Computer Science 2002

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PROGRAMMING AND SOFTWARE DEVELOPMENT

TEXTBOOK **NEW EDITION**

Modern Compiler Implementation in Java

Second edition

Andrew W. Appel
Princeton University
with Jens Palsberg
Purdue University

This textbook describes all phases of a compiler: lexical analysis, parsing, abstract syntax, semantic coverage of current techniques in code generation and register allocation. It even covers the compilation of functional and object-oriented languages missing from most books. This new edition has been rewritten to include more discussion of Java and object-oriented programming concepts, such as visitor patterns. The newly redesigned compiler project includes both front-end and back-end phases, so that students can build a complete working compiler in one semester. More information can be found at:
http://www.cambridge.org/computerscience/appel

- New easy-to-use compiler project, available on-line
- Solution sets for instructors available on the web site
- Expanded coverage of object-oriented concepts

From reviews of the first edition...
'...the book is a pleasure to read or study...warmly recommended'
Science of Computer Programming

'...a textbook example of an excellent textbook.'
Infoworld

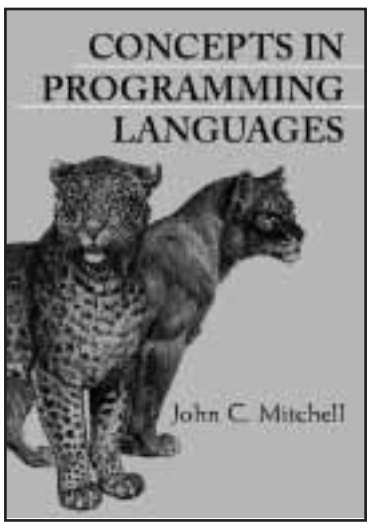
Contents: Part I. FUNDAMENTALS OF COMPILATION: 1. Introduction; 2. Lexical analysis; 3. Parsing; 4. Abstract syntax; 5. Semantic analysis; 6. Activation records; 7. Translation to intermediate code; 8. Basic blocks and traces; 9. Instruction selection; 10. Liveness analysis; 11. Register allocation; 12. Putting it all together; Part II. ADVANCED TOPICS: 13. Garbage collection; 14. Object-oriented languages; 15. Functional programming languages; 16. Polymorphic types; 17. Dataflow analysis; 18. Loop optimizations; 19. Static single-assignment form; 20. Pipelining and scheduling; 21. The memory hierarchy; Appendix: Mini-Java reference manual.

2002 246 x 156 mm 528pp 80 line diagrams 35 tables 135 exercises
0 521 82060 X Hardback £32.50

TEXTBOOK

Concepts in Programming Languages

John C. Mitchell
Stanford University



Unrivalled in its breadth and depth of presentation, this undergraduate textbook explains and examines the pivotal concepts in modern programming languages. Importantly, as well as traditional material, much of the discussion concerns object-oriented languages, and includes sections on the history of objects, Simula, Smalltalk, C++ and Java. PowerPoint slides to help run courses and solutions to the many high-quality exercises in the book are available for lecturers from:
http://www.cambridge.org/computerscience/mitchell

- Describes the theory and practical implications of language design.
- Solutions to exercises and PowerPoint slides available to lecturers
- A thorough treatment of object-orientation

Contents: Part I. FUNCTIONS AND FOUNDATIONS: 1 Introduction; 2 Computability; 3 Lisp: Functions, Recursion, and Lists; 4 Fundamentals; Part II. PROCEDURES, TYPES, MEMORY MANAGEMENT AND CONTROL: 5 The Algol Family and ML; 6 Type Systems and Type Inference; 7 Scope, Functions, and Storage Management; 8 Control in Sequential Languages; Part III. MODULARITY, ABSTRACTION AND OBJECT-ORIENTED PROGRAMMING: 9 Data Abstraction and Modularity; 10 Concepts in Object-Oriented Languages; 11 History of Objects: Simula and Smalltalk; 12 Objects and Run-Time Efficiency: C++; 13 Portability and Safety: Java; Part IV. CONCURRENCY AND LOGIC PROGRAMMING: 14 Concurrent and Distributed Programming; 15 The Logic Programming Paradigm and Prolog by Krzysztof Apt; Appendix; Additional Programming Examples; Glossary

2002 253 x 177 mm 480pp 54 line diagrams 8 half-tones 14 tables 140 exercises
0 521 78098 5 Hardback £35.00

