

scheduling or automotive assembly, yet for want of sound methods they have remained almost untouched to date. This text shows how methods such as Elitist Nondominated Sorting Genetic Algorithm (ENGA) can find a bevy of Pareto optimal solutions for them. Also it accents the value of hybridizing Gas with both solution-generating and solution-improvement methods. It envisions fundamental research into such methods, greatly strengthening the growing reach of metaheuristic methods. This book is therefore intended for students of industrial engineering, operations research, operations management and computer science, as well as practitioners. It may also assist in the development of efficient shop management software tools for schedulers and production planners who face multiple planning and operating objectives as a matter of course.

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A new model for task scheduling that dramatically improves the efficiency of parallel systems Task scheduling for parallel systems can become a quagmire of heuristics, models, and methods that have been developed over the past decades. The author of this innovative text cuts through the confusion and complexity by presenting a consistent and comprehensive theoretical framework along with realistic parallel system models. These new models, based on an investigation of the concepts and principles underlying task scheduling, take into account heterogeneity, contention for communication resources, and the involvement of the processor in communications. For readers who may be new to task scheduling, the first chapters are essential. They serve as an excellent introduction to programming parallel systems, and they place task scheduling within the context of the program parallelization process. The author then reviews the basics of graph theory, discussing the major graph models used to represent parallel programs. Next, the author introduces his task scheduling framework. He carefully explains the theoretical background of this framework and provides several examples to enable readers to fully understand how it greatly simplifies and, at the same time, enhances the ability to schedule. The second half of the text examines both basic and advanced scheduling techniques, offering readers a thorough understanding of the principles underlying scheduling algorithms. The final two chapters address communication contention in scheduling and processor involvement in communications. Each chapter features exercises that help readers put their new skills into practice. An extensive bibliography leads to additional information for further research. Finally, the use of figures and examples helps readers better visualize and understand complex concepts and processes. Researchers and students in distributed and parallel computer systems will find that this text dramatically improves their ability to schedule tasks accurately and efficiently.

Genetic algorithms (GAs) are powerful search techniques based on principles of evolution and widely applied to solve problems in many disciplines. However, most GAs employed in practice nowadays are unable to learn genetic linkage and suffer from the linkage problem. The linkage learning genetic algorithm (LLGA) was proposed to tackle the linkage problem with several specially designed mechanisms. While the LLGA performs much better on badly scaled problems than simple GAs, it does not work well on uniformly scaled problems as other competent GAs. Therefore, we need to understand why it is so and need to know how to design a better LLGA or whether there are certain limits of such a linkage learning process. This book aims to gain better understanding of the LLGA in theory and to improve the LLGA's performance in practice. It starts with a survey of the existing genetic linkage learning techniques and describes the steps and approaches taken to tackle the research topics, including using promoters, developing the convergence time model, and adopting subchromosomes.

The book proposes new technologies and discusses future solutions for design infrastructure for ICT. The book contains high quality submissions presented at Second International Conference on Information and Communication Technology for Sustainable Development (ICT4SD - 2016) held at Goa, India during 1 - 2 July, 2016. The conference stimulates the cutting-edge research discussions among many academic pioneering researchers, scientists, industrial engineers, and students from all around the world. The topics covered in this book also focus on innovative issues at international level by bringing together the experts from different countries.

