Foundations Of Computer Science

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MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE, Second Edition
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LISA CHACE

Lessons in Enumerative Combinatorics Laxmi Publications
Mathematical Foundations of Computer Science explains the fundamental concepts in mathematics. It can be used by the students in computer science as an introduction to the underlying ideas of mathematics for computer science. It explains topics like mathematical logic, predicates, relations, functions, combinatorics, algebraic structures and graph theory. It would be useful for the students of B.Tech, BCA, & MCA. Key Features: " Comprehensive discussion on logic, function, algebraic systems, recurrence relations and graph theory " Wide variety of exercises at all levels " Several worked out examples
Foundations for Programming Languages Addison-Wesley Professional
Mathematical Foundations of Computer Science, Volume I is the first of two volumes presenting topics from mathematics (mostly discrete mathematics) which have proven relevant and useful to computer science. This volume treats basic topics, mostly of a set-theoretical nature (sets, functions and relations, partially ordered sets, induction, enumerability, and diagonalization) and illustrates the usefulness of mathematical ideas by presenting applications to computer science. Readers will find useful applications in algorithms, databases, semantics of programming languages, formal languages, theory of computation, and program verification. The material is treated in a straightforward, systematic, and rigorous manner. The volume is organized by mathematical area, making the material easily accessible to the upper-undergraduate students in mathematics as well as in computer science and each chapter contains a large number of exercises. The volume can be used as a textbook, but it will also be useful to researchers and professionals who want a thorough presentation of the mathematical tools they need in a single source. In addition, the book can be used effectively as supplementary reading material in computer science courses, particularly those courses which involve the semantics of programming languages, formal languages and automata, and logic programming.
Mathematical Foundation of Computer Science East African Publishers
This book contains proceedings of the 2018 International Conference on Foundations of Computer Science (FCS'18). FCS is an international conference that serves researchers, scholars, professionals, students, and academicians who are looking to both foster working relationships and gain access to the latest research results.
Foundations of Computer Studies 1 Mit Press
Essay from the year 2019 in the subject Computer Science - Theory, grade: 4.00, Atlantic International University, language: English, abstract: The paper presents an analytical exposition, critical context and integrative conclusion on the discussion on the meaning, significance and potential applications of theoretical foundations of computer science with respect to Algorithms Design and Analysis, Complexity Theory, Turing Machines,

Finite Automata, Cryptography and Machine Learning. An algorithm is any well-defined computational procedure that takes some value or sets of values as input and produces some values or sets of values as output. A Turing machine consists of a finite program, called the finite control, capable of manipulating a linear list of cells, called the tape, using one access pointer, called the head. Cellular automata is an array of finite state machines (inter-related). A universal Turing machine U is a Turing machine that can imitate the behavior of any other Turing machine T. Automata are a particularly simple, but useful, model of computation which were were initially proposed as a simple model for the behavior of neurons. A model of computation is a mathematical abstraction of computers which is used by computer scientists to perform a rigorous study of computation. An automaton with a finite number of states is called a Finite Automaton (FA) or Finite State Machine (FSM). The Church-Turing Thesis states that the Turing machine is equivalent in computational ability to any general mathematical device for computation, including digital computers. The important themes in Theoretical Computer Science (TCS) are efficiency, impossibility results, approximation, central role of randomness, and reductions (NP-completeness and other intractability results).

Foundations of Computing Oxford University Press, USA

This advanced text for undergraduate and graduate students introduces mathematical logic with an emphasis on proof theory and procedures for algorithmic construction of formal proofs. The self-contained treatment is also useful for computer scientists and mathematically inclined readers interested in the formalization of proofs and basics of automatic theorem proving. Topics include propositional logic and its resolution, first-order logic, Gentzen's cut elimination theorem and applications, and Gentzen's sharpened Hauptsatz and Herbrand's theorem. Additional subjects include resolution in first-order logic; SLD-resolution, logic programming, and the foundations of PROLOG; and many-sorted first-order logic. Numerous problems appear throughout the book, and two Appendixes provide practical background information.

