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This book presents a peer reviewed selection of extended versions of ten original papers that were presented at the 15th International Symposium on Computers in Education (SIIE 2013) held in Viseu,

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Portugal. The book provide a representative view of current Information and Communications Technology (ICT) educational research approaches in the Ibero-American context as well as internationally. It includes

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studies that range from elementary to higher education, from traditional to distance learning settings. It considers special needs and other inclusive issues, across a range of disciplines, using

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multiple and diverse perspectives and technologies to furnish detailed information on the latest trends in ICT and education globally. Design, development and evaluation of educational software; ICT

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*use and evaluation
methodologies; social web
and collaborative systems;
and learning communities are
some of the topics covered.
Richard Bird takes a radical
approach to algorithm
design, namely, design by*

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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

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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

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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

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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

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*about programs in an
equational style.*

*Here are the refereed
proceedings of the Second
International Workshop on
Parameterized and Exact
Computation, IWPEC 2006,
held in the context of the*

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*combined conference ALGO
2006. The book presents 23
revised full papers together
with 2 invited lectures.
Coverage includes research
in all aspects of
parameterized and exact
computation and complexity,*

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including new techniques for the design and analysis of parameterized and exact algorithms, parameterized complexity theory, and more. Analysis and Design of Algorithms. A Critical Comparison of Different

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Works on Algorithms

Computational Complexity

Algorithms in a Nutshell

Iterative Methods in

Combinatorial Optimization

**Computer science and economics
have engaged in a lively**

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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,

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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

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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

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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.

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Extends the primal-dual method to the setting of online algorithms, and shows its applicability to a wide variety of fundamental problems.

Every aspect of Elementary Statistics has been carefully

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crafted to help readers learn statistics. The Third Edition features many updates and revisions that place increased emphasis on interpretation of results and critical thinking over calculations. Chapter topics

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include probability, discrete probability distributions, normal probability distributions, confidence intervals, hypothesis testing, correlation and regression, chi-square tests and the f-distribution, and nonparametric

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tests. For readers who want a comprehensive, step-by-step, flexible introduction to statistics. Academic Paper from the year 2019 in the subject Computer Science - Theory, grade: 4.00, Atlantic International University,

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language: English, abstract: The paper presents an analytical exposition, a critical context, and an integrative conclusion on the six major text books on Algorithms design and analysis. Algorithms form the heart of Computer

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Science in general. An algorithm is simply a set of steps to accomplish or complete a task that is described precisely enough that a computer can run it. It is a sequence of unambiguous instructions for solving a problem,

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and is used for obtaining a required output for any legitimate input in a finite amount of time. Algorithms can be considered as procedural solutions to problems where the focus is on correctness and efficiency. The important

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problem types are sorting, searching, string processing, graph problems, combinatorial problems, geometric problems, and numerical problems.

The Top Ten Algorithms in Data Mining

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Elementary Statistics

Second International Workshop,
IWPEC 2006, Zürich, Switzerland,
September 13-15, 2006,

Proceedings

Algorithms

ICT in Education

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With the advent of approximation algorithms for NP-hard combinatorial optimization problems, several techniques from exact optimization such as the primal-dual method have proven their staying power

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and versatility. This book describes a simple and powerful method that is iterative in essence and similarly useful in a variety of settings for exact and approximate optimization. The authors highlight the

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commonality and uses of this method to prove a variety of classical polyhedral results on matchings, trees, matroids and flows. The presentation style is elementary enough to be accessible to anyone with exposure to basic linear

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**algebra and graph theory,
making the book suitable for
introductory courses in
combinatorial optimization at
the upper undergraduate and
beginning graduate levels.
Discussions of advanced
applications illustrate their**

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**potential for future
application in research in
approximation algorithms.
Identifying some of the most
influential algorithms that are
widely used in the data
mining community, The Top
Ten Algorithms in Data Mining**

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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

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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,

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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

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**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.**

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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

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and novel research issues of these algorithms.

New and classical results in computational complexity, including interactive proofs, PCP, derandomization, and quantum computation. Ideal for graduate students.

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Python Algorithms, Second Edition explains the Python approach to algorithm analysis and design. Written by Magnus Lie Hetland, author of Beginning Python, this book is sharply focused on classical algorithms, but it

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also gives a solid understanding of fundamental algorithmic problem-solving techniques. The book deals with some of the most important and challenging areas of programming and computer

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science in a highly readable manner. It covers both algorithmic theory and programming practice, demonstrating how theory is reflected in real Python programs. Well-known algorithms and data

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structures that are built into the Python language are explained, and the user is shown how to implement and evaluate others.

