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Algebra - Aigli Papantonopoulou 2002

For a one-semester course covering groups and rings or a two-semester course in Abstract Algebra. This text provides thorough coverage of the main topics of abstract algebra while offering nearly 100 pages of applications. A repetition and examples first approach introduces students to mathematical rigor and abstraction while teaching them the basic notions and results of modern algebra.

Algorithmic Puzzles - Anany Levitin 2011-10-14

Algorithmic puzzles are puzzles involving well-defined procedures for solving problems. This book will provide an enjoyable and accessible introduction to algorithmic puzzles that will develop the reader's algorithmic thinking. The first part of this book is a tutorial on algorithm design strategies and analysis techniques. Algorithm design strategies — exhaustive search, backtracking, divide-and-conquer and a few others — are general approaches to designing step-by-step instructions for solving problems. Analysis techniques are methods for investigating such procedures to answer questions about the ultimate result of the procedure or how many steps are executed before the procedure stops. The discussion is an elementary level, with puzzle examples, and requires neither programming nor mathematics beyond a secondary school level. Thus, the tutorial provides a gentle and entertaining introduction to main ideas in high-level algorithmic problem solving. The

second and main part of the book contains 150 puzzles, from centuries-old classics to newcomers often asked during job interviews at computing, engineering, and financial companies. The puzzles are divided into three groups by their difficulty levels. The first fifty puzzles in the Easier Puzzles section require only middle school mathematics. The sixty puzzle of average difficulty and forty harder puzzles require just high school mathematics plus a few topics such as binary numbers and simple recurrences, which are reviewed in the tutorial. All the puzzles are provided with hints, detailed solutions, and brief comments. The comments deal with the puzzle origins and design or analysis techniques used in the solution. The book should be of interest to puzzle lovers, students and teachers of algorithm courses, and persons expecting to be given puzzles during job interviews.

Algorithm Design - Michael T. Goodrich 2001-10-15

Michael Goodrich and Roberto Tamassia, authors of the successful, Data Structures and Algorithms in Java, 2/e, have written Algorithm Engineering, a text designed to provide a comprehensive introduction to the design, implementation and analysis of computer algorithms and data structures from a modern perspective. This book offers theoretical analysis techniques as well as algorithmic design patterns and experimental methods for the engineering of algorithms. Market: Computer Scientists; Programmers.

Introduction to Algorithms, third edition - Thomas H. Cormen
2009-07-31

The latest edition of the essential text and professional reference, with substantial new material on such topics as vEB trees, multithreaded algorithms, dynamic programming, and edge-based flow. Some books on algorithms are rigorous but incomplete; others cover masses of material but lack rigor. *Introduction to Algorithms* uniquely combines rigor and comprehensiveness. The book covers a broad range of algorithms in depth, yet makes their design and analysis accessible to all levels of readers. Each chapter is relatively self-contained and can be used as a unit of study. The algorithms are described in English and in a pseudocode designed to be readable by anyone who has done a little programming. The explanations have been kept elementary without sacrificing depth of coverage or mathematical rigor. The first edition became a widely used text in universities worldwide as well as the standard reference for professionals. The second edition featured new chapters on the role of algorithms, probabilistic analysis and randomized algorithms, and linear programming. The third edition has been revised and updated throughout. It includes two completely new chapters, on van Emde Boas trees and multithreaded algorithms, substantial additions to the chapter on recurrence (now called "Divide-and-Conquer"), and an appendix on matrices. It features improved treatment of dynamic programming and greedy algorithms and a new notion of edge-based flow in the material on flow networks. Many exercises and problems have been added for this edition. The international paperback edition is no longer available; the hardcover is available worldwide.

[The Algorithm Design Manual](#) - Steven S Skiena 2009-04-05

This newly expanded and updated second edition of the best-selling classic continues to take the "mystery" out of designing algorithms, and analyzing their efficacy and efficiency. Expanding on the first edition, the book now serves as the primary textbook of choice for algorithm design courses while maintaining its status as the premier practical reference guide to algorithms for programmers, researchers, and students. The reader-friendly *Algorithm Design Manual* provides straightforward

access to combinatorial algorithms technology, stressing design over analysis. The first part, *Techniques*, provides accessible instruction on methods for designing and analyzing computer algorithms. The second part, *Resources*, is intended for browsing and reference, and comprises the catalog of algorithmic resources, implementations and an extensive bibliography. NEW to the second edition:

