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Discrete Mathematics - Mike Piff 1991-06-27

Discrete mathematics is the basic language which every student of computing should take pride in mastering and this book should prove an essential tool in this aim.

Guide to Discrete Mathematics - Gerard O'Regan 2021-10-29

This stimulating textbook presents a broad and accessible guide to the fundamentals of discrete mathematics, highlighting how the techniques may be applied to various exciting areas in computing. The text is designed to motivate and inspire the reader, encouraging further study in this important skill. Features: This book provides an introduction to the building blocks of discrete mathematics, including sets, relations and functions; describes the basics of number theory, the techniques of induction and recursion, and the applications of mathematical sequences, series, permutations, and combinations; presents the essentials of algebra; explains the fundamentals of automata theory, matrices, graph theory, cryptography, coding theory, language theory, and the concepts of computability and decidability; reviews the history of logic, discussing propositional and predicate logic, as well as advanced topics such as the nature of theorem proving; examines the field of software engineering, including software reliability and dependability and describes formal methods; investigates probability and statistics and presents an overview of operations research and financial mathematics.

Lectures On Discrete Mathematics For Computer Science - Khousainov Bakhadyr M 2012-03-21

This textbook presents fundamental topics in discrete mathematics introduced from the perspectives of a pure mathematician and an applied computer scientist. The synergy between the two complementary perspectives is seen throughout the book; key concepts are motivated and explained through real-world examples, and yet are still formalized with mathematical rigor. The book is an excellent introduction to discrete mathematics for computer science, software engineering, and mathematics students. The first author is a leading mathematician in the area of logic, computability, and theoretical computer science, with more than 25 years of teaching and research experience. The second author is a computer science PhD student at the University of Washington specializing in database systems. The father-and-daughter team merges two different views to create a unified book for students interested in learning discrete mathematics, the connections between discrete mathematics and computer science, and the mathematical foundations of computer science. Readers will learn how to formally define abstract concepts, reason about objects (such as programs, graphs and numbers), investigate properties of algorithms, and prove their correctness. The textbook studies several well-known algorithmic problems including the path problem for graphs and finding the greatest common divisor,

inductive definitions, proofs of correctness of algorithms via loop invariants and induction, the basics of formal methods such as propositional logic, finite state machines, counting, probability, as well as the foundations of databases such as relational calculus.

Computational Discrete Mathematics - Sriram Pemmaraju 2009-10-15

This book was first published in 2003. Combinatorica, an extension to the popular computer algebra system Mathematica®, is the most comprehensive software available for teaching and research applications of discrete mathematics, particularly combinatorics and graph theory. This book is the definitive reference/user's guide to Combinatorica, with examples of all 450 Combinatorica functions in action, along with the associated mathematical and algorithmic theory. The authors cover classical and advanced topics on the most important combinatorial objects: permutations, subsets, partitions, and Young tableaux, as well as all important areas of graph theory: graph construction operations, invariants, embeddings, and algorithmic graph theory. In addition to being a research tool, Combinatorica makes discrete mathematics accessible in new and exciting ways to a wide variety of people, by encouraging computational experimentation and visualization. The book contains no formal proofs, but enough discussion to understand and appreciate all the algorithms and theorems it contains.

Discrete Mathematics for Computing - Peter Grossman 2008-12-16

For first-year undergraduate computing students with very little mathematical background, this is a low-level introductory text which takes the topics at a gentle pace, covering all the essential material that forms the background for studies in computing and information systems.

Discrete Mathematics for Computer Science - Jon Pierre Fortney
2020-12-24

"Discrete Mathematics for Computer Science: An Example-Based Introduction is intended for a first or second-year discrete mathematics course for computer science majors. It covers many important mathematical topics essential for future computer science majors, such as algorithms, number representations, logic, set theory, Boolean algebra, functions, combinatorics, algorithmic complexity, graphs, and

trees. Features designed to be especially useful for courses at the community college level Ideal as a first or second-year textbook for computer science majors, or as a general introduction to discrete mathematics Written to be accessible to those with a limited mathematics background and to aid with the transition to abstract thinking Filled with over 200 worked examples, boxed for easy reference, and over 200 practice problems with answers. Contains approximately 40 simple algorithms to aid students in becoming proficient with algorithm control structures and pseudocode. An appendix on basic circuit design provides a real-world motivational example for computer science majors by drawing on multiple topics covered in the book to design a circuit that adds two eight-digit binary numbers"--

Algorithms and Discrete Applied Mathematics - Apurva Mudgal
2021-01-28

This book constitutes the proceedings of the 7th International Conference on Algorithms and Discrete Applied Mathematics, CALDAM 2021, which was held in Rupnagar, India, during February 11-13, 2021. The 39 papers presented in this volume were carefully reviewed and selected from 82 submissions. The papers were organized in topical sections named: approximation algorithms; parameterized algorithms; computational geometry; graph theory; combinatorics and algorithms; graph algorithms; and computational complexity.