Logical Foundations of Computer Science 2018 Worldcomp International C

Please note: Taylor & Francis does not sell or distribute the Hardback in India, Pakistan, Nepal, Bhutan, Bangladesh and Sri Lanka

Foundations of Computer Science Pearson Education

This book constitutes the refereed proceedings of the International Symposium on Logical Foundations of Computer Science, LFCS 2020, held in Deerfield Beach, FL, USA, in January 2020. The 17 revised full papers were carefully reviewed and selected from 30 submissions. The scope of the Symposium is broad and includes constructive mathematics and type theory; homotopy type theory; logic, automata, and automatic structures; computability and randomness; logical foundations of programming; logical aspects of computational complexity; parameterized complexity; logic programming and constraints; automated deduction and interactive theorem proving; logical methods in protocol and program verification; logical methods in program specification and extraction; domain theory logics; logical foundations of database theory; equational logic and term rewriting; lambda and combinatory calculi; categorical logic and topological semantics; linear logic; epistemic and temporal logics; intelligent and multiple-agent system logics; logics of proof and justification; non-monotonic reasoning; logic in game theory and social software; logic of hybrid systems; distributed system logics; mathematical fuzzy logic; system design logics; other logics in computer science.

On the Theoretical Foundations of Computer Science. An Introductory Essay New Age International

This textbook introduces enumerative combinatorics through the framework of formal languages and bijections. By starting with elementary operations on words and languages, the authors paint an insightful, unified picture for readers entering the field. Numerous concrete examples and illustrative metaphors motivate the theory throughout, while the overall approach illuminates the important connections between discrete mathematics and theoretical computer science. Beginning with the basics of formal languages, the first chapter quickly establishes a common setting for modeling and counting classical combinatorial objects and constructing bijective proofs. From here, topics are modular and offer substantial flexibility when designing a course. Chapters on generating functions and partitions build further fundamental tools for enumeration and include applications such as a combinatorial proof of the Lagrange inversion formula. Connections to linear algebra emerge in chapters studying Cayley trees, determinantal formulas, and the combinatorics that lie behind the classical Cayley–Hamilton theorem. The remaining chapters range across the Inclusion-Exclusion Principle, graph theory and coloring, exponential structures, matching and distinct representatives, with each topic opening many doors to further study. Generous exercise sets complement all chapters, and miscellaneous sections explore additional applications. Lessons in Enumerative Combinatorics captures the authors' distinctive style and flair for introducing newcomers to combinatorics. The conversational yet rigorous presentation suits students in mathematics and computer science at the graduate, or advanced undergraduate level. Knowledge of single-variable calculus and the basics of discrete mathematics is assumed; familiarity with linear algebra will enhance the study of certain chapters.

Mathematical Foundation of Computer Science Cengage Learning EMEA

Written for professionals learning the field of discrete mathematics, this book provides the necessary foundations of computer science without requiring excessive mathematical prerequisites. Using a balanced approach of theory and examples, software engineers will find it a refreshing treatment of applications in programming.

Foundations of Computer Science PHI Learning Pvt. Ltd.

This book introduces the mathematics that supports advanced computer programming and the analysis of algorithms. The primary aim of its well-known authors is to provide a solid and relevant base of mathematical skills - the skills needed to solve complex problems, to evaluate horrendous sums, and to discover subtle patterns in data. It is an indispensable text and reference not only for computer scientists - the authors themselves rely heavily on it! - but for serious users of mathematics in virtually every discipline. Concrete Mathematics is a blending of CONtinuous and disCRETE mathematics. "More concretely," the authors explain, "it is the controlled manipulation of mathematical formulas, using a collection of techniques for solving problems." The subject matter is primarily an expansion of the Mathematical Preliminaries section in Knuth's classic Art of Computer Programming, but the style of presentation is more leisurely, and individual topics are covered more deeply. Several new topics have been added, and the most significant ideas have been traced to their historical roots. The book includes more than 500 exercises, divided into six categories. Complete answers are provided for all exercises, except research problems, making the book particularly valuable for self-study. Major topics include: Sums Recurrences Integer functions Elementary number theory Binomial coefficients Generating functions Discrete probability Asymptotic methods

This second edition includes important new material about mechanical summation. In response to the widespread use of the first edition as a reference book, the bibliography and index have also been expanded, and additional nontrivial improvements can be found on almost every page. Readers will appreciate the informal style of Concrete Mathematics. Particularly enjoyable are the marginal graffiti contributed by students who have taken courses based on this material. The authors want to convey not only the importance of the techniques presented, but some of the fun in learning and using them.

