

foundation you need to successfully design, implement and maintain virtually any software system. Theoretical, yet practical, DATA STRUCTURES AND ALGORITHMS IN C++, 4E by experienced author Adam Drosdek highlights the fundamental connection between data structures and their algorithms, giving equal weight to the practical implementation of data structures and the theoretical analysis of algorithms and their efficiency. This edition provides critical new coverage of treaps, k-d trees and k-d B-trees, generational garbage collection, and other advanced topics such as sorting methods and a new hashing technique. Abundant C++ code examples and a variety of case studies provide valuable insights into data structures implementation. DATA STRUCTURES AND ALGORITHMS IN C++ provides the balance of theory and practice to prepare readers for a variety of applications in a modern, object-oriented paradigm.

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As organizations continue to develop, there is an increasing need for technological methods that can keep up with the rising amount of data and information that is being generated. Machine learning is a tool that has become powerful due to its ability to analyze large amounts of data quickly. Machine learning is one of many technological advancements that is being implemented

into a multitude of specialized fields. An extensive study on the execution of these advancements within professional industries is necessary. The Handbook of Research on Big Data Clustering and Machine Learning is an essential reference source that synthesizes the analytic principles of clustering and machine learning to big data and provides an interface between the main disciplines of engineering/technology and the organizational, administrative, and planning abilities of management. Featuring research on topics such as project management, contextual data modeling, and business information systems, this book is ideally designed for engineers, economists, finance officers, marketers, decision makers, business professionals, industry practitioners, academicians, students, and researchers seeking coverage on the implementation of big data and machine learning within specific professional fields.

Over the past three decades, the exploding number of new technologies and applications introduced in medical practice, often powered by advances in biosignal processing and biomedical imaging, created an amazing account of new possibilities for diagnosis and therapy, but also raised major questions of appropriateness and safety. The accelerated development in this field, alongside with the promotion of electronic health care solutions, is often on the basis of an uncontrolled diffusion and use of medical technology. The emergence and use of

medical devices is multiplied rapidly and today there exist more than one million different products available on the world market. Despite the fact that the rising cost of health care, partly resulting from the new emerging technological applications, forms the most serious and urgent problem for many governments today, another important concern is that of patient safety and user protection, issues that should never be compromised and expelled from the Biomedical Engineering research practice agenda.

The fast user growth in wireless communications has created significant demands for new wireless services in both the licensed and unlicensed frequency spectra. Since many spectra are not fully utilized most of the time, cognitive radio, as a form of spectrum reuse, can be an effective means to significantly boost communications resources. Since its introduction in late last century, cognitive radio has attracted wide attention from academics to industry. Despite the efforts from the research community, there are still many issues of applying it in practice. This book is an attempt to cover some of the open issues across the area and introduce some insight to many of the problems. It contains thirteen chapters written by experts across the globe covering topics including spectrum sensing fundamental, cooperative sensing, spectrum management, and interaction among users.

Data Structures & Theory of Computation

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Graph algorithms are easy to visualize and indeed there already exists a variety of packages to animate the dynamics when solving problems from graph theory. Still it can be difficult to understand the ideas behind the algorithm from the dynamic display alone. CATBox consists of a software system for animating graph algorithms and a course book which we developed simultaneously. The software system presents both the algorithm and the graph and puts the user always in control of the actual code that is executed. In the course book, intended for readers at advanced undergraduate or graduate level, computer exercises and examples replace the usual static pictures of algorithm dynamics. For this volume we have chosen solely algorithms for classical problems from combinatorial optimization, such as minimum spanning trees, shortest paths, maximum flows, minimum cost flows, weighted and unweighted matchings both for bipartite and non-bipartite graphs. Find more information at <http://schliep.org/CATBox/>.

The overall structure of this new edition is three-tier: Part I presents the basics, Part II is concerned with methodological issues, and Part III discusses advanced topics. In the second edition the authors have reorganized the material to focus on problems, how to represent them, and then how to choose and design algorithms for different representations. They also added a chapter on problems, reflecting the overall book focus on problem-solvers, a chapter on parameter tuning, which they combined with the parameter control and "how-to" chapters

into a methodological part, and finally a chapter on evolutionary robotics with an outlook on possible exciting developments in this field. The book is suitable for undergraduate and graduate courses in artificial intelligence and computational intelligence, and for self-study by practitioners and researchers engaged with all aspects of bioinspired design and optimization. For many applications a randomized algorithm is either the simplest algorithm available, or the fastest, or both. This tutorial presents the basic concepts in the design and analysis of randomized algorithms. The first part of the book presents tools from probability theory and probabilistic analysis that are recurrent in algorithmic applications. Algorithmic examples are given to illustrate the use of each tool in a concrete setting. In the second part of the book, each of the seven chapters focuses on one important area of application of randomized algorithms: data structures; geometric algorithms; graph algorithms; number theory; enumeration; parallel algorithms; and on-line algorithms. A comprehensive and representative selection of the algorithms in these areas is also given. This book should prove invaluable as a reference for researchers and professional programmers, as well as for students.

