

Solution To Michael Sipser

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Computability and

Complexity Apr 14 2021

Computability and complexity theory should be of central concern to practitioners as well as theorists. Unfortunately, however, the field is known for its impenetrability. Neil Jones's goal as an educator and author is to build a bridge between computability and complexity theory and other areas of computer science, especially programming. In a shift away from the Turing machine- and Gödel number-oriented classical approaches, Jones uses concepts familiar from programming languages to

make computability and complexity more accessible to computer scientists and more applicable to practical programming problems. According to Jones, the fields of computability and complexity theory, as well as programming languages and semantics, have a great deal to offer each other. Computability and complexity theory have a breadth, depth, and generality not often seen in programming languages. The programming language community, meanwhile, has a firm grasp of algorithm design, presentation, and implementation. In addition, programming languages

sometimes provide computational models that are more realistic in certain crucial aspects than traditional models. New results in the book include a proof that constant time factors do matter for its programming-oriented model of computation. (In contrast, Turing machines have a counterintuitive "constant speedup" property: that almost any program can be made to run faster, by any amount. Its proof involves techniques irrelevant to practice.) Further results include simple characterizations in programming terms of the central complexity classes

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PTIME and LOGSPACE, and a new approach to complete problems for NLOGSPACE, PTIME, NPTIME, and PSPACE, uniformly based on Boolean programs. Foundations of Computing series

The Nature of Computation Apr 26 2022 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.

Gödel's Theorem Mar 02 2020 "Among the many expositions of Gödel's incompleteness theorems written for non-specialists, this book stands apart. With exceptional clarity, Franzén gives careful, non-technical explanations both of what those theorems say and, more importantly, what they do not. No other book aims, as his does, to address in detail the misunderstandings and abuses of the incompleteness theorems that are so rife in popular discussions of their significance. As an antidote to the many spurious appeals to incompleteness in theological, anti-mechanist and post-modernist debates, it is a valuable addition to the literature." --- John W. Dawson, author of Logical Dilemmas: The Life and Work of Kurt Gödel

Programming Language Pragmatics Sep 27 2019 Programming Language Pragmatics, Fourth Edition, is the most comprehensive programming language textbook available today. It is distinguished and acclaimed for its integrated treatment of language design and implementation, with an emphasis on the fundamental tradeoffs that continue to drive software development. The book provides readers with a solid foundation in the syntax, semantics, and pragmatics of the full range of programming

languages, from traditional languages like C to the latest in functional, scripting, and object-oriented programming. This fourth edition has been heavily revised throughout, with expanded coverage of type systems and functional programming, a unified treatment of polymorphism, highlights of the newest language standards, and examples featuring the ARM and x86 64-bit architectures. Updated coverage of the latest developments in programming language design, including C & C++11, Java 8, C# 5, Scala, Go, Swift, Python 3, and HTML 5 Updated treatment of functional programming, with extensive coverage of OCaml New chapters devoted to type systems and composite types Unified and updated treatment of polymorphism in all its forms New examples featuring the ARM and x86 64-bit architectures

The Logic of Quantum Mechanics: Jun 04 2020 Originally published in 1981, this book forms volume 15 of the Encyclopedia of Mathematics and its Applications. The text provides a clear and thorough treatment of its subject, adhering to a clean exposition of the mathematical content of serious formulations of rational physical alternatives of quantum theory as elaborated in the influential works of the period, to which the authors made a significant contribution. The treatment falls into three distinct, logical parts: in the first part, the modern version of accumulated wisdom is presented, avoiding

as far as possible the traditional language of classical physics for its interpretational character; in the second part, the individual structural elements for the logical content of the theory are laid out; in part three, the results of section two are used to reconstruct the usual Hilbert space formulation of quantum mechanics in a novel way.

The Golden Ticket Jan 30 2020 The P-NP problem is the most important open problem in computer science, if not all of mathematics. Simply stated, it asks whether every problem whose solution can be quickly checked by computer can also be quickly solved by computer. The Golden Ticket provides a nontechnical introduction to P-NP, its rich history, and its algorithmic implications for everything we do with computers and beyond. Lance Fortnow traces the history and development of P-NP, giving examples from a variety of disciplines, including economics, physics, and biology. He explores problems that capture the full difficulty of the P-NP dilemma, from discovering the shortest route through all the rides at Disney World to finding large groups of friends on Facebook. The Golden Ticket explores what we truly can and cannot achieve computationally, describing the benefits and unexpected challenges of this compelling problem.