Foundations of Computer Science GRIN Verlag

Foundations of Computer Technology is an easily accessible introduction to the architecture of computers and peripherals. This textbook clearly and completely explains modern computer systems through an approach that integrates components, systems, software, and design. It provides a succinct, systematic, and readable guide to computers, providing a springboard for students to pursue more detailed technology subjects. This volume focuses on hardware elements within a computer system and the impact of software on its architecture. It discusses practical aspects of computer organization (structure, behavior, and design) delivering the necessary fundamentals for electrical engineering and computer science students. The book not only lists a wide range of terms, but also explains the basic operations of components within a system, aided by many detailed illustrations. Material on modern technologies is combined with a historical perspective, delivering a range of articles on hardware, architecture and software, programming methodologies, and the nature of operating systems. It also includes a unified treatment on the entire computing spectrum, ranging from microcomputers to supercomputers. Each section features learning objectives and chapter outlines. Small glossary entries define technical terms and each chapter ends with an alphabetical list of key terms for reference and review. Review questions also appear at the end of each chapter and project questions inspire readers to research beyond the text. Short, annotated bibliographies direct students to additional useful reading.

Theoretical Foundations of Computer Science BPB Publications

This book, in its Second Edition, provides the basic concepts and applications of discrete mathematics and graph theory. The book is aimed at undergraduate students of computer science and engineering, and information technology. It is also suitable for undergraduate and postgraduate students of computer science, mathematics and computer applications. The book exposes the students to fundamental knowledge in: - Mathematical logic, tautology and normal forms - Elementary set theory, functions and their relations - Algebraic structure, binary operation, group theory and homomorphism - Theory of permutations and combinations, binomial and multinomial theorems - Recurrence relations and methods of solving them - Graph theory, spanning tree, Eulerian and Hamiltonian circuits and isomorphism Key Features Includes a large number of worked-out problems for sound understanding of the concepts. Offers chapter-end exercises to test students’ comprehension of theory. Gives a quiz section at the end of each chapter to help students prepare for the competitive examinations. Incorporates short questions asked in universities’ examinations.

Foundations of Computer Technology Springer Nature

The Interesting Feature Of This Book Is Its Organization And Structure. That Consists Of Systematizing Of The Definitions, Methods, And Results That Something Resembling A Theory. Simplicity, Clarity, And Precision Of Mathematical Language Makes Theoretical Topics More Appealing To The Readers Who Are Of Mathematical Or Non-Mathematical Background. For Quick References And Immediate Attentions3/4Concepts And Definitions, Methods And Theorems, And Key Notes Are Presented Through Highlighted Points From Beginning To End. Whenever, Necessary And Probable A Visual Approach Of Presentation Is Used. The Amalgamation Of Text And Figures Make Mathematical Rigors Easier To Understand. Each Chapter Begins With The Detailed Contents, Which Are Discussed Inside The Chapter And Conclude With A Summary Of The Material Covered In The Chapter. Summary Provides A Brief Overview Of All The Topics Covered In The Chapter. To Demonstrate The Principles Better, The Applicability Of The Concepts Discussed In Each Topic Are Illustrated By Several Examples Followed By The Practice Sets Or Exercises.

Basic Category Theory for Computer Scientists Springer Nature

Computing, today more than ever before, is a multi-faceted discipline which collates several methodologies, areas of interest, and approaches: mathematics, engineering, programming, and applications. Given its enormous impact on everyday life, it is essential that its debated origins are understood, and that its different foundations are explained. On the Foundations of Computing offers a comprehensive and critical overview of the birth and evolution of computing, and it presents some of the most important technical results and philosophical problems of the discipline, combining both historical and systematic analyses. The debates this text surveys are among the latest and most urgent ones: the crisis of foundations in mathematics and the birth of the decision problem, the nature of algorithms, the debates on computational artefacts and malfunctioning, and the analysis of computational experiments. By covering these topics, On the Foundations of Computing provides a much-needed resource to contextualize these foundational issues. For practitioners, researchers, and students alike, a historical and philosophical approach such as what this volume offers becomes essential to understand the past of the discipline and to figure out the challenges of its future.

Foundations of Computer Science Springer Science & Business Media

"Programming languages embody the pragmatics of designing software systems, and also the mathematical concepts which underlie them. Anyone who wants to know how, for example, object-oriented programming rests upon a firm foundation in logic should read this book. It guides one surefootedly through the rich variety of basic programming concepts developed over the past forty years." -- Robin Milner, Professor of Computer Science, The Computer Laboratory, Cambridge University "Programming languages need not be designed in an intellectual vacuum; John Mitchell's book provides an extensive analysis of the fundamental notions underlying programming constructs. A basic grasp of this material is essential for the understanding, comparative analysis, and design of programming languages." -- Luca Cardelli, Digital Equipment Corporation Written for advanced undergraduate and beginning graduate students, "Foundations for Programming Languages" uses a series of typed lambda calculi to study the axiomatic, operational, and denotational semantics of sequential programming languages. Later chapters are devoted to progressively more sophisticated type systems.

