



Luke Welling
Laura Thomson

Fourth Edition

PHP and MySQL[®] Web Development

Developer's Library



"I've never purchased a better programming book... This book proved to be the most informative, easiest to follow, and had the best examples of any other computer-related book I have ever purchased. The text is very easy to follow!"

—Nick Landman

"This book by Welling & Thomson is the only one which I have found to be indispensable. The writing is clear and straightforward but never wastes my time. The book is extremely well laid out. The chapters are the right length and chapter titles quickly take you where you want to go."

—Wright Sullivan, President, A&E Engineering, Inc., Greer South Carolina

"I just wanted to tell you that I think the book *PHP and MySQL Web Development* rocks! It's logically structured, just the right difficulty level for me (intermediate), interesting and easy to read, and, of course, full of valuable information!"

—CodE-E, Austria

"There are several good introductory books on PHP, but Welling & Thomson is an excellent handbook for those who wish to build up complex and reliable systems. It's obvious that the authors have a strong background in the development of professional applications and they teach not only the language itself, but also how to use it with good software engineering practices."

—Javier Garcia, senior telecom engineer, Telefonica R&D Labs, Madrid

"I picked up this book two days ago and I am half way finished. I just can't put it down. The layout and flow is perfect. Everything is presented in such a way so that the information is very palatable. I am able to immediately grasp all the concepts. The examples have also been wonderful. I just had to take some time out to express to you how pleased I have been with this book."

—Jason B. Lancaster

"This book has proven a trusty companion, with an excellent crash course in PHP and superb coverage of MySQL as used for Web applications. It also features several complete applications that are great examples of how to construct modular, scalable applications with PHP. Whether you are a PHP newbie or a veteran in search of a better desk-side reference, this one is sure to please!"

—WebDynamic

"The true PHP/MySQL bible, *PHP and MySQL Web Development* by Luke Welling and Laura Thomson, made me realize that programming and databases are now available to the commoners. Again, I know 1/10000th of what there is to know, and already I'm enthralled."

—Tim Luoma, TnTLuoma.com

"Welling and Thomson's book is a good reference for those who want to get to grips with practical projects straight off the bat. It includes webmail, shopping cart, session control, and web-forum/weblog applications as a matter of course, and begins with a sturdy look at PHP first, moving to MySQL once the basics are covered."

—twilight30 on Slashdot

PHP and MySQL Web Development

Table of Contents

Table of Contents

Introduction

I: Using PHP

1 PHP Crash Course

Before You Begin: Accessing PHP

Creating a Sample Application: Bobs Auto Parts

Embedding PHP in HTML

Adding Dynamic Content

Accessing Form Variables

Understanding Identifiers

Examining Variable Types

Declaring and Using Constants

Understanding Variable Scope

Using Operators

Working Out the Form Totals

Understanding Precedence and Associativity

Using Variable Functions

Making Decisions with Conditionals

Repeating Actions Through Iteration

Breaking Out of a Control Structure or Script

Employing Alternative Control Structure Syntax

Using declare

Next

2 Storing and Retrieving Data

Table of Contents

- Saving Data for Later
- Storing and Retrieving Bobs Orders
- Processing Files
- Opening a File
- Writing to a File
- Closing a File
- Reading from a File
- Using Other Useful File Functions
- Locking Files
- A Better Way: Database Management Systems
- Further Reading
- Next

3 Using Arrays

- What Is an Array?
- Numerically Indexed Arrays
- Arrays with Different Indices
- Array Operators
- Multidimensional Arrays
- Sorting Arrays
- Sorting Multidimensional Arrays
- Reordering Arrays
- Loading Arrays from Files
- Performing Other Array Manipulations
- Further Reading
- Next

4 String Manipulation and Regular Expressions

- Creating a Sample Application: Smart Form Mail
- Formatting Strings
- Joining and Splitting Strings with String Functions