- Doubles the tutorial material and exercises over the first edition
- Provides full online support for lecturers, and a completely updated and improved website component with lecture slides, audio and video
- Contains a unique catalog identifying the 75 algorithmic problems that arise most often in practice, leading the reader down the right path to solve them
- Includes several NEW "war stories" relating experiences from real-world applications
- Provides up-to-date links leading to the very best algorithm implementations available in C, C++, and Java

Graph Algorithms - Mark Needham 2019-05-16

Discover how graph algorithms can help you leverage the relationships within your data to develop more intelligent solutions and enhance your machine learning models. You'll learn how graph analytics are uniquely suited to unfold complex structures and reveal difficult-to-find patterns lurking in your data. Whether you are trying to build dynamic network models or forecast real-world behavior, this book illustrates how graph algorithms deliver value—from finding vulnerabilities and bottlenecks to detecting communities and improving machine learning predictions. This practical book walks you through hands-on examples of how to use graph algorithms in Apache Spark and Neo4j—two of the most common choices for graph analytics. Also included: sample code and tips for over 20 practical graph algorithms that cover optimal pathfinding, importance through centrality, and community detection. Learn how graph analytics vary from conventional statistical analysis Understand how classic graph algorithms work, and how they are applied Get guidance on which algorithms to use for different types of questions Explore algorithm examples with working code and sample datasets from Spark and Neo4j See how connected feature extraction can increase machine learning accuracy and precision Walk through creating an ML workflow for link

prediction combining Neo4j and Spark

Data Mining the Web - Zdravko Markov 2007-04-06

This book introduces the reader to methods of data mining on the web, including uncovering patterns in web content (classification, clustering, language processing), structure (graphs, hubs, metrics), and usage (modeling, sequence analysis, performance).

A Programmer's Companion to Algorithm Analysis - Ernst L. Leiss 2006-09-26

Until now, no other book examined the gap between the theory of algorithms and the production of software programs. Focusing on practical issues, A Programmer's Companion to Algorithm Analysis carefully details the transition from the design and analysis of an algorithm to the resulting software program. Consisting of two main complementary

Introduction to the Design and Analysis of Algorithms - Anany Levitin 2014-10-07

Based on a new classification of algorithm design techniques and a clear delineation of analysis methods, Introduction to the Design and Analysis of Algorithms presents the subject in a coherent and innovative manner. Written in a student-friendly style, the book emphasises the understanding of ideas over excessively formal treatment while thoroughly covering the material required in an introductory algorithms course. Popular puzzles are used to motivate students' interest and strengthen their skills in algorithmic problem solving. Other learning-enhancement features include chapter summaries, hints to the exercises, and a detailed solution manual. The full text downloaded to your computer With eBooks you can: search for key concepts, words and phrases make highlights and notes as you study share your notes with friends eBooks are downloaded to your computer and accessible either offline through the Bookshelf (available as a free download), available online and also via the iPad and Android apps. Upon purchase, you'll gain instant access to this eBook. Time limit The eBooks products do not have an expiry date. You will continue to access your digital ebook products whilst you have your Bookshelf installed.

Introduction to Algorithms - Udi Manber 1995-12

Design of Fluid Thermal Systems - William S. Janna 2009

This book is designed to serve senior-level engineering students taking a capstone design course in fluid and thermal systems design. It is built from the ground up with the needs and interests of practicing engineers in mind; the emphasis is on practical applications. The book begins with a discussion of design methodology, including the process of bidding to obtain a project, and project management techniques. The text continues with an introductory overview of fluid thermal systems (a pump and pumping system, a household air conditioner, a baseboard heater, a water slide, and a vacuum cleaner are among the examples given), and a review of the properties of fluids and the equations of fluid mechanics. The text then offers an in-depth discussion of piping systems, including the economics of pipe size selection. Janna examines pumps (including net positive suction head considerations) and piping systems. He provides the reader with the ability to design an entire system for moving fluids that is efficient and cost-effective. Next, the book provides a review of basic heat transfer principles, and the analysis of heat exchangers, including double pipe, shell and tube, plate and frame cross flow heat exchangers. Design considerations for these exchangers are also discussed. The text concludes with a chapter of term projects that may be undertaken by teams of students.

