



Randomized Algorithms

Michael Mitzenmacher, Eli Upfal



Randomized Algorithms:

Randomized Algorithms Rajeev Motwani,Prabhakar Raghavan,1995-08-25 For many applications a randomized algorithm is either the simplest algorithm available or the fastest or both This tutorial presents the basic concepts in the design and analysis of randomized algorithms The first part of the book presents tools from probability theory and probabilistic analysis that are recurrent in algorithmic applications Algorithmic examples are given to illustrate the use of each tool in a concrete setting In the second part of the book each of the seven chapters focuses on one important area of application of randomized algorithms data structures geometric algorithms graph algorithms number theory enumeration parallel algorithms and on line algorithms A comprehensive and representative selection of the algorithms in these areas is also given This book should prove invaluable as a reference for researchers and professional programmers as well as for students

Randomized Algorithms Rajeev Motwani,Prabhakar Raghavan,1995-08-25 This book presents basic tools from probability theory used in algorithmic applications with concrete examples

Randomized Algorithms for Analysis and Control of Uncertain Systems Roberto Tempo,Giuseppe Calafiore,Fabrizio Dabbene,2004-09-28 Moving on from earlier stochastic and robust control paradigms this book introduces the fundamentals of probabilistic methods in the analysis and design of uncertain systems The use of randomized algorithms guarantees a reduction in the computational complexity of classical robust control algorithms and in the conservativeness of methods like H infinity control Features self contained treatment explaining randomized algorithms from their genesis in the principles of probability theory to their use for robust analysis and controller synthesis comprehensive treatment of sample generation including consideration of the difficulties involved in obtaining independent and identically distributed samples applications in congestion control of high speed communications networks and the stability of quantized sampled data systems This monograph will be of interest to theorists concerned with robust and optimal control techniques and to all control engineers dealing with system uncertainties

Randomized Algorithms for Query Optimization Younkyung Cha Kang,1991

Randomized Algorithms: Approximation, Generation, and Counting Russ Bubley,2012-12-06 Randomized Algorithms discusses two problems of fine pedigree counting and generation both of which are of fundamental importance to discrete mathematics and probability When asking questions like How many are there and What does it look like on average of families of combinatorial structures answers are often difficult to find we can be blocked by seemingly intractable algorithms Randomized Algorithms shows how to get around the problem of intractability with the Markov chain Monte Carlo method as well as highlighting the method s natural limits It uses the technique of coupling before introducing path coupling a new technique which radically simplifies and improves upon previous methods in the area

Efficient Random Algorithms for Constrained Global and Convex Optimization Daniel Joseph Reaume,1997

[Design and Analysis of Randomized Algorithms](#) J. Hromkovic,2005-10-11 Randomness is a powerful phenomenon that can be harnessed to solve various problems in all areas of computer science Randomized

algorithms are often more efficient simpler and surprisingly also more reliable than their deterministic counterparts Computing tasks exist that require billions of years of computer work when solved using the fastest known deterministic algorithms but they can be solved using randomized algorithms in a few minutes with negligible error probabilities Introducing the fascinating world of randomness this book systematically teaches the main algorithm design paradigms foiling an adversary abundance of witnesses fingerprinting amplification and random sampling etc while also providing a deep insight into the nature of success in randomization Taking sufficient time to present motivations and to develop the reader s intuition while being rigorous throughout this text is a very effective and efficient introduction to this exciting field

Randomized Algorithms in Automatic Control and Data Mining Oleg Granichin,Zeev (Vladimir) Volkovich,Dvora Toledano-Kitai,2014-07-14 In the fields of data mining and control the huge amount of unstructured data and the presence of uncertainty in system descriptions have always been critical issues The book Randomized Algorithms in Automatic Control and Data Mining introduces the readers to the fundamentals of randomized algorithm applications in data mining especially clustering and in automatic control synthesis The methods proposed in this book guarantee that the computational complexity of classical algorithms and the conservativeness of standard robust control techniques will be reduced It is shown that when a problem requires brute force in selecting among options algorithms based on random selection of alternatives offer good results with certain probability for a restricted time and significantly reduce the volume of operations

Randomized Algorithms for the List Update Problem Yale University. Dept. of Computer Science,N. Reingold,J. Westbrook,1990 Abstract We prove upper and lower bounds on the competitiveness of randomized algorithms for the list update problem of Sleator and Tarjan We give a simple and elegant randomized algorithm BIT that is more competitive than the best possible deterministic algorithm Among randomized algorithms for request answer games BIT is the first that uses only a bounded number of random bits independent of the number of requests We also prove lower bounds on list update algorithms against oblivious and adaptive on line adversaries *Algorithms and Computation* Dingzhu Du,Xiang-Sun Zhang,1994 This volume is the proceedings of the fifth International Symposium on Algorithms and Computation ISAAC 94 held in Beijing China in August 1994 The 79 papers accepted for inclusion in the volume after a careful reviewing process were selected from a total of almost 200 submissions Besides many internationally renowned experts a number of excellent Chinese researchers present their results to the international scientific community for the first time here The volume covers all relevant theoretical and many applicational aspects of algorithms and computation PUBLISHER S WEBSITE

