B.1 Operator Precedence**

! ++ --
* / %
+ - .
< <= > >=
== != ===
&&
= += -= *= /= .= %=
and
xor
or

---

---

**TABLE B.2 PHP's Operators**

Operator	Usage	Type
+	Addition	Arithmetic
-	Subtraction	Arithmetic
*	Multiplication	Arithmetic
/	Division	Arithmetic
%	Modulus (remainder of a division)	Arithmetic
++	Incrementation	Arithmetic
--	Decrementation	Arithmetic
=	Assigns a value to a variable	Assignment
==	Equality	Comparison
!=	Inequality	Comparison
<	Less than	Comparison
>	Greater than	Comparison
<=	Less than or equal to	Comparison
>=	Greater than or equal to	Comparison
!	Negation	Logical
AND	And	Logical
&&	And	Logical
OR	Or	Logical
	Or	Logical
.	Concatenation	String
XOR	Or not	Logical
.=	Concatenates to the value of a variable	Combined concatenation and assignment
+=	Adds to the value of a variable	Combined arithmetic and assignment
-=	Subtracts from the value of a variable	Combined arithmetic and assignment

---

---

**TABLE B.3** fopen() Modes

Mode	Meaning
r	Read only; begin reading at the start of the file.
r+	Read or write; begin at the start of the file.
w	Write only; create the file if it doesn't exist, and overwrite any existing contents.
w+	Read or write; create the file if it doesn't exist, and overwrite any existing contents (when writing).
a	Write only; create the file if it doesn't exist, and append the new data to the end of the file (retain any existing data and add to it).
a+	Read or write; create the file if it doesn't exist, and append the new data to the end of the file (when writing).
x	Write only; create the file if it doesn't exist, but do nothing (and issue a warning) if the file does exist.
x+	Read or write; create the file if it doesn't exist, but do nothing (and issue a warning) if the file already exists (when writing).

---

**TABLE B.4** Date() Function Formatting

Character	Meaning	Example
Y	Year as 4 digits	2011
y	Year as 2 digits	11
L	Is it a leap year?	1 (for yes)
n	Month as 1 or 2 digits	2
m	Month as 2 digits	02
F	Month	February
M	Month as 3 letters	Feb
j	Day of the month as 1 or 2 digits	8
d	Day of the month as 2 digits	08
I (lowercase L)	Day of the week	Monday
D	Day of the week as 3 letters	Mon
w	Day of the week as a single digit	0 (Sunday)
z	Day of the year: 0 to 365	189
t	Number of days in the month	31

---

**TABLE B.4** continued

Character	Meaning	Example
S	English ordinal suffix for a day, as 2 characters	rd
g	Hour; 12-hour format as 1 or 2 digits	6
G	Hour; 24-hour format as 1 or 2 digits	18
h	Hour; 12-hour format as 2 digits	06
H	Hour; 24-hour format as 2 digits	18
i	Minutes	45
s	Seconds	18
u	Microseconds	1234
a	am or pm	am
A	AM or PM	PM
U	Seconds since the epoch	1048623008
e	Timezone	UTC
I (capital i)	Is it daylight savings?	1 (for yes)
O	Difference from GMT	+0600

---

# Index

## Symbols

.., using with directories, 293  
\, using with absolute paths, 320  
' (apostrophe), in MySQL, 358, 360  
@ (at symbol), using in MySQL, 342  
\ (backslash), using with strings, 39  
<!-- --> comment characters, 27  
# (comments), using with scripts, 25, 27  
// (comments), using with scripts , 25, 27  
/\* \*/ (comments), using with scripts, 25, 27  
{ } (curly brackets), using with array values, 163  
\$ (dollar sign), preceding variables with, 36  
\$ (dollar sign), printing, 79  
() (parentheses)  
    using in calculations, 84–85  
    using in conditionals, 125  
" (double quotation marks)  
    error caused by, 22  
    using with strings, 39  
    using with variables, 45–47  
\n (newline character), using with HTML, 23  
; (semicolon), using in MySQL, 358  
' (single quotation marks)  
    using with arrays, 160  
    using with strings, 39  
    using with variables, 45–47  
\_ (underscore), using with variables, 36  
- operator, using, 77–80, 129  
-- operator, 129  
! operator, 129, 133  
!= operator, 129  
!= operator, 130  
% operator, 129

<= operator, 129  
== operator, 129  
= operator, 129  
-= operator, 87

**A**

**abs()**math function, 89  
absolute paths  
    creating on Windows servers, 319  
    start of, 293  
    using with external files, 194  
**action** attribute, including in **form** tag, 50, 53  
**add\_entry.php** script  
    creating, 353  
    saving, 357  
    securing query data, 359–360  
**add\_quote.php** script  
    creating, 296  
    file locks, 302  
    for sample site, 393–396  
    saving, 300  
addition (+) operator, using, 77–80, 129  
Ajax resources, 443–444  
**ALTER** command in SQL, 334  
**AND** operator, 129, 133–134  
Apache Web site, 10  
apostrophe ('), in MySQL, 358, 360  
arguments. See also PHP functions  
    error, 266  
    using with functions, 265–270  
arithmetic  
    assignment operators, 87, 129  
    performing, 77–80  
**array()** calls, nesting, 167  
array elements  
    accessing, 161–163, 167  
    deleting, 158  
    pointing to, 164  
    referring to, 157  
**array()** function, 154–155, 157  
array indexes, using strings for, 161  
array syntax, using, 176–178  
array values, accessing, 163

arrays, 40. *See also* superglobals  
    adding items to, 158–160  
    associative, 40  
    for checkbox input names, 177  
    versus constants, 200  
    contents of, 152  
    creating, 154–157  
    creating from forms, 176–181  
    deleting, 158  
    examples of, 153  
    grocery list example, 152  
    indexed, 40, 157  
    indexing, 154, 157  
    merging, 160  
    multidimensional, 164–167  
    overview, 152  
    printing values of, 162–163  
    sorting, 168–171  
    \$**soups**, 155  
    superglobals, 153  
    syntactical rules, 153  
    using single quotation marks with, 160  
arrays and strings, transforming between, 172–175  
**arsort()** function, 168, 170  
**asort()** function, 168–170  
assignment versus comparison operators, 130  
at symbol (@), using in MySQL, 342  
attributes, identifying, 315