Twenty Lectures on Algorithmic Game Theory - Tim Roughgarden 2016-08-30

Computer science and economics have engaged in a lively interaction over the past fifteen years, resulting in the new field of algorithmic game theory. Many problems that are central to modern computer science, ranging from resource allocation in large networks to online advertising, involve interactions between multiple self-interested parties. Economics and game theory offer a host of useful models and definitions to reason about such problems. The flow of ideas also travels in the other direction, and concepts from computer science are increasingly important in economics. This book grew out of the author's Stanford University course

on algorithmic game theory, and aims to give students and other newcomers a quick and accessible introduction to many of the most important concepts in the field. The book also includes case studies on online advertising, wireless spectrum auctions, kidney exchange, and network management.

Applied Combinatorics - Fred Roberts 2009-06-03

Now with solutions to selected problems, Applied Combinatorics, Second Edition presents the tools of combinatorics from an applied point of view. This bestselling textbook offers numerous references to the literature of combinatorics and its applications that enable readers to delve more deeply into the topics. After introducing fundamental counting

Learning the ABC's with Shujaa Farmer - Muta El-Amin 2021-09-19

A fact based information source for children. ABC Book using plants as the subject/images to teach children how to pronounce words. Teaching guide for children using art, literature, and images.

Introduction to Enumerative and Analytic Combinatorics - Miklos Bona 2015-09-18

Introduction to Enumerative and Analytic Combinatorics fills the gap between introductory texts in discrete mathematics and advanced graduate texts in enumerative combinatorics. The book first deals with basic counting principles, compositions and partitions, and generating functions. It then focuses on the structure of permutations, graph enumeration, and extremal combinatorics. Lastly, the text discusses supplemental topics, including error-correcting codes, properties of sequences, and magic squares. Strengthening the analytic flavor of the book, this Second Edition: Features a new chapter on analytic combinatorics and new sections on advanced applications of generating functions Demonstrates powerful techniques that do not require the residue theorem or complex integration Adds new exercises to all chapters, significantly extending coverage of the given topics Introduction to Enumerative and Analytic Combinatorics, Second Edition makes combinatorics more accessible, increasing interest in this rapidly expanding field. Outstanding Academic Title of the Year, Choice magazine, American Library Association.

Algorithms and Data Structures for External Memory - Jeffrey Scott Vitter 2008

Describes several useful paradigms for the design and implementation of efficient external memory (EM) algorithms and data structures. The problem domains considered include sorting, permuting, FFT, scientific computing, computational geometry, graphs, databases, geographic information systems, and text and string processing.

Programming Challenges - Steven S Skiena 2006-04-18

There are many distinct pleasures associated with computer programming. Craftsmanship has its quiet rewards, the satisfaction that comes from building a useful object and making it work. Excitement arrives with the flash of insight that cracks a previously intractable problem. The spiritual quest for elegance can turn the hacker into an artist. There are pleasures in parsimony, in squeezing the last drop of performance out of clever algorithms and tight coding. The games, puzzles, and challenges of problems from international programming competitions are a great way to experience these pleasures while improving your algorithmic and coding skills. This book contains over 100 problems that have appeared in previous programming contests, along with discussions of the theory and ideas necessary to attack them. Instant online grading for all of these problems is available from two WWW robot judging sites. Combining this book with a judge gives an exciting new way to challenge and improve your programming skills. This book can be used for self-study, for teaching innovative courses in algorithms and programming, and in training for international competition. The problems in this book have been selected from over 1,000 programming problems at the Universidad de Valladolid online judge. The judge has ruled on well over one million submissions from 27,000 registered users around the world to date. We have taken only the best of the best, the most fun, exciting, and interesting problems available.

Algorithms in a Nutshell - George T. Heineman 2008-10-14

Creating robust software requires the use of efficient algorithms, but programmers seldom think about them until a problem occurs.

Algorithms in a Nutshell describes a large number of existing algorithms for solving a variety of problems, and helps you select and implement the right algorithm for your needs -- with just enough math to let you understand and analyze algorithm performance. With its focus on application, rather than theory, this book provides efficient code solutions in several programming languages that you can easily adapt to a specific project. Each major algorithm is presented in the style of a design pattern that includes information to help you understand why and when the algorithm is appropriate. With this book, you will: Solve a particular coding problem or improve on the performance of an existing solution Quickly locate algorithms that relate to the problems you want to solve, and determine why a particular algorithm is the right one to use Get algorithmic solutions in C, C++, Java, and Ruby with implementation tips Learn the expected performance of an algorithm, and the conditions it needs to perform at its best Discover the impact that similar design decisions have on different algorithms Learn advanced data structures to improve the efficiency of algorithms With Algorithms in a Nutshell, you'll learn how to improve the performance of key algorithms essential for the success of your software applications.