CAMBRIDGE UNIVERSITY PRESS

TEXTBOOK

Specifying Software

A Hands-On Introduction

R. D. Tennent
Queen's University, Ontario

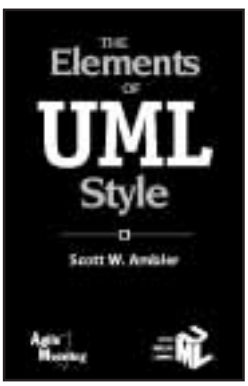
Provides an innovative hands-on introduction to techniques for specifying the behaviour of software components. It is primarily intended for use as a textbook for a course in the 2nd or 3rd year of Computer Science and Computer Engineering programs, but it is also suitable for self-study. Using this book will help the reader improve programming skills and gain a sound foundation and motivation for subsequent courses in advanced algorithms and data structures, software design, formal methods, compilers, programming languages, and theory. The presentation is based on numerous examples and case studies appropriate to the level of programming expertise of the intended readership. The main topics covered are techniques for using programmer-friendly assertional notations to specify, develop, and verify small but non-trivial algorithms and data representations, and the use of state diagrams, grammars, and regular expressions to specify and develop recognizers for formal languages.

Contents: Introduction; Part A: 1. Specifying algorithms; 2. Verifying algorithms: basic techniques; 3. Verifying algorithms: some examples; 4. Additional techniques and examples; Part B: 5. Case study: a simple data base; 6. Examples of data representations; Part C. Language Recognizers: 7. Basic concepts; 8. State-transition diagrams; 9. Regular languages; 10. Context-free languages; 11. Parsing; 12. Unimplementable specifications; Hints for selected exercises; Index.

2002 228 x 152 mm 302pp 29 line diagrams 1 table 215 exercises
0 521 80814 6 Hardback £47.50
0 521 00401 2 Paperback £17.95

The Elements of UML Style

Scott W. Ambler
Ronin International



This new book in the popular format of the earlier book, *The Elements of Java Style*, is for all developers who create models using the Unified Modeling Language (UML), especially in teams where understandability and consistency are critical. The author describes a collection of standards and guidelines for creating effective UML diagrams that will be concise and easy to understand. *The Elements of UML Style* sets the rules for style that will improve your productivity.

December 2002 177 x 117 mm 200pp 25 line diagrams
0 521 52547 0 Paperback £9.95

UML Xtra-Light

How to Specify Your Software Requirements

Milan Kratochvil
Kiseldalens Metod AB
and Barry McGibbon
Princeton Softech

If you are a non-technical person with a stake in the success of a software project, this book is for you. Business managers often find it impossible to communicate business objectives and specify their software requirements to technical members of staff. This beginner's guide teaches readers to communicate with software developers in a more focused, effective way. It describes the basic diagrams of the UML modeling notation and shows how they are used to specify requirements in an unambiguous way. When used on project, the risk of failure through unclear requirements is removed.

2002 228 x 152 mm 128pp 30 line diagrams
0 521 89242 2 Paperback £15.95

Java Frameworks and Components

Accelerate Your Web Application Development

Michael Nash
Jcorporate Ltd., Freeport, Bahamas

Application frameworks are large often very complex tools that many developers do not yet fully understand. This means they cannot take advantage of the substantial benefits such a technology can bring to their development project – they often are re-inventing the wheel repeatedly As the market for web applications begins its second wave, this book provides the critical information for developers to make the transition into component and framework-based development, keeping them ahead in an increasingly competitive market.It provides the necessary information for them to be able to find, evaluate and select an application framework suitable to their needs. The book explains in plain language the benefits of frameworks and component technologies, specifically in relation to web application development. It does not focus on any specific technology, but instead, uses examples from several different frameworks to explain the underlying principles. This gives it a broad appeal to developers that are not sure which framework is right for their purpose. An emphasis on quality and globalization is maintained throughout, as these factors become essential in new projects.