Discrete Mathematics - László Lovász 2006-05-11

Aimed at undergraduate mathematics and computer science students, this book is an excellent introduction to a lot of problems of discrete mathematics. It discusses a number of selected results and methods, mostly from areas of combinatorics and graph theory, and it uses proofs and problem solving to help students understand the solutions to problems. Numerous examples, figures, and exercises are spread throughout the book.

Discrete Mathematical Structures for Computer Science - Bernard Kolman 1987

This text has been designed as a complete introduction to discrete mathematics, primarily for computer science majors in either a one or

two semester course. The topics addressed are of genuine use in computer science, and are presented in a logically coherent fashion. The material has been organized and interrelated to minimize the mass of definitions and the abstraction of some of the theory. For example, relations and directed graphs are treated as two aspects of the same mathematical idea. Whenever possible each new idea uses previously encountered material, and then developed in such a way that it simplifies the more complex ideas that follow.

Discrete Mathematics Using a Computer - Cordelia Hall 2013-04-17

Several areas of mathematics find application throughout computer science, and all students of computer science need a practical working understanding of them. These core subjects are centred on logic, sets, recursion, induction, relations and functions. The material is often called discrete mathematics, to distinguish it from the traditional topics of continuous mathematics such as integration and differential equations. The central theme of this book is the connection between computing and discrete mathematics. This connection is useful in both directions: • Mathematics is used in many branches of computer science, in applications including program specification, datastructures, design and analysis of algorithms, database systems, hardware design, reasoning about the correctness of implementations, and much more; • Computers can help to make the mathematics easier to learn and use, by making mathematical terms executable, making abstract concepts more concrete, and through the use of software tools such as proof checkers. These connections are emphasised throughout the book. Software tools (see Appendix A) enable the computer to serve as a calculator, but instead of just doing arithmetic and trigonometric functions, it will be used to calculate with sets, relations, functions, predicates and inferences. There are also special software tools, for example a proof checker for logical proofs using natural deduction.

Essential Discrete Mathematics for Computer Science - Harry Lewis 2019-03-19

Discrete mathematics is the basis of much of computer science, from algorithms and automata theory to combinatorics and graph theory.

Essential Discrete Mathematics for Computer Science aims to teach mathematical reasoning as well as concepts and skills by stressing the art of proof. It is fully illustrated in color, and each chapter includes a concise summary as well as a set of exercises.

Discrete Mathematics - Oscar Levin 2018-12-31

Note: This is the 3rd edition. If you need the 2nd edition for a course you are taking, it can be found as a "other format" on amazon, or by searching its isbn: 1534970746 This gentle introduction to discrete mathematics is written for first and second year math majors, especially those who intend to teach. The text began as a set of lecture notes for the discrete mathematics course at the University of Northern Colorado. This course serves both as an introduction to topics in discrete math and as the "introduction to proof" course for math majors. The course is usually taught with a large amount of student inquiry, and this text is written to help facilitate this. Four main topics are covered: counting, sequences, logic, and graph theory. Along the way proofs are introduced, including proofs by contradiction, proofs by induction, and combinatorial proofs. The book contains over 470 exercises, including 275 with solutions and over 100 with hints. There are also Investigate! activities throughout the text to support active, inquiry based learning. While there are many fine discrete math textbooks available, this text has the following advantages: It is written to be used in an inquiry rich course. It is written to be used in a course for future math teachers. It is open source, with low cost print editions and free electronic editions. This third edition brings improved exposition, a new section on trees, and a bunch of new and improved exercises. For a complete list of changes, and to view the free electronic version of the text, visit the book's website at discrete.openmathbooks.org

Understand Mathematics, Understand Computing - Arnold L. Rosenberg 2020-12-05

In this book the authors aim to endow the reader with an operational, conceptual, and methodological understanding of the discrete mathematics that can be used to study, understand, and perform computing. They want the reader to understand the elements of

computing, rather than just know them. The basic topics are presented in a way that encourages readers to develop their personal way of thinking about mathematics. Many topics are developed at several levels, in a single voice, with sample applications from within the world of computing. Extensive historical and cultural asides emphasize the human side of mathematics and mathematicians. By means of lessons and exercises on “doing” mathematics, the book prepares interested readers to develop new concepts and invent new techniques and technologies that will enhance all aspects of computing. The book will be of value to students, scientists, and engineers engaged in the design and use of computing systems, and to scholars and practitioners beyond these technical fields who want to learn and apply novel computational ideas.