[Automata, Formal Languages, and Turing Machines](#) Oct 09 2020 Turing Machines is about the theoretical foundations of computer science. It offers a bird's-eye view of all possible

algorithms. This viewpoint is very rewarding but at the same time very abstract. This book strikes a balance between theory and applications, mathematical concepts and practical consequences for computer programs, and the usual dilemma of any textbook, that of going to greater depths or covering a wider range of topics. The gently sloping learning curve is especially suitable for self-study.

An Introduction to Formal Languages and Automata

Dec 11 2020 An Introduction to Formal Languages & Automata provides an excellent presentation of the material that is essential to an introductory theory of computation course. The text was designed to familiarize students with the foundations & principles of computer science & to strengthen the students' ability to carry out formal & rigorous mathematical argument. Employing a problem-solving approach, the text provides students insight into the course material by stressing intuitive motivation & illustration of ideas through straightforward explanations & solid mathematical proofs. By emphasizing learning through problem solving, students learn the material primarily through problem-type illustrative examples that show the motivation behind the concepts, as well as their connection to the theorems & definitions.

A Friendly Introduction to Mathematical Logic

Jul 26 2019 At the intersection of mathematics, computer

science, and philosophy, mathematical logic examines the power and limitations of formal mathematical thinking. In this expansion of Leary's user-friendly 1st edition, readers with no previous study in the field are introduced to the basics of model theory, proof theory, and computability theory. The text is designed to be used either in an upper division undergraduate classroom, or for self study. Updating the 1st Edition's treatment of languages, structures, and deductions, leading to rigorous proofs of Gödel's First and Second Incompleteness Theorems, the expanded 2nd Edition includes a new introduction to incompleteness through computability as well as solutions to selected exercises.

Matrix Algebra Sep 19 2021 Matrix algebra is one of the most important areas of mathematics for data analysis and for statistical theory. This much-needed work presents the relevant aspects of the theory of matrix algebra for applications in statistics. It moves on to consider the various types of matrices encountered in statistics, such as projection matrices and positive definite matrices, and describes the special properties of those matrices. Finally, it covers numerical linear algebra, beginning with a discussion of the basics of numerical computations, and following up with accurate and efficient algorithms for factoring matrices, solving linear systems of equations, and extracting eigenvalues and eigenvectors.

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What Can Be Computed? Nov 09 2020 An accessible and rigorous textbook for introducing undergraduates to computer science theory What Can Be Computed? is a uniquely accessible yet rigorous introduction to the most profound ideas at the heart of computer science. Crafted specifically for undergraduates who are studying the subject for the first time, and requiring minimal prerequisites, the book focuses on the essential fundamentals of computer science theory and features a practical approach that uses real computer programs (Python and Java) and encourages active experimentation. It is also ideal for self-study and reference. The book covers the standard topics in the theory of computation, including Turing machines and finite automata, universal computation, nondeterminism, Turing and Karp reductions, undecidability, time-complexity classes such as P and NP, and NP-completeness, including the Cook-Levin Theorem. But the book also provides a broader view of computer science and its historical development, with discussions of Turing's original 1936 computing machines, the connections between undecidability and Gödel's incompleteness theorem, and Karp's famous set of twenty-one NP-complete problems. Throughout, the book recasts traditional computer science concepts by considering how computer programs are used to solve real problems. Standard theorems are stated and

proven with full mathematical rigor, but motivation and understanding are enhanced by considering concrete implementations. The book's examples and other content allow readers to view demonstrations of—and to experiment with—a wide selection of the topics it covers. The result is an ideal text for an introduction to the theory of computation. An accessible and rigorous introduction to the essential fundamentals of computer science theory, written specifically for undergraduates taking introduction to the theory of computation Features a practical, interactive approach using real computer programs (Python in the text, with forthcoming Java alternatives online) to enhance motivation and understanding Gives equal emphasis to computability and complexity Includes special topics that demonstrate the profound nature of key ideas in the theory of computation Lecture slides and Python programs are available at whatcanbecomputed.com **Automata and Computability** Jun 28 2022 These are my lecture notes from CS381/481: Automata and Computability Theory, a one-semester senior-level course I have taught at Cornell University for many years. I took this course myself in the fall of 1974 as a first-year Ph.D. student at Cornell from Juris Hartmanis and have been in love with the subject ever since. The course is required for computer science majors at Cornell. It exists in two forms: CS481, an honors version; and CS381, a

somewhat gentler paced version. The syllabus is roughly the same, but CS481 goes deeper into the subject, covers more material, and is taught at a more abstract level. Students are encouraged to start off in one or the other, then switch within the first few weeks if they find the other version more suitable to their level of mathematical skill. The purpose of this course is twofold: to introduce computer science students to the rich heritage of models and abstractions that have arisen over the years; and to develop the capacity to form abstractions of their own and reason in terms of them. Theory of Computation May 16 2021 This textbook is uniquely written with dual purpose. It covers core material in the foundations of computing for graduate students in computer science and also provides an introduction to some more advanced topics for those intending further study in the area. This innovative text focuses primarily on computational complexity theory: the classification of computational problems in terms of their inherent complexity. The book contains an invaluable collection of lectures for first-year graduates on the theory of computation. Topics and features include more than 40 lectures for first year graduate students, and a dozen homework sets and exercises. *Computers and Intractability* May 04 2020 **Multimedia: A Practical Approach** Mar 26 2022 *Introduction to Theory of*