2002 234 x 177 mm 550pp
0 521 52059 2 Paperback c. £34.95

JOURNAL

Journal of Functional Programming

Editors-in-Chief: Simon L. Peyton Jones
Microsoft Research Ltd, Cambridge
Philip L. Wadler
Avaya Labs, USA

Journal of Functional Programming is the only journal devoted to this important area of computer science and it spans the range from mathematical theory to industrial practice. Topics covered include functional languages and extensions, implementation techniques, reasoning and proof, program transformation and synthesis, type theory and formalised proofs, parallelism and applications.

online

Volume 13 in 2003: January, March, May, July, September and November
Institutions print plus electronic: £182
Institutions electronic only: £164
Individuals print only: £70
ISSN 0956-7968
http://journals.cambridge.org/jid_jfp

JOURNAL

Theory and Practice of Logic Programming

Published for the Association for Logic Programming

Editor-in-Chief: Maurice Bruynooghe
Katholieke Universiteit Leuven

Logic applies to all areas of artificial intelligence and computer science. Logic programming is fundamental to all these areas. Among the topics to be covered by TPLP are AI applications that use logic programming, natural language processing, knowledge representation, nonmonotonic reasoning, databases, implementations and architectures and constraint logic programming. In addition to these topics, reviews of books will be featured, as will successful cases of elegant and efficient logic programs, to appear in the Logic Programming Pearls section.

online

Volume 3 in 2003: January, March, May, July, September and November
Institutions print plus electronic: £202
Institutions electronic only: £185
Individuals print only: £50
ISSN 1471-0684
http://journals.cambridge.org/jid_tlp

Genomic Perl

Includes CD-ROM

From Bioinformatics Basics to Working Code

Rex A. Dwyer
The BioAlgorithmic Consultancy

This introduction to computational molecular biology will help programmers and biologists learn the skills needed to start work in this important, expanding field. The author explains many of the basic computational problems and gives concise, working programs to solve them in the Perl programming language. With minimal prerequisites, the author explains the biological background for each problem, develops a model for the solution, then introduces the Perl concepts needed to implement the solution. The concrete examples and step-by-step approach make it easy to grasp the computational and statistical methods, including dynamic programming, branch-and-bound optimization, greedy methods, maximum likelihood methods, substitution matrices, BLAST searching, and Karlin-Altschul statistics. Perl code is provided on the accompanying CD.

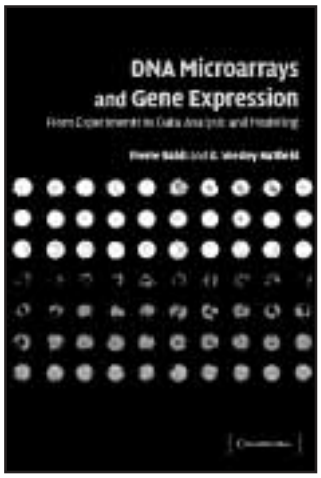
Contents: 1. The central dogma; 2. RNA secondary structure; 3. Comparing DNA sequences; 4. Statistical models; 5. Substitution matrices for amino acids; 6. Sequence databases; 7. Local alignment and the BLAST heuristic; 8. Statistics of BLAST database searches; 9. Multiple sequence alignment I; 10. Multiple sequence alignment II; 11. Phylogeny reconstruction; 12. Protein motifs and PROSITE; 13. Fragment assembly; 14. Coding sequence prediction with dicodon frequencies; 15. Satellite identification; 16. Restriction mapping; 17. Hybridization mapping; 18. Genome rearrangement: gates and hurdles; 19. Now what?; A. Drawing RNA cloverleaves; B. Space-saving strategies for alignment; C. A data structure for disjoint sets; D. A data structure for set operations.

2002 253 x 177 mm 400pp 100 exercises
0 521 80177 X Hardback c. £35.00

DNA Microarrays and Gene Expression

From Experiments to Data Analysis and Modeling

Pierre Baldi
University of California, Irvine
and G. Wesley Hatfield
University of California, Irvine



Massive data acquisition technologies, such as genome sequencing, high-throughput drug screening, and DNA arrays are in the process of revolutionizing biology and medicine. Using the mRNA of a given cell, at a given time, under a given set of conditions, DNA microarrays can provide a snapshot of the level of expression of all the genes in the cell. Such snapshots can be used to study fundamental biological phenomena such as development or evolution, to determine the function of new genes, to infer the role individual genes or groups of genes may play in diseases, and to monitor the effect of drugs and other compounds on gene expression. This inter-disciplinary introduction to DNA arrays will be essential reading for both biology and computer science researchers wanting to take advantage of this powerful new technology.