Mathematical Foundations of Computer Science MIT Press

This text discusses the basic concepts of theoretical computer science (formal languages, automata theory and the theory of computability) and

shows their application to current programming practice. It emphasizes the practical use of theory in current, everyday programming practice and covers classical topics, semi-classical topics and less classical topics. All of the basic topics of theoretical computer science are covered at an advanced undergraduate level and topics for more advanced study are marked.

Mathematical Foundations of Computer Science W. H. Freeman

Basic Category Theory for Computer Scientists provides a straightforward presentation of the basic constructions and terminology of category theory, including limits, functors, natural transformations, adjoints, and cartesian closed categories. Category theory is a branch of pure mathematics that is becoming an increasingly important tool in theoretical computer science, especially in programming language semantics, domain theory, and concurrency, where it is already a standard language of discourse. Assuming a minimum of mathematical preparation, Basic Category Theory for Computer Scientists provides a straightforward presentation of the basic constructions and terminology of category theory, including limits, functors, natural transformations, adjoints, and cartesian closed categories. Four case studies illustrate applications of category theory to programming language design, semantics, and the solution of recursive domain equations. A brief literature survey offers suggestions for further study in more advanced texts. Contents Tutorial • Applications • Further Reading

On the Foundations of Computing CRC Press

Foundations of Computation is a free textbook for a one-semester course in theoretical computer science. It has been used for several years in a course at Hobart and William Smith Colleges. The course has no prerequisites other than introductory computer programming. The first half of the course covers material on logic, sets, and functions that would often be taught in a course in discrete mathematics. The second part covers material on automata, formal languages and grammar that would ordinarily be encountered in an upper level course in theoretical computer science.

Foundations of Computer Science Courier Dover Publications

Content Description #Dedicated to Wilfried Brauer.#Includes bibliographical references and index.

Annual Symposium on Foundations of Computer Science CRC Press

DESCRIPTION If you wish to have a bright future in any profession today, you cannot ignore having sound foundation in Information Technology (IT). Hence, you cannot ignore to have this book because it provides comprehensive coverage of all important topics in IT. Foundations of Computing is designed to introduce through a single book the important concepts of the Foundation Courses in Computer Science (CS), Computer Applications (CA), and Information Technology (IT) programs taught at undergraduate and postgraduate levels. WHAT YOU WILL LEARN ● Characteristics, Evolution and Classification of computers. ● Binary, Octal and Hexadecimal Number systems, Computer codes and Binary arithmetic. ● Boolean algebra, Logic gates, Flip-Flops, and Design of Combinational and Sequential Circuits. ● Computer architecture, including design of CPU, Memory, Secondary storage, and I/O devices. ● Computer software, how to acquire software, and the commonly used tools and techniques for planning, developing, implementing, and operating software systems. ● Programming languages, Operating systems, Communication technologies, Computer networks, Multimedia computing, and Information security. ● Database and Data Science technologies. ● The Internet, Internet of Things (IoT), E-Governance, Geo- informatics, Medical Informatics, Bioinformatics, and many more. WHO THIS BOOK IS FOR ● Students of CS, CA and IT will find the book suitable for use as a textbook or reference book. ● Professionals will find it suitable for use as a reference book for topics in CS, CA and IT. ● Applicants preparing for various entrance tests and competitive examinations will find it suitable for clearing their concepts of CS, CA and IT. ● Anyone else interested in developing a clear understanding of the important concepts of various topics in CS, CA and IT will also find this book useful. TABLE OF CONTENTS Letter to Readers Preface About Lecture Notes Presentation Slides Abbreviations 1. Characteristics, Evolution, And Classification Of Computers 2. Internal Data Representation In Computers 3. Digital Systems Design 4. Computer Architecture 5. Secondary Storage 6. Input-Output Devices 7. Software 8. Planning The Computer Program 9. Programming Languages 10. Operating Systems 11. Database And Data Science 12. Data Communications and Computer Networks 13. The Internet and Internet Of Things 14. Multimedia Computing 15. Information Security 16. Application Domains Glossary Index Know Your Author