## B

backslash (\), using with strings, 39  
banners, creating for Web pages, 186  
BBEdit Web site, 4  
birth year, creating input for, 117  
blank Web pages, debugging, 440–441  
blog entry  
    adding, 355–358  
    editing, 372–377  
    retrieving data from, 362  
    securing query data, 360  
\$books array, 164–165  
**books.php** script  
    creating, 165, 198  
    saving, 199  
**<br />** tag  
    using for newlines, 98–99  
    using in XHTML pages, 6  
**break**, language construct, 144  
breaks, converting newlines to, 98–99, 102  
browser  
    sending **Hello, world!** greeting to, 16–17  
    sending HTML to, 22–24  
    sending text to, 15–17  
    testing scripts in, 12–14  
buffer size, setting maximum for, 224  
buttons. *See* radio buttons; submit button

## C

calculations, using parentheses in, 84–85  
**calculator.html** script  
    creating, 74–76  
    saving, 76  
**calculator.php** script  
    function returning value, 275–278  
    saving, 278  
    variable scope, 281–285  
Cascading Style Sheets (CSS), adding to Web pages, 3  
case of strings, adjusting, 111  
**cell()** math function, 89  
characters  
    counting in strings, 109  
    escaping, 59  
    indexed positions of, 108  
check boxes  
    creating for form, 118  
    presetting status of, 216  
**checkdate()** validation function, 128  
code repositories, 438  
comments  
    # type of, 25, 27  
    // type of, 25, 27  
    /\* \*/ type of, 25, 27  
    <!-- --> type of, 27  
    adding to scripts, 25–27  
comparison operators  
    versus assignment operators, 130  
    using, 129–132  
concatenating strings, 95–97  
concatenation  
    operator, 129  
    using with functions, 106  
conditionals. *See also* if  
    conditional debugging, 442  
    **if-else**, 126–127  
    nesting, 133  
    nesting for login form, 207  
    reverse, 132  
    using in functions, 125  
    using parentheses in, 125  
conditions, TRUE versus FALSE, 133  
configuration changes, confirming, 424  
constants  
    versus arrays, 200  
    benefits of, 285  
    global scope of, 200  
    naming, 200  
    predefined, 200  
    printing, 199–200  
    using in Web applications, 197–200  
control structures. *See also* loops  
    **else**, 126–128  
    **elseif**, 138–141  
    **foreach** loop, 146, 162–163  
    HTML form for, 116–118

**if** conditional, 119–121, 124  
**for** loop, 146–149, 163  
**switch** conditional, 142–145  
**while** loop, 146, 149  
cookies  
    adding **expiration** arguments to, 242–244  
    adding parameters to, 242–243  
    creating, 234–238  
    debugging, 233  
    deleting, 245–247  
    features of, 234  
    output buffering, 238  
    overview, 232–233  
    reading from, 239–241  
    in sample site, 383  
    **secure** value, 243  
    sending, 235–238  
    versus sessions, 248  
    testing compatibility, 247  
cost, calculating, 79  
**count()** function, 160  
**CREATE** command in SQL, 334  
**create\_table.php** script  
    beginning, 348  
    saving, 351  
Crimson Editor Web site, 4  
cross-site scripting (XSS) attacks, 100  
CRUD, explained, 396  
**crypt()** function, using with strings, 106  
CSS (Cascading Style Sheets), adding to  
    Web pages, 3  
CSS code, adding to layout model, 185  
CSS templates, 191. See *also* templates  
curly brackets ({}), using with array values, 163  
**customize.php** script  
    creating for cookies, 235  
    expiration date, 243–244  
    saving, 238

## D

database code, placement of, 351  
database information, setting, 346  
database management system (DBMS), 335  
database records  
    CRUD, 396  
    editing in databases, 373–374  
    inserting via MySQL, 357  
    paginating returned, 365  
database resources, 439  
database tables  
    columns in, 347  
    creating, 347–351  
    creating for sample site, 380–381  
    emptying of records, 371  
    entries example, 347  
    primary keys, 347  
    using commas in, 347

databases. See *also* sample site  
    connecting to, 382  
    creating, 343–346  
    defined, 334  
    deleting data in, 366–371  
    editing records in, 373–374  
    **id** primary key, 377  
    **INSERT INTO** command, 352  
    inserting data into, 352–357  
    permissions for, 343  
    queries, 352  
    retrieving data from, 361–365  
    securing query data, 358–360  
    selecting, 343–346  
    updating data in, 372–377  
**date()** function, 201–203, 295, 446  
day of month, drop-down menu for, 147–148  
day pull-down menu, creating, 262  
**\$dbc** reference  
    explained, 361  
    setting, 364  
DBMS (database management system), 335  
debugging  
    cookies, 233  
    FAQs (frequently asked questions), 440–442  
    PHP scripts, 28–29, 63  
    variables without values, 441  
decrementation operator, 129  
**default** case, adding to **switch** conditional, 145  
**DELETE** queries, 334  
    error related to, 371  
    using in MySQL, 366–371  
**delete\_entry.php** script  
    creating, 367  
    saving, 371  
**delete\_quote.php** script  
    creating, 406  
    saving, 409  
deleting  
    arrays, 158  
    cookies, 245–247  
    data in databases, 366–371  
    directories, 326  
    files, 314  
    sessions, 254–255  
deprecated functions, listing in PHP manual, 21  
**die()**, calling in MySQL, 342  
**die**, language construct, 144  
directories  
    deleting, 326  
    finding contents of, 315  
    finding parts of, 319  
    navigating, 315–319  
    parent folders, 293  
    permissions for, 320  
    referring to, 293  
    saving, 320–326  
**scandir()** function, 315  
searching files in, 319

