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Nota di contenuto	Contents; Preface; 1 An introduction to Mathematica; 1.1 Overview of basic operations; 1.2 Getting started; 1.3 Getting help; 2 The Mathematica language; 2.1 Expressions; 2.2 Definitions; 2.3 Predicates and Boolean operations; 2.4 Attributes; 3 Lists; 3.1 Creating and displaying lists; 3.2 The structure of lists; 3.3 Operations on lists; 4 Patterns and rules; 4.1 Patterns; 4.2 Transformation rules; 4.3 Examples and applications; 5 Functional programming; 5.1 Introduction; 5.2 Functions for manipulating expressions; 5.3 Iterating functions; 5.4 Programs as functions; 5.5 Scoping constructs 5.6 Pure functions5.7 Options and messages; 5.8 Examples and applications; 6 Procedural programming; 6.1 Loops and iteration; 6.2 Flow control; 6.3 Examples and applications; 7 Recursion; 7.1 Fibonacci numbers; 7.2 Thinking recursively; 7.3 Dynamic programming; 7.4 Classical examples .; 8 Numerics; 8.1 Numbers in Mathematica; 8.2 Numerical computation; 8.3 Arrays of numbers; 8.4 Examples and

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10.1 Structure of graphics10.2 Efficient structures; 10.3 Sound; 10.4 Examples and applications; 11 Dynamic expressions; 11.1 Manipulating expressions; 11.2 The structure of dynamic expressions; 11.3 Examples and applications; 12 Optimizing Mathematica programs; 12.1 Measuring efficiency; 12.2 Efficient programs; 12.3 Parallel processing; 12.4 Compiling; 13 Applications and packages; 13.1 Random walk application; 13.2 Overview of packages; 13.3 Contexts; 13.4 Creating packages; Solutions to exercises; 2 The Mathematica language; 3 Lists; 4 Patterns and rules; 5 Functional programming  
6 Procedural programming7 Recursion; 8 Numerics; 9 Strings; 10 Graphics and visualization; 11 Dynamic expressions; 12 Optimizing Mathematica programs; 13 Applications and packages; Bibliography; Index

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### Sommario/riassunto

Starting from first principles, this book covers all of the foundational material needed to develop a clear understanding of the Mathematica language, with a practical emphasis on solving problems. Concrete examples throughout the text demonstrate how Mathematica can be used to solve problems in science, engineering, economics/finance, computational linguistics, geoscience, bioinformatics, and a range of other fields. The book will appeal to students, researchers and programmers wishing to further their understanding of Mathematica. Designed to suit users of any ability, it assumes no formal knowledge of programming so it is ideal for self-study. Over 290 exercises are provided to challenge the reader's understanding of the material covered and these provide ample opportunity to practice using the language. Mathematica notebooks containing examples, programs and solutions to exercises are available from [www.cambridge.org/wellin](http://www.cambridge.org/wellin).

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