Preface

In the last five decades of the twentieth century, we have witnessed a technology revolution which is primarily fueled by the invention of the **digital computer**. Computers are now prevalent in virtually every application, from games for children through the most sophisticated planning tools for governments and multinational firms.

This incredible device has literally changed the way we live. It provides the basic infrastructure for the representation, implementation, manipulation and communication of digital information. Because information is so important, computer scientists have developed a large body of concepts and techniques for manipulating data. These concepts and techniques form the focus of this book.

The text provides a clear description of the *concepts* that underlie the field of computer science. Concepts are presented using intuitive descriptions. Important theoretical results are covered, but formal proofs are omitted. The bibliographical notes contain pointers to research papers in which results were first presented and proved, as well as references to material for further reading. In place of proofs, figures and examples are used to suggest why we should expect the result in question to be true.

We wrote this book as a text for an introductory course in computer science. We hope that practitioners will also find it useful. The course can be taken as a first course by computer science majors as well as by those students who want to get a basic understanding of the underlie "digital" technology. We do NOT assume that the reader is familiar with any programming language or basic computer organization; these will be covered in the text.

Organization of This Book

Since the text is intended for both computer science majors as well as non-majors, we envision that the material presented in the text will be covered differently for both audiences. On the supporting web page for this text, we provide several sample syllabi that suggest various approaches for using the text in both cases. As a general rule, we encourage readers to progress sequentially through the chapters, as this strategy provides the most thorough

study of computer science. However, by using the sample syllabi, a reader can select a different ordering of chapters (or subsections of chapters).

Content of This Book

The text is organized in thirteen chapters:

- **Introduction**. Chapter 1 explains what the field of computer science is all about. The presentation is motivational and explanatory in nature. We have avoided a discussion of how things are done internally in these chapters. Therefore, they are suitable for individual readers or for students in lower-level classes who want to learn what computer science is without getting into specific details.
- **The Art of Programming**. Chapter 2 deals with xxxx.
- **Fundamental Data Structures**. Chapter 3 deals with xxxx.
- **Fundamental Algorithms**. Chapter 4 deals with xxxx.
- **Approximation**. Chapter 5 deals with xxxx.
- **Programming Design Techniques**. Chapter 6 deals with xxxx.
- **Programming Language Notations**. Chapter 7 deals with xxxx.
- **Digital Representation of Information**. Chapter 8 deals with xxxx.
- **Computer-System Organization**. Chapter 9 deals with xxxx.
- **Models of Computation**. Chapter 10 deals with xxxx.
- **Models of Concurrent Computations**. Chapter 11
- **Models of Distributed Computation**. Chapter 12 deals with xxx.
- **Security**. Chapter 13 deals with issue of protecting the information stored in the system (both data and code), as well as the physical resources of the computer system, from unauthorized access, malicious destruction or alteration, and accidental introduction of inconsistency.

Teaching Supplements and Web Page

The web page for the book contains such material as a set of slides to accompany the book, model course syllabi, all Java source code, and up-to-date errata. The URL is:

http://www.cs-book.com

We also provide a supplement called Practice Exercises, which consists of exercises not found in the text. The Practice Exercises and their associated solutions are publicly available on the Web page of the book. Students are encouraged to solve the practice exercises on their own, and later use the solutions on the Web page to check their own solutions.

To obtain restricted supplements, such as the solution guide to the exercises in the text, contact your local xxxx sales representative. Note that these supplements are available only to faculty who use this text.

Mailing List

We are using the mailman system for communication among the users of *Computer Science.* If you wish to use this facility, please visit the following URL and follow the instructions there to subscribe:

http://mailman.cs.yale.edu/mailman/listinfo/cs-book-list

The mailman mailing-list system provides many benefits, such as an archive of postings, as well as several subscription options, including digest and Web only. To send messages to the list, send e-mail to:

cs-book-list@cs.yale.edu

Depending on the message, we will either reply to you personally or forward the message to everyone on the mailing list. The list is moderated, so you will receive no inappropriate mail.

Students who are using this book as a text for class should not use the list to ask for answers to the exercises. They will not be provided.

Abraham Silberschatz, New Haven, CT, 2006
Fritz Laux, Tuebingen, Germany, 2006