directory control panel, creating, 316–319  
**display\_errors** setting. See *also* errors  
enabling for debugging scripts, 63  
turning on, 29, 62  
viewing, 61  
division (/) operator, using, 77–80, 129  
documents, creating for XHTML pages, 4  
dollar sign (\$), preceding variables with, 36  
dollar sign (\$), printing, 79  
double quotation marks ("")  
    error caused by, 22  
    using with strings, 39  
    using with variables, 45–47  
Dreamweaver Web site, 4  
**DROP** command in SQL, 334  
drop-down menu. See *also* menu  
    creating for form, 118  
    for day of month, 147–148  
    selecting options from, 181

**E**

**edit\_entry.php** script  
    creating, 373  
    saving, 376  
**edit\_quote.php** script  
    creating, 400  
    saving, 405  
EditPlus Web site, 4  
**else** conditional, 126–128  
**elseif** conditional, 138–141  
email, sending, 217–221  
email address  
    adding text input for, 52  
    adding to HTML form, 93  
    creating inputs for, 117  
email body, creating lines in, 221  
**empty()** validation function, 122–123  
encoding, selecting, 5  
equality operator, 129  
error handling  
    applying to PHP scripts, 70  
    in **handle\_calc.php** document, 78  
error messages  
    for sample site, 390  
    trusting, 440  
error reporting. See *also* **display\_errors** setting  
    adjusting level of, 65–66  
    constants, 64  
error settings, placing in external files, 196  
Error type, 64  
error types  
    Error, 64  
    Notice, 64  
    Parse error, 64  
    Warning, 64  
error-handling techniques, 340  
errors. See *also* **display\_errors** setting  
    Access denied, 441  
    “Call to undefined function,” 264

*Call to undefined function..., 441*  
database queries, 350  
**DELETE** queries, 371  
displaying in scripts, 61–63  
file permissions, 300  
**\$FILES** variable, 308  
*Headers already sent, 441*  
parsing, 442  
related to **foreach** loop, 181  
related to functions, 264  
related to **header()** call, 222  
*Supplied argument is not valid MySQL result resource, 442*  
*Undefined index, 441*  
Undefined variable, 44  
*Undefined variable, 441*  
escape sequences, using with files, 293  
escaping characters, 59  
**event.html** script  
    creating, 177  
    saving, 178  
**event.php** script  
    creating, 179–181  
    saving, 181  
**exit()**, alias for, 342  
**exit**, language construct, 144  
**explode()** function, 172, 174  
extensions, explained, 9  
external files  
    placing error settings in, 196  
    using with Web applications, 192–196  
    writing to, 296–300

**F**

FALSE versus TRUE conditionals, 133, 137  
FAQs (frequently asked questions), 440–442  
**fclose()** function, 295, 302  
**feedback.html** script  
    adding **method** attribute to, 55–56  
    creating, 51  
    saving, 53  
    using with HTML forms, 60  
**fgetcsv()** function, 331  
**fgets()** function, 327  
file access, returning time of, 319  
**file()** function, 304  
file navigation, 194  
file owner, returning, 319  
file paths, 293, 319  
file permissions  
    versus database permissions, 343  
for directories, 320  
error, 300  
overview, 288–289  
**quotes.txt** file, 289–290  
returning, 319  
setting, 291–292  
File Transfer Protocol (FTP), using, 10–11

file uploads  
  configuring PHP for, 307  
  **file** tag, 307  
  \$FILES variable, 308  
  **form** tag, 307  
  hidden input type, 307  
  using PHP for, 310–314  
  writable directory, 309  
**file\_get\_contents()** function, 304  
**file\_put\_contents()** function, 293–294  
files  
  copying on server, 314  
  deleting, 314  
  locking, 301–303  
  modification times of, 315  
  opening, 294  
  reading from, 303–306  
  reading incrementally, 327–331  
  writing to, 293–300  
\$FILES variable  
  elements of, 308  
  error codes, 308  
FileZilla, using to upload scripts, 10–11  
Firebug extension for Firefox, 233, 238  
firewalls, using, 416  
first name, adding to HTML form, 93  
**flag** variable  
  creating for sticky form, 213  
  using with if conditional, 120–121  
floating-point numbers and integers, 38  
**flock()** lock types, 301–303  
**floor()** math function, 89  
footer file, creating for Web pages, 190–191  
**footer.html** script  
  for sample site, 386–387  
  saving, 190  
**fopen()** modes, 294, 446  
**for** loop. See *also* loops  
  executing, 146–147  
  variables in, 149  
  writing, 147–149  
**foreach** loop, 146  
  error related to, 181  
  using to access array elements, 162–163  
form inputs, quoting attributes in, 216  
form submission, determining, 204–205. See *also*  
  HTML forms  
**form** tags, 50  
  adding to **feedback.html** file, 51–52  
  for **calculator.html** document, 75  
  creating for **register.html** script, 117  
  for **posting.html** script, 92  
frameworks resources, 443  
frequently asked questions (FAQs), 440–442  
FTP (File Transfer Protocol), using, 10–11  
function calls, using spaces between, 83  
function definitions, looking up, 20–21  
function design theory, 285  
**function\_exists()** function, 264  
functions. See *also* PHP functions;  
  user-defined functions  
  calling, 17  
  deprecated, 21  
  looking up in PHP manual, 18  
**functions.php** script, creating for sample  
  site, 384–385  
**fwrite()** function, 295

