Computer And Intractability A Guide To The Theory Of Np Completeness

OSBORNE SADIE

Dynamic Programming Addison-Wesley Professional
Presenting a complementary perspective to standard books on algorithms, A Guide to Algorithm Design: Paradigms, Methods, and Complexity Analysis provides a roadmap for readers to determine the difficulty of an algorithmic problem by finding an optimal solution or proving complexity results. It gives a practical treatment of algorithmic complexity and guides readers in solving algorithmic problems. Divided into three parts, the book offers a comprehensive set of problems with solutions as well as in-depth case studies that demonstrate how to assess the complexity of a new problem. Part I helps readers understand the main design principles and design efficient algorithms. Part II covers polynomial reductions from NP-complete problems and approaches that go beyond NP-completeness. Part III supplies readers with tools and techniques to evaluate problem complexity, including how to determine which instances are polynomial and which are NP-hard. Drawing on the authors' classroom-tested material, this text takes readers step by step through the concepts and methods for analyzing algorithmic complexity. Through many problems and detailed examples, readers can investigate polynomial-time algorithms and NP-completeness and beyond.
Computing Handbook, Third Edition CRC Press
New and classical results in computational complexity, including interactive proofs, PCP, derandomization, and quantum computation. Ideal for graduate students.
Neural Network Design and the Complexity of Learning Cambridge University Press
Intractability is a growing concern across the cognitive sciences: while many models of cognition can describe and predict human behavior in the lab, it remains unclear how these models can scale to situations of real-world complexity. Cognition and Intractability is the first book to provide an accessible

introduction to computational complexity analysis and its application to questions of intractability in cognitive science. Covering both classical and parameterized complexity analysis, it introduces the mathematical concepts and proof techniques that can be used to test one's intuition of (in)tractability. It also describes how these tools can be applied to cognitive modeling to deal with intractability, and its ramifications, in a systematic way. Aimed at students and researchers in philosophy, cognitive neuroscience, psychology, artificial intelligence, and linguistics who want to build a firm understanding of intractability and its implications in their modeling work, it is an ideal resource for teaching or self-study.

Computational Complexity PHI Learning Pvt. Ltd.

Handbook of Knowledge Representation describes the essential foundations of Knowledge Representation, which lies at the core of Artificial Intelligence (AI). The book provides an up-to-date review of twenty-five key topics in knowledge representation, written by the leaders of each field. It includes a tutorial background and cutting-edge developments, as well as applications of Knowledge Representation in a variety of AI systems. This handbook is organized into three parts. Part I deals with general methods in Knowledge Representation and reasoning and covers such topics as classical logic in Knowledge Representation; satisfiability solvers; description logics; constraint programming; conceptual graphs; nonmonotonic reasoning; model-based problem solving; and Bayesian networks. Part II focuses on classes of knowledge and specialized representations, with chapters on temporal representation and reasoning; spatial and physical reasoning; reasoning about knowledge and belief; temporal action logics; and nonmonotonic causal logic. Part III discusses Knowledge Representation in applications such as question answering; the semantic web; automated planning; cognitive robotics; multi-agent systems; and knowledge engineering. This book is an essential resource for graduate students, researchers, and practitioners in knowledge representation and AI. * Make your computer smarter* Handle qualitative and uncertain information* Improve computational tractability to solve your problems easily

A Beautiful Math Princeton University Press

Computational complexity is one of the most beautiful fields of modern mathematics, and it is increasingly relevant to other sciences ranging from physics to biology. But this beauty is often buried underneath layers of unnecessary formalism, and exciting recent results like interactive proofs, phase transitions, and quantum computing are usually considered too advanced for the typical student. This book bridges these gaps by explaining the deep ideas of theoretical computer science in a clear and enjoyable fashion, making them accessible to non-computer scientists and to computer scientists who finally want to appreciate their field from a new point of view. The authors start with a lucid and playful explanation of the P vs. NP problem, explaining why it is so fundamental, and so hard to resolve. They then lead the reader through the complexity of mazes and games; optimization in theory and practice; randomized algorithms, interactive proofs, and pseudorandomness; Markov chains and phase transitions; and the outer reaches of quantum computing. At every turn, they use a minimum of formalism, providing explanations that are both deep and accessible. The book is intended for graduate and undergraduate students, scientists from other areas who have long wanted to understand this subject, and experts who want to fall in love with this field all over again.