Approximation Algorithms for NP-hard Problems Dorit S. Hochbaum,1997 This is the first book to fully address the study of approximation algorithms as a tool for coping with intractable problems With chapters contributed by leading researchers in the field this book introduces unifying techniques in the analysis of approximation algorithms APPROXIMATION ALGORITHMS FOR NP HARD PROBLEMS is intended for computer scientists and operations researchers interested in

specific algorithm implementations as well as design tools for algorithms Among the techniques discussed the use of linear programming primal dual techniques in worst case analysis semidefinite programming computational geometry techniques randomized algorithms average case analysis probabilistically checkable proofs and inapproximability and the Markov Chain Monte Carlo method The text includes a variety of pedagogical features definitions exercises open problems glossary of problems index and notes on how best to use the book

Probability and Computing Michael Mitzenmacher, Eli Upfal, 2005-01-31 Randomization and probabilistic techniques play an important role in modern computer science with applications ranging from combinatorial optimization and machine learning to communication networks and secure protocols This 2005 textbook is designed to accompany a one or two semester course for advanced undergraduates or beginning graduate students in computer science and applied mathematics It gives an excellent introduction to the probabilistic techniques and paradigms used in the development of probabilistic algorithms and analyses It assumes only an elementary background in discrete mathematics and gives a rigorous yet accessible treatment of the material with numerous examples and applications The first half of the book covers core material including random sampling expectations Markov's inequality Chebyshev's inequality Chernoff bounds the probabilistic method and Markov chains The second half covers more advanced topics such as continuous probability applications of limited independence entropy Markov chain Monte Carlo methods and balanced allocations With its comprehensive selection of topics along with many examples and exercises this book is an indispensable teaching tool

Concentration of Measure for the Analysis of Randomized Algorithms Devdatt P. Dubhashi, Alessandro Panconesi, 2009-06-15 This book presents a coherent and unified account of classical and more advanced techniques for analyzing the performance of randomized algorithms

Transactions of the Society for Computer Simulation, 1998

Analysis and Parameter Selection for an Adaptive Random Search Algorithm Rajeeva Kumar, 2004

Proceedings of the Thirty-eighth Annual ACM Symposium on Theory of Computing ACM Special Interest Group for Algorithms and Computation Theory, 2006

Proceedings of the Fifth Israeli Symposium on Theory of Computing and Systems, June 17-19, 1997, Ramat-Gan, Israel, 1997 Annotation The proceedings from the June 1997 conference present preliminary reports of ongoing research featuring novel computing techniques across a variety of fields The 20 papers discuss the theoretical aspects of algorithms and data structures coding theory complexity theory computability and automata computational biology computational geometry computer communication computer vision cryptography and data security databases data compression distributed and parallel computing foundations of computer technology information retrieval logics of programs machine learning natural language processing program verification robotics semantics of programming languages and VLSI layout and design Lacks an index Annotation copyrighted by Book News Inc Portland OR

Proceedings, Twelfth Annual IEEE Conference on Computational Complexity, 1997

Algorithms in C Robert Sedgewick, 1998 Introduction Principles of algorithm analysis Elementary data structures

Abstract data types Recursion and trees Elementary sorting methods Quicksort Merging and mergesort Priority queues and
heapsort Radix sorting Special purpose sorts Symbol tables and BSTs Balanced trees Hashing Radix search External
searching Index *Experimental and Efficient Algorithms*, 2004

Unveiling the Power of Verbal Art: An Psychological Sojourn through **Randomized Algorithms**

In a global inundated with screens and the cacophony of instant transmission, the profound energy and psychological resonance of verbal artistry frequently disappear into obscurity, eclipsed by the constant onslaught of sound and distractions. Yet, nestled within the lyrical pages of **Randomized Algorithms**, a captivating perform of fictional elegance that pulses with raw emotions, lies an memorable trip waiting to be embarked upon. Penned by a virtuoso wordsmith, this exciting opus manuals visitors on a psychological odyssey, delicately revealing the latent possible and profound impact embedded within the complicated internet of language. Within the heart-wrenching expanse of this evocative examination, we shall embark upon an introspective exploration of the book is central subjects, dissect their captivating publishing type, and immerse ourselves in the indelible impression it leaves upon the depths of readers souls.

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