Discrete Mathematics with Applications - Thomas Koshy 2004-01-19
This approachable text studies discrete objects and the relationships that bind them. It helps students understand and apply the power of discrete math to digital computer systems and other modern applications. It provides excellent preparation for courses in linear algebra, number theory, and modern/abstract algebra and for computer science courses in data structures, algorithms, programming languages, compilers, databases, and computation. * Covers all recommended topics in a self-contained, comprehensive, and understandable format for students and new professionals * Emphasizes problem-solving techniques, pattern recognition, conjecturing, induction, applications of varying nature, proof techniques, algorithm development and correctness, and numeric computations * Weaves numerous applications into the text * Helps students learn by doing with a wealth of examples and exercises: - 560 examples worked out in detail - More than 3,700 exercises - More than 150 computer assignments - More than 600 writing projects * Includes chapter summaries of important vocabulary, formulas, and properties, plus the chapter review exercises * Features interesting anecdotes and biographies of 60 mathematicians and computer scientists * Instructor's Manual available for adopters * Student Solutions Manual available separately for purchase (ISBN: 0124211828)

Discrete Mathematics for Computer Science - Gary Haggard 2005

Master the fundamentals of discrete mathematics with DISCRETE MATHEMATICS FOR COMPUTER SCIENCE with Student Solutions Manual CD-ROM! An increasing number of computer scientists from diverse areas are using discrete mathematical structures to explain concepts and problems and this mathematics text shows you how to express precise ideas in clear mathematical language. Through a wealth of exercises and examples, you will learn how mastering discrete mathematics will help you develop important reasoning skills that will continue to be useful throughout your career.

Quantum Logic - Karl Svozil 1998-09-01

Quantum Logic deals with the foundations of quantum mechanics and, related to it, the behaviour of finite, discrete deterministic systems. The quantum logical approach is particularly suitable for the investigation and exclusion of certain hidden parameter models of quantum mechanics. Conversely, it can be used to embed quantum universes into classical ones. It is also highly relevant for the characterization of finite automation. This book has been written with a broad readership in mind. Great care has been given to the motivation of the concepts and to the explicit and detailed discussions of examples.

Mathematics of Discrete Structures for Computer Science - Gordon J. Pace 2012-07-09

Mathematics plays a key role in computer science, some researchers would consider computers as nothing but the physical embodiment of mathematical systems. And whether you are designing a digital circuit, a computer program or a new programming language, you need mathematics to be able to reason about the design -- its correctness, robustness and dependability. This book covers the foundational mathematics necessary for courses in computer science. The common approach to presenting mathematical concepts and operators is to define them in terms of properties they satisfy, and then based on these definitions develop ways of computing the result of applying the operators and prove them correct. This book is mainly written for computer science students, so here the author takes a different approach: he starts by defining ways of calculating the results of

applying the operators and then proves that they satisfy various properties. After justifying his underlying approach the author offers detailed chapters covering propositional logic, predicate calculus, sets, relations, discrete structures, structured types, numbers, and reasoning about programs. The book contains chapter and section summaries, detailed proofs and many end-of-section exercises -- key to the learning process. The book is suitable for undergraduate and graduate students, and although the treatment focuses on areas with frequent applications in computer science, the book is also suitable for students of mathematics and engineering.

Discrete Mathematics for Computer Science - David Liben-Nowell 2017

Discrete Mathematics and Graph Theory - K. Erciyes 2021-01-28

This textbook can serve as a comprehensive manual of discrete mathematics and graph theory for non-Computer Science majors; as a reference and study aid for professionals and researchers who have not taken any discrete math course before. It can also be used as a reference book for a course on Discrete Mathematics in Computer Science or Mathematics curricula. The study of discrete mathematics is one of the first courses on curricula in various disciplines such as Computer Science, Mathematics and Engineering education practices. Graphs are key data structures used to represent networks, chemical structures, games etc. and are increasingly used more in various applications such as bioinformatics and the Internet. Graph theory has gone through an unprecedented growth in the last few decades both in terms of theory and implementations; hence it deserves a thorough treatment which is not adequately found in any other contemporary books on discrete mathematics, whereas about 40% of this textbook is devoted to graph theory. The text follows an algorithmic approach for discrete mathematics and graph problems where applicable, to reinforce learning and to show how to implement the concepts in real-world applications.