2002 228 x 152 mm 228pp 16 line diagrams 1 half-tone 16 figures
0 521 80022 6 Hardback £35.00

COMPUTATIONAL BIOLOGY AND BIOINFORMATICS

Flexible Pattern Matching in Strings

Practical On-Line Search Algorithms for Texts and Biological Sequences

Gonzalo Navarro
University of Chile
and Mathieu Raffinot
CNRS Equipe Genome et Informatique, Evry, France

String matching problems range from the relatively simple task of searching a single text for a string of characters to searching a database for approximate occurrences of a complex pattern, such as a gene sequence. Recent years have witnessed a dramatic increase of interest in sophisticated string matching problems, especially in information retrieval and computational biology. This book presents a practical approach to string matching problems, focusing on the algorithms and implementations that perform best in practice. It covers searching for simple, multiple and extended strings, as well as regular expressions, and exact and approximate searching. It includes all the most significant new developments in complex pattern searching. The clear explanations, step-by-step examples, algorithm pseudocode, and implementation efficiency maps will enable researchers, professionals and students in bioinformatics, computer science, and software engineering to choose the most appropriate algorithms for their applications.

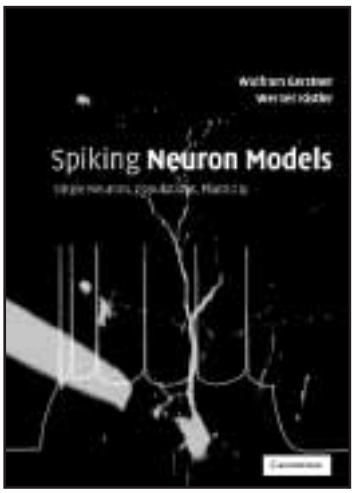
2002 253 x 177 mm 232pp 90 line diagrams
0 521 81307 7 Hardback £40.00

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

GRADUATE TEXTBOOK

Spiking Neuron Models

An Introduction



W. Gerstner
Ecole Polytechnique Federale de Lausanne
and W. Kistler
Erasmus University Rotterdam

Neurons in the brain communicate by short electrical pulses, the so-called action potentials or spikes. How can we understand the process of spike generation? How can we understand information transmission by neurons? What happens if thousands of neurons are coupled together in a seemingly random network? How does the network connectivity determine the activity patterns? And, vice versa, how does the spike activity influence the connectivity pattern? These questions are addressed in this introduction to spiking neurons aimed at those taking courses in computational neuroscience, theoretical biology, biophysics, or neural networks. The approach will suit students of physics, mathematics, or computer science; it will also be useful for biologists who are interested in mathematical modelling. The text is enhanced by many worked examples and illustrations. There are no mathematical prerequisites beyond what the audience would meet as undergraduates: more advanced techniques are introduced in an elementary, concrete fashion when needed.

2002 247 x 174 mm 450pp 162 figures
0 521 81384 0 Hardback £65.00
0 521 89079 9 Paperback £24.95

GRADUATE TEXTBOOK

Knowledge Representation, Reasoning and Declarative Problem Solving

Chitta Baral
Arizona State University

Knowledge management and knowledge-based intelligence are areas of importance in today's economy and society, and to exploit them fully and efficiently it is necessary both to represent and reason about knowledge via a declarative interface whose input language is based on logic. In this book, Chitta Baral shows exactly how to go about doing that: how to write programs that behave intelligently by giving them the ability to express knowledge and reason about it. He presents a language, AnsProlog, for both knowledge representation and reasoning, and declarative problem solving. Many of the results here have never appeared before in book form, and they have been organised here into a form that will appeal to practicing and would-be knowledge engineers wishing to learn more about the subject, either in courses or through self-teaching. A comprehensive bibliography rounds off the book.

January 2003 247 x 174 mm 470pp
0 521 81802 8 Hardback c. £55.00

Probabilistic Reasoning in Multiagent Systems

A Graphical Models Approach

Yang Xiang
University of Guelph, Ontario

This book investigates the opportunities in building intelligent decision support systems offered by multi-agent distributed probabilistic reasoning. Probabilistic reasoning with graphical models, also known as Bayesian networks or belief networks, has become an active field of research and practice in artificial intelligence, operations research and statistics in the last two decades. The success of this technique in modeling intelligent decision support systems under the centralized and single-agent paradigm has been striking. In this book, the author extends graphical dependence models to the distributed and multi-agent paradigm. He identifies the major technical challenges involved in such an endeavour and presents the results from a decade's research. The framework developed in the book allows distributed representation of uncertain knowledge on a large and complex environment embedded in multiple cooperative agents, and effective, exact and distributed probabilistic inference.

