Beginning Java Objects

From Concepts to Code, Second Edition

JACQUIE BARKER

Beginning Java Objects: From Concepts to Code, Second Edition

Copyright © 2005 by Jacquie Barker

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage or retrieval system, without the prior written permission of the copyright owner and the publisher.

ISBN (pbk): 1-59059-457-6

Printed and bound in the United States of America 987654321

Trademarked names may appear in this book. Rather than use a trademark symbol with every occurrence of a trademarked name, we use the names only in an editorial fashion and to the benefit of the trademark owner, with no intention of infringement of the trademark.

Lead Editor: Steve Anglin

Technical Reviewer: James Huddleston

Editorial Board: Steve Anglin, Dan Appleman, Ewan Buckingham, Gary Cornell, Tony Davis, Jason Gilmore, Jonathan Hassell, Chris Mills, Dominic Shakeshaft, Jim Sumser

Assistant Publisher: Grace Wong Project Manager: Beckie Stones Copy Edit Manager: Nicole LeClerc Copy Editors: Nicole LeClerc, Ami Knox Production Manager: Kari Brooks-Copony

Production Editor: Katie Stence

Compositor and Artist: Kinetic Publishing Services, LLC

Proofreader: Sue Boshers

Indexer: Broccoli Information Management Interior Designer: Van Winkle Design Group

Cover Designer: Kurt Krames

Manufacturing Manager: Tom Debolski

Distributed to the book trade in the United States by Springer-Verlag New York, Inc., 233 Spring Street, 6th Floor, New York, NY 10013, and outside the United States by Springer-Verlag GmbH & Co. KG, Tiergartenstr. 17, 69112 Heidelberg, Germany.

In the United States: phone 1-800-SPRINGER, fax 201-348-4505, e-mail orders@springer-ny.com, or visit http://www.springer-ny.com. Outside the United States: fax +49 6221 345229, e-mail orders@springer.de, or visit http://www.springer.de.

For information on translations, please contact Apress directly at 2560 Ninth Street, Suite 219, Berkeley, CA 94710. Phone 510-549-5930, fax 510-549-5939, e-mail info@apress.com, or visit http://www.apress.com.

The information in this book is distributed on an "as is" basis, without warranty. Although every precaution has been taken in the preparation of this work, neither the author(s) nor Apress shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the information contained in this work.

The source code for this book is available to readers at http://www.apress.com in the Downloads section.

Contents at a Glance

| About the Author | r | xxiii |
|-------------------|---|-------|
| About the Technic | ical Reviewer | xxv |
| Acknowledgmen | nts | xxvii |
| Preface | | xxix |
| Introduction | | xxxi |
| PART 1 | ■■ The ABCs of Objects | |
| CHAPTER 1 | Abstraction and Modeling | 3 |
| CHAPTER 2 | Some Java Basics | |
| CHAPTER 3 | Objects and Classes | 65 |
| CHAPTER 4 | Object Interactions | 95 |
| CHAPTER 5 | Relationships Between Objects | 167 |
| CHAPTER 6 | Collections of Objects | 213 |
| CHAPTER 7 | Some Final Object Concepts | 273 |
| PART 2 | Object Modeling 101 | |
| CHAPTER 8 | The Object Modeling Process in a Nutshell | 333 |
| CHAPTER 9 | Formalizing Requirements Through Use Cases | 343 |
| CHAPTER 10 | Modeling the Static/Data Aspects of the System | 355 |
| CHAPTER 11 | Modeling the Dynamic/Behavioral Aspects of the System | 409 |
| CHAPTER 12 | Wrapping Up Our Modeling Efforts | 431 |

PART 3 - Translating an Object Blueprint into Java Code

| CHAPTER 13 | Rounding Out Your Java Knowledge |
|------------|--|
| CHAPTER 14 | Transforming Your Model into Java Code567 |
| CHAPTER 15 | Rounding Out Your Application, Part 1: Adding a Data Access Layer |
| CHAPTER 16 | Rounding Out Your Application, Part 2: Adding a Presentation Layer |
| CHAPTER 17 | SRS, Take 3: Adding a GUI773 |
| CHAPTER 18 | Next Steps831 |
| | |
| PART 4 ■ | Appendixes |
| APPENDIX A | Suggestions for Using This Book As a Textbook |
| APPENDIX B | Alternative Case Studies 843 |
| APPENDIX C | Setting Up Your Java Development Environment |
| APPENDIX D | Downloading and Compiling the Book's Source Code865 |
| APPENDIX E | Note to Experienced C++ Programmers 867 |
| APPENDIX F | How Polymorphism Works Behind the Scenes (Static vs. Dynamic Binding)873 |
| APPENDIX G | Collections Prior to J2SE 5.0 |
| APPENDIX H | Programming 101, and the Role of a Compiler |
| INDEV | 000 |