Table of Contents

Comparing Strings

Matching and Replacing Substrings with String Functions

Introducing Regular Expressions

Finding Substrings with Regular Expressions

Replacing Substrings with Regular Expressions

Splitting Strings with Regular Expressions

Further Reading

Next

5 Reusing Code and Writing Functions

The Advantages of Reusing Code

Using `require()` and `include()`

Using Functions in PHP

Defining Your Own Functions

Examining Basic Function Structure

Using Parameters

Understanding Scope

Passing by Reference Versus Passing by Value

Using the `return` Keyword

Implementing Recursion

Further Reading

Next

6 Object-Oriented PHP

Understanding Object-Oriented Concepts

Creating Classes, Attributes, and Operations in PHP

Instantiating Classes

Using Class Attributes

Controlling Access with `private` and `public`

Calling Class Operations

Implementing Inheritance in PHP

Table of Contents

Designing Classes

Writing the Code for Your Class

Understanding Advanced Object-Oriented Functionality in PHP

Next

7 Error and Exception Handling

Exception Handling Concepts

The Exception Class

User-Defined Exceptions

Exceptions in Bobs Auto Parts

Exceptions and PHPs Other Error Handling Mechanisms

Further Reading

Next

II: Using MySQL

8 Designing Your Web Database

Relational Database Concepts

Designing Your Web Database

Web Database Architecture

Further Reading

Next

9 Creating Your Web Database

Using the MySQL Monitor

Logging In to MySQL

Creating Databases and Users

Setting Up Users and Privileges

Introducing MySQLs Privilege System

Setting Up a User for the Web

Using the Right Database

Creating Database Tables

Understanding MySQL Identifiers

Table of Contents

Choosing Column Data Types

Further Reading

Next

10 Working with Your MySQL Database

What Is SQL?

Inserting Data into the Database

Retrieving Data from the Database

Updating Records in the Database

Altering Tables After Creation

Deleting Records from the Database

Dropping Tables

Dropping a Whole Database

Further Reading

Next

11 Accessing Your MySQL Database from the Web with PHP

How Web Database Architectures Work

Querying a Database from the Web

Putting New Information in the Database

Using Prepared Statements

Using Other PHP-Database Interfaces

Further Reading

Next

12 Advanced MySQL Administration

Understanding the Privilege System in Detail

Making Your MySQL Database Secure

Getting More Information About Databases

Optimizing Your Database

Backing Up Your MySQL Database

Restoring Your MySQL Database

Table of Contents

Implementing Replication

Further Reading

Next

13 Advanced MySQL Programming

The LOAD DATA INFILE Statement

Storage Engines

Transactions

Foreign Keys

Stored Procedures

Further Reading

Next

III: E-commerce and Security

14 Running an E-commerce Site

Deciding What You Want to Achieve

Considering the Types of Commercial Websites

Understanding Risks and Threats

Choosing a Strategy

Next

15 E-commerce Security Issues

How Important Is Your Information?

Security Threats

Usability, Performance, Cost, and Security

Creating a Security Policy

Authentication Principles

Encryption Basics

Digital Certificates

Secure Web Servers

Auditing and Logging

Firewalls

Table of Contents

Data Backups

Physical Security

Next

16 Web Application Security

Strategies for Dealing with Security

Identifying the Threats We Face

Understanding Who We're Dealing With

Securing Your Code

Securing Your Web Server and PHP

Database Server Security

Protecting the Network

Computer and Operating System Security

Disaster Planning

Next

17 Implementing Authentication with PHP and MySQL

Identifying Visitors

Implementing Access Control

Using Basic Authentication

Using Basic Authentication in PHP

Using Basic Authentication with Apache's .htaccess Files

Using mod_auth_mysql Authentication

Creating Your Own Custom Authentication

Further Reading

Next

18 Implementing Secure Transactions with PHP and MySQL

Providing Secure Transactions

Using Secure Sockets Layer (SSL)