This volume presents the proceedings of the Fourth International Conference on Data Organization and Algorithms, FODO '93, held in Evanston, Illinois. FODO '93 reflects the maturing of the database field which has been driven by the enormous growth in the range of applications for database systems. The "non-standard" applications of the not-so-distant past, such as hypertext, multimedia, and scientific and engineering databases, now provide some of the central motivation for the advances in hardware technology and data organizations and algorithms. The volume contains 3 invited talks, 22 contributed papers, and 2 panel papers. The contributed papers are grouped into parts on multimedia, access methods, text

processing, query processing, industrial applications, physical storage, and new directions. A Concise, Comprehensive Approach to Java Programming Java Foundations is a comprehensive textbook for introductory programming sequences. The versatile layout supports a two- or three-semester schedule and introduces you to the world of programming--from the basics, to complex data structures. Inspired by the success of their highly successful text, Java Software Solutions, authors Lewis, DePasquale and Chase build a solid framework for lasting comprehension. The Fourth Edition is updated and revised to keep the content fully up-to-speed while incorporating changes from user feedback. One such revision is maintaining a section on Swing in addition to a separate chapter dedicated to JavaFX. Although JavaFX is slated to replace Swing as the main graphics package in Java, the large amount of existing Swing code will continue to make it relevant for some time to come. The overall flow of the text is redesigned for intuitive progression through programming discussions and problem solving.

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This book provides a comprehensive overview of the field of pattern mining with evolutionary algorithms. To do so, it covers formal definitions about patterns, patterns mining, type of patterns and the usefulness of patterns in the knowledge discovery process. As it is described within the book, the discovery process suffers from both high runtime and memory requirements, especially when high dimensional datasets are analyzed. To solve this issue, many pruning strategies have been developed. Nevertheless, with the growing interest in the storage of

information, more and more datasets comprise such a dimensionality that the discovery of interesting patterns becomes a challenging process. In this regard, the use of evolutionary algorithms for mining pattern enables the computation capacity to be reduced, providing sufficiently good solutions. This book offers a survey on evolutionary computation with particular emphasis on genetic algorithms and genetic programming. Also included is an analysis of the set of quality measures most widely used in the field of pattern mining with evolutionary algorithms. This book serves as a review of the most important evolutionary algorithms for pattern mining. It considers the analysis of different algorithms for mining different type of patterns and relationships between patterns, such as frequent patterns, infrequent patterns, patterns defined in a continuous domain, or even positive and negative patterns. A completely new problem in the pattern mining field, mining of exceptional relationships between patterns, is discussed. In this problem the goal is to identify patterns which distribution is exceptionally different from the distribution in the complete set of data records. Finally, the book deals with the subgroup discovery task, a method to identify a subgroup of interesting patterns that is related to a dependent variable or target attribute. This subgroup of patterns satisfies two essential conditions: interpretability and interestingness.

Fundamentals of Athletic Training, Fourth Edition, provides a clear understanding of the functions, skills, and activities that are involved in the work of certified athletic trainers. This book helps students evaluate the possibility of a career as a sports medicine professional.

Generally speaking, Biosignals refer to signals recorded from the human body. They can be either electrical (e. g. Electrocardiogram (ECG), Electroencephalogram (EEG), Electromyogram (EMG), etc.) or non-electrical (e. g. breathing, movements, etc.). The acquisition and processing of such signals play an important role in clinical routines. They are usually considered as major indicators which provide clinicians and physicians with useful information during diagnostic and monitoring processes. In some applications, the purpose is not necessarily medical. It may also be industrial. For instance, a real-time EEG system analysis can be used to control and analyze the vigilance of a car driver. In this case, the purpose of such a system basically consists of preventing crash risks. Furthermore, in certain other applications, a set of biosignals (e. g. ECG, respiratory signal, EEG, etc.) can be used to control or analyze human emotions. This is the case of the famous polygraph system, also known as the “lie detector”, the efficiency of which remains open to debate! Thus when one is dealing with biosignals, special attention must be given to their acquisition, their

analysis and their processing capabilities which constitute the final stage preceding the clinical diagnosis. Naturally, the diagnosis is based on the information provided by the processing system.