Fundamentals of Discrete Math for Computer Science - Tom Jenkyns 2018-05-08

This clearly written textbook presents an accessible introduction to

discrete mathematics for computer science students, offering the reader an enjoyable and stimulating path to improve their programming competence. The text empowers students to think critically, to be effective problem solvers, to integrate theory and practice, and to recognize the importance of abstraction. Its motivational and interactive style provokes a conversation with the reader through a questioning commentary, and supplies detailed walkthroughs of several algorithms. This updated and enhanced new edition also includes new material on directed graphs, and on drawing and coloring graphs, in addition to more than 100 new exercises (with solutions to selected exercises). Topics and features: assumes no prior mathematical knowledge, and discusses concepts in programming as and when they are needed; designed for both classroom use and self-study, presenting modular and self-contained chapters that follow ACM curriculum recommendations; describes mathematical processes in an algorithmic manner, often supported by a walkthrough demonstrating how the algorithm performs the desired task; includes an extensive set of exercises throughout the text, together with numerous examples, and shaded boxes highlighting key concepts; selects examples that demonstrate a practical use for the concept in question. Students embarking on the start of their studies of computer science will find this book to be an easy-to-understand and fun-to-read primer, ideal for use in a mathematics course taken concurrently with their first programming course.

Discrete Mathematics with Proof - Eric Gossett 2009-06-22

A Trusted Guide to Discrete Mathematics with Proof? Now in a Newly Revised Edition Discrete mathematics has become increasingly popular in recent years due to its growing applications in the field of computer science. Discrete Mathematics with Proof, Second Edition continues to facilitate an up-to-date understanding of this important topic, exposing readers to a wide range of modern and technological applications. The book begins with an introductory chapter that provides an accessible explanation of discrete mathematics. Subsequent chapters explore additional related topics including counting, finite probability theory, recursion, formal models in computer science, graph theory, trees, the

concepts of functions, and relations. Additional features of the Second Edition include: An intense focus on the formal settings of proofs and their techniques, such as constructive proofs, proof by contradiction, and combinatorial proofs. New sections on applications of elementary number theory, multidimensional induction, counting tulips, and the binomial distribution. Important examples from the field of computer science presented as applications including the Halting problem, Shannon's mathematical model of information, regular expressions, XML, and Normal Forms in relational databases. Numerous examples that are not often found in books on discrete mathematics including the deferred acceptance algorithm, the Boyer-Moore algorithm for pattern matching, Sierpinski curves, adaptive quadrature, the Josephus problem, and the five-color theorem. Extensive appendices that outline supplemental material on analyzing claims and writing mathematics, along with solutions to selected chapter exercises. Combinatorics receives a full chapter treatment that extends beyond the combinations and permutations material by delving into non-standard topics such as Latin squares, finite projective planes, balanced incomplete block designs, coding theory, partitions, occupancy problems, Stirling numbers, Ramsey numbers, and systems of distinct representatives. A related Web site features animations and visualizations of combinatorial proofs that assist readers with comprehension. In addition, approximately 500 examples and over 2,800 exercises are presented throughout the book to motivate ideas and illustrate the proofs and conclusions of theorems. Assuming only a basic background in calculus, *Discrete Mathematics with Proof, Second Edition* is an excellent book for mathematics and computer science courses at the undergraduate level. It is also a valuable resource for professionals in various technical fields who would like an introduction to discrete mathematics.