Computation Oct 28 2019

Introduction to the Theory of Computation Nov 02 2022

Now you can clearly present even the most complex computational theory topics to your students with Sipser's distinct, market-leading INTRODUCTION TO THE THEORY OF COMPUTATION, 3E. The number one choice for today's computational theory course, this highly anticipated revision retains the unmatched clarity and thorough coverage that make it a leading text for upper-level undergraduate and introductory graduate students. This edition continues author Michael Sipser's well-known, approachable style with timely revisions, additional exercises, and more memorable examples in key areas. A new first-of-its-kind theoretical treatment of deterministic context-free languages is ideal for a better understanding of parsing and LR(k) grammars. This edition's refined presentation ensures a trusted accuracy and clarity that make the challenging study of computational theory accessible and intuitive to students while maintaining the subject's rigor and formalism. Readers gain a solid understanding of the fundamental mathematical properties of computer hardware, software, and applications with a blend of practical and philosophical coverage and mathematical treatments, including advanced theorems and proofs. INTRODUCTION TO THE THEORY OF COMPUTATION, 3E's comprehensive coverage makes this an ideal ongoing reference tool for those

studying theoretical computing. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version. Machines, Languages, and Computation Jul 06 2020 *Introduction to Automata Theory, Languages, and Computation* Aug 07 2020 This classic book on formal languages, automata theory, and computational complexity has been updated to present theoretical concepts in a concise and straightforward manner with the increase of hands-on, practical applications. This new edition comes with Gradiance, an online assessment tool developed for computer science. Please note, Gradiance is no longer available with this book, as we no longer support this product.

Theory of Computer Science

Jan 12 2021 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.

Theory Of Computation Nov 21 2021

Automata, Computability and Complexity Jun 16 2021

For upper level courses on Automata. Combining classic theory with unique applications, this crisp narrative is supported by abundant examples and clarifies key concepts by introducing important uses of techniques in real systems. Broad-ranging coverage allows instructors to easily customise course material to fit their unique requirements.

Formal Languages and Automata Theory Jun 24 2019

Formal Languages and Automata Theory deals with the mathematical abstraction model of computation and its relation to formal languages. This book is intended to expose students to the theoretical

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development of computer science. It also provides conceptual tools that practitioners use in computer engineering. An assortment of problems illustrative of each method is solved in all possible ways for the benefit of students. The book also presents challenging exercises designed to hone the analytical skills of students.

Mathematics and

Computation Aug 19 2021 An introduction to computational complexity theory, its connections and interactions with mathematics, and its central role in the natural and social sciences, technology, and philosophy *Mathematics and Computation* provides a broad, conceptual overview of computational complexity theory—the mathematical study of efficient computation. With important practical applications to computer science and industry, computational complexity theory has evolved into a highly interdisciplinary field, with strong links to most mathematical areas and to a growing number of scientific endeavors. Avi Wigderson takes a sweeping survey of complexity theory, emphasizing the field's insights and challenges. He explains the ideas and motivations leading to key models, notions, and results. In particular, he looks at algorithms and complexity, computations and proofs, randomness and interaction, quantum and arithmetic computation, and cryptography and learning, all as parts of a cohesive whole with numerous cross-influences. Wigderson

illustrates the immense breadth of the field, its beauty and richness, and its diverse and growing interactions with other areas of mathematics. He ends with a comprehensive look at the theory of computation, its methodology and aspirations, and the unique and fundamental ways in which it has shaped and will further shape science, technology, and society. For further reading, an extensive bibliography is provided for all topics covered. *Mathematics and Computation* is useful for undergraduate and graduate students in mathematics, computer science, and related fields, as well as researchers and teachers in these fields. Many parts require little background, and serve as an invitation to newcomers seeking an introduction to the theory of computation. Comprehensive coverage of computational complexity theory, and beyond High-level, intuitive exposition, which brings conceptual clarity to this central and dynamic scientific discipline Historical accounts of the evolution and motivations of central concepts and models A broad view of the theory of computation's influence on science, technology, and society Extensive bibliography **Models of Computation** Oct 21 2021 A Concise Introduction to Computation Models and Computability Theory provides an introduction to the essential concepts in computability, using several models of computation, from the standard Turing Machines and Recursive Functions, to the modern computation models inspired