## G

garbage collection, 255  
GET method  
  using with HTML forms, 54–56  
  using with **welcome.php** page, 229  
\$\_GET predefined variable, 57  
**getrandmax()** math function, 89  
**glob()** function, 319  
**global** statement, using with variable  
  scope, 279–285  
**\$grades** array, 169, 171  
**GRANT** command, using in MySQL, 434–435  
greater than operator, 129  
greater than or equal to operator, 129  
greetings, creating in PHP scripts, 70–71  
**\$groceries** array, 164

## H

**handle\_calc.php** script  
  creating, 77  
  precedence example, 85–87  
  saving, 79, 83  
  using to format numbers, 82–83  
**handle\_form.php** script  
  adjusting error reporting in, 65–66  
  creating, 58  
  displaying errors in, 62–63  
  saving, 59, 62  
  slashes displayed in, 60  
**handle\_post.php** script  
  creating, 96  
  functions in, 101–102  
  saving, 97, 99  
  string variables sent to, 95  
  substring example, 109  
  **urlencode()** example, 103–105  
**handle\_reg.php** script  
  comparison operators examples, 130–132  
  creating, 120  
  **else** control structure example, 126–128  
  **elseif** example, 139–141  
  form validation example, 123–125  
  logical operators example, 134–137  
  saving, 121, 124  
  **switch** conditional example, 143–145  
hash, creating, 326  
header file, creating for Web pages, 188–189  
**header()** function, 222, 225–229

**header.html** script  
  **date()** function, 202–203  
  modifying, 199–200  
  output, 222  
  printing constants, 199–200  
  for sample site, 385  
  saving, 199, 203  
**headers\_sent()** function, 229  
*Hello, world!* greeting  
  enhanced version of, 23  
  sending to browser, 16–17  
**hello2.php** script  
  adding comments to, 26  
  saving, 23  
  source code, 24  
**hello3.php** file, saving, 26  
**hello.html** script, creating, 68  
**hello.php** file, saving, 17  
**hello.php** script  
  creating, 70  
  versus **hello.html**, 71  
  running directly, 71  
hidden input, using with HTML forms, 60  
home page, creating for sample site, 410–413  
HTML (HyperText Markup Language)  
  outside of PHP tags, 24  
  versus PHP documents, 7  
  resource, 6  
  sending to browser, 22–24  
  versus XHTML, 6  
HTML code, spacing, 23  
HTML comments, location of, 27  
**html\_entities()** function, 100–102  
HTML form data  
  accessing, 60  
  receiving in PHP, 57–60  
  validating, 120–121, 123–125  
HTML forms. See *also* form submission  
  adding menus to, 52  
  adding radio buttons to, 52  
  adding submit buttons to, 53  
  for control structures, 116–118  
  creating, 50–53  
  creating arrays from, 176–181  
  GET method, 54–56  
  handling with PHP, 204–209  
  hidden input, 60  
  making sticky, 210–216  
  **method** attribute, 54–56  
  for numbers, 74–76  
  POST method, 54–56  
  preset values cut off, 442  
  printing out user data from, 60  
  redisplaying immediately, 209  
  **select** element, 52  
  for strings, 92–94  
  for strings and arrays, 173–174  
  **textarea**, 53

using with databases, 353–357  
viewing information in, 56  
HTML pages  
  creating to receive data, 67–69  
  with input types, 51  
  sending data to manually, 67–71  
HTML syntax, 2–4  
HTML tags, using PHP functions with, 100–101.  
  See *also* PHP tags; tags

**html\_entity\_decode** function, 102  
**htmlspecialchars()** function, 100, 102  
HTTP headers, manipulating, 225–226  
HTML (HyperText Markup Language)  
  outside of PHP tags, 24  
  versus PHP documents, 7  
  resource, 6  
  sending to browser, 22–24  
  versus XHTML, 6

## I

**id** primary key, using in databases, 377  
**if** conditional. See *also* conditionals  
  = versus == operators in, 132  
  creating, 119–121  
  for validating form data, 124  
**if-else** conditional, 126–127, 135  
**if-else** statements, troubleshooting, 137  
**if-elseif** conditionals, simplifying, 142–144  
**if-else-else** conditional, 138–141  
**implode()** function, 172, 174  
**include()** function, 192–193, 196  
increment (++) operator, using, 86–87, 129  
incrementing numbers, 86–87  
**index.php** script  
  creating, 193  
  running in browser, 195  
  for sample site, 410–413  
  saving, 194, 410–413  
inequality operator, 129  
**ini\_set()** function, using with scripts, 62  
**INSERT** command in SQL, 334  
**INSERT INTO** command, using with  
  queries, 352, 357  
**INSERT** query, using form data in, 355  
installation  
  on Mac OS X, 419–422  
  on Windows, 415–418  
integers and floating-point numbers, 38  
**is\_numeric()** validation function, 123, 125  
**is\_readable()** function, 306  
**is\_writable()** function, 295  
**isset()** validation function, 122–123, 125

## J

JavaScript resources, 443–444  
**join()** function, 174

## K

key-value pairs, using with arrays, 40  
**krsort()** function, 168  
**ksort()** function, 168–171

