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with examples in JavaScript, Python, and Ruby. This new and revised second edition features new chapters on recursion, dynamic programming, and using Big O in your daily work. Use Big O notation to measure and articulate the efficiency of your code, and modify your algorithm to make it faster. Find out how your choice of arrays, linked lists, and hash tables can dramatically affect the code you write. Use recursion to solve tricky problems and create algorithms that run exponentially faster than the alternatives. Dig into advanced data structures such as binary trees and graphs to help scale specialized applications such as social networks and mapping software. You â€™ll even encounter a single keyword that can give your code a turbo boost. Practice your new skills with exercises in every chapter, along with detailed solutions. Use these techniques today to make your code faster and more scalable. Foundations of Algorithms Pearson

Understanding Cryptography Springer

Algorithms and data structures are much more than abstract concepts. Mastering them enables you to write code that runs faster and more efficiently, which is particularly important for today â€™s web and mobile apps. Take a practical approach to data structures and algorithms, with techniques and real-world scenarios that you can use in your daily production code,

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Are you looking for a deeper understanding of the Java™ programming language so that you can write code that is clearer, more correct, more robust, and more reusable? Look no further! *Effective Java™, Second Edition*, brings together seventy-eight indispensable programmer 's rules of thumb: working, best-practice solutions for the programming challenges you encounter every day. This highly anticipated new edition of the classic, Jolt Award-winning work has been thoroughly updated to cover Java SE 5 and Java SE 6 features introduced since the first edition. Bloch explores new design patterns and language idioms, showing you how to make the most of features ranging from generics to enums, annotations to autoboxing. Each chapter in the book consists of several “ items ” presented in the form of a short, standalone essay that provides specific advice, insight into Java platform subtleties, and outstanding code examples. The comprehensive descriptions and explanations for each item illuminate what to do, what not to do, and why. Highlights include: New coverage of generics, enums, annotations, autoboxing, the for-each loop, varargs, concurrency utilities, and much more Updated techniques and best practices on classic topics, including objects, classes, libraries, methods, and serialization How to avoid the traps and pitfalls of commonly misunderstood subtleties of the language Focus on the language and its most fundamental libraries: `java.lang`, `java.util`, and, to a lesser extent, `java.util.concurrent` and `java.io` Simply put, *Effective Java™, Second Edition*, presents the most practical, authoritative guidelines available for writing efficient, well-designed programs.

**How to Think About Algorithms** Cambridge University Press  
**LEARN HOW TO USE DATA STRUCTURES IN WRITING  
HIGH PERFORMANCE PYTHON PROGRAMS AND  
ALGORITHMS** This practical introduction to data structures and algorithms can help every programmer who wants to write more efficient software. Building on Robert Lafore's legendary Java-based guide, this book helps you understand exactly how data structures and algorithms operate. You'll learn how to efficiently

apply them with the enormously popular Python language and scale your code to handle today's big data challenges. Throughout, the authors focus on real-world examples, communicate key ideas with intuitive, interactive visualizations, and limit complexity and math to what you need to improve performance. Step-by-step, they introduce arrays, sorting, stacks, queues, linked lists, recursion, binary trees, 2-3-4 trees, hash tables, spatial data structures, graphs, and more. Their code examples and illustrations are so clear, you can understand them even if you're a near-beginner, or your experience is with other procedural or object-oriented languages. Build core computer science skills that take you beyond merely “writing code” Learn how data structures make programs (and programmers) more efficient See how data organization and algorithms affect how much you can do with today's, and tomorrow's, computing resources Develop data structure implementation skills you can use in any language Choose the best data structure(s) and algorithms for each programming problem—and recognize which ones to avoid *Data Structures & Algorithms in Python* is packed with examples, review questions, individual and team exercises, thought experiments, and longer programming projects. It's ideal for both self-study and classroom settings, and either as a primary text or as a complement to a more formal presentation.

*Introduction to Information Retrieval* McGraw-Hill Higher Education

This advanced graduate textbook gives an authoritative and insightful description of the major ideas and techniques of public key

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cryptography.