by quantum physics. An in-depth analysis of the basic concepts underlying each model of computation is provided. Divided into two parts, the first highlights the traditional computation models used in the first studies on computability: - Automata and Turing Machines; - Recursive functions and the Lambda-Calculus; - Logic-based computation models. and the second part covers object-oriented and interaction-based models. There is also a chapter on concurrency, and a final chapter on emergent computation models inspired by quantum mechanics. At the end of each chapter there is a discussion on the use of computation models in the design of programming languages.

Quantum Computing for Computer Scientists Apr 02 2020 The multidisciplinary field of quantum computing strives to exploit some of the uncanny aspects of quantum mechanics to expand our computational horizons. *Quantum Computing for Computer Scientists* takes readers on a tour of this fascinating area of cutting-edge research. Written in an accessible yet rigorous fashion, this book employs ideas and techniques familiar to every student of computer science. The reader is not expected to have any advanced mathematics or physics background. After presenting the necessary prerequisites, the material is organized to look at different aspects of quantum computing from the specific standpoint of computer science. There are chapters on

computer architecture, algorithms, programming languages, theoretical computer science, cryptography, information theory, and hardware. The text has step-by-step examples, more than two hundred exercises with solutions, and programming drills that bring the ideas of quantum computing alive for today's computer science students and researchers.

Computability and Unsolvability Nov 29 2019

Classic graduate-level introduction to theory of computability. Discusses general theory of computability, computable functions, operations on computable functions, Turing machines self-applied, unsolvable decision problems, applications of general theory, mathematical logic, Kleene hierarchy, more.

Introducing the Theory of Computation Feb 22 2022

Introducing the Theory of Computation is the ideal text for any undergraduate, introductory course on formal languages, automata, and computability. The author provides a concise, yet complete, introduction to the important models of finite automata, grammars, and Turing machines, as well as to undecidability and the basics of complexity theory. Numerous problems, varying in level of difficulty, round out each chapter and allow students to test themselves on key topics. Answers to selected exercises are included as an appendix and a complete instructor's solutions manual is available on

the text's website.

Formal Languages and Automata Theory Aug 26 2019

Theory of Automata is designed to serve as a textbook for undergraduate students of B..E, B.Tech. CSE and MCA/IT. It attempts to help students grasp the essential concepts involved in automata theory.

Introduction to the Theory of Computation Oct 01 2022

"Intended as an upper-level undergraduate or introductory graduate text in computer science theory," this book lucidly covers the key concepts and theorems of the theory of computation. The presentation is remarkably clear; for example, the "proof idea," which offers the reader an intuitive feel for how the proof was constructed, accompanies many of the theorems and a proof. Introduction to the Theory of Computation covers the usual topics for this type of text plus it features a solid section on complexity theory--including an entire chapter on space complexity. The final chapter introduces more advanced topics, such as the discussion of complexity classes associated with probabilistic algorithms.

Formal Language Dec 31 2019

Business ethics has largely been written from the perspective of analytical philosophy with very little attention paid to the work of continental philosophers. Yet although very few of these philosophers directly discuss business ethics, it is clear that their ideas have interesting applications in this field. This innovative textbook shows how the work of continental

philosophers - Deleuze and Guattari, Foucault, Levinas, Bauman, Derrida, Levinas, Nietzsche, Zizek, Jonas, Sartre, Heidegger, Latour, Nancy and Sloterdijk - can provide fresh insights into a number of different issues in business ethics. Topics covered include agency, stakeholder theory, organizational culture, organizational justice, moral decision-making, leadership, whistle-blowing, corporate social responsibility, globalization and sustainability. The book includes a number of features designed to aid comprehension, including a detailed glossary of key terms, text boxes explaining key concepts, and a wide range of examples from the world of business.