The only book to provide a unified view of the interplay between computational number theory and cryptography Computational number theory and modern cryptography are two of the most important and fundamental research fields in information security. In this book, Song Y. Yang combines knowledge of these two critical fields, providing a unified view of the relationships between computational number theory and cryptography. The author takes an innovative approach, presenting mathematical ideas first, thereupon treating cryptography as an immediate application of the mathematical concepts. The book also presents topics from number theory, which are relevant for applications in public-key cryptography, as well as modern topics, such as coding and lattice based cryptography for post-quantum cryptography. The author further covers the current research and applications for common cryptographic algorithms, describing the mathematical problems behind these applications in a manner accessible to computer scientists and engineers. Makes mathematical problems accessible to computer scientists and engineers by showing their immediate application Presents topics from number theory relevant for public-key

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This Fourth Edition introduces the latest theory and applications in optimization. It emphasizes constrained optimization, beginning with a substantial treatment of linear programming and then proceeding to convex analysis, network flows, integer programming, quadratic programming, and convex optimization. Readers will discover a host of practical business applications as well as non-business applications. Topics are clearly developed with many numerical examples worked out in detail. Specific examples and concrete algorithms precede more abstract topics. With its focus on solving practical problems, the book features free C programs to implement the major algorithms covered, including the two-phase simplex method, primal-dual simplex method, path-following interior-point method, and homogeneous self-dual methods. In addition, the author provides online JAVA applets that illustrate various pivot rules and variants of the simplex method, both for linear programming and for network flows. These C programs and JAVA tools can be found on the book's website. The website also includes new online instructional tools and exercises.

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.

The thoroughly updated 4th edition of the book Current Affairs 2019 captures the Most Important Events, Issues, Ideas & People of 2018 in a very lucid and student friendly manner. It is essential for aspirants to keep themselves updated as just knowing things can get them more marks in such exams. Moreover Current Affairs prove to be very important tool to handle GD and PI. It comes in handy for the aspirants of UPSC, SSC, Banking, Insurance, Railways, Engg. Services and AFCAT etc. Infographics, Charts and MindMaps have facilitated information quickly and clearly. The information provided is in line with the analysis of previous years' competitive exams papers which will help aspirants update on all happenings across India and the world.

Fundamental data structures in a consistent object-oriented framework Now revised to reflect the innovations of Java 5.0, Goodrich and Tamassia's Fourth Edition of Data Structures and Algorithms in Java continues to offer accessible coverage of fundamental data structures, using a consistent object-oriented framework. The authors provide intuition, description, and analysis of fundamental data structures and algorithms. Numerous illustrations, web-based animations, and simplified mathematical

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analyses justify important analytical concepts. Key Features of the Fourth Edition: *

- * Updates to Java 5.0 include new sections on generics and other Java 5.0 features, and revised code fragments, examples, and case studies to conform to Java 5.0. *
- * Hundreds of exercises, including many that are new to this edition, promote creativity and help readers learn how to think like programmers and reinforce important concepts.
- * New case studies illustrate topics such as web browsers, board games, and encryption. *
- * A new early chapter covers Arrays, Linked Lists, and Recursion. *
- * A new final chapter on Memory covers memory management and external memory data structures and algorithms. *
- * Java code examples are used extensively, with source code provided on the website. *
- * Online animations and effective in-text art illustrate data structures and algorithms in a clear, visual manner. Access additional resources on the web www.wiley.com/college/goodrich): *
- * Java source code for all examples in the book *
- * Animations *
- * Library (net.datastructures) of Java constructs used in the book *
- * Problems database and search engine *
- * Student hints to all exercises in the book *
- * Instructor resources, including solutions to selected exercises *
- * Lecture slides

A comprehensive overview of environmental research and its applications...

Environmental research covers the development and application of quantitative methods in the environmental sciences. It provides essential tools for understanding, predicting, and controlling the impacts of agents, both man-made and natural, which affect the environment. Basic and applied research in this area covers a broad range of topics.

