

their alternative implementations. This book aims to give readers the necessary understanding.

Readership

This book can be read by anyone who has taken a first programming course in Java.

The book is designed primarily as a text for a second-level course in algorithms and data structures, in the context of a computer science program in which Java is the main programming language. In terms of the 1991 and 2001 ACM Computing Curricula, the book covers the knowledge units summarized in Table P.1.

The book is also suitable for practicing software engineers who have just learned Java and who now wish to gain (or refresh) the knowledge of algorithms and data structures required to make effective use of the Java 2 collection classes.

The detailed prerequisites of this book are as follows:

- A knowledge of fundamental Java programming topics – expressions, statements, objects, and classes – is essential. A knowledge of more advanced topics – inheritance, exceptions, interfaces, inner classes – is desirable but not essential before reading this book. Readers unfamiliar with the latter topics should refer to Appendix B whenever necessary.
- Certain mathematical topics – powers, logarithms, series summations, and recurrences – are needed to analyze the efficiency of algorithms. Most of these mathematical topics are taught in secondary/high schools. Readers unfamiliar with any of these topics should refer to Appendix A whenever necessary.

Outline

Chapter 1 introduces two of this book’s major themes: algorithms and data structures. Chapter 2 takes a closer look at algorithms, showing how we can analyze their efficiency and introducing recursive algorithms.

Chapters 3 and 4 review two simple and ubiquitous data structures – arrays and linked lists – together with their associated insertion, deletion, searching, merging, and sorting algorithms. Later in the book, Chapters 10, 12, 13, and 16 introduce more sophisticated

Table P.1 Coverage of ACM Computing Curricula knowledge units.

ACM/IEEE Computing Curricula 2001	ACM/IEEE Computing Curricula 1991
PF1 (algorithms and problem-solving)	AL1 (basic data structures)
PF3 (basic data structures)	AL2 (abstract data types)
PF4 (recursion)	AL3 (recursive algorithms)
PF5 (abstract data types)	AL4 (complexity analysis)
AL1 (basic algorithmic analysis)	AL6 (sorting and searching)
AL3 (fundamental computing algorithms)	