An introduction to algorithms for readers with no background in advanced mathematics or computer science, emphasizing examples and real-world problems. Algorithms are what we do in order not to have to do something. Algorithms consist of instructions to carry out tasks—usually dull, repetitive ones. Starting from simple building blocks, computer algorithms enable machines to recognize and produce speech, translate texts, categorize and summarize documents, describe images, and predict the weather. A task that would take hours can be completed in virtually no time by using a few lines of code in a modern scripting program. This book offers an introduction to algorithms through the real-world problems they solve. The algorithms are presented in pseudocode and can readily be implemented in a computer language. The book presents algorithms simply and accessibly, without overwhelming readers or insulting their intelligence. Readers should be comfortable with mathematical fundamentals and have a basic understanding of how computers work; all other necessary concepts are explained in the text. After presenting background in pseudocode conventions, basic terminology, and data structures, chapters cover compression, cryptography, graphs, searching and sorting, hashing, classification, strings, and chance. Each chapter describes real problems and then presents algorithms to solve them. Examples illustrate the wide range of applications, including shortest paths as a solution to paragraph line breaks, strongest paths in elections systems, hashes for song recognition, voting power Monte Carlo methods, and entropy for machine learning. Real-World Algorithms can be used by students in disciplines from economics to applied sciences. Computer science majors can read it before using a more technical text.

Data structures and algorithm analysis in C++ is an advanced algorithms book that bridges the gap between traditional CS2 and Algorithms Analysis courses. As the speed and power of computers increases, so does the need for effective programming and algorithm analysis. By approaching these skills in tandem, Mark Allen Weiss teaches readers to develop well-constructed, maximally efficient programs using the C++ programming language.

Number Theory in Science and Communication introduces non-mathematicians to the fascinating and diverse applications of number theory. This best-selling book stresses intuitive understanding rather than abstract theory. This revised fourth edition is augmented by recent advances in primes in progressions, twin primes, prime triplets, prime quadruplets and quintuplets, factoring with elliptic curves, quantum factoring, Golomb rulers and "baroque" integers.

The articles in this book present advanced soft methods related to genetic and evolutionary algorithms, immune systems, formulation of deterministic neural networks and Bayesian NN. Many attention is paid to hybrid systems for inverse analysis fusing soft methods and the finite element method. Numerical efficiency of these soft methods is illustrated on the analysis and design of complex engineering structures.

Data Structures and Problem Solving Using Java takes a practical and unique approach to data structures that separates interface from implementation. It is suitable for the second or third programming course. This book provides a practical introduction to data structures with an emphasis on abstract thinking and problem solving, as well as the use of Java. It does this through what remains a unique approach that clearly separates each data structure's interface (how to use a data structure) from its implementation (how to actually program that structure). Parts I (Tour of Java), II (Algorithms and Building Blocks), and III (Applications) lay the groundwork by discussing basic concepts and tools and providing some practical examples, while Part IV (Implementations) focuses on implementation of data structures. This forces the reader to think about the functionality of the data structures before the hash table is implemented. The Fourth Edition features many new updates as well as new exercises.

Get up to date quickly on the new changes coming with C++17 Professional C++ is the advanced manual for C++ programming. Designed to help experienced developers get more out of the latest release, this book skims over the basics and dives right in to exploiting the full capabilities of C++17. Each feature is explained by example, each including actual code snippets that you can plug into your own applications. Case studies include extensive, working code that has been tested on Windows and Linux, and the author's expert tips, tricks, and workarounds can dramatically enhance your workflow. Even many experienced developers have never fully explored the boundaries of the language's capabilities; this book reveals the advanced features you never knew about, and drills down to show you how to turn these features into real-world solutions. The C++17 release includes changes that impact the way you work with C++; this new fourth edition covers them all, including nested namespaces, structured bindings, string_view, template argument deduction for constructors, parallel algorithms, generalized sum algorithms, Boyer-Moore string searching, string conversion primitives, a filesystem API, clamping values, optional values, the variant type, the any type, and more. Clear explanations and professional-level depth make this book an invaluable resource for any professional needing to get up to date quickly. Maximize C++ capabilities with effective design solutions Master little-known elements and learn what to avoid Adopt new workarounds and testing/debugging best practices Utilize real-world program segments in your own applications C++ is notoriously complex, and whether you use it for gaming or business, maximizing its functionality means keeping up to date with the latest changes. Whether these changes enhance your work or make it harder depends on how well-versed you are in the newest C++ features. Professional C++ gets you up to date quickly, and provides the answers you need for everyday solutions.