Introduction to Evolutionary Computing Springer Science & Business Media

Covering the basic techniques used in the latest research work, the author consolidates progress made so far, including some very recent and promising results, and conveys the beauty and excitement of work in the field. He gives clear, lucid explanations of key results and ideas, with intuitive proofs, and provides critical examples and numerous illustrations to help elucidate the algorithms. Many of the results presented have been simplified and new insights provided. Of interest to theoretical computer scientists, operations researchers, and discrete mathematicians.

Limits to Parallel Computation CRC Press

The book is intended for lectures on string processes and pattern matching in Master's courses of computer science and software engineering curricula. The details of algorithms are given with correctness proofs and complexity analysis, which make them ready to implement. Algorithms are described in a C-like language. The book is also a reference for students in computational linguistics or computational biology. It presents examples of questions related to the automatic processing of natural language, to the analysis of molecular sequences, and to the management of textual databases.

Handbook of Scheduling Cambridge University Press

An overview of the rapidly growing field of ant colony optimization that describes theoretical findings, the major algorithms, and current applications. The complex social behaviors of ants have been much studied by science, and computer scientists are now finding that these behavior patterns can provide models for solving difficult combinatorial optimization problems. The attempt to develop algorithms inspired by one aspect of ant behavior, the ability to find what computer scientists would call shortest paths, has become the field of ant colony optimization (ACO), the most successful and widely recognized algorithmic technique based on ant behavior. This book presents an overview of this rapidly growing field, from its theoretical inception to practical applications, including descriptions of many available ACO algorithms and their uses. The book first describes the translation of observed ant behavior into working optimization algorithms. The ant colony metaheuristic is then introduced and viewed in the general context of combinatorial optimization. This is followed by a detailed description and guide to all major ACO algorithms and a report on current theoretical findings. The book surveys ACO applications now in use, including routing, assignment, scheduling, subset, machine learning, and bioinformatics problems. AntNet, an ACO algorithm designed for the network routing problem, is described in detail. The authors conclude by summarizing the progress in the field and outlining future research directions. Each chapter ends with bibliographic material, bullet points setting out important ideas covered in the chapter, and exercises. Ant Colony Optimization will be of interest to academic and industry researchers, graduate students, and practitioners who wish to learn how to implement ACO algorithms.

Proceedings of the Ninth Annual ACM-SIAM Symposium on Discrete Algorithms National Academies Press

When you think about how far and fast computer science has progressed in recent years, it's not hard to conclude that a seven-year old handbook may fall a little short of the kind of reference today's computer scientists, software engineers, and IT professionals need. With a broadened scope, more emphasis on applied computing, and more than 70 chap

Cognition and Intractability Springer Science & Business Media

Named a Notable Book in the 21st Annual Best of Computing list by the ACM! Robert Sedgewick and Kevin Wayne’s Computer Science: An Interdisciplinary Approach is the ideal modern introduction to computer science with Java programming for both students and professionals. Taking a broad, applications-based