## L

language constructs  
  **break**, 144  
  **die**, 144  
  **exit**, 144  
  **print**, 144  
last name, adding to HTML form, 93  
layout model, creating for Web pages, 185–187  
**layout.html** script, footer file, 190–191  
less than operator, 129  
less than or equal to operator, 129  
links  
  creating to PHP scripts, 68–69  
  using to send values to scripts, 71  
**list()** function, 181  
list of words, alphabetizing, 172  
**list\_dir.php** script  
  creating, 316–317  
  displaying, 315–319  
  saving, 319  
**list.html** script  
  creating, 173–174  
  saving, 174  
**list.php** script  
  creating, 174  
  saving, 175  
locking files, 301–303  
**\$loggedin** flag, 330  
logical operators, using, 133–137  
login form  
  checking for hidden input, 209  
  creating for Web page, 205–209  
login script, creating, 327–331  
**login.php** script  
  creating, 206, 328–329  
  **header()** function, 226  
  **\$loggedin** flag, 330  
  for sample site, 388–391  
  saving, 209, 331, 391  
  sessions, 250–251  
**logout.php** script  
  creating, 254–255  
  for sample site, 392  
  saving, 255  
loops. See *also* control structures; **for** loop  
  debugging, 442  
  nesting, 149

## M

Mac OS X, installation on, 419–422  
Magic Quotes, 59–60. See *also* quotation marks  
**mail()** function, 218–221, 424  
mailing lists, 439

**make\_date\_menus()** function, 263

**make\_text\_input()** function, 269  
MAMP, installing on Mac OS X, 420–422  
mathematical functions

**abs()**, 89  
  **ceil()**, 89  
  **floor()**, 89  
  **getrandmax()**, 89  
  **mt\_rand()**, 89  
  **rand()**, 89  
  **round()**, 89

mathematical operators, 84–85, 87.

  See *also* operators

mathematics, principles of, 77

**mcrypt\_encrypt()** function, using with strings, 106

**md5()** function, 326

menu, adding to HTML form, 52. See *also*  
  drop-down menu; pull-down menu

menu variables, values of, 60

**menus.php** script

  creating, 260  
  saving, 263

message, printing in browser, 16

**method** attribute, using with HTML forms, 54–56

MIME type, finding, 319

**mkdir()** command., 320

modulus operator, 129

**money\_format()** function, 83

month pull-down menu, creating, 260

monthly payment, calculating, 79

**move\_uploaded\_file()** script, 310–311

**mt\_rand()** math function, 89

multidimensional arrays

  using, 164–167  
  viewing, 167

multilingual page, creating, 5

multiplication (\*) operator, using, 77–80, 129

My Blog example. See blog entry

My Site of Quotes, setting up, 380

MySQL

  alias for **exit()**, 342

  auto-incrementing primary keys, 357

  calling **die()**, 342

  connecting to, 336–340

**DELETE** queries, 366–371

  error handling, 340–342

  extensions, 339

**GRANT** command, 434–435

  inserting records, 357

**localhost** value, 339

  paginating returned records, 365

**REVOKE** command, 436

**SELECT** queries, 361

  support for, 334–335

**TRUNCATE TABLE** command, 371

**WHERE** clauses, 361

MySQL client, using, 425–427

MySQL errors, showing, 358

MySQL privileges, creating, 433–436

MySQL symbols  
; (semicolon), 358  
@ (at sign), 342  
' (apostrophe), 358, 360

MySQL users  
creating, 433–436  
setting root user password, 430–432

**mysql\_connect.php** script  
creating, 337  
creating databases, 344–346  
error-handling, 341  
sample site, 382  
saving, 338, 342, 382  
selecting databases, 344–346

**mysql\_error()** function, 340

**mysql\_fetch\_array()** function, 365

**mysql\_num\_rows()** function, 365, 377

**mysql\_query()** function  
invoking, 348, 350  
returning TRUE, 350  
using, 356

**mysql\_real\_escape\_string()** function, 377

## N

name, adding to HTML form, 93  
**name** value, using with greetings, 70–71  
**\$name** variable, creating via concatenation, 96

**natcasesort()** function, 171

**natsort()** function, 171

negation operator, 129

nesting  
    conditionals, 133  
    conditionals for login form, 207  
    loops, 149

newline character (\n), using with HTML, 23

newlines  
    converting to breaks, 98–99, 102  
    inserting into strings, 99

newsgroups, 439

**nl2br()** function. See *also* functions  
    in PHP manual, 18  
    using with HTML in PHP, 101–102  
    using with newlines, 99

not equal to operator, 130

Not Found server response, receiving, 13

**not** operator, 133–134

Notice error type, 64

**number** class, using with **handle\_calc.php**  
    document, 77

number variables, 38

**number\_format()** function, 81–83

numbers. See *also* random numbers  
    creating HTML forms for, 74–76  
    decrementing, 86–87  
    formatting, 81–83  
    incrementing, 86–87  
    integers and floating-point, 38  
    **round()** function, 81, 83  
    valid versus invalid, 38

## O

**ob\_clean()** function, 224

**ob\_end\_clean()** function, 222

**ob\_end\_flush()** function, 222, 224

**ob\_flush()** function, 224

**ob\_get\_contents()** function, 224

**ob\_get\_length()** function, 224

**ob\_start()** function, 222–223

object-oriented programming resources, 443

**\$okay** conditional, using with **else**, 126–127

online resources. See *also* Web sites  
    code repositories, 438  
    newsgroups, 439  
    PHP manual, 437–438  
    Web sites, 438

operators. See *also* mathematical operators  
    arithmetic, 129  
    comparison, 129–132  
    logical, 133–137  
    precedence of, 84–85, 445  
    table of, 129, 445  
    using, 77–80

**OR** operator, 129, 133

**ORDER BY** clause, contents of, 399

output buffering, 222–224, 238

## P

pages. See HTML pages; Web pages

parameters, using with functions, 265–270

parentheses (( ))  
    using in calculations, 84–85  
    using in conditionals, 125

parse errors, 64  
    debugging, 442  
    for variable values, 44

password values, validating, 130–133

passwords  
    assigning to root user in MySQL, 431–432  
    creating inputs for, 117  
    validating for sticky forms, 214

permissions. See databases; file permissions

PHP. See *also* sample site  
    case-insensitivity of, 17  
    configuring, 423–424  
    as server-side technology, 203