Algorithmic Puzzles

Picturing the World

Algorithm Design: Pearson

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**New International Edition
The Design and Analysis of
Computer Algorithms
The Programming Contest
Training Manual**

*Creating robust software requires the
use of efficient algorithms, but
programmers seldom think about them*

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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

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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

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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

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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

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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

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*the performance of key algorithms
essential for the success of your
software applications.*

*This newly expanded and updated
second edition of the best-selling
classic continues to take the "mystery"
out of designing algorithms, and*

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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,

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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

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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

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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

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*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*

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C, C++, and Java

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

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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

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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. This textbook, for second- or third-year

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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

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*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*

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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

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way, helping students to think abstractly and preparing them for creating their own innovative ways to solve problems.

Algorithm Design

Parameterized Algorithms

Parameterized and Exact Computation

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*Multiple and Inclusive Perspectives
Introduction To Algorithms*

Algorithms are the lifeblood of computer science. They are the machines that proofs build and the music that programs play. Their history

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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

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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

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computer science professor at the University of Illinois, Urbana-Champaign; this book is based on algorithms classes he has taught there since 1998.

Introducing a **NEW** addition to

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our growing library of
computer science titles,
Algorithm Design and
Applications, by Michael T.
Goodrich & Roberto
Tamassia! Algorithms is a
course required for all

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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

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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

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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

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connections between topics being taught and their potential applications, increasing engagement.

These are my lecture notes from CS681: Design and Analysis of Algorithms, a one-

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semester graduate course I taught at Cornell for three consecutive fall semesters from '88 to '90. The course serves a dual purpose: to cover core material in algorithms for graduate

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students in computer science preparing for their PhD qualifying exams, and to introduce theory students to some advanced topics in the design and analysis of algorithms. The material is

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thus a mixture of core and advanced topics. At first I meant these notes to supplement and not supplant a textbook, but over the three years they gradually took on a life of their own. In addition

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to the notes, I depended heavily on the texts • A. V. Aho, J. E. Hopcroft, and J. D. Ullman, The Design and Analysis of Computer Algorithms. Addison-Wesley, 1975. • M. R. Garey and D.

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S. Johnson, Computers and Intractability: A Guide to the Theory of NP-Completeness. w. H. Freeman, 1979. • R. E. Tarjan, Data Structures and Network Algorithms. SIAM Regional Conference Series in

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Applied Mathematics 44,
1983. and still recommend
them as excellent references.
Supply chain scheduling is a
relatively new research area
with less than 20 years of
history. It is an intersection

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of two traditional areas:
supply chain management and
scheduling. In this book, the
authors provide a
comprehensive coverage of
supply chain scheduling. The
book covers applications,

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solution algorithms for solving related problems, evaluation of supply chain conflicts, and models for encouraging cooperation between decision makers. Supply chain scheduling

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studies detailed scheduling issues within supply chains, as motivated by a variety of applications in the real world. Topics covered by the book include: Coordinated decision making in centralized supply

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chains, including integrated production and distribution scheduling, joint scheduling and product pricing, and coordinated subcontracting and scheduling. Coordination and competition issues in

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decentralized supply chains,
including conflict and
cooperation within scheduling
decisions made by different
parties in supply chains, and
both cooperative and non-
cooperative supply chain

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scheduling games. The book describes a variety of representative problems within each of these topics. The authors define these problems mathematically, describe corresponding

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applications, and introduce
solution methods for solving
each problem to improve
supply chain performance.
Foundations, Analysis, and
Internet Examples
Guide to Competitive

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Programming

Twenty Lectures on

Algorithmic Game Theory

Campbell Biology, Books a la

Carte Edition

The Design and Analysis of

Algorithms

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Focuses on the interplay between algorithm design and the underlying computational models. We live in a highly connected world with multiple self-interested agents interacting and myriad opportunities for conflict and cooperation. The goal of game

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theory is to understand these opportunities. This book presents a rigorous introduction to the mathematics of game theory without losing sight of the joy of the subject. This is done by focusing on theoretical highlights (e.g., at least six Nobel Prize

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winning results are developed from scratch) and by presenting exciting connections of game theory to other fields such as computer science (algorithmic game theory), economics (auctions and matching markets), social choice (voting theory),

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biology (signaling and evolutionary stability), and learning theory. Both classical topics, such as zero-sum games, and modern topics, such as sponsored search auctions, are covered. Along the way, beautiful mathematical tools used in game

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theory are introduced, including convexity, fixed-point theorems, and probabilistic arguments. The book is appropriate for a first course in game theory at either the undergraduate or graduate level, whether in mathematics, economics, computer science, or

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statistics. The importance of game-theoretic thinking transcends the academic setting—for every action we take, we must consider not only its direct effects, but also how it influences the incentives of others.