approach, Sedgewick and Wayne teach through important examples from science, mathematics, engineering, finance, and commercial computing. The book demystifies computation, explains its intellectual underpinnings, and covers the essential elements of programming and computational problem solving in today’s environments. The authors begin by introducing basic programming elements such as variables, conditionals, loops, arrays, and I/O. Next, they turn to functions, introducing key modular programming concepts, including components and reuse. They present a modern introduction to object-oriented programming, covering current programming paradigms and approaches to data abstraction. Building on this foundation, Sedgewick and Wayne widen their focus to the broader discipline of computer science. They introduce classical sorting and searching algorithms, fundamental data structures and their application, and scientific techniques for assessing an implementation’s performance. Using abstract models, readers learn to answer basic questions about computation, gaining insight for practical application. Finally, the authors show how machine architecture links the theory of computing to real computers, and to the field’s history and evolution. For each concept, the authors present all the information readers need to build confidence, together with examples that solve intriguing problems. Each chapter contains question-and-answer sections, self-study drills, and challenging problems that demand creative solutions. Companion web site (introcs.cs.princeton.edu/java) contains Extensive supplementary information, including suggested approaches to programming assignments, checklists, and FAQs Graphics and sound libraries Links to program code and test data Solutions to selected exercises Chapter summaries Detailed instructions for installing a Java programming environment Detailed problem sets and projects Companion 20-part series of video lectures is available at informit.com/title/9780134493831

A Guide to Algorithm Design W.H. Freeman

This Third Edition, in response to the enthusiastic reception given by academia and students to the previous edition, offers a cohesive presentation of all aspects of theoretical computer science, namely automata, formal languages, computability, and complexity. Besides, it includes coverage of mathematical preliminaries. NEW TO THIS EDITION • Expanded sections on pigeonhole principle and the principle of induction (both in Chapter 2) • A rigorous proof of Kleene’s theorem (Chapter 5) • Major changes in the chapter on Turing machines (TMs) – A new section on high-level description of TMs – Techniques for the construction of TMs – Multitape TM and nondeterministic TM • A new chapter (Chapter 10) on decidability and recursively enumerable languages • A new chapter (Chapter 12) on complexity theory and NP-complete problems • A section on quantum computation in Chapter 12. • KEY FEATURES • Objective-type questions in each chapter—with answers provided at the end of the book. • Eighty-three additional solved examples—added as Supplementary Examples in each chapter. • Detailed solutions at the end of the book to chapter-end exercises. The book is designed to meet the needs of the undergraduate and postgraduate students of computer science and engineering as well as those of the students offering courses in computer applications.

Explorations in Quantum Computing John Wiley & Sons

Using the tools of complexity theory, Stephen Judd develops a formal description of associative learning in connectionist networks. He rigorously exposes the computational difficulties in training neural networks and explores how certain design principles will or will not make the problems easier.Judd looks beyond the scope of any one particular learning rule, at a level above the details of neurons. There he finds new issues that arise when great numbers of neurons are employed and he offers fresh insights into design principles that could guide the construction of artificial and biological neural networks.The first part of the book describes the motivations and goals of the study and relates them to current scientific theory. It provides an overview of the major ideas, formulates the general learning problem with an eye to the computational complexity of the task, reviews current theory on learning, relates the book's model of learning to other models outside the connectionist paradigm, and sets out to examine scale-up issues in connectionist learning.Later chapters prove the intractability of the general case of memorizing in networks, elaborate on implications of this intractability and point out several corollaries applying to various special subcases. Judd refines the distinctive characteristics of the difficulties with families of shallow networks, addresses concerns about the ability of neural networks to generalize, and summarizes the results, implications, and possible extensions of the work. Neural Network Design and the Complexity of Learning is included in the Network Modeling and Connectionism series edited by Jeffrey Elman.

Philosophical Logic and Artificial Intelligence Courier Corporation

cians concerned with using logical tools in philosophy have been keenly aware of the limitations that arise from the original con centration of symbolic logic on the idiom of mathematics, and many of them have worked to create extensions of the received logical theories that would make them more generally applicable in philosophy. Carnap's Testability and Meaning, published in 1936 and 1937, was a good early example of this sort of research, motivated by the inadequacy of first-order formalizations of dis 'This sugar cube is soluble in water'. positional sentences like And in fact there is a continuous history of work on this topic, extending from Carnap's paper to Shoham's contribution to the present volume . . Much of the work in philosophical logic, and much of what has appeared in The Journal of Philosophical Logic, was mo tivated by similar considerations: work in modal logic (includ ing tense, deontic, and epistemic logic), intensional logics, non declaratives, presuppositions, and many other topics. In this sort of research, sin.ce the main point is to devise new formalisms, the technical development tends to be rather shallow in comparison with mathematical logic, though it is sel dom absent: theorems need to be proved in order to justify the formalisms, and sometimes these are nontrivial. On the other hand, much effort has to go into motivating a logical innovation.