Algorithms - Panos Louridas 2020-08-18

In the tradition of Real World Algorithms: A Beginner's Guide, Panos Louridas is back to introduce algorithms in an accessible manner, utilizing various examples to explain not just what algorithms are but how they work. Digital technology runs on algorithms, sets of instructions that describe how to do something efficiently. Application areas range from search engines to tournament scheduling, DNA sequencing, and machine learning. Arguing that every educated person today needs to have some understanding of algorithms and what they do, in this volume in the MIT Press Essential Knowledge series, Panos Louridas offers an introduction to algorithms that is accessible to the nonspecialist reader. Louridas explains not just what algorithms are but also how they work, offering a wide range of examples and keeping mathematics to a minimum.

Algorithms - Jeff Erickson 2019-06-13

Algorithms are the lifeblood of computer science. They are the machines that proofs build and the music that programs play. Their history is as old as mathematics itself. This textbook is a wide-ranging, idiosyncratic treatise on the design and analysis of algorithms, covering several fundamental techniques, with an emphasis on intuition and the problem-solving process. The book includes important classical examples, hundreds of battle-tested exercises, far too many historical digressions, and exactly four typos. Jeff Erickson is a computer science professor at the University of Illinois, Urbana-Champaign; this book is based on algorithms classes he has taught there since 1998.

Computer Vision: A Modern Approach - David A. Forsyth 2015-01-23

Appropriate for upper-division undergraduate- and graduate-level courses in computer vision found in departments of Computer Science, Computer Engineering and Electrical Engineering. This textbook provides the most complete treatment of modern computer vision methods by two of the leading authorities in the field. This accessible presentation gives both a general view of the entire computer vision enterprise and also offers sufficient detail for students to be able to build useful applications. Students will learn techniques that have proven to be useful by first-hand experience and a wide range of mathematical methods.

Advanced Data Structures - Peter Brass 2019-05-16

Advanced Data Structures presents a comprehensive look at the ideas, analysis, and implementation details of data structures as a specialized topic in applied algorithms. Data structures are how data is stored within a computer, and how one can go about searching for data within. This text examines efficient ways to search and update sets of numbers, intervals, or strings by various data structures, such as search trees, structures for sets of intervals or piece-wise constant functions, orthogonal range search structures, heaps, union-find structures, dynamization and persistence of structures, structures for strings, and hash tables. This is the first volume to show data structures as a crucial algorithmic topic, rather than relegating them as trivial material used to illustrate object-oriented programming methodology, filling a void in the

ever-increasing computer science market. Numerous code examples in C and more than 500 references make *Advanced Data Structures* an indispensable text. Numerous code examples in C and more than 500 references make *Advanced Data Structures* an indispensable text. [The Design and Analysis of Computer Algorithms](#) - Alfred V. Aho 1974-09

[If Hemingway Wrote JavaScript](#) - Angus Croll 2014-10-14

What if William Shakespeare were asked to generate the Fibonacci series or Jane Austen had to write a factorial program? In *If Hemingway Wrote JavaScript*, author Angus Croll imagines short JavaScript programs as written by famous wordsmiths. The result is a peculiar and charming combination of prose, poetry, and programming. The best authors are those who obsess about language—and the same goes for JavaScript developers. To master either craft, you must experiment with language to develop your own style, your own idioms, and your own expressions. To that end, *If Hemingway Wrote JavaScript* playfully bridges the worlds of programming and literature for the literary geek in all of us. Featuring original artwork by Miran Lipovača.

[Pearls of Functional Algorithm Design](#) - Richard Bird 2010-09-16

Richard Bird takes a radical approach to algorithm design, namely, design by calculation. These 30 short chapters each deal with a particular programming problem drawn from sources as diverse as games and puzzles, intriguing combinatorial tasks, and more familiar areas such as data compression and string matching. Each pearl starts with the statement of the problem expressed using the functional programming language Haskell, a powerful yet succinct language for capturing algorithmic ideas clearly and simply. The novel aspect of the book is that each solution is calculated from an initial formulation of the problem in Haskell by appealing to the laws of functional programming. *Pearls of Functional Algorithm Design* will appeal to the aspiring functional programmer, students and teachers interested in the principles of algorithm design, and anyone seeking to master the techniques of reasoning about programs in an equational style.

