

Object- Oriented Design & Patterns

WILEY
INTERNATIONAL
EDITION

Restricted: Not for sale
in North America

CAY HORSTMANN

Contents

Preface iii

▶ Chapter 1 A Crash Course in Java ix

- 1.1 "Hello, World!" in Java 2
- 1.2 Documentation Comments 6
- 1.3 Primitive Types 9
- 1.4 Control Flow Statements 12
- 1.5 Object References 12
- 1.6 Parameter Passing 14
- 1.7 Packages 16
- 1.8 Basic Exception Handling 18
- 1.9 Strings 21
- 1.10 Reading Input 23
- 1.11 Array Lists and Linked Lists 24
- 1.12 Arrays 26
- 1.13 Static Fields and Methods 28
- 1.14 Programming Style 30

▶ Chapter 2 The Object-Oriented Design Process 35

- 2.1 From Problem to Code 36
- 2.2 The Object and Class Concepts 39
- 2.3 Identifying Classes 41
- 2.4 Identifying Responsibilities 45
- 2.5 Relationships between Classes 47
- 2.6 Use Cases 49
- 2.7 CRC Cards 51
- 2.8 UML Class Diagrams 54
- 2.9 Sequence Diagrams 59
- 2.10 State Diagrams 61
- 2.11 Using javadoc for Design Documentation 62
- 2.12 Case Study: A Voice Mail System 63

▶ Chapter 3 Guidelines for Class Design 89

- 3.1 An Overview of the Date Classes in the Java Library 90
- 3.2 Designing a Day Class 94
- 3.3 Three Implementations of the Day Class 98
- 3.4 The Importance of Encapsulation 109
- 3.5 Analyzing the Quality of an Interface 118
- 3.6 Programming by Contract 122
- 3.7 Unit Testing 133

► Chapter 4 Interface Types and Polymorphism 139

- 4.1 The Icon Interface Type 140
- 4.2 Polymorphism 145
- 4.3 Drawing Shapes 146
- 4.4 The Comparable Interface Type 151
- 4.5 The Comparator Interface Type 153
- 4.6 Anonymous Classes 155
- 4.7 Frames and User Interface Components 158
- 4.8 User Interface Actions 160
- 4.9 Timers 164
- 4.10 Designing an Interface Type 166

► Chapter 5 Patterns and GUI Programming 175

- 5.1 Iterators 176
- 5.2 The Pattern Concept 178
- 5.3 The OBSERVER Pattern 182
- 5.4 Layout Managers and the STRATEGY Pattern 185
- 5.5 Components, Containers, and the COMPOSITE Pattern 195
- 5.6 Scroll Bars and the DECORATOR Pattern 197
- 5.7 How to Recognize Patterns 200
- 5.8 Putting Patterns to Work 202

► Chapter 6 Inheritance and Abstract Classes 217

- 6.1 The Concept of Inheritance 218
- 6.2 Graphics Programming with Inheritance 225
- 6.3 Abstract Classes 231
- 6.4 The TEMPLATE METHOD Pattern 239
- 6.5 Protected Interfaces 243
- 6.6 The Hierarchy of Swing Components 246
- 6.7 The Hierarchy of Standard Geometric Shapes 250
- 6.8 The Hierarchy of Exception Classes 255
- 6.9 When Not to Use Inheritance 257

► Chapter 7 The Java Object Model 263

- 7.1 The Java Type System 264
- 7.2 Type Inquiry 271
- 7.3 The Object Class 274
- 7.4 Shallow and Deep Copy 283
- 7.5 Serialization 288
- 7.6 Reflection 291
- 7.7 JavaBeans Components 298

► Chapter 8 Frameworks 321

- 8.1 Frameworks 322
- 8.2 Applets as a Simple Framework 323
- 8.3 The Collections Framework 326
- 8.4 A Graph Editor Framework 335
- 8.5 Enhancing the Graph Editor Framework 355

▶ **Chapter 9 Multithreading 363**

- 9.1 Thread Basics 364
- 9.2 Thread Synchronization 372
- 9.3 Animations 385

▶ **Chapter 10 More Design Patterns 395**

- 10.1 The ADAPTER Pattern 396
- 10.2 Actions and the COMMAND Pattern 399
- 10.3 The FACTORY METHOD Pattern 404
- 10.4 The PROXY Pattern 406
- 10.5 The SINGLETON Pattern 411
- 10.6 The VISITOR Pattern 413
- 10.7 Other Design Patterns 420