### Algorithms MIT Press

This book is Part I of the fourth edition of Robert Sedgewick and Kevin Wayne's *Algorithms*, the leading textbook on algorithms today, widely used in colleges and universities worldwide. Part I contains Chapters 1 through 3 of the book. The fourth edition of *Algorithms* surveys the most important computer algorithms currently in use and provides a full treatment of data structures and algorithms for sorting, searching, graph processing, and string processing -- including fifty algorithms every programmer should know. In this edition, new Java implementations are written in an accessible modular programming style, where all of the code is exposed to the reader and ready to use. The algorithms in this book represent a body of knowledge developed over the last 50 years that has become indispensable, not just for professional programmers and computer science students but for any student with interests in science, mathematics, and engineering, not to mention students who use computation in the liberal arts. The companion web site, [algs4.cs.princeton.edu](http://algs4.cs.princeton.edu) contains An online synopsis Full Java implementations Test data Exercises and answers Dynamic visualizations Lecture slides Programming assignments with checklists Links to related material The MOOC related to this book is accessible via the "Online Course" link at [algs4.cs.princeton.edu](http://algs4.cs.princeton.edu). The course offers more than 100 video lecture segments that are integrated with the text, extensive online assessments, and the large-scale discussion forums that have proven so valuable. Offered each fall and spring, this course regularly attracts tens of thousands of registrants. Robert Sedgewick and Kevin Wayne are developing a modern

approach to disseminating knowledge that fully embraces technology, enabling people all around the world to discover new ways of learning and teaching. By integrating their textbook, online content, and MOOC, all at the state of the art, they have built a unique resource that greatly expands the breadth and depth of the educational experience.

### **Introduction to Machine Learning** Wiley Global Education

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

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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

#### *Effective Java* Pragmatic Bookshelf

From the reviews: "This book offers a coherent treatment, at the graduate textbook level, of the field that has come to be known in the last decade or so as computational geometry. ... The book is well organized and lucidly written; a timely contribution by two founders of the field. It clearly demonstrates that computational geometry in the plane is now a fairly well-understood branch of computer science and mathematics. It also points the way to the solution of the more challenging problems in dimensions higher than two." #Mathematical Reviews#1 "... This remarkable book is a comprehensive and systematic study on research results obtained especially in the last ten years. The very clear presentation concentrates on basic ideas, fundamental combinatorial structures, and crucial algorithmic techniques. The plenty of results is cleverly organized following these guidelines and within the framework of some detailed case studies. A large number of figures and examples also aid the understanding of the material. Therefore, it can be highly recommended as an early graduate text but it should prove also to be essential to researchers and professionals in applied fields of computer-aided design, computer graphics, and robotics." #Biometrical Journal#2

#### *Data Structures and Algorithms in Python* OUP USA

This new edition provides a comprehensive, colorful, up-to-date, and accessible presentation of AI without sacrificing theoretical foundations. It includes numerous examples, applications, full color images, and human interest boxes to enhance student interest. New chapters on robotics and

machine learning are now included. Advanced topics cover neural nets, genetic algorithms, natural language processing, planning, and complex board games. A companion DVD is provided with resources, applications, and figures from the book. Numerous instructors' resources are available upon adoption. eBook Customers: Companion files are available for downloading with order number/proof of purchase by writing to the publisher at [info@merclearning.com](mailto:info@merclearning.com). FEATURES: • Includes new chapters on robotics and machine learning and new sections on speech understanding and metaphor in NLP • Provides a comprehensive, colorful, up to date, and accessible presentation of AI without sacrificing theoretical foundations • Uses numerous examples, applications, full color images, and human interest boxes to enhance student interest • Introduces important AI concepts e.g., robotics, use in video games, neural nets, machine learning, and more thorough practical applications • Features over 300 figures and color images with worked problems detailing AI methods and solutions to selected exercises • Includes DVD with resources, simulations, and figures from the book • Provides numerous instructors' resources, including: solutions to exercises, Microsoft PP slides, etc.

#### **Mathematics of Public Key Cryptography** Cengage Learning

This textbook, for second- or third-year students of computer science, presents insights, notations, and analogies to help them describe and think about algorithms

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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.