PHP code, placing in files, 224

**.php** extension, 9

PHP function list, 20

PHP functions. See *also* arguments; functions;  
    **nl2br()** function; sorting functions;  
    validation functions  
with arguments, 265–270

**array()**, 154–155, 157

**count()**, 160

creating and calling, 260–264

**crypt()**, 106

**date()**, 201–203, 446

**explode()**, 172, 174

`fclose()`, 295, 302  
`fgetcsv()`, 331  
`fgets()`, 327  
`file()`, 304  
`file_get_contents()`, 304  
`file_put_contents()`, 293–294  
`flock()` lock types, 301–303  
`fopen()` modes, 294, 446  
formatting, 259  
`function_exists()`, 264  
`fwrite()`, 295  
`glob()`, 319  
`header()`, 222, 225–229  
`headers_sent()`, 229  
`html_entities()` function, 100–102  
`html_entity_decode`, 102  
`implode()`, 172, 174  
`include()`, 192–193, 196  
`is_readable()`, 306  
`is_writable()`, 295  
`join()`, 174  
`list()`, 181  
`mail()`, 218–221, 424  
`make_date_menus()` function, 263  
`make_text_input()`, 269  
`mcrypt_encrypt()`, 106  
`md5()`, 326  
`move_uploaded_file()`, 310  
`mysql_error()`, 340  
`mysql_fetch_array()`, 365  
`mysql_num_rows()`, 365, 377  
`mysql_query()`, 348, 356  
`mysql_real_escape_string()` function, 377  
naming, 258  
`ob_clean()`, 224  
`ob_end_clean()`, 222  
`ob_end_flush()`, 222, 224  
`ob_flush()`, 224  
`ob_get_contents()`, 224  
`ob_get_length()`, 224  
`ob_start()`, 222–223  
omitting spaces from, 258  
`readfile()`, 306  
`require()`, 192–193, 196  
returning values, 274–278  
`rmdir()`, 326  
`scandir()` function, 315  
`session_start()`, 222, 249  
`setcookie()`, 222, 234, 238  
`sizeof()`, 160  
`strtoupper()`, 111  
`str_ireplace()`, 111–113  
`str_word_count()`, 109  
`strcasecmp()`, 107  
`strcmp()`, 107  
`strip_tags()` function, 100–102  
`strpos()`, 107  
`stripos()`, 107

`strlen()`, 109  
`strnatcasecmp()`, 107  
`strnatcmp()`, 107  
`strpos()`, 107  
`strstr()`, 107  
`strtok()`, 107  
`strtolower()`, 111  
`substr()`, 108  
`trim()`, 111–113, 132  
`ucfirst()`, 111  
`ucwords()`, 111  
`unlink()`, 314  
`unset()`, 158  
`urldecode()`, 105  
`urlencode()`, 103–105  
user-defined, 258  
using concatenation with, 106  
using conditionals in, 125  
using with HTML tags, 100–101  
`var_dump()`, 157  
`wordwrap()`, 102  
PHP installation  
  on Mac OS X, 419–422  
  on Windows, 415–418  
PHP manual  
  accessing, 18  
  deprecated functions in, 21  
  looking up function definitions, 20–21  
  `nl2br()` function page, 18  
  `print` function page, 18  
  using, 18–19, 437–438  
PHP scripts  
  accessing via URLs, 14  
  adding comments to, 25–27  
  blank pages displayed in, 63  
  creating, 8–9  
  creating for HTML pages, 70–71  
  creating links to, 68–69  
  debugging, 28–29  
  displaying errors in, 61–63  
  executing, 9  
  as open source software, 10  
  passing data to, 67  
  passing preset values to, 60  
  running, 10  
  running through URLs, 28, 440  
  sending to server via FTP, 10–11  
  testing in browsers, 12–14  
PHP scripts, running through URLs, 7  
PHP syntax, 7–8  
PHP tags, 7, 16. See also HTML tags; tags  
PHP version, confirming, 28, 440  
PHP versus HTML documents, 7  
PHP Web sites, 438  
PHP-enabled server, obtaining, 10  
`phpinfo()` function  
  calling, 8  
  running to display errors, 61

**/phpinfo.php**, adding to URL, 13  
**phpinfo.php** script  
    creating, 8  
    saving, 9  
    uploading to server, 11  
**phpMyAdmin**, 335  
    assigning root user, 432  
    creating users in, 432  
    using, 428–429  
**\$\_POST** elements, adding to calculator, 78  
**POST** method, using with HTML forms, 54–56  
**\$\_POST** predefined variable, 57–59  
**posting.html** script  
    creating, 92  
    saving, 94  
    string variables in, 95  
**<pre></pre>** tags, using with variables, 35  
precedence of operators managing, 84–85, 445.  
    See also operators  
predefined variables, 32–35, 57. See also  
    variables  
**predefined.php** file, saving, 34  
**print** statement  
    language construct, 144  
    in PHP manual, 18  
    typing, 15  
    using on variable types, 41  
    using over multiple lines, 17  
    using to send HTML to browser, 22  
    using with HTML in PHP, 101  
    using with sales cost calculator, 79  
    using with substrings, 110  
    using with **urlencode()** function, 104  
**print\_r()** function, calling, 33, 35  
**printf()** function, using to format numbers, 83  
printing  
    \$ (dollar sign), 79  
    constants, 199–200  
    message in browser, 16  
    predefined variables, 33–35  
    values of arrays, 162–163  
    variable values, 41–42  
projects, identifying goals of, 380  
pull-down menu. See also menu  
    creating for form, 260–261  
    preselecting, 216