[Networks, Crowds, and Markets](#) - David Easley 2010-07-19

Are all film stars linked to Kevin Bacon? Why do the stock markets rise and fall sharply on the strength of a vague rumour? How does gossip spread so quickly? Are we all related through six degrees of separation? There is a growing awareness of the complex networks that pervade modern society. We see them in the rapid growth of the Internet, the ease of global communication, the swift spread of news and information, and in the way epidemics and financial crises develop with startling speed and intensity. This introductory book on the new science of networks takes an interdisciplinary approach, using economics, sociology, computing, information science and applied mathematics to address fundamental questions about the links that connect us, and the ways that our decisions can have consequences for others.

Real-World Algorithms - Panos Louridas 2017-03-17

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.

Algorithms -

Nonlinear Systems - Hassan K. Khalil 2013-11-01

For a first-year graduate-level course on nonlinear systems. It may also be used for self-study or reference by engineers and applied mathematicians. The text is written to build the level of mathematical sophistication from chapter to chapter. It has been reorganized into four parts: Basic analysis, Analysis of feedback systems, Advanced analysis, and Nonlinear feedback control.

A Course in Networks and Markets - Rafael Pass 2019-04-16

A graduate-level, mathematically rigorous introduction to strategic behavior in a networked world. This introductory graduate-level text uses tools from game theory and graph theory to examine the role of network structures and network effects in economic and information markets. The goal is for students to develop an intuitive and mathematically rigorous understanding of how strategic agents interact in a connected world. The text synthesizes some of the central results in the field while also simplifying their treatment to make them more accessible to nonexperts. Thus, students at the introductory level will gain an understanding of key ideas in the field that are usually only taught at the advanced graduate level. The book introduces basic concepts from game theory and graph theory as well as some fundamental algorithms for exploring graphs. These tools are then applied to analyze strategic interactions over social networks, to explore different types of markets and mechanisms for networks, and to study the role of beliefs and higher-level beliefs (beliefs about beliefs). Specific topics discussed include coordination and contagion on social networks, traffic networks, matchings and matching markets, exchange networks, auctions, voting, web search, models of

belief and knowledge, and how beliefs affect auctions and markets. An appendix offers a “Primer on Probability.” Mathematically rigorous, the text assumes a level of mathematical maturity (comfort with definitions and proofs) in the reader.

Foundations of Data Science - Avrim Blum 2020-01-23

This book provides an introduction to the mathematical and algorithmic foundations of data science, including machine learning, high-dimensional geometry, and analysis of large networks. Topics include the counterintuitive nature of data in high dimensions, important linear algebraic techniques such as singular value decomposition, the theory of random walks and Markov chains, the fundamentals of and important algorithms for machine learning, algorithms and analysis for clustering, probabilistic models for large networks, representation learning including topic modelling and non-negative matrix factorization, wavelets and compressed sensing. Important probabilistic techniques are developed including the law of large numbers, tail inequalities, analysis of random projections, generalization guarantees in machine learning, and moment methods for analysis of phase transitions in large random graphs. Additionally, important structural and complexity measures are discussed such as matrix norms and VC-dimension. This book is suitable for both undergraduate and graduate courses in the design and analysis of algorithms for data.

Field and Wave Electromagnetics - Cheng 1989-09

The Top Ten Algorithms in Data Mining - Xindong Wu 2009-04-09

Identifying some of the most influential algorithms that are widely used in the data mining community, *The Top Ten Algorithms in Data Mining* provides a description of each algorithm, discusses its impact, and reviews current and future research. Thoroughly evaluated by independent reviewers, each chapter focuses on a particular algorithm and is written by either the original authors of the algorithm or world-class researchers who have extensively studied the respective algorithm. The book concentrates on the following important algorithms: C4.5, k-Means, SVM, Apriori, EM, PageRank, AdaBoost, kNN, Naive Bayes, and

CART. Examples illustrate how each algorithm works and highlight its overall performance in a real-world application. The text covers key topics—including classification, clustering, statistical learning, association analysis, and link mining—in data mining research and development as well as in data mining, machine learning, and artificial intelligence courses. By naming the leading algorithms in this field, this book encourages the use of data mining techniques in a broader realm of real-world applications. It should inspire more data mining researchers to further explore the impact and novel research issues of these algorithms.