Artificial Intelligence Wiley Global Education

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.

*Grokking Algorithms* Mercury Learning and Information

For anyone who has ever wondered how computers solve problems, an engagingly written guide for nonexperts to the basics of computer algorithms. Have you ever wondered how your GPS can find the fastest way to your destination, selecting one route from seemingly countless possibilities in mere seconds? How your credit card account number is protected when you make a purchase over the Internet? The answer is algorithms. And how do these mathematical formulations translate themselves into your GPS, your laptop, or your smart phone? This book offers an engagingly written guide to the basics of computer algorithms. In *Algorithms Unlocked*, Thomas Cormen—coauthor of the leading college textbook on the subject—provides a general explanation, with limited mathematics, of how algorithms enable computers to solve

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problems. Readers will learn what computer algorithms are, how to describe them, and how to evaluate them. They will discover simple ways to search for information in a computer; methods for rearranging information in a computer into a prescribed order ("sorting"); how to solve basic problems that can be modeled in a computer with a mathematical structure called a "graph" (useful for modeling road networks, dependencies among tasks, and financial relationships); how to solve problems that ask questions about strings of characters such as DNA structures; the basic principles behind cryptography; fundamentals of data compression; and even that there are some problems that no one has figured out how to solve on a computer in a reasonable amount of time.

Algorithms Franklin Beedle & Associates

Artificial Intelligence: A Modern Approach offers the most comprehensive, up-to-date introduction to the theory and practice of artificial intelligence. Number one in its field, this textbook is ideal for one or two-semester, undergraduate or graduate-level courses in Artificial Intelligence.

**Algorithms for Decision Making** John Wiley & Sons

This practical text contains fairly "traditional" coverage of data structures with a clear and complete use of algorithm analysis, and some emphasis on file processing techniques as relevant to modern programmers. It fully integrates OO programming with these topics, as part of the detailed presentation of OO programming itself. Chapter topics include lists, stacks, and queues; binary and general trees; graphs; file processing and external sorting; searching; indexing; and limits to computation. For programmers who need a good reference on data structures.

An Introduction to the Analysis of Algorithms MIT Press

An extensively revised edition of a mathematically rigorous yet accessible introduction to algorithms.

*Problems on Algorithms* Cambridge University Press

Data Structures & Theory of Computation

**Problem Solving with Algorithms and Data Structures Using**

**Python** Springer Science & Business Media

The design and analysis of efficient data structures has long been recognized as a key component of the Computer Science curriculum. Goodrich, Tomassia and Goldwasser's approach to this classic topic is based on the object-oriented paradigm as the framework of choice for the design of data structures. For each ADT presented in the text, the authors provide an associated Java interface. Concrete data structures realizing the ADTs are provided as Java classes implementing the interfaces. The Java code implementing fundamental data structures in this book is organized in a single Java package, `net.datastructures`. This package forms a coherent library of data structures and algorithms in Java specifically designed for educational purposes in a way that is complimentary with the Java Collections Framework.

Guide to Competitive Programming Springer Science & Business Media

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

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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.

*Data Structures & Algorithms in Python* Simon and Schuster

This invaluable textbook presents a comprehensive introduction to modern competitive programming. 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, 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 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 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 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 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 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 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.

*Introduction To Algorithms* Addison-Wesley Professional  
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. 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.

*Network Flow Algorithms* "O'Reilly Media, Inc."

Discrete optimization problems are everywhere, from traditional operations research planning problems, such as scheduling, facility location, and network design; to computer science problems in

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databases; to advertising issues in viral marketing. Yet most such problems are NP-hard. Thus unless  $P = NP$ , there are no efficient algorithms to find optimal solutions to such problems. This book shows how to design approximation algorithms: efficient 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, dynamic programming, linear and semidefinite programming, and randomization. Each chapter in the first part of the book is devoted to a single algorithmic technique, which is then applied to several different problems. The second part revisits the techniques but offers more sophisticated treatments of them. The book also covers methods for proving that optimization problems are hard to approximate. Designed as a textbook for graduate-level algorithms courses, the book will also serve as a reference for researchers interested in the heuristic solution of discrete optimization problems.