2002 247 x 174 mm 320pp 153 line diagrams 32 half-tones 22 tables
0 521 81308 5 Hardback £45.00

The Description Logic Handbook

Theory, Implementation and Applications

Edited by F. Baader
Aachen University of Technology
D. McGuinness
Stanford University
D. Nardi
Università di Roma La Sapienza
and P. P. Schneider
Bell Labs Research

Description Logics are a family of knowledge representation languages that have been studied extensively in Artificial Intelligence over the last two decades. They are embodied in several knowledge-based systems and are used to develop various real-life applications. The Description Logic Handbook provides a thorough account of the subject, covering all aspects of research in this field, namely: theory, implementation, and applications. Its appeal will be broad, ranging from more theoretically-oriented readers, to those with more practically-oriented interests who need a sound and modern understanding of knowledge representation systems based on Description Logics. The chapters are written by some of the most prominent researchers in the field, introducing the basic technical material before taking the reader to the current state of the subject, and including comprehensive guides to the literature. In sum, the book will serve as a unique reference for the subject, and can also be used for self-study or in conjunction with Knowledge Representation and Artificial Intelligence courses.

2003 247 x 174 mm 570pp 14 tables 53 figures
0 521 78176 0 Hardback c. £80.00

Cellular Neural Networks and Visual Computing

Foundations and Applications

Leon O. Chua and Tamas Roska

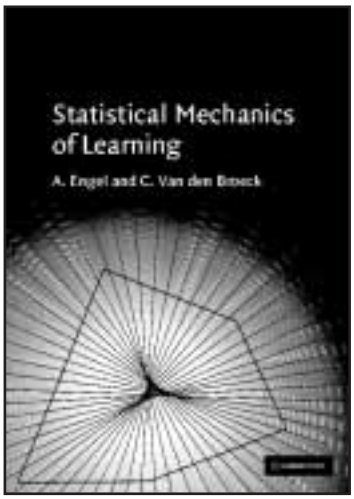
Cellular Nonlinear/neural Network (CNN) technology is both a revolutionary concept and an experimentally proven new computing paradigm. Analogic cellular computers based on CNNs are set to change the way analog signals are processed and are paving the way to an entire new analog computing industry. This unique undergraduate level textbook includes many examples and exercises, including CNN simulator and development software accessible via the Internet. It is an ideal introduction to CNNs and analogic cellular computing for students, researchers and engineers from a wide range of disciplines. Although its prime focus is on visual computing, the concepts and techniques described in the book will be of great interest to those working in other areas of research including modeling of biological, chemical and physical processes. Leon Chua, co-inventor of the CNN, and Tamás Roska are both highly respected pioneers in the field.

2002 247 x 174 mm 408pp 50 tables 36 exercises 400 figures
0 521 65247 2 Hardback £47.50

TEXTBOOK

Statistical Mechanics of Learning

Andreas Engel
Otto von Guericke Universitat, Magdeburg
and Christian P. L. Van den Broeck
Limburgs Universitair Centrum



Learning is one of the things that humans do naturally, and it has always been a challenge for us to understand the process. Nowadays this challenge has another dimension as we try to build machines that are able to learn and to undertake tasks such as datamining, image processing and pattern recognition. We can formulate a simple framework, artificial neural networks, in which learning from examples may be described and understood. The contribution to this subject made over the last decade by researchers applying the techniques of statistical mechanics is the subject of this book. The authors provide a coherent account of various important concepts and techniques that are currently only found scattered in papers, supplement this with background material in mathematics and physics and include many examples and exercises to make a book that can be used with courses, or for self-teaching, or as a handy reference.

2001 247 x 174 mm 342pp 1 table 136 exercises 54 figures
0 521 77307 5 Hardback £70.00
0 521 77479 9 Paperback £24.95

JOURNAL

AI EDAM

Artificial Intelligence for Engineering Design, Analysis and Manufacturing

Editor: David C. Brown
Worcester Polytecnic Institute

AI EDAM is intended to reach two audiences: engineers and designers who see AI technologies as powerful means for solving difficult engineering problems; and researchers in AI and computer science who are interested in theory and applications of AI. The journal publishes original articles that develop new and interesting applications based on the most up-to-date research in all branches and phases of engineering.