Data-intensive Text Processing with MapReduce - Jimmy Lin 2010

Our world is being revolutionized by data-driven methods: access to large amounts of data has generated new insights and opened exciting new opportunities in commerce, science, and computing applications. Processing the enormous quantities of data necessary for these advances requires large clusters, making distributed computing paradigms more crucial than ever. MapReduce is a programming model for expressing distributed computations on massive datasets and an execution framework for large-scale data processing on clusters of commodity servers. The programming model provides an easy-to-understand abstraction for designing scalable algorithms, while the execution framework transparently handles many system-level details, ranging from scheduling to synchronization to fault tolerance. This book focuses on MapReduce algorithm design, with an emphasis on text processing algorithms common in natural language processing, information retrieval, and machine learning. We introduce the notion of MapReduce design patterns, which represent general reusable solutions to commonly occurring problems across a variety of problem domains. This book not only intends to help the reader "think in MapReduce", but also discusses limitations of the programming model as well. This volume is a printed version of a work that appears in the Synthesis Digital Library of Engineering and Computer Science. Synthesis Lectures provide concise, original presentations of important research and development topics, published quickly, in digital and print formats. For more information visit

www.morganclaypool.com

Algorithm Design - Jon Kleinberg 2012-02-28

This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. Algorithm Design introduces algorithms by looking at the real-world problems that motivate them. The book teaches students a range of design and analysis techniques for problems that arise in computing applications. The text encourages an understanding of the algorithm design process and an appreciation of the role of algorithms in the broader field of computer science. August 6, 2009 Author, Jon Kleinberg, was recently cited in the New York Times for his statistical analysis research in the Internet age.

Calculated Bets - Steven S. Skiena 2001-08-06

A story of using computer simulations and mathematical modeling techniques to predict the outcome of jai-alai matches and bet on them successfully.

Algorithm Design and Applications - Michael T. Goodrich 2014-10-27

Introducing a NEW addition to our growing library of computer science titles, Algorithm Design and Applications, by Michael T. Goodrich & Roberto Tamassia! Algorithms is a course required for all computer science majors, with a strong focus on theoretical topics. Students enter the course after gaining hands-on experience with computers, and are expected to learn how algorithms can be applied to a variety of contexts. This new book integrates application with theory. Goodrich & Tamassia believe that the best way to teach algorithmic topics is to present them in a context that is motivated from applications to uses in society, computer games, computing industry, science, engineering, and the internet. The text teaches students about designing and using algorithms, illustrating connections between topics being taught and their potential applications, increasing engagement.

Design and Analysis of Algorithms - Sandeep Sen 2019-05-23

The text covers important algorithm design techniques, such as greedy algorithms, dynamic programming, and divide-and-conquer, and gives applications to contemporary problems. Techniques including Fast

Fourier transform, KMP algorithm for string matching, CYK algorithm for context free parsing and gradient descent for convex function minimization are discussed in detail. The book's emphasis is on computational models and their effect on algorithm design. It gives insights into algorithm design techniques in parallel, streaming and memory hierarchy computational models. The book also emphasizes the role of randomization in algorithm design, and gives numerous applications ranging from data-structures such as skip-lists to dimensionality reduction methods.

Analysis of Algorithms - Jeffrey J. McConnell 2008

Data Structures & Theory of Computation

How to Think About Algorithms - Jeff Edmonds 2008-05-19

This textbook, for second- or third-year students of computer science, presents insights, notations, and analogies to help them describe and think about algorithms like an expert, without grinding through lots of formal proof. Solutions to many problems are provided to let students check their progress, while class-tested PowerPoint slides are on the web for anyone running the course. By looking at both the big picture and easy step-by-step methods for developing algorithms, the author guides students around the common pitfalls. He stresses paradigms such as loop invariants and recursion to unify a huge range of algorithms into a few meta-algorithms. The book fosters a deeper understanding of how and why each algorithm works. These insights are presented in a careful and clear way, helping students to think abstractly and preparing them for creating their own innovative ways to solve problems.