**Q**

queries, executing, 352  
query data, securing, 358–360  
query statement, 353–354  
quotation marks. See also Magic Quotes  
    using, 45–47  
    using with strings, 39  
    using with variables, 45  
quotations  
    adding to sample site, 393–396  
    deleting, 406–409

displaying randomly, 304–306  
editing, 400–405  
storing in text file, 296–300  
**quotes.php** file, saving, 47  
**quotes.txt** file  
    creating, 289–290  
    referencing, 297

**R**

radio buttons  
    adding to HTML forms, 52  
    presetting status of, 216  
    values of, 60  
**rand()** function, invoking, 89  
random numbers, generating, 88–89. See also  
    numbers  
**random.php** script, creating, 88  
**range()** function, using to create arrays, 157  
**readfile()** function, 306  
reading from files, 304–306  
records  
    CRUD, 396  
    editing in databases, 373–374  
    inserting via MySQL, 357  
    paginating returned, 365  
**register.html** script  
    creating for control structures, 116–118  
    **for** loop example, 147–149  
    saving, 118  
**register.php** script  
    directories, 321–326  
    **mail()** function, 218  
    saving, 216  
    sticky form, 212  
registration form, creating shell of, 211–216  
registration script, creating for directory, 321–326  
relative paths  
    start of, 293  
    using with external files, 193–194  
**require()** function, 192–193, 196  
resources  
    Ajax, 443–444  
    books, 444  
    code repositories, 438  
    frameworks, 443  
    JavaScript, 443–444  
    newsgroups, 439  
    object-oriented programming, 443  
    PHP manual, 437–438  
    security, 443  
    Web sites, 438  
reverse conditionals, 132  
**REVOKE** command, using in MySQL, 436  
**rmdir()** function, 326  
**round()** function, using with numbers, 81, 83, 89  
**\$row** reference, explained, 361  
**rsort()** function, 168

## S

sales cost calculator, creating, 77–80  
sample site. *See also* databases; PHP; Web sites  
    adding quotes, 393–396  
    connecting to database, 382  
    creating database for, 380  
    creating home page, 410–413  
    creating tables for, 380  
    creating template, 385–387  
    deleting quotes, 406–409  
    editing quotes, 400–405  
    listing quotes, 397–399  
    logging in, 388–391  
    logging out, 392  
    organizing, 381  
    **quote\_id** primary key, 381  
    structure of, 381  
    writing user-defined function, 383–384  
scalar variable, defined, 152. *See also* variables  
**scandir()** function, 315  
scripts. *See* PHP scripts  
security resources, 443  
**select** element, using with HTML forms, 52  
**SELECT** queries, 334  
    defining, 361, 363  
    running, 363  
semicolon (;), using in MySQL, 358  
server  
    configuring to send email, 221  
    requesting information from, 55  
    setting time zone, 203  
    uploading **phpinfo.php** script to, 11  
**\$\_SERVER** predefined variable, 57  
server-side technology, 7  
**\$\_SESSION** array, 252  
session values, deleting, 255  
session variables  
    accessing, 252–253  
    verifying, 253  
**session\_start()** function, 222, 249  
sessions  
    versus cookies, 248  
    creating, 249–251  
    deleting, 254–255  
    overview, 248  
    using without cookies, 255  
**setcookie()** function, 222, 234, 238  
short tags, 9  
**shuffle()** function, using with arrays, 168  
single quotation marks (')  
    using with arrays, 160  
    using with strings, 39  
    using with variables, 45–47  
site structure, 194  
sites. *See* sample site; Web sites  
**sizeof()** function, 160  
**sort()** function, 168

sorting functions. *See also* PHP functions

**arsort()**, 168, 170  
    **asort()**, 168–170  
    **krsort()**, 168  
    **ksort()**, 168–171  
    **natcasesort()**, 171  
    **natsort()**, 171  
    **rsort()**, 168  
    **shuffle()**, 168  
    **sort()**, 168  
    **uasort()**, 171  
    **ursort()**, 171  
    **usort()**, 171  
**sort.php** file  
    creating, 169  
    saving, 171  
**\$soups** array, 155, 162  
**soups1.php** script  
    creating, 159  
    opening, 159  
    saving, 156  
**soups3.php** script  
    creating, 162  
    saving, 163  
spaces, using between function calls, 83  
spacing HTML code, 23  
**sprintf()** function, using to format numbers, 83  
SQL (Structured Query Language), 334–335  
SQL injection attack, 358  
SQL keywords, writing, 351  
sticky forms, making, 210–216  
**sticky1.php** script  
    creating, 268  
    functions with default values, 272  
    saving, 270  
**sticky2.php** script, saving, 273  
**str\_ireplace()** function, 111–113  
**str\_word\_count()** function, 109  
**strcasecmp()** function, 107  
**strcmp()** function, 107  
string case, adjusting, 111  
string operator, 129  
string values, comparing, 132  
string variables, 39  
strings. *See also* substrings  
    comparing, 107  
    concatenating, 95–97  
    counting words and characters in, 109  
    decrypting, 106  
    empty, 39  
    encoding and decoding, 103–106  
    encrypting, 106  
    HTML form for, 92–94  
    inserting newlines into, 99  
    linking via concatenation, 97  
    replacing parts of, 111–113  
    using for array indexes, 161  
    using in **switch** conditionals, 145

strings and arrays, transforming between, 172–175  
**strip\_tags()** function, 100–102  
**stripos()** function, 107  
**stristr()** function, 107  
**strlen()** function, 109  
**strnatcasecmp()** function, 107  
**strnatcmp()** function, 107  
**strpos()** function, 107  
**strstr()** function, 107  
**strtok()** function, 107  
**strtolower()** function, 111  
Structured Query Language (SQL), 334–335  
**strupr()** function, 111  
subdirectories, listing, 318  
submit button  
    adding to HTML forms, 53  
    creating for **register.html** script, 118  
**substr()** function, 108  
substrings. *See also* strings  
    finding, 107–110  
    replacing, 111–113  
subtraction (–) operator, using, 77–80, 129  
superglobals, 153, 285. *See also* arrays  
support forum, 6  
**switch** conditional, using, 142–145