Volume 17 in 2003: January, April, June, September and November
Institutions print plus electronic: £240
Institutions electronic only: £215
Individuals print plus electronic: £88
ISSN 0890-0604
http://journals.cambridge.org/jid_aie

JOURNAL

Robotica

An Official Journal of the International Federation of Robotics

Editor: J. Rose
University of Central Lancashire

Robotica provides an international forum for the multidisciplinary subject of robotics and encourages developments in this important field of automation with regard to industry, education and research. Particular stress is laid on practical applications of theoretical concepts in the industrial field and also on many aspects of artificial intelligence and its impact on automation. As well as original papers the journal publishes research notes, book reviews, conference reports, letters, announcements of conferences and R & D profiles. Special issues by guest editors, experts in their fields, present in-depth surveys of key developments.

Volume 21 in 2003: January, March, May, July, September and November
Institutions print plus electronic: £312
Institutions electronic only: £281
ISSN 0263-5747
http://journals.cambridge.org/jid_rob

JOURNAL

Natural Language Engineering

Executive Editor: John I. Tait
University of Sunderland
Editors: B. K. Boguraev
IBM Thomas J. Watson Research Centre, New York
Christian Jacquemin
CNRS-UMSI

Natural Language Engineering is an international journal designed to meet the needs of professionals and researchers working in all areas of computerised language processing, whether from the perspective of theoretical or descriptive linguistics, lexicology, computer science or engineering. The journal publishes research articles on a broad range of topics – from text analysis, machine translation and speech generation and synthesis to integrated systems and multi modal interfaces. Its aim is to provide the essential link between industry and the academic community.

Volume 9 in 2003: March, June, September and December
Institutions print plus electronic: £120
Institutions electronic only: £108
Individuals print only: £30
ISSN 1351-3249
http://journals.cambridge.org/jid_nle

JOURNAL

The Knowledge Engineering Review

Editor-in-Chief: Simon Parsons
Brooklyn College, City University of New York
North American Editor: Adele E. Howe
Colorado State University, Fort Collins

This journal is dedicated to the development of the field of artificial intelligence, and the clarification and dissemination of its methods and concepts. KER publishes review articles, technical tutorials book reviews and a popular 'from the journals' section that looks at the very latest applied AI research published in current journals.

Volume 18 in 2003; March, June, September and December
Institutions print and electronic £162
Institutions electronic only £146
Individuals print only £68
British Computer Society, Association for Computing Machinery £55
http://journals.cambridge.org/jid_ker

NEW EDITION

Numerical Recipes in C++

The Art of Scientific Computing
Second edition

William H. Press
Los Alamos National Laboratory
Saul A. Teukolsky
Cornell University, New York
William T. Vetterling
Polaroid Corporation
and Brian P. Flannery
EXXON Research and Engineering Company

The power of *Numerical Recipes (Second Edition)* is now available to C++ users. Completely self-contained, the book features more than 300 routines that provide a solid basis for Scientific Computing of every kind. It proceeds from mathematical and theoretical considerations to real practical routines, and takes scientific C++ programming to a new standard.

- The outstanding resource for Scientific Computing, now in C++
- Includes tips on Object-Oriented Scientific Computing and a Numerical Recipes Class Library
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Contents: 1. Preliminaries; 2. Solution of linear algebraic equations; 3. Interpolation and extrapolation; 4. Integration of functions; 5. Evaluation of functions; 6. Special functions; 7. Random numbers; 8. Sorting; 9. Root finding and nonlinear sets of equations; 10. Minimisation or maximisation of functions; 11. Eigensystems; 12. Fast Fourier transform; 13. Fourier and spectral applications; 14. Statistical description of data; 15. Modelling of data; 16. Integration of ordinary differential equations; 17. Two point boundary value problems; 18. Integral equations and inverse theory; 19. Partial differential equations; 20. Less-numerical algorithms; References.