Primary among these are the quantitative sciences, such as statistics, probability and applied mathematics, chemometrics, and econometrics. Applications are also important, for example in, ecology and environmental biology, public health, atmospheric science, geology, engineering, risk management, and regulatory/governmental policy amongst others. * Divided into 12 sections, the Encyclopedia brings together over 600 detailed articles which have been carefully selected and reviewed through the collaborative efforts of the Editors-in-Chief and the appropriate Section Editor * Presented in alphabetical order all the articles will include an explanatory introduction, extensive cross-referencing and an up-to-date bibliography providing literature references for further reading. Presenting state of the art information in a readable, highly accessible style, the scope and coverage provided by the Encyclopedia of Environmetrics will ensure its place as the landmark reference for the many scientists, educators, and decision-makers working across this multidisciplinary field. An essential reference tool for university libraries, research laboratories, government institutions and consultancies concerned with the environmental sciences, the Encyclopedia of Environmetrics brings together for the first time, comprehensive coverage of the full range of topics, techniques and applications covered by this multidisciplinary field. There is currently no central reference source which addresses the needs of this multidisciplinary community. This new Encyclopedia will fill this gap by providing a comprehensive source of relevant fundamental concepts in environmetric

research, development and applications for statisticians, mathematicians, economists, environmentalists, ecologist, government officials and policy makers.

This book explores internet applications in which a crucial role is played by classification, such as spam filtering, recommender systems, malware detection, intrusion detection and sentiment analysis. It explains how such classification problems can be solved using various statistical and machine learning methods, including K nearest neighbours, Bayesian classifiers, the logit method, discriminant analysis, several kinds of artificial neural networks, support vector machines, classification trees and other kinds of rule-based methods, as well as random forests and other kinds of classifier ensembles. The book covers a wide range of available classification methods and their variants, not only those that have already been used in the considered kinds of applications, but also those that have the potential to be used in them in the future. The book is a valuable resource for post-graduate students and professionals alike.

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Designed to provide engineers with quick access to current and practical information on the dynamics of structure and foundation, this 2-volume reference work is intended for engineers involved with earthquake or dynamic analysis, or the design of machine foundations in the oil, gas, and energy sector. Whereas the first volume deals with the fundamentals, this volume is dedicated to applications in various civil engineering

problems, related to dynamic soil-structure interaction, machine foundation and earthquake engineering. It presents innovative, easy-to-apply and practical solutions to various problems and difficulties a design engineer will encounter. It allows quick access to targeted information; it includes a wealth of case studies and also examines geotechnical considerations with regard to dynamic soil-structure interaction. This book is concentrated on three major application areas: dynamic soil-structure interaction (DSSI), the analysis and design of machine foundations, and on the analytical and design concepts for earthquake engineering. Vol. 1 (ISBN 9780415471459) focusses on the theory and fundamentals book.

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.

Recognizing that robust decision making is vital in risk management, this book provides concepts and algorithms for computing the best decision in view of the worst-case scenario. The main tool used is minimax, which ensures robust policies with guaranteed optimal performance that will improve further if the worst case is not realized. The applications considered are drawn from finance, but the design and algorithms presented are equally applicable to problems of economic policy, engineering design, and other areas of decision making. Critically, worst-case design addresses not only Armageddon-type uncertainty. Indeed, the determination of the worst case becomes nontrivial when faced with numerous--possibly infinite--and reasonably likely rival scenarios. Optimality does not depend on any single scenario but on all the scenarios under consideration. Worst-case optimal decisions provide guaranteed optimal performance for systems operating within the specified scenario range indicating the uncertainty. The noninferiority of minimax solutions--which also offer the possibility of multiple maxima--ensures this optimality. Worst-case design is not intended to necessarily replace expected value optimization when the underlying uncertainty is stochastic. However, wise decision making requires the justification of policies based on expected value optimization in view of the worst-case scenario. Conversely, the cost of the assured performance provided by robust worst-case decision making needs to be evaluated relative to optimal expected values. Written for postgraduate students and researchers engaged in optimization, engineering design, economics, and finance, this book will also be invaluable to practitioners in risk management.

This is the of the programming language-independent text that helped establish computer

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algorithms as a discipline of computer science. The text incorporates the latest research and state-of-the-art applications, bringing this classic to the forefront of modern computer science education. A major strength of this text is its focus on design techniques rather than on individual algorithms. This book is appropriate as a core text for upper-and graduate-level courses in algorithms.

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