Contents

Introduction xxi

Assessment Test xxxi

Chapter 1 Java Building Blocks 1

Understanding the Java Class Structure 2
  Fields and Methods 2
  Comments 4
  Classes vs. Files 5
Writing a main() Method 6
Understanding Package Declarations and Imports 9
  Wildcards 10
  Redundant Imports 11
  Naming Conflicts 12
  Creating a New Package 13
  Code Formatting on the Exam 16
Creating Objects 16
  Constructors 17
  Reading and Writing Object Fields 18
  Instance Initializer Blocks 18
  Order of Initialization 19
Distinguishing Between Object References and Primitives 20
  Primitive Types 20
  Reference Types 24
  Key Differences 25
Declaring and Initializing Variables 25
  Declaring Multiple Variables 26
  Identifiers 27
Understanding Default Initialization of Variables 29
  Local Variables 29
  Instance and Class Variables 30
Understanding Variable Scope 31
Ordering Elements in a Class 34
Destroying Objects 36
  Garbage Collection 36
  finalize() 38
Benefits of Java 39
Summary 40
Exam Essentials 41
Review Questions 42
Chapter 2 Operators and Statements

Understanding Java Operators 52
Working with Binary Arithmetic Operators 53
  Arithmetic Operators 53
  Numeric Promotion 55
Working with Unary Operators 57
  Logical Complement and Negation Operators 57
  Increment and Decrement Operators 58
Using Additional Binary Operators 60
  Assignment Operators 60
  Compound Assignment Operators 62
  Relational Operators 63
  Logical Operators 64
  Equality Operators 65
Understanding Java Statements 66
  The if-then Statement 67
  The if-then-else Statement 68
  The switch Statement 72
  The while Statement 76
  The do-while Statement 78
  The for Statement 80
Understanding Advanced Flow Control 86
  Nested Loops 87
  Adding Optional Labels 87
  The break Statement 88
  The continue Statement 90
Summary 92
Exam Essentials 92
Review Questions 94

Chapter 3 Core Java APIs

Creating and Manipulating Strings 102
  Concatenation 102
  Immutability 104
  The String Pool 105
  Important String Methods 105
  Method Chaining 110
Using the StringBuilder Class 111
  Mutability and Chaining 112
  Creating a StringBuilder 113
  Important StringBuilder Methods 114
  StringBuilder vs. StringBuffer 117
Understanding Equality
Understanding Java Arrays
  Creating an Array of Primitives
  Creating an Array with Reference Variables
  Using an Array
  Sorting
  Searching
  Varargs
  Multidimensional Arrays
Understanding an \textit{ArrayList}
  Creating an \textit{ArrayList}
  Using an \textit{ArrayList}
  Wrapper Classes
  Autoboxing
  Converting Between array and \textit{List}
  Sorting
Working with Dates and Times
  Creating Dates and Times
  Manipulating Dates and Times
  Working with Periods
  Formatting Dates and Times
  Parsing Dates and Times
Summary
Exam Essentials
Review Questions

\textbf{Chapter 4} Methods and Encapsulation

Designing Methods
  Optional Specifiers
  Return Type
  Method Name
  Parameter List
  Optional Exception List
  Method Body
Working with Varargs
Applying Access Modifiers
  Private Access
  Default (Package Private) Access
  Protected Access
  Public Access
Designing Static Methods and Fields
Calling a Static Variable or Method
Static vs. Instance
Static Variables
Chapter 5 Class Design 233

Introducing Class Inheritance 234
   Extending a Class 235
   Applying Class Access Modifiers 237
   Creating Java Objects 237
   Defining Constructors 238
   Calling Inherited Class Members 244
   Inheriting Methods 246
   Inheriting Variables 257

Creating Abstract Classes 259
   Defining an Abstract Class 260
   Creating a Concrete Class 262
   Extending an Abstract Class 263

Implementing Interfaces 266
   Defining an Interface 267
   Inheriting an Interface 269
   Interface Variables 273
   Default Interface Methods 274
   Static Interface Methods 278

Understanding Polymorphism 279
   Object vs. Reference 281
   Casting Objects 282
   Virtual Methods 284
   Polymorphic Parameters 285
   Polymorphism and Method Overriding 287
Contents

Summary 288
Exam Essentials 289
Review Questions 291

Chapter 6 Exceptions 299
Understanding Exceptions 300
   The Role of Exceptions 300
   Understanding Exception Types 302
   Throwing an Exception 304
Using a try Statement 305
   Adding a finally Block 307
   Catching Various Types of Exceptions 309
   Throwing a Second Exception 311
Recognizing Common Exception Types 313
   Runtime Exceptions 314
   Checked Exceptions 317
   Errors 317
Calling Methods That Throw Exceptions 318
   Subclasses 319
   Printing an Exception 321
Summary 323
Exam Essentials 324
Review Questions 325

Appendix A Answers to Review Questions 333
Chapter 1: Java Building Blocks 334
Chapter 2: Operators and Statements 336
Chapter 3: Core Java APIs 339
Chapter 4: Methods and Encapsulation 342
Chapter 5: Class Design 346
Chapter 6: Exceptions 349

Appendix B Study Tips 353
Studying for the Test 354
   Creating a Study Plan 354
   Creating and Running Sample Applications 355
Taking the Test 359
   Understanding the Question 359
   Applying Process of Elimination 362
   Optimizing Your Time 364
   Getting a Good Night’s Rest 366

Index 367