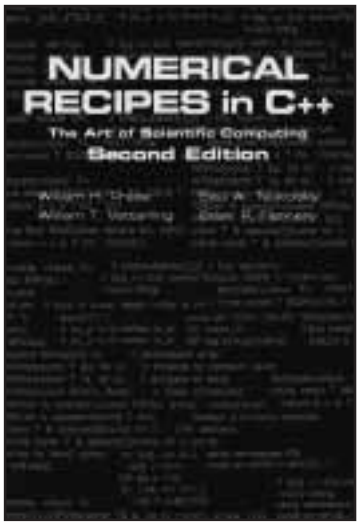
2002 246x168mm 1064pp 100 line diagrams
0 521 75033 4 Hardback £45.00

Praise for previous releases of *Numerical Recipes.*

'... many books on numerical analysis have been published ... I have acquired a modest number of these books, finding each useful in one way or another ... However I could survive very well if I had to give up all of these books but one: *Numerical Recipes*'
Computational Science and Engineering

'… it is the one book to buy if you are going to have to solve anything numerical on your computer.'
Dr Dobb's Journal

'… an impressive book…definitely deserves to be in the personal or professional library of engineers and scientists who utilise the power of numerical analysis.'
Computer



Also Available

C++ Example Book

Contains C++ source programs that give useful implementations all of the subroutines, procedures, and functions in *Numerical Recipes in C++*.

2002 228x152 mm 352pp
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*Multi-Language CDs include all the source code in Fortran 77, Fortran 90, C, Pascal, BASIC, Lisp, Modula 2 and of course C++.

For more information visit: **http://www.cambridge.org/numericalrecipes**

OTHER LANGUAGES

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Object Oriented Programming in Fortran 90/95

J. E. Akin
Rice University

Learn how to write technical applications in a modern object-oriented approach, using Fortran 90 or 95. This book will teach you how to stop focusing on the traditional procedural abilities of Fortran and to employ the principles of object-oriented programming to produce clear, highly efficient executable codes. Get ready now to take advantage of all the features of the finalized, fully object-oriented Fortran 200X! In addition to covering the OOP methodologies the book also covers the basic foundation of the language and good programming skills, making the book valuable also as a good migration tool for experienced Fortran programmers who want to smoothly pick up the OOP paradigm. The author highlights common themes by using comparisons with Matlab and C++ and uses numerous cross-referenced examples to convey all concepts quickly and clearly. Complete code for the examples is included on the accompanying CD-ROM.

January 2003 253 x 152 mm 350pp
0 521 52408 3 Paperback c. £35.00

TEXTBOOK

Parallel Scientific Computing in C++ and MPI

George Em Karniadakis
Brown University
Robert M. Kirby
Brown University

This book provides a seamless approach to numerical algorithms, modern programming techniques, and parallel computing. Such concepts and tools are often taught serially across different courses and different textbooks, and hence the interconnection between them is not immediately apparent. The book includes both basic as well as advanced topics and places equal emphasis on the discretization of partial differential equations and on solvers. Some of the advanced topics include wavelets, high-order methods, non-symmetric systems, and parallelization of sparse systems.

2002 240 x 215 mm 650 pp
0 521 81754 4 Hardback c. £90.00
0 521 52080 0 Paperback c. £34.95

JOURNAL

LMS Journal of Computation and Mathematics

Editor-in-Chief: J. H. Davenport
University of Bath

Marketed for the London Mathematical Society

The new electronic-only *LMS Journal of Computation and Mathematics* publishes papers on the computational aspects of mathematics, mathematical aspects of computation. It ensures rapid publication, after acceptance, in high-quality PDF. There are also facilities for adding updates and discussions to papers, while the main text of each paper is guaranteed to remain unaltered. Hyperlinks are provided for cross-references within and between papers. The journal is refereed to the same high standard as the established LMS journals, and carries a commitment from the LMS to be archived into the indefinite future. Go to http://www.lms.ac.uk/jcm for further details.

Volume 6 in 2003. Electronic journal published incrementally throughout the year.
ISSN 1461-1570
http://www.lms.ac.uk/jcm

JOURNAL

Combinatorics, Probability & Computing

Editor-in-chief: Béla Bollobás
University of Memphis

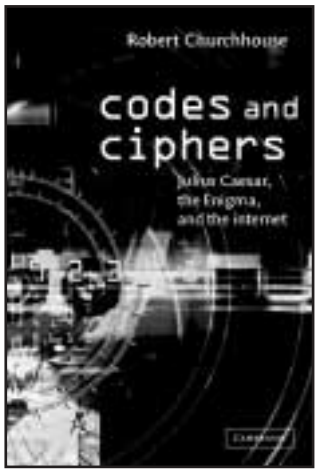
Now published bimonthly, *Combinatorics, Probability & Computing* is devoted to the three areas of combinatorics, probability theory and theoretical computer science. Topics covered include classical and algebraic graph theory, external set theory, matroid theory, probabilistic methods and random combinatorial structures; combinatorial probability and limit theorems for random combinatorial structures; the theory of algorithms (including complexity theory), randomised algorithms, probabilistic analysis of algorithms, computational learning theory and optimisation.