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The first edition won the award for Best 1990 Professional and Scholarly Book in Computer Science and Data Processing by the Association of American Publishers. There are books on algorithms that are rigorous but incomplete and others that cover

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masses of material but lack rigor.
Introduction to Algorithms
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.

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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

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elementary without sacrificing depth of coverage or mathematical rigor. The first edition became the standard reference for professionals and a widely used text in universities worldwide. The second edition features new chapters on the role

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of algorithms, probabilistic analysis and randomized algorithms, and linear programming, as well as extensive revisions to virtually every section of the book. In a subtle but important change, loop invariants are introduced early

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and used throughout the text to prove algorithm correctness.

Without changing the mathematical and analytic focus, the authors have moved much of the mathematical foundations material from Part I to an appendix and have included

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additional motivational material
at the beginning.

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

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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

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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

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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

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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

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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.

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Pearls of Functional Algorithm
Design

Pure & Applied

Introduction to Algorithms

Introduction to Algorithms, third
edition

Mastering Basic Algorithms in the
Python Language

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NOTE: This edition features the same content as the traditional text in a convenient, three-hole-punched, loose-leaf version. Books a la Carte also offer a great value--this format costs significantly less than a new textbook. The Eleventh Edition of the best-selling text Campbell BIOLOGY sets you on the

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path to success in biology through its clear and engaging narrative, superior skills instruction, and innovative use of art, photos, and fully integrated media resources to enhance teaching and learning. To engage you in developing a deeper understanding of biology, the Eleventh Edition challenges you to apply

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knowledge and skills to a variety of NEW! hands-on activities and exercises in the text and online. NEW! Problem-Solving Exercises challenge you to apply scientific skills and interpret data in the context of solving a real-world problem. NEW! Visualizing Figures and Visual Skills Questions provide practice

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interpreting and creating visual representations in biology. NEW! Content updates throughout the text reflect rapidly evolving research in the fields of genomics, gene editing technology (CRISPR), microbiomes, the impacts of climate change across the biological hierarchy, and more.

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Significant revisions have been made to Unit 8, Ecology, including a deeper integration of evolutionary principles. NEW! A virtual layer to the print text incorporates media references into the printed text to direct you towards content in the Study Area and eText that will help you prepare for class and succeed in

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exams--Videos, Animations, Get Ready for This Chapter, Figure Walkthroughs, Vocabulary Self-Quizzes, Practice Tests, MP3 Tutors, and Interviews. (Coming summer 2017). NEW! QR codes and URLs within the Chapter Review provide easy access to Vocabulary Self-Quizzes and Practice Tests for each chapter that

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can be used on smartphones, tablets, and computers.

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

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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

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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

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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

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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,

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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

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persons expecting to be given puzzles during job interviews.

This comprehensive textbook presents a clean and coherent account of most fundamental tools and techniques in Parameterized Algorithms and is a self-contained guide to the area. The book covers many of the recent developments

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of the field, including application of important separators, branching based on linear programming, Cut & Count to obtain faster algorithms on tree decompositions, algorithms based on representative families of matroids, and use of the Strong Exponential Time Hypothesis. A number of older results are

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revisited and explained in a modern and didactic way. The book provides a toolbox of algorithmic techniques. Part I is an overview of basic techniques, each chapter discussing a certain algorithmic paradigm. The material covered in this part can be used for an introductory course on fixed-parameter tractability.

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Part II discusses more advanced and specialized algorithmic ideas, bringing the reader to the cutting edge of current research. Part III presents complexity results and lower bounds, giving negative evidence by way of $W[1]$ -hardness, the Exponential Time Hypothesis, and kernelization lower bounds. All the

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results and concepts are introduced at a level accessible to graduate students and advanced undergraduate students. Every chapter is accompanied by exercises, many with hints, while the bibliographic notes point to original publications and related work.

There are many distinct pleasures

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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

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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

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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

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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

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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.

Design and Analysis of Algorithms

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How to Think About Algorithms
Foundations of Data Exchange
A Modern Approach
Algebra

The problem of exchanging data
between different databases with
different schemas is an area of

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immense importance.

Consequently data exchange has been one of the most active research topics in databases over the past decade. Foundational questions related to data exchange largely revolve around three key

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problems: how to build target solutions; how to answer queries over target solutions; and how to manipulate schema mappings themselves? The last question is also known under the name 'metadata management', since

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mappings represent metadata, rather than data in the database. In this book the authors summarize the key developments of a decade of research. Part I introduces the problem of data exchange via examples, both relational and XML;

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Part II deals with exchanging relational data; Part III focuses on exchanging XML data; and Part IV covers metadata management. This invaluable textbook presents a comprehensive introduction to modern competitive programming.