## T

tables. *See* database tables  
tags, 9. *See also* HTML tags; PHP tags  
tax rate  
    calculating, 79  
    recalculating, 86–87  
template system, files in, 196  
**template.html** script  
    creating, 185–187  
    header file, 188–189  
    saving, 187  
templates. *See also* CSS templates; Web  
    applications; Web pages  
    creating, 184  
    creating for sample site, 385–387  
    footer file, 190–191  
    header file, 188–189  
    layout model, 185–187  
    using with external files, 193–194  
text, sending to browser, 15–17  
text area, presetting value of, 216  
text input, adding to email address, 52  
**textarea** form element  
    adding to HTML forms, 53  
    using with newlines, 98–99  
TextMate Web site, 4  
time zone, setting for server, 203  
token substring, explained, 107  
**trim()** function, using with strings, 111–113, 132  
TRUE versus FALSE conditionals, 133, 137  
**TRUNCATE TABLE** command, 371

## U

**uasort()** function, 171  
**ucfirst()** function, using with strings, 111  
**ucwords()** function, using with strings, 111  
Undefined variable error, 44  
underscore (\_), using with variables, 36  
Unicode encoding, 5  
**unlink()** function, 314  
**unset()** function, 158  
**UPDATE** command in SQL, 334  
**UPDATE** queries  
    **LIMIT 1** clause, 377  
    using with databases, 372–377  
**upload\_file.php** script  
    creating, 310  
    saving, 314  
**uploads** folder, creating, 309  
**urldecode()** function, 105  
**urlencode()** function, 103–105  
URLs  
    accessing scripts from, 13  
    adding **/phpinfo.php** to, 13  
    running PHP scripts through, 28  
**usort()** function, 171  
user-defined functions. *See also* functions  
    creating, 258–259  
    memory requirements, 264  
    writing for sample site, 383–384  
**users** folder, creating, 320  
**users.txt** file  
    displaying, 326  
    login script, 327–331  
    saving, 320  
**usort()** function, 171  
UTF-8 encoding, using, 5

## V

validating  
    form data, 120–121, 123–125  
    password values, 130–133  
    variables, 141  
    year values, 130–133  
validation, repeating for sticky form, 213–214  
validation functions. *See also* PHP functions  
    **checkdate()**, 128  
    **empty()**, 122–123  
    **is\_numeric()**, 123, 125  
    **isset()**, 122–123, 125  
values, assigning to variables, 129  
**var\_dump()** function, 157  
variable names  
    case sensitivity of, 36  
    conventions, 37  
variable scope  
    **\$arg** and **\$var** values, 280  
    **global** statement, 279–285  
    overview, 279–281

variable syntax, 36–37  
variable types  
  arrays, 40  
  numbers, 38  
  strings, 39  
  using `print` statement on, 41  
variable values  
  assigning, 41–44  
  incrementing, 86–87  
  parse errors, 44  
  printing, 35, 41–42  
**variables.** See *also* predefined variables;  
  scalar variable  
  `$_SERVER`, 34–35  
  assigning values to, 129  
  documenting purpose of, 37  
  minimizing bugs in, 37  
  nonexisting, 60  
  overview, 32  
  predefined, 32–35  
  referring to, 37  
  valid versus invalid, 37  
  validating, 141  
  without values, 441  
**variables.php** file, saving, 44  
**view\_blog.php** script, 366, 369–371, 376–377  
**view\_entries.php** script  
  creating, 362  
  saving, 365  
**view\_quote.php** script  
  creating, 305–306  
  for sample site, 397–399  
  saving, 306  
**view\_settings.php** script  
  saving, 241  
  using with cookies, 239

**W**

Warning error type, 64  
weakly typed, explained, 97  
Web applications. See *also* templates  
  constants, 197–200  
  date and time, 201–203  
  external files, 192–196  
  HTTP headers, 225–229  
  output buffering, 222–224  
  sending email, 217–221  
  sticky forms, 210–216  
Web document root, 12  
Web pages. See *also* templates  
  adding CSS to, 3  
  banners, 186  
  blank, 440–441  
  content, 187  
  defining titles for, 198  
  footer, 187, 190–191

header area, 186  
header file, 188–189  
layout model, 185–188  
login form, 205–209  
sidebars, 187  
Web root directory, 288  
Web sites. See *also* online resources; sample site  
  Apache, 10  
  BBEdit, 4  
  Crimson Editor, 4  
  Dreamweaver, 4  
  EditPlus, 4  
  identifying goals of, 380  
  support forum, 6  
  TextMate, 4  
Web-page extensions, 9  
**welcome.html** file, saving, 6  
**welcome.php** page  
  creating, 227–229  
  session variables, 252  
**WHERE** clauses, using in queries, 361  
**while** loop, 146, 149  
white space, using, 23  
Windows, installation on, 415–418  
word list, alphabetizing, 172  
**wordwrap()** function, 102

## X

XAMPP, installing on Windows, 417–419  
XHTML  
  attributes, 2  
  CSS, 2  
  versus HTML, 2  
  resource, 6  
  rules, 50–51  
  tags, 2–3  
XHTML code sample document, 4  
XHTML page  
  body section, 5–6  
  **body** tags, 6  
  **<br />** tag, 6  
  creating, 4–6  
  head section, 5  
  header lines, 4–5  
  saving, 6  
  testing, 6  
**XOR** operator, 133–134  
XSS (cross-site scripting) attacks, 100

## Y

year pull-down menu, creating, 262  
year validation, 137  
year values, validating, 130–133, 135  
year variable, checking digits in, 135–136



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