P, NP, and NP-Completeness MIT Press

This classic on games and how to play them intelligently is being re-issued in a new, four volume edition. This book has laid the foundation to a mathematical approach to playing games. The wise authors wield witty words, which wangle wonderfully winning ways. In Volume 1, the authors do the Spade Work, presenting theories and techniques to "dissect" games of varied structures and formats in order to develop winning strategies.

Computational Complexity CRC Press

The rapidly growing field of computational social choice, at the intersection of computer science and economics, deals with the computational aspects of collective decision making. This handbook, written by thirty-six prominent members of the computational social choice community, covers the field comprehensively. Chapters devoted to each of the field's major themes offer detailed introductions. Topics include voting theory (such as the computational complexity of winner determination and manipulation in elections), fair allocation (such as algorithms for dividing divisible and indivisible goods), coalition formation (such as matching and hedonic games), and many more.

Graduate students, researchers, and professionals in computer science, economics, mathematics, political science, and philosophy will benefit from this accessible and self-contained book.

What Can Be Computed? Cambridge University Press

This volume contains a revised collection of papers originally presented at the Fifth International Workshop on Artificial Intelligence and Statistics in 1995. The topics represented in this volume are diverse, and include natural language application causality and graphical models, classification, learning, knowledge discovery, and exploratory data analysis. The chapters illustrate the rich possibilities for interdisciplinary study at the interface of artificial intelligence and statistics. The chapters vary in the background that they assume, but moderate familiarity with techniques of artificial intelligence and statistics is desirable in most cases.

Approximation Algorithms Springer Science & Business Media

Introduction to mathematical theory of multistage decision processes takes a "functional equation" approach. Topics include existence and uniqueness theorems, optimal inventory equation, bottleneck problems, multistage games, Markovian decision processes, and more. 1957 edition.

Games, Puzzles, and Computation Springer Science & Business Media

This book provides a comprehensive analysis of the most important topics in parallel computation. It is written so that it may be used as a self-study guide to the field, and researchers in parallel computing will find it a useful reference for many years to come. The first half of the book consists of an introduction to many fundamental issues in parallel computing. The second half provides lists of P-complete- and open problems. These lists will have lasting value to researchers in both industry and academia. The lists of problems, with their corresponding remarks, the thorough index, and the hundreds of references add to the exceptional value of this resource. While the exciting field of parallel computation continues to expand rapidly, this book serves as a guide to research done through 1994 and also describes the fundamental concepts that new workers will need to know in coming years. It is intended for anyone interested in parallel computing, including senior level undergraduate students, graduate students, faculty, and people in industry. As an essential reference, the book will be needed in all academic libraries.

Handbook of Knowledge Representation Springer Science & Business Media

Computer Science: Reflections on the Field, Reflections from the Field provides a concise characterization of key ideas that lie at the core of computer science (CS) research. The book offers a description of CS research recognizing the richness and diversity of the field. It brings together two dozen essays on diverse aspects of CS research, their motivation and results. By describing in accessible form computer science's intellectual character, and by conveying a sense of its vibrancy through a set of examples, the book aims to prepare readers for what the future might hold and help to inspire CS researchers in its creation.

Handbook of Nature-Inspired and Innovative Computing MIT Press

Mathematics of Computing -- Numerical Analysis.

Related with Computer And Intractability A Guide To The Theory Of Np Completeness:

• What Is Level C In Iready Math : click here