Foundation Discrete Mathematics for Computing - DEXTER J. BOOTH
2013-12-19

Mathematics for Computer Scientists -

Discrete Mathematics and Computing - Malik Magdon-Ismael
2019-12-14

This text is a semester course in the basic mathematical and theoretical foundations of computer science. Students who make heavy use of computing should learn these foundations well, setting a base for a follow-on course in algorithms. A solid theoretical and algorithmic foundation in computer science sets the stage for developing good programs, programs that work, always and efficiently. Each chapter is a lecture that has been taught as such. Part I starts with basic logic, proofs and discrete mathematics, including: induction, recursion, summation, asymptotics and number theory. We then continue with graphs, counting and combinatorics, and wrap up the coverage of discrete mathematics with discrete probability. Part II presents the blockbuster application of discrete mathematics: the digital computer and a theory of computing. The goal is to understand what a computer can and cannot do. We start small, with automata, and end big with Turing Machines. Our approach is Socratic. The reader is encouraged to participate actively in the learning process by doing the quizzes and exercises that are liberally sprinkled through the text. The pace and level is appropriate for readers with one year of training in programming and calculus (college sophomores).

Discrete Mathematics for Computing - Andrew Vince 1990

This text is suitable for an introductory course in the mathematics related to computing, generally referred to as discrete mathematics. Topics covered include set theory, logic, and methods of proof, graphs, digraphs and trees, number systems and matrix algebra, and an introduction to binary codes. Throughout the book, the interrelations between the mathematical structures and their representations is stressed, and use is made of 'action diagrams' as a language-independent means of presenting algorithmic processes. Readers who work through this text will acquire the mathematical knowledge and approach to problem solving required by introductory computing courses, and a sound bases from which to pursue the subject further.

Discrete Mathematics for Computer Scientists - Clifford Stein 2011
Stein/Drysdale/Bogart's *Discrete Mathematics for Computer Scientists* is

ideal for computer science students taking the discrete math course. Written specifically for computer science students, this unique textbook directly addresses their needs by providing a foundation in discrete math while using motivating, relevant CS applications. This text takes an active-learning approach where activities are presented as exercises and the material is then fleshed out through explanations and extensions of the exercises.

Discrete Computational Structures - Robert R. Korfhage 2014-05-12
Discrete Computational Structures describes discrete mathematical concepts that are important to computing, covering necessary mathematical fundamentals, computer representation of sets, graph theory, storage minimization, and bandwidth. The book also explains conceptual framework (Gorn trees, searching, subroutines) and directed graphs (flowcharts, critical paths, information network). The text discusses algebra particularly as it applies to concentrates on semigroups, groups, lattices, propositional calculus, including a new tabular method of Boolean function minimization. The text emphasizes combinatorics and probability. Examples show different techniques of the general process of enumerating objects. Combinatorics cover permutations, enumerators for combinations, Stirling numbers, cycle classes of permutations, partitions, and compositions. The book cites as example the interplay between discrete mathematics and computing using a system of distinct representatives (SDR) problem. The problem, originating from group theory, graph theory, and set theory can be worked out by the student with a network model involving computers to generate and analyze different scenarios. The book is intended for sophomore or junior level, corresponding to the course B3, "Introduction to Discrete Structures," in the ACM Curriculum 68, as well as for mathematicians or professors of computer engineering and advanced mathematics.

Introductory Discrete Mathematics - V. K. Balakrishnan 2012-04-30
This concise, undergraduate-level text focuses on combinatorics, graph theory with applications to some standard network optimization problems, and algorithms. More than 200 exercises, many with complete

solutions. 1991 edition.

Discrete Mathematics for Computer Science - Jon Pierre Fortney 2020-12-23

Discrete Mathematics for Computer Science: An Example-Based Introduction is intended for a first- or second-year discrete mathematics course for computer science majors. It covers many important mathematical topics essential for future computer science majors, such as algorithms, number representations, logic, set theory, Boolean algebra, functions, combinatorics, algorithmic complexity, graphs, and trees. Features Designed to be especially useful for courses at the community-college level Ideal as a first- or second-year textbook for computer science majors, or as a general introduction to discrete mathematics Written to be accessible to those with a limited mathematics background, and to aid with the transition to abstract thinking Filled with over 200 worked examples, boxed for easy reference, and over 200 practice problems with answers Contains approximately 40 simple algorithms to aid students in becoming proficient with algorithm control structures and pseudocode Includes an appendix on basic circuit design which provides a real-world motivational example for computer science majors by drawing on multiple topics covered in the book to design a circuit that adds two eight-digit binary numbers Jon Pierre Fortney graduated from the University of Pennsylvania in 1996 with a BA in Mathematics and Actuarial Science and a BSE in Chemical Engineering. Prior to returning to graduate school, he worked as both an environmental engineer and as an actuarial analyst. He graduated from Arizona State University in 2008 with a PhD in Mathematics, specializing in Geometric Mechanics. Since 2012, he has worked at Zayed University in Dubai. This is his second mathematics textbook.

