

JavaTM Open Source Programming

With XDoclet,
JUnit, WebWork,
Hibernate

Joe Walnes
Ara Abrahamian
Mike Cannon-Brookes
Pat Lightbody



www.it-ebooks.info



Java[™] Open Source Programming

**With XDoclet, JUnit,
WebWork, Hibernate**

Joe Walnes
Ara Abrahamian
Mike Cannon-Brookes
Pat Lightbody



WILEY

Wiley Publishing, Inc.



Java[™] Open Source Programming

**With XDoclet, JUnit,
WebWork, Hibernate**

Joe Walnes
Ara Abrahamian
Mike Cannon-Brookes
Pat Lightbody



WILEY

Wiley Publishing, Inc.

Vice President and Executive Group Publisher: Richard Swadley
Vice President and Executive Publisher: Bob Ipsen
Vice President and Publisher: Joseph B. Wikert
Executive Editorial Director: Mary Bednarek
Editorial Manager: Kathryn A. Malm
Executive Editor: Robert Elliott
Senior Production Editor: Fred Bernardi
Development Editor: Kevin Shafer
Production Editor: Pamela Hanley
Media Development Specialist: Kit Malone
Permissions Editor: Carmen Krikorian
Text Design & Composition: Wiley Composition Services

Copyright © 2004 by Wiley Publishing, Inc., Indianapolis, Indiana. All rights reserved.

Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning, or otherwise, except as permitted under Section 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 646-8600. Requests to the Publisher for permission should be addressed to the Legal Department, Wiley Publishing, Inc., 10475 Crosspoint Blvd., Indianapolis, IN 46256, (317) 572-3447, fax (317) 572-4447, E-mail: permcoordinator@wiley.com.

Limit of Liability/Disclaimer of Warranty: While the publisher and author have used their best efforts in preparing this book, they make no representations or warranties with respect to the accuracy or completeness of the contents of this book and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives or written sales materials. The advice and strategies contained herein may not be suitable for your situation. You should consult with a professional where appropriate. Neither the publisher nor author shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages.

For general information on our other products and services please contact our Customer Care Department within the United States at (800) 762-2974, outside the United States at (317) 572-3993 or fax (317) 572-4002.

Trademarks: Wiley and the Wiley Publishing logo are trademarks or registered trademarks of John Wiley & Sons, Inc. and/or its affiliates in the United States and other countries. Java is a trademark of Sun Microsystems, Inc. All other trademarks are the property of their respective owners. Wiley Publishing, Inc., is not associated with any product or vendor mentioned in this book.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Library of Congress Cataloging-in-Publication Data:

Java Open source programming : with Xdoclet, JUnit, WebWork, Hibernate
(Java Open Source Library) / Joe Walnes ... [et al].
p. cm.
ISBN 0-471-46362-0 (PAPER/WEBSITE)
1. Java (Computer program language) 2. Open source software. I.
Walnes, Joe, 1978-
QA76.73.J38J3785 2003
005.2762--dc22

2003020242

ISBN: 0-471-46362-0

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1



Contents

Acknowledgments	xiii
About the Authors	xv
Introduction	xvii
Part One Introduction	1
Chapter 1 Overview of the Book	3
Using Open Source Technologies	3
Understanding Design and Development Philosophies	5
Test First	5
Less Is More	5
Always Ask the Dumb Questions	6
Exploring the PetSoar Project	6
Sticking to the Basics	7
Summary	7
Chapter 2 Application Overview	9
Looking at Yet Another Pet Store?	9
Understanding the Importance of Maintainability	11
Understanding the Requirements of PetSoar	11
Examining the Architecture and Technologies	12
Looking at the Architecture	12
Looking at Utility Libraries	14
Using Persistence and Searching	14
Using the Web Front End	15
Testing	16
Summary	16

Part Two	Building Your Open Source Toolbox	17
Chapter 3	Unit Testing with JUnit	19
	Types of Testing	19
	Using JUnit	20
	Features of JUnit	21
	Writing a Unit Test	21
	Running a Unit Test	23
	Running Multiple Tests	25
	Everything You Need to Know about JUnit	28
	Assertion Methods	28
	Exception Handling	29
	Test Suites	30
	Test Runners	30
	Setting Up and Tearing Down the Environment	34
	Extensions	37
	Summary	38
Chapter 4	Testing Object Interactions with Mocks	39
	Testing Object Interactions	39
	Exploring Some Pitfalls of Testing State	39
	Too Many Dependencies	40
	Too Much Exposure	40
	Too Much State to Manage	40
	Too Hard to Test	41
	Exploring the Alternative: Testing Interactions	41
	Using Mock Objects	42
	Example Scenario	43
	Understanding the Role of a Mock Object	44
	Understanding the Mock Objects Library	45
	Using Dynamic Mocks	46
	Creating Mocks	47
	Substituting Objects	47
	Defining the Expectations	48
	Understanding Argument Constraints	48
	Verifying Expectations	49
	Setting Up Return Values	50
	Summary	51
Chapter 5	Storing Objects with Hibernate	53
	Understanding the Complexities of Persistence	53
	Persisting Objects with Hibernate 2	54
	Creating the Persistent Classes	55
	Mapping the Classes to a Database	57
	<hibernate-mapping>	58
	<class>	58
	<property>	59
	<id>	59
	<component>	60