Screening User Input

Providing Secure Storage

Table of Contents

Storing Credit Card Numbers

Using Encryption in PHP

Further Reading

Next

IV: Advanced PHP Techniques

19 Interacting with the File System and the Server

Uploading Files

Using Directory Functions

Interacting with the File System

Using Program Execution Functions

Interacting with the Environment: `getenv()` and `putenv()`

Further Reading

Next

20 Using Network and Protocol Functions

Examining Available Protocols

Sending and Reading Email

Using Data from Other Websites

Using Network Lookup Functions

Backing Up or Mirroring a File

Further Reading

Next

21 Managing the Date and Time

Getting the Date and Time from PHP

Converting Between PHP and MySQL Date Formats

Calculating Dates in PHP

Calculating Dates in MySQL

Using Microseconds

Using the Calendar Functions

Further Reading

Table of Contents

Next

22 Generating Images

Setting Up Image Support in PHP

Understanding Image Formats

Creating Images

Using Automatically Generated Images in Other Pages

Using Text and Fonts to Create Images

Drawing Figures and Graphing Data

Using Other Image Functions

Further Reading

Next

23 Using Session Control in PHP

What Is Session Control?

Understanding Basic Session Functionality

Implementing Simple Sessions

Creating a Simple Session Example

Configuring Session Control

Implementing Authentication with Session Control

Further Reading

Next

24 Other Useful Features

Evaluating Strings: `eval()`

Terminating Execution: `die()` and `exit()`

Serializing Variables and Objects

Getting Information About the PHP Environment

Temporarily Altering the Runtime Environment

Highlighting Source Code

Using PHP on the Command Line

Next

Table of Contents

V: Building Practical PHP and MySQL Projects

25 Using PHP and MySQL for Large Projects

Applying Software Engineering to Web Development

Planning and Running a Web Application Project

Reusing Code

Writing Maintainable Code

Implementing Version Control

Choosing a Development Environment

Documenting Your Projects

Prototyping

Separating Logic and Content

Optimizing Code

Testing

Further Reading

Next

26 Debugging

Programming Errors

Variable Debugging Aid

Error Reporting Levels

Altering the Error Reporting Settings

Triggering Your Own Errors

Handling Errors Gracefully

Next

27 Building User Authentication and Personalization

Solution Components

Solution Overview

Implementing the Database

Implementing the Basic Site

Implementing User Authentication

Table of Contents

Implementing Bookmark Storage and Retrieval

Implementing Recommendations

Considering Possible Extensions

Next

28 Building a Shopping Cart

Solution Components

Solution Overview

Implementing the Database

Implementing the Online Catalog

Implementing the Shopping Cart

Implementing Payment

Implementing an Administration Interface

Extending the Project

Using an Existing System

Next

29 Building a Web-Based Email Service

Solution Components

Solution Overview

Setting Up the Database

Examining the Script Architecture

Logging In and Out

Setting Up Accounts

Reading Mail

Sending Mail

Extending the Project

Next

30 Building a Mailing List Manager

Solution Components

Solution Overview

Table of Contents

Setting Up the Database

Defining the Script Architecture

Implementing Login

Implementing User Functions

Implementing Administrative Functions

Extending the Project

Next

31 Building Web Forums

Understanding the Process

Solution Components

Solution Overview

Designing the Database

Viewing the Tree of Articles

Viewing Individual Articles

Adding New Articles

Adding Extensions

Using an Existing System

Next

32 Generating Personalized PDF Documents

Project Overview

Solution Components

Solution Overview

Handling Problems with Headers

Extending the Project

Next

33 Connecting to Web Services with XML and SOAP

Project Overview: Working with XML and Web Services

Solution Components

Solution Overview

Table of Contents

Installing the Project Code

Extending the Project

Further Reading

34 Building Web 2.0 Applications with Ajax

What Is Ajax?

Fundamental Ajax

Adding Ajax Elements to Earlier Projects

For More Information

Appendixes

A: Installing PHP and MySQL

Installing Apache, PHP, and MySQL Under Unix

Installing Apache, PHP, and MySQL Under Windows

Installing PEAR

Setting Up Other Configurations

B: Web Resources

PHP Resources

MySQL and SQL Specific Resources

Apache Resources

Web Development

Index