DATA STRUCTURES and ABSTRACTIONS with JAVA™

Frank M. Carrano ■ Timothy M. Henry

Pearson

Fifth Edition

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Welcome

Welcome to the fifth edition of *Data Structures and Abstractions with Java*, a book for an introductory course in data structures, typically known as CS-2.

I wrote this book with you in mind—whether you are an instructor or a student—based upon my experiences during more than three decades of teaching undergraduate computer science. I wanted my book to be reader friendly so that students could learn more easily and instructors could teach more effectively. To this end, you will find the material covered in small pieces—I call them “segments”— that are easy to digest and facilitate learning. Numerous examples that mimic real-world situations provide a context for the new material and help to make it easier for students to learn and retain abstract concepts. Many illustrations clarify complicated ideas. Included are over 60 video tutorials to supplement the instruction and help students when their instructor is unavailable.

I am happy to work again with my colleague and co-author of the fourth edition, Dr. Timothy Henry. Together we have continued to enhance the presentation with our focus on design decisions for both specifications and implementations of various data structures, as well as our emphasis on safe and secure programming practices.

We hope that you enjoy reading this book. Like many others before you, you can learn—or teach —data structures in an effective and sustainable way.

Warm regards,

Frank M. Carrano

Using This Flexible and Unique Textbook

This book's organization, sequencing, and pace of topic coverage make teaching and learning easier by

- Focusing the reader's attention on one concept at a time
- Providing flexibility in the order in which you can cover topics
- Clearly distinguishing between the specification and implementation of abstract data types (ADTs)
- Separating the relevant coverage of Java into Java Interludes, which you can use as needed

To accomplish this approach, we have organized the material into 30 chapters, composed of small, numbered segments that deal with one concept at a time. Each chapter focuses on either the specification and use of an ADT or its various implementations. You can choose to cover the specification of an ADT followed by its implementations, or you can treat the specification and use of several ADTs before you consider any implementation issues. The book's organization makes it easy for you to choose the topic order that you prefer.

Our use of Java Interludes to treat the pertinent aspects of Java clearly separate our coverage of data structures from Java-specific issues. These interludes occur between chapters throughout the book as needed. Our focus, however, is on data structures not Java. You can see the titles of these interludes, as well as their placement between chapters, in the table of contents that follows.

Brief Table of Contents

Table of Contents at a Glance

The following brief table of contents shows the overall composition of the book. Notice the Introduction, Prelude, and nine Java Interludes. Further details—including a chapter-by-chapter description—are given later in this preface.

Supplement 4 Answers to Study Questions (online)

New to This Edition

What’s New?

This new edition of *Data Structures and Abstractions with Java* enhances the previous edition and continues its pedagogical approach to make the material accessible to students at the introductory level. The coverage that you enjoyed in previous editions is still here. As is usual for us, we have read every word of the previous edition and made changes to improve clarity and correctness. No chapter or interlude appears exactly as it did before. Our changes are motivated by reader suggestions and our own desire to improve the presentation.

In this new edition, we

- Added coverage of recursion in a new chapter that introduces grammars, languages, and backtracking.
- Continued our introduction to safe and secure programing practices.
- Added additional Design Decisions, Notes, Security Notes, and Programming Tips throughout the book.
- Added new exercises and programming projects, with an emphasis in areas of gaming, e-commerce, and finance to most chapters.
- Adjusted the order of some topics.
- Refined our terminology, presentation, and word choices to ease understanding.
- Revised the illustrations to make them easier to read and to understand.
- Renamed Self-Test Questions as Study Questions and moved their answers to online. We encourage our students to discuss their own

answers with a study partner or group.

- Included the appendix about Java classes within the book instead of leaving it online.
- Reduced the amount of Java code given in the book.
- Ensured that all Java code is Java 9 compliant.

Connect with Us

We are always available to instructors and students who use our books. Your comments, suggestions, and corrections will be greatly appreciated. Please e-mail us at carrano@acm.org or timhenry@acm.org

You can also find us on Twitter, our websites, or Facebook:

- Twitter: twitter.com/makingCSreal
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