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Nota di contenuto	Front Cover; Essential Java for Scientists and Engineers; Copyright Page; Contents; Preface; Acknowledgements; Part I: Essentials; Chapter 1. Getting going; 1.1 Introduction to programming; 1.2 Setting up your computer for programming in Java; 1.3 Writing your first Java program; 1.4 Input and output; 1.5 Comments; 1.6 Using objects; 1.7 Java on the WWW (optional); Chapter 2. Java programming basics; 2.1 Compound interest again; 2.2 Primitive data types; 2.3 Names; 2.4 Vertical motion under gravity; 2.5 Operators, expressions and assignments; 2.6 Repeating with for; 2.7 Deciding with if 2.8 Characters2.9 Math methods; 2.10 Programming style; Chapter 3. Solving a problem in Java; 3.1 Introduction; 3.2 The class provider, class user and end user; 3.3 What are objects and classes?; 3.4 Writing and using a simple class; 3.5 How memory works; 3.6 The String class; 3.7 Understanding methods; 3.8 Example: simulating a rabbit colony; 3.9 Access modifiers; 3.10 Example: simulating the growth of trees; 3.11 Scope; 3.12 More on object handles; 3.13 The static keyword; 3.14 Naming conventions; 3.15 Using the Java API; 3.16 Making your own package (optional); Chapter 4. More on loops

4.1 Determinate repetition with for; 4.2 Indeterminate repetition with while; Chapter 5. Debugging; 5.1 Compilation errors; 5.2 Run-time errors; 5.3 Errors in logic; 5.4 Rounding errors; Chapter 6. Arrays and matrices; 6.1 Introduction; 6.2 The basics of arrays; 6.3 Passing arrays to methods; 6.4 Frequency distributions: a simple bar chart; 6.5 Multi-dimensional arrays; 6.6 Arrays of objects; 6.7 Sorting an array; Part II: More advanced topics; Chapter 7. Inheritance; 7.1 Introduction; 7.2 Inheritance in Java; 7.3 Constructors and inheritance; 7.4 The Object class; 7.5 Abstract classes and interfaces; Chapter 8. Graphical user interfaces (GUIs); 8.1 Introduction; 8.2 Building a Swing application; 8.3 Arranging components; 8.4 A colour chooser application; 8.5 Painting; 8.6 Drawing mathematical graphs; 8.7 Fractals; Chapter 9. Input/output; 9.1 Introduction; 9.2 Input through command line parameters; 9.3 Input from the keyboard without the essential package; 9.4 Streams; 9.5 File input/output; 9.6 Manipulating data; 9.7 Streams and the Internet; Chapter 10. Exceptions; 10.1 Introduction; 10.2 Exceptions in Java; 10.3 Throwing exceptions; 10.4 Handling exceptions; 10.5 Exceptions and file input; Part III: Some applications; Chapter 11. Simulation; 11.1 Random number generation; 11.2 Spinning coins; 11.3 Rolling dice; 11.4 Bacteria division; 11.5 Radioactive decay; 11.6 A random walk; 11.7 Traffic flow; Chapter 12. Modelling with matrices; 12.1 Using the Matrix class; 12.2 Networks; 12.3 Leslie matrices: population growth; 12.4 Markov processes; 12.5 Linear equations; Chapter 13. Introduction to numerical methods; 13.1 Equations; 13.2 Numerical differentiation; 13.3 Integration; 13.4 First-order differential equations; 13.5 Runge-Kutta methods

Sommario/riassunto

Essential Java serves as an introduction to the programming language, Java, for scientists and engineers, and can also be used by experienced programmers wishing to learn Java as an additional language. The book focuses on how Java, and object-oriented programming, can be used to solve science and engineering problems. Many examples are included from a number of different scientific and engineering areas, as well as from business and everyday life. Pre-written packages of code are provided to help in such areas as input/output, matrix manipulation and scientific graphing.