Systematically teaches key paradigmatic algorithm design methods Provides a deep insight into randomization Essential Information about Algorithms and Data Structures A Classic Reference The latest version of Sedgewick, s best-selling series, reflecting an indispensable body of knowledge developed over the past several decades. Broad Coverage Full treatment of data structures and algorithms for sorting, searching, graph processing, and string processing, including fifty algorithms every programmer should know. See Table of contents

This book considers classical and current theory and practice, of supervised, unsupervised and semi-supervised pattern recognition, to build a complete background for professionals and students of engineering. The authors, leading experts in the field of pattern recognition, have provided an up-to-date, self-contained volume encapsulating this wide spectrum of information. The very latest methods are incorporated in this edition: semi-supervised learning, combining clustering algorithms, and relevance feedback. Thoroughly developed to include many more worked examples to give greater understanding of the various methods and techniques Many more diagrams included--now in two color--to provide greater insight through visual presentation Matlab code of the most common methods are given at the end of each chapter An accompanying book with Matlab code of the most common methods and algorithms in the book, together with a descriptive summary and solved examples, and including real-life data sets in imaging and audio recognition. The companion book is available separately or at a special packaged price (Book ISBN: 9780123744869. Package ISBN: 9780123744913) Latest hot topics included to further the reference value of the text including non-linear dimensionality reduction techniques, relevance feedback, semi-supervised learning, spectral clustering, combining clustering algorithms Solutions manual, powerpoint slides, and additional resources are available to faculty using the text for their course. Register at www.textbooks.elsevier.com and search on "Theodoridis" to access resources for instructor.

Genetic Algorithms (GAs) are one of several techniques in the family of Evolutionary Algorithms - algorithms that search for solutions to optimization problems by "evolving" better and better solutions. Genetic Algorithms have been applied in science, engineering, business and social sciences. This book consists of 16 chapters organized into five sections. The first section deals with some applications in automatic control, the second section contains several applications in scheduling of resources, and the third section introduces some applications in electrical and electronics engineering. The next section illustrates some examples of character recognition and multi-criteria classification, and the last one deals with trading systems. These evolutionary techniques may be useful to engineers and scientists in various fields of specialization, who need some optimization techniques in their work and who may be using Genetic Algorithms in their applications for the first time. These applications may be useful to many other people who are getting familiar with the subject of Genetic Algorithms.

Computational geometry as an area of research in its own right emerged in the early seventies of this century. Right from the beginning, it was obvious that strong connections of various kinds exist to questions studied in the considerably older field of combinatorial geometry. For example, the combinatorial structure of a geometric problem usually decides which algorithmic method solves the problem most efficiently. Furthermore, the analysis of an algorithm often requires a great deal of combinatorial knowledge. As it turns out, however, the connection between the two research areas commonly referred to as computational geometry and combinatorial geometry is not as lop-sided as it appears. Indeed, the interest in computational issues in geometry gives a new and constructive direction to the combinatorial study of geometry. It is the intention of this book to demonstrate that computational and combinatorial investigations in geometry are doomed to profit from each other. To reach this goal, I designed this book to consist of three parts, a combinatorial part, a computational part, and one that presents applications of the results of the first two parts. The choice of the topics covered in this book was guided by my attempt to describe the most fundamental algorithms in computational geometry that have an interesting combinatorial structure. In this early stage geometric transforms played an important role as they reveal connections between seemingly unrelated problems and thus help to structure the field. This highly structured text, in its second edition, provides comprehensive coverage of design techniques of algorithms. It traces the complete development of various algorithms in a stepwise approach followed by their pseudo-codes to build an understanding of their applications in practice. With clear explanations, the textbook intends to be much more comprehensive book on design and analysis of algorithm.

Commencing with the introduction, the book gives a detailed account of graphs and data structure. It then elaborately discusses the matrix algorithms, basic algorithms, network algorithms, sorting algorithm, backtracking algorithms and search algorithms. The text also focuses on