Mathematics for Computer Science - Eric Lehman 2017-03-08
This book covers elementary discrete mathematics for computer science and engineering. It emphasizes mathematical definitions and proofs as well as applicable methods. Topics include formal logic notation, proof methods; induction, well-ordering; sets, relations; elementary graph theory; integer congruences; asymptotic notation and growth of

functions; permutations and combinations, counting principles; discrete probability. Further selected topics may also be covered, such as recursive definition and structural induction; state machines and invariants; recurrences; generating functions.

Mathematical Structures for Computer Science - Judith L. Gersting
2014-01-01

Judith Gersting's *Mathematical Structures for Computer Science* has long been acclaimed for its clear presentation of essential concepts and its exceptional range of applications relevant to computer science majors. Now with this new edition, it is the first discrete mathematics textbook revised to meet the proposed new ACM/IEEE standards for the course.

Practical Discrete Mathematics - Ryan T. White 2021-02-22

A practical guide simplifying discrete math for curious minds and demonstrating its application in solving problems related to software development, computer algorithms, and data science

Key Features

- Apply the math of countable objects to practical problems in computer science
- Explore modern Python libraries such as scikit-learn, NumPy, and SciPy for performing mathematics
- Learn complex statistical and mathematical concepts with the help of hands-on examples and expert guidance

Book Description

Discrete mathematics deals with studying countable, distinct elements, and its principles are widely used in building algorithms for computer science and data science. The knowledge of discrete math concepts will help you understand the algorithms, binary, and general mathematics that sit at the core of data-driven tasks. *Practical Discrete Mathematics* is a comprehensive introduction for those who are new to the mathematics of countable objects. This book will help you get up to speed with using discrete math principles to take your computer science skills to a more advanced level. As you learn the language of discrete mathematics, you'll also cover methods crucial to studying and describing computer science and machine learning objects and algorithms. The chapters that follow will guide you through how memory and CPUs work. In addition to this, you'll understand how to analyze data for useful patterns, before finally

exploring how to apply math concepts in network routing, web searching, and data science. By the end of this book, you'll have a deeper understanding of discrete math and its applications in computer science, and be ready to work on real-world algorithm development and machine learning. What you will learn

- Understand the terminology and methods in discrete math and their usage in algorithms and data problems
- Use Boolean algebra in formal logic and elementary control structures
- Implement combinatorics to measure computational complexity and manage memory allocation
- Use random variables, calculate descriptive statistics, and find average-case computational complexity
- Solve graph problems involved in routing, pathfinding, and graph searches, such as depth-first search
- Perform ML tasks such as data visualization, regression, and dimensionality reduction

Who this book is for

This book is for computer scientists looking to expand their knowledge of discrete math, the core topic of their field. University students looking to get hands-on with computer science, mathematics, statistics, engineering, or related disciplines will also find this book useful. Basic Python programming skills and knowledge of elementary real-number algebra are required to get started with this book.

Concrete Mathematics: A Foundation for Computer Science - Ronald L. Graham 1994

Discrete Structures, Logic, and Computability - James L. Hein 2001

Discrete Structure, Logic, and Computability introduces the beginning computer science student to some of the fundamental ideas and techniques used by computer scientists today, focusing on discrete structures, logic, and computability. The emphasis is on the computational aspects, so that the reader can see how the concepts are actually used. Because of logic's fundamental importance to computer science, the topic is examined extensively in three phases that cover informal logic, the technique of inductive proof; and formal logic and its applications to computer science.

Fundamentals of Discrete Math for Computer Science - Tom Jenkyns 2012-10-16

This textbook provides an engaging and motivational introduction to traditional topics in discrete mathematics, in a manner specifically designed to appeal to computer science students. The text empowers students to think critically, to be effective problem solvers, to integrate theory and practice, and to recognize the importance of abstraction. Clearly structured and interactive in nature, the book presents detailed walkthroughs of several algorithms, stimulating a conversation with the reader through informal commentary and provocative questions. Features: no university-level background in mathematics required; ideally structured for classroom-use and self-study, with modular chapters following ACM curriculum recommendations; describes mathematical processes in an algorithmic manner; contains examples and exercises throughout the text, and highlights the most important concepts in each section; selects examples that demonstrate a practical use for the concept in question.