Game Theory Mar 14 2021

The definitive introduction to game theory This comprehensive textbook introduces readers to the principal ideas and applications of game theory, in a style that combines rigor with accessibility. Steven Tadelis begins with a concise description of rational decision making, and goes on to discuss strategic and extensive form games with complete information, Bayesian games, and extensive form games with imperfect information. He covers a host of topics, including multistage and repeated games, bargaining theory, auctions, rent-seeking games, mechanism design, signaling games, reputation building, and information transmission games. Unlike other books on game theory, this one begins with the idea of rationality and explores its

implications for multiperson decision problems through concepts like dominated strategies and rationalizability. Only then does it present the subject of Nash equilibrium and its derivatives. Game Theory is the ideal textbook for advanced undergraduate and beginning graduate students. Throughout, concepts and methods are explained using real-world examples backed by precise analytic material. The book features many important applications to economics and political science, as well as numerous exercises that focus on how to formalize informal situations and then analyze them. Introduces the core ideas and applications of game theory Covers static and dynamic games, with complete and incomplete information Features a variety of examples, applications, and exercises Topics include repeated games, bargaining, auctions, signaling, reputation, and information transmission Ideal for advanced undergraduate and beginning graduate students Complete solutions available to teachers and selected solutions available to students [Introduction to the Theory of Computation](#) Jul 30 2022 This highly anticipated revision builds upon the strengths of the previous edition. Sipser's candid, crystal-clear style allows students at every level to understand and enjoy this field. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version. *Introduction to the Theory of Computation* Aug 31 2022 Now

you can clearly present even the most complex computational theory topics to your students with Sipser's distinct, market-leading INTRODUCTION TO THE THEORY OF COMPUTATION, 3E. The number one choice for today's computational theory course, this highly anticipated revision retains the unmatched clarity and thorough coverage that make it a leading text for upper-level undergraduate and introductory graduate students. This edition continues author Michael Sipser's well-known, approachable style with timely revisions, additional exercises, and more memorable examples in key areas. A new first-of-its-kind theoretical treatment of deterministic context-free languages is ideal for a better understanding of parsing and LR(k) grammars. This edition's refined presentation ensures a trusted accuracy and clarity that make the challenging study of computational theory accessible and intuitive to students while maintaining the subject's rigor and formalism. Readers gain a solid understanding of the fundamental mathematical properties of computer hardware, software, and applications with a blend of practical and philosophical coverage and mathematical treatments, including advanced theorems and proofs. INTRODUCTION TO THE THEORY OF COMPUTATION, 3E's comprehensive coverage makes this an ideal ongoing reference tool for those studying theoretical computing. Important Notice: Media content referenced within the

product description or the product text may not be available in the ebook version. *Elements of Automata Theory* Sep 07 2020 Automata theory lies at the foundation of computer science, and is vital to a theoretical understanding of how computers work and what constitutes formal methods. This treatise gives a rigorous account of the topic and illuminates its real meaning by looking at the subject in a variety of ways. The first part of the book is organised around notions of rationality and recognisability. The second part deals with relations between words realised by finite automata, which not only exemplifies the automata theory but also illustrates the variety of its methods and its fields of application. Many exercises are included, ranging from those that test the reader, to those that are technical results, to those that extend ideas presented in the text. Solutions or answers to many of these are included in the book. **Introduction to Computer Theory** Jul 18 2021 Designed for undergraduate courses in computer theory, this textbook covers three areas: formal languages, automata theory and Turing machines. The author substitutes graphic representation for symbolic proofs, making it accessible even to students with little mathematical background. **Problem Solving in Automata, Languages, and Complexity** Dec 23 2021 Automata and natural language theory are topics lying at the heart of computer science.

Both are linked to computational complexity and together, these disciplines help define the parameters of what constitutes a computer, the structure of programs, which problems are solvable by computers, and a range of other crucial aspects of the practice of computer science. In this important volume, two respected authors/editors in the field offer accessible, practice-oriented coverage of these issues with an emphasis on refining core problem solving skills.

Computational Complexity

May 28 2022 New and classical results in computational complexity, including interactive proofs, PCP, derandomization, and quantum computation. Ideal for graduate students.

Practical Foundations for

Programming Languages

Jan 24 2022 This text develops a comprehensive theory of programming languages based on type systems and structural operational semantics.

Language concepts are precisely defined by their static and dynamic semantics, presenting the essential tools

both intuitively and rigorously while relying on only elementary mathematics. These tools are used to analyze and prove properties of languages and provide the framework for combining and comparing language features. The broad range of concepts includes fundamental data types such as sums and products, polymorphic and abstract types, dynamic typing, dynamic dispatch, subtyping and refinement types, symbols and dynamic classification, parallelism and cost semantics, and concurrency and distribution. The methods are directly applicable to language implementation, to the development of logics for reasoning about programs, and to the formal verification language properties such as type safety. This thoroughly revised second edition includes exercises at the end of nearly every chapter and a new chapter on type refinements.

The Design and Analysis of Algorithms

Feb 10 2021 These are my lecture notes from CS681: Design and Analysis of Algorithms, a one-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 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 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 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. 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 Applied Mathematics 44, 1983. and still recommend them as excellent references.