Configuring Hibernate	60
Obtaining a Session	63
Storing Objects in the Database	64
Retrieving Objects from the Database	67
Querying Persistent Objects	68
Persisting Relationships Between Objects	70
Persisting Hierarchies of Objects	76
Understanding the Hibernate Toolset	79
Comparing Hibernate with Competing Technologies	79
Hibernate vs. EJB	79
Hibernate vs. JDO	81
Hibernate vs. DAO Frameworks	81
Summary	81
Chapter 6 Model View Controller with WebWork	83
Understanding Model View Controller (MVC)	83
Examining the Model Layer	84
Examining the View Layer	85
Examining the Controller Layer	85
Tying It All Together	85
Looking at Reasons to Use MVC	86
Understanding MVC, WebWork, and XWork	87
Exploring XWork	87
Exploring WebWork	88
Taking an In-depth Look at Actions	89
A Simple XWork Example	90
Configuring XWork	91
Structuring Your Actions (Action Composition)	91
Calling an Action from XWork	93
Using Parameters and the ActionContext	94
Applying Newton's Third Law of Physics	95
Understanding XWork Results and Action Chaining	96
Examining WebWork Results and the Servlet Environment	96
Configuring WebWork	98
Understanding the Role of the Dispatcher	99
Namespaces	100
Exploring Example Views in JSP and Velocity	101
HelloWorld in JSP	101
JSP Tags	102
Looking at Component-Based Web Development	104
Themes	107
Writing Your Own Component	108
One Small Problem	108
Expressing Yourself	109
Using Basic Expressions	110
Properties	110
Method Calls	111
Static Fields and Method Calls	111

	Using Advanced Expressions	111
	Dealing with Collections	112
	Constructors	113
	Context Variables and the Root Variable	113
	Understanding the ValueStack	113
	Accessing Stack Elements	114
	Examples Using the JSP Tags	114
	Exploring Type Conversion	115
	Digging into a Date Example	115
	Specifying Default Conversion Rules	117
	Specifying New Conversion Rules	117
	Separating Concerns with Interceptors	118
	Looking at Configuration and Interceptor Stacks	118
	Using LoggingInterceptor	119
	Building Your Own Interceptor	120
	Validation — A Powerful Interceptor	120
	Exploring an Example without XWork Validation Framework	120
	Exploring an Example with XWork Validation Framework	122
	Using Built-In and Custom Validators	123
	Using the Expression Validator	125
	Summary	125
Chapter 7	Simplifying Layout with SiteMesh	127
	Identifying Problems with Layout	127
	Using the Object-Oriented Solution	132
	Decorator Design Pattern	133
	Composite Design Pattern	134
	Combining the Patterns	135
	Implementing the Solution with SiteMesh	137
	SiteMesh Fundamentals	138
	Creating a Decorator	140
	Composing Pages	142
	Exploring SiteMesh	145
	Getting to the Content	145
	Mapping Decorators	148
	Using Tips and Tricks	149
	Group Decorators Together	150
	Don't Be Afraid to Include	150
	CSS Is Your Friend	150
	Minimize HTML	151
	Separate Your Concerns	151
	Summary	151
Chapter 8	Adding Search Capabilities with Lucene	153
	Understanding the Complexities of Searching	153
	Introducing Lucene	154
	Understanding the Elements of Lucene	154
	Indexing a Document	155

	Searching Documents	159
	Reindexing and Removing an Indexed Document	161
	Using Advanced Searching	161
	Customizing the Tokenization Process	162
	Summary	164
Chapter 9	Generating Configuration Files with XDoclet	165
	Introducing XDoclet	165
	Understanding Attribute Oriented	
	Programming with XDoclet	166
	Understanding the Syntax of Attributes	168
	Running XDoclet	170
	Using Advanced Hibernate OR Mapping with XDoclet	173
	Using XDoclet for Generating More Sophisticated Artifacts	175
	Understanding XDoclet Tasks and Subtasks	179
	EJBDoclet	179
	WebDoclet	180
	JMXDoclet	180
	JDODoclet	180
	HibernateDoclet	181
	Using XDoclet Effectively	181
	Summary	183
Chapter 10	Communication and Tools	185
	Exploring PetSoar Development	185
	Managing Imperfect Communication	188
	Communicating in Every Way	188
	Using Source Communication	189
	Using Communication as a Learning Tool	190
	Exploring Our Toolbox	191
	Source Configuration Management — CVS	191
	Knowledge Management — Wiki	191
	Mailing List — Majordomo	192
	Real-time Discussion — IRC and Instant Messaging	192
	IDEs — IDEA and Eclipse	193
	Issue Tracking and Task Management — JIRA	193
	Using Continuous Integration	193
	Tying the Tools Together	195
	Summary	195
Chapter 11	Time-Saving Tools	197
	Understanding Utility Components	197
	Understanding OSCache	198
	Introducing SampleNews.com	198
	Using the Loop Test	199
	Exploring the OSCache Tag Library	201
	Understanding OSCache Concepts	202
	Cache Key	202
	Scope	202
	Data	202

www.it-ebooks.info