Volume 12 in 2003: January, March, May, July, September and November
Institutions print plus electronic: £184
Institutions electronic only: £165
ISSN 0963-5483
http://journals.cambridge.org/jid_cpc

Codes and Ciphers

Julius Caesar, the ENIGMA, and the Internet

Robert Churchhouse
Emeritus Professor,
Cardiff University



Powerful personal computers have resulted in an explosion of e-banking, e-commerce and e-mail, and as a consequence the encryption of communications to ensure security has become a matter of public interest and importance. This book describes and analyses many cipher systems ranging from the earliest and elementary to the most recent and sophisticated, such as RSA and DES, as well as wartime machines such as the ENIGMA and Hagelin, and ciphers used by spies. Security issues and possible methods of attack are discussed and illustrated by examples. The design of many systems involves advanced mathematical concepts and this is explained in detail in a major appendix.

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Now available in paperback, this is a modern, advanced textbook on modal logic, a field which caught the attention of computer scientists in the late 1970s. Researchers in areas ranging from economics to computational linguistics have since realised its worth. The book is for novices and for more experienced readers, with two distinct tracks clearly signposted at the start of each chapter. The development is mathematical; prior acquaintance with first-order logic and its semantics is assumed, and familiarity with the basic mathematical notions of set theory is required. The authors focus on the use of modal languages as tools to analyze the properties of relational structures, including their algorithmic and algebraic aspects, and applications to issues in logic and computer science such as completeness, computability and complexity are considered.

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Robert McEliece
California Institute of Technology

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Randomness and Complexity

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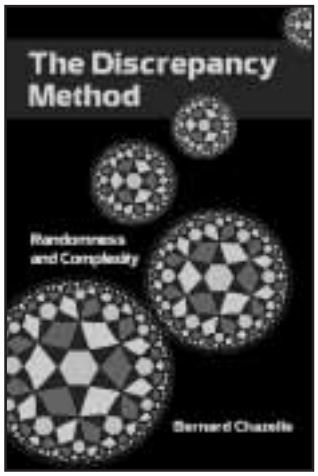

The discrepancy method has played a major role in complexity theory; in particular, it has caused a mini-revolution of sorts in computational geometry. This book tells the story of the discrepancy method in a few short independent vignettes. It is a varied tale which includes such topics as communication complexity, pseudo-randomness, rapidly mixing Markov chains, points on the sphere and modular forms, derandomization, convex hulls, Voronoi diagrams, linear programming and extensions, geometric sampling, VC-dimension theory, minimum spanning trees, linear circuit complexity, and multidimensional searching. The mathematical treatment is thorough and self-contained. In particular, background material in discrepancy theory is supplied as needed. Thus the book should appeal to students and researchers in computer science, operations research, pure and applied mathematics, and engineering.

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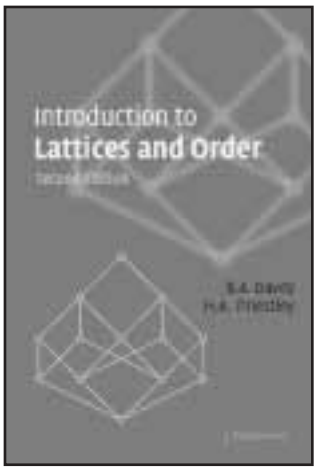

B. A. Davey
La Trobe University
and H. A. Priestley
University of Oxford

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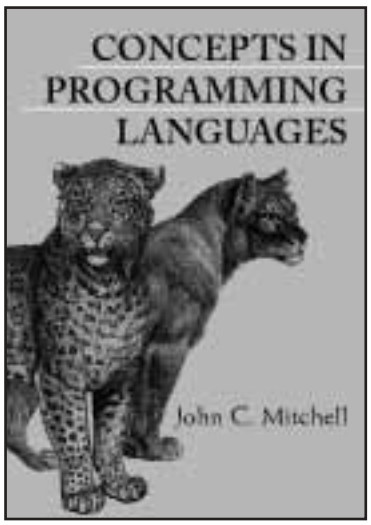

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