

Contents

Preface	xi
Notational Conventions	xii
1 Running Java: Compilation, Loading, and Execution	2
2 Names and Reserved Names	2
3 Java Naming Conventions	2
4 Comments and Program Layout	2
5 Types	4
5.1 Primitive Types	4
5.2 Reference Types	4
5.3 Array Types	4
5.4 Boxing: Wrapping Primitive Types as Reference Types	4
5.5 Subtypes and Compatibility	6
5.6 Signatures and Subsumption	6
5.7 Type Conversion	6
6 Variables, Parameters, Fields, and Scope	8
6.1 Values Bound to Variables, Parameters, or Fields	8
6.2 Variable Declarations	8
6.3 Scope of Variables, Parameters, and Fields	8
7 Strings	10
7.1 String Formatting	12
8 Arrays	16
8.1 Array Creation and Access	16
8.2 Array Initializers	16
8.3 Multidimensional Arrays	18
8.4 The Utility Class Arrays	18
9 Classes	22
9.1 Class Declarations and Class Bodies	22
9.2 Top-Level Classes, Nested Classes, Member Classes, and Local Classes	22
9.3 Class Modifiers	22
9.4 The Class Modifiers <code>public</code> , <code>final</code> , <code>abstract</code>	24
9.5 Subclasses, Superclasses, Class Hierarchy, Inheritance, and Overriding	24
9.6 Field Declarations in Classes	26
9.7 The Member Access Modifiers <code>private</code> , <code>protected</code> , <code>public</code>	26
9.8 Method Declarations	28
9.9 Parameter Arrays and Variable-Arity Methods	30

9.10	Constructor Declarations	30
9.11	Nested Classes, Member Classes, Local Classes, and Inner Classes	32
9.12	Anonymous Classes	32
9.13	Initializer Blocks, Field Initializers, and Initializers	32
10	Classes and Objects in the Computer	34
10.1	What Is a Class?	34
10.2	What Is an Object?	34
10.3	Inner Objects	34
11	Expressions	36
11.1	Table of Expression Forms	36
11.2	Arithmetic Operators	38
11.3	Logical Operators	38
11.4	Bitwise Operators and Shift Operators	38
11.5	Assignment Expressions	40
11.6	Conditional Expressions	40
11.7	Object Creation Expressions	40
11.8	Instance Test Expressions	40
11.9	Field Access Expressions	42
11.10	The Current Object Reference <code>this</code>	42
11.11	Type Cast Expression	42
11.12	Method Call Expressions	44
11.13	Lambda Expressions (Java 8.0)	48
11.14	Method Reference Expressions (Java 8.0)	48
12	Statements	52
12.1	Expression Statements	52
12.2	Block Statements	52
12.3	The Empty Statement	52
12.4	Choice Statements	54
12.5	Loop Statements	56
12.6	Returns, Labeled Statements, Exits, and Exceptions	60
12.7	The Try-with-Resources Statement	64
12.8	The <code>assert</code> Statement	64
13	Interfaces	66
13.1	Interface Declarations	66
13.2	Classes Implementing Interfaces	66
13.3	Default and Static Methods on Interfaces (Java 8.0)	68
13.4	Annotation Type Declarations	68
14	Enum Types	70
15	Exceptions, Checked and Unchecked	72
16	Compilation, Source Files, Class Names, and Class Files	74

17 Packages and Jar Files	74
18 Mathematical Functions	76
19 String Builders and String Buffers	78
20 Threads, Concurrent Execution, and Synchronization	80
20.1 Threads and Concurrent Execution	80
20.2 Locks and the synchronized Statement	82
20.3 Operations on Threads	84
20.4 Operations on Locked Objects	84
20.5 The Java Memory Model and Visibility Across Threads	86
21 Generic Types and Methods	88
21.1 Generics: Safety, Generality, and Efficiency	88
21.2 Generic Types, Type Parameters, and Type Instances	88
21.3 How Can Type Instances Be Used?	88
21.4 Generic Classes	90
21.5 Constraints on Type Parameters	92
21.6 How Can Type Parameters Be Used?	92
21.7 Generic Interfaces	94
21.8 Generic Methods	96
21.9 Wildcard Type Arguments	98
21.10 The Raw Type	100
21.11 The Implementation of Generic Types and Methods	100
22 Generic Collections and Maps	102
22.1 Interface Collection<T>	104
22.2 Interface List<T> and Its Implementations LinkedList<T> and ArrayList<T>	105
22.3 Interface Set<T> and Its Implementations HashSet<T> and LinkedHashSet<T>	106
22.4 Interface SortedSet<T> and Implementation TreeSet<T>	106
22.5 Interface Map<K,V> and Implementation HashMap<K,V>	108
22.6 Interface SortedMap<K,V> and Implementation TreeMap<K,V>	110
22.7 Going through a Collection: Interfaces Iterator<T> and Iterable<T>	112
22.8 Interface ListIterator<T>	114
22.9 Equality, Hash Codes, and Comparison	114
22.10 The Comparator<T> Interface	116
22.11 The Utility Class Collections	118
22.12 Choosing the Right Collection Class or Map Class	120
23 Functional Interfaces (Java 8.0)	122
23.1 Functional Programming	122
23.2 Generic Functional Interfaces	124
23.3 Primitive-Type Specialized Functional Interfaces	124
23.4 Covariance and Contravariance in Functional Interfaces	126
23.5 Interface Function<T,R>	126
23.6 Interface UnaryOperator<T>	126

23.7	Interfaces Predicate<T> and BiPredicate<T,U>	128
23.8	Interfaces Consumer<T> and BiConsumer<T,U>	128
23.9	Interface Supplier<T>	128
23.10	Interface BiFunction<T,U,R>	130
23.11	Interface BinaryOperator<T>	130
24	Streams for Bulk Data (Java 8.0)	132
24.1	Creating Streams	134
24.2	Stream Builders	134
24.3	Methods on Streams	136
24.4	Numeric Streams: DoubleStream, IntStream, and LongStream	140
24.5	Summary Statistics for Numeric Streams	140
24.6	Collectors on Streams	142
25	Class Optional<T> (Java 8.0)	146
26	Input and Output	148
26.1	Creating an IO Stream from Another One	149
26.2	Kinds of Input and Output Methods	150
26.3	Imports, Exceptions, Thread Safety	150
26.4	Sequential Character Input: Readers	152
26.5	Sequential Character Output: Writers	153
26.6	Printing Primitive Data to a Character Stream: PrintWriter	154
26.7	The Appendable Interface and the CharSequence Interface	154
26.8	Reading Primitive Data from a Character Stream: StreamTokenizer	156
26.9	Sequential Byte Input: InputStream	158
26.10	Sequential Byte Output: OutputStream	159
26.11	Binary Input-Output of Primitive Data: DataInput and DataOutput	160
26.12	Serialization of Objects: ObjectInput and ObjectOutput	162
26.13	Buffered Input and Output	164
26.14	Random Access Files: RandomAccessFile	166
26.15	Files, Directories, and File Descriptors	168
26.16	Thread Communication: PipedInputStream and PipedOutputStream	168
26.17	Socket Communication	170
27	Reflection	172
27.1	Reflective Use of Types: The Class<T> Class	172
27.2	Reflection: The Field Class	174
27.3	Reflection: The Method Class and the Constructor<T> Class	174
27.4	Exceptions Thrown When Using Reflection	174
28	Metadata Annotations	176
29	What Is New in Java 8.0	178
	References	180