Sets, Logic and Maths for Computing - David Makinson 2012-02-27

This easy-to-follow textbook introduces the mathematical language, knowledge and problem-solving skills that undergraduates need to study computing. The language is in part qualitative, with concepts such as set, relation, function and recursion/induction; but it is also partly quantitative, with principles of counting and finite probability. Entwined with both are the fundamental notions of logic and their use for representation and proof. Features: teaches finite math as a language for thinking, as much as knowledge and skills to be acquired; uses an intuitive approach with a focus on examples for all general concepts; brings out the interplay between the qualitative and the quantitative in all areas covered, particularly in the treatment of recursion and induction; balances carefully the abstract and concrete, principles and proofs, specific facts and general perspectives; includes highlight boxes that raise common queries and clear confusions; provides numerous exercises, with selected solutions.

The Discrete Math Workbook - Sergei Kurgalin 2018-07-31

This practically-oriented textbook presents an accessible introduction to discrete mathematics through a substantial collection of classroom-

tested exercises. Each chapter opens with concise coverage of the theory underlying the topic, reviewing the basic concepts and establishing the terminology, as well as providing the key formulae and instructions on their use. This is then followed by a detailed account of the most common problems in the area, before the reader is invited to practice solving such problems for themselves through a varied series of questions and assignments. Topics and features: provides an extensive set of exercises and examples of varying levels of complexity, suitable for both laboratory practical training and self-study; offers detailed solutions to many problems, applying commonly-used methods and computational schemes; introduces the fundamentals of mathematical logic, the theory of algorithms, Boolean algebra, graph theory, sets, relations, functions, and combinatorics; presents more advanced material on the design and analysis of algorithms, including asymptotic analysis, and parallel algorithms; includes reference lists of trigonometric and finite summation formulae in an appendix, together with basic rules for differential and integral calculus. This hands-on study guide is designed to address the core needs of undergraduate students training in computer science, informatics, and electronic engineering, emphasizing the skills required to develop and implement an algorithm in a specific programming language.

Logic and Discrete Mathematics - Willem Conradie 2015-05-08

Solutions manual to accompany *Logic and Discrete Mathematics: A Concise Introduction* This book features a unique combination of comprehensive coverage of logic with a solid exposition of the most important fields of discrete mathematics, presenting material that has been tested and refined by the authors in university courses taught over more than a decade. Written in a clear and reader-friendly style, each section ends with an extensive set of exercises, most of them provided with complete solutions which are available in this accompanying solutions manual.

Mathematics in Computing - Gerard O'Regan 2020-01-10

This illuminating textbook provides a concise review of the core concepts in mathematics essential to computer scientists. Emphasis is placed on

the practical computing applications enabled by seemingly abstract mathematical ideas, presented within their historical context. The text spans a broad selection of key topics, ranging from the use of finite field theory to correct code and the role of number theory in cryptography, to the value of graph theory when modelling networks and the importance of formal methods for safety critical systems. This fully updated new edition has been expanded with a more comprehensive treatment of algorithms, logic, automata theory, model checking, software reliability and dependability, algebra, sequences and series, and mathematical induction. Topics and features: includes numerous pedagogical features, such as chapter-opening key topics, chapter introductions and summaries, review questions, and a glossary; describes the historical contributions of such prominent figures as Leibniz, Babbage, Boole, and von Neumann; introduces the fundamental mathematical concepts of sets, relations and functions, along with the basics of number theory, algebra, algorithms, and matrices; explores arithmetic and geometric sequences and series, mathematical induction and recursion, graph theory, computability and decidability, and automata theory; reviews the

core issues of coding theory, language theory, software engineering, and software reliability, as well as formal methods and model checking; covers key topics on logic, from ancient Greek contributions to modern applications in AI, and discusses the nature of mathematical proof and theorem proving; presents a short introduction to probability and statistics, complex numbers and quaternions, and calculus. This engaging and easy-to-understand book will appeal to students of computer science wishing for an overview of the mathematics used in computing, and to mathematicians curious about how their subject is applied in the field of computer science. The book will also capture the interest of the motivated general reader.

Discrete Mathematics for Computing - Rod Haggarty 2002

A concise introduction to key mathematical ideas for computing students which develops their understanding of discrete mathematics and its application in computing. The topics are presented in a logical order that build upon each other and are constantly reinforced by worked examples. Reliance on students' previous mathematical experience is kept to a minimum, though some basic algebraic manipulation is required.