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The text highlights how competitive programming has proven to be an excellent way to learn algorithms, by encouraging the design of algorithms that actually work, stimulating the improvement of programming and debugging skills,

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and reinforcing the type of thinking required to solve problems in a competitive setting. The book contains many “folklore” algorithm design tricks that are known by experienced competitive programmers, yet which have

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previously only been formally discussed in online forums and blog posts. Topics and features: reviews the features of the C++ programming language, and describes how to create efficient algorithms that can quickly process

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large data sets; discusses sorting algorithms and binary search, and examines a selection of data structures of the C++ standard library; introduces the algorithm design technique of dynamic programming, and investigates

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elementary graph algorithms; covers such advanced algorithm design topics as bit-parallelism and amortized analysis, and presents a focus on efficiently processing array range queries; surveys specialized algorithms for trees, and discusses

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the mathematical topics that are relevant in competitive programming; examines advanced graph techniques, geometric algorithms, and string techniques; describes a selection of more advanced topics, including square

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root algorithms and dynamic programming optimization. This easy-to-follow guide is an ideal reference for all students wishing to learn algorithms, and practice for programming contests. Knowledge of the basics of programming is

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assumed, but previous background in algorithm design or programming contests is not necessary. Due to the broad range of topics covered at various levels of difficulty, this book is suitable for both beginners and more experienced readers.

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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

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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

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engineering of algorithms. Market:
Computer Scientists; Programmers.
August 6, 2009 Author, Jon
Kleinberg, was recently cited in the
New York Times for his statistical
analysis research in the Internet
age. Algorithm Design introduces

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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

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design process and an appreciation of the role of algorithms in the broader field of computer science. Learning and Improving Algorithms Through Contests
The Design of Competitive Online Algorithms Via a Primal-Dual

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Approach

Python Algorithms

The Design of Approximation

Algorithms

Algorithm Design and Applications

"Algorithm Design takes a
fresh approach to the

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algorithms course,
introducing algorithmic
ideas through the real-
world problems that
motivate them. In a clear,
direct style, Jon
Kleinberg and Eva Tardos

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teach students to analyze and define problems for themselves, and from this to recognize which design principles are appropriate for a given situation. The text encourages a greater

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understanding of the algorithm design process and an appreciation of the role of algorithms in the broader field of computer science." --Book Jacket.

"This textbook is designed

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to accompany a one- or two-semester course for advanced undergraduates or beginning graduate students in computer science and applied mathematics. - It gives an

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excellent introduction to the probabilistic techniques and paradigms used in the development of probabilistic algorithms and analyses. - It assumes only an elementary

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background in discrete mathematics and gives a rigorous yet accessible treatment of the material, with numerous examples and applications." --Jacket.
There has been an

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explosive growth in the field of combinatorial algorithms. These algorithms depend not only on results in combinatorics and especially in graph

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theory, but also on the development of new data structures and new techniques for analyzing algorithms. Four classical problems in network optimization are covered

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in detail, including a development of the data structures they use and an analysis of their running time. Data Structures and Network Algorithms attempts to provide the

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reader with both a practical understanding of the algorithms, described to facilitate their easy implementation, and an appreciation of the depth and beauty of the field of

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graph algorithms.

The latest edition of the essential text and professional reference, with substantial new material on such topics as vEB trees, multithreaded

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algorithms, dynamic programming, and edge-based flow. Some books on algorithms are rigorous but incomplete; others cover masses of material but lack rigor.

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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

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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

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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

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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

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algorithms, probabilistic analysis and randomized algorithms, and linear programming. The third edition has been revised and updated throughout. It includes two completely

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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

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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

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exercises and problems have been added for this edition. The international paperback edition is no longer available; the hardcover is available worldwide.

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A Creative Approach
Randomized Algorithms and
Probabilistic Analysis
The Algorithm Design
Manual
Game Theory, Alive
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Discrete optimization problems are everywhere, from traditional operations research planning (scheduling, facility location and network design); to computer science databases; to advertising

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issues in viral marketing. Yet most such problems are NP-hard; unless $P = NP$, there are no efficient algorithms to find optimal solutions. This book shows how to design approximation algorithms: efficient

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algorithms that find provably near-optimal solutions. The book is organized around central algorithmic techniques for designing approximation algorithms, including greedy and local search algorithms,

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dynamic programming, linear and semidefinite programming, and randomization. Each chapter in the first section is devoted to a single algorithmic technique applied to several different

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problems, with more sophisticated treatment in the second section. The book also covers methods for proving that optimization problems are hard to approximate. Designed as a textbook for graduate-level

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algorithm courses, it will also serve as a reference for researchers interested in the heuristic solution of discrete optimization problems.

For a one-semester course covering groups and rings or

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Systems

*Data Structures and Network
Algorithms*

A Contemporary Perspective