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Mathematics of Discrete Structures for Computer Science



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Katrin Zwirgmaier



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[Applied Discrete Structures for Computer Science](#) Alan Doerr, Kenneth Levasseur, 1989 *Discrete Structures* Fletcher R. Norris, 1985 *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

Discrete Mathematics for Computer Science Gary Haggard, John Schlipf, Sue Whitesides, 2006 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

Lectures On Discrete Mathematics For Computer Science Bakhadyr M Khoussainov, Nodira Khoussainova, 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

Fundamentals of Discrete Math for Computer Science Tom Jenkyns, Ben Stephenson, 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

Discrete Structures Andreas Klappenecker, Hyunyoung Lee, 2025-02-18 The aim of this text is to introduce discrete mathematics to beginning students of mathematics or computer science It does this by bringing some coherency into the seemingly incongruent subjects that compose discrete math such as logic set theory algebra and combinatorics It emphasizes their theoretical foundations and illustrates proofs along the way The book prepares readers for the analysis of algorithms by discussing asymptotic analysis and a discrete calculus for sums The book also deduces combinatorial methods from the foundations that are laid out Unlike other texts on this subject there is a greater emphasis on foundational material that leads to a better understanding To further assist the reader in grasping and practicing concepts roughly 690 exercises are provided at various levels of difficulty Readers are encouraged to study the examples in the text and solve as many of the exercises as possible The text is intended for freshman or sophomore undergraduate students in mathematics computer science or similar majors The assumed background is precalculus The chapter dependency chart included is designed to help students independent readers and instructors follow a systematic path for learning and teaching the material with the option to explore material in later chapters

Mathematical Structures for Computer Science Judith L. Gersting, 2007 This edition offers a pedagogically rich and intuitive introduction to discrete mathematics structures It meets the needs of computer science majors by being both comprehensive and accessible

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 **Discrete Mathematics for Computer Science** Kenneth Bogart, Clifford Stein, Robert L. Drysdale, 2005-09-08 Discrete Mathematics for Computer Science is the perfect text to combine the fields of mathematics and computer science Written by leading academics in the field of computer science readers will gain the skills needed to write and understand the concept of proof This text teaches all the math with the exception of linear algebra that is needed to succeed in computer science The book explores the topics of basic combinatorics number and graph theory logic and proof techniques and many more Appropriate for large or small class sizes or self study for the motivated professional reader Assumes familiarity with data structures Early treatment of number theory and combinatorics allow readers to explore RSA encryption early and also to encourage them to use their knowledge of hashing and trees from CS2 before those topics are covered in this course **Discrete Mathematical Structures for Computer Science** Bernard Kolman, Robert C. Busby, 1984 *Discrete Structures, Logic, and Computability* James Hein, 2010-10-25 Thoroughly updated the new Third Edition of Discrete Structures Logic and Computability introduces beginning computer science and computer engineering students to the fundamental techniques and ideas used by computer scientists today focusing on topics from the fields of mathematics logic and computer science itself Dr Hein provides elementary introductions to those ideas and techniques that are necessary to understand and practice the art and science of computing The text contains all the topics for discrete structures in the reports of the IEEE ACM Joint Task Force on Computing Curricula for computer science programs and for computer engineering programs **Applied Discrete Structures** K. D. Joshi, 1997 Although This Book Is Intended As A Sequel To Foundations Of Discrete Mathematics By The Same Author It Can Be Read Independently Of The Latter As The Relevant Background Needed Has Been Reviewed In Chapter 1 The Subsequent Chapters Deal With Graph Theory With Applications Analysis Of Algorithms With A Detailed Study Of A Few Sorting Algorithms And A Discussion Of Tractability Linear Programming With Applications Variations Karmarkars Polynomial Time Algorithm Integer And Quadratic Programming Applications Of Algebra To Polya's Theory Of Counting Galois Theory Coding Theory Of Designs A Chapter On Matroids Familiarises The Reader With This Relatively New Branch Of Discrete Mathematics Even Though Some Of The Topics Are Relatively Advanced An Attempt Has Been Made To Keep The Style Elementary So That A Sincere Student Can Read The Book On His Own A Large Number Of Comments Exercises And References Is Included To Broaden The Readers Scope Of Vision A Detailed Index Is Provided For Easy Reference **Discrete Structures and Their Interactions** Jason I. Brown, 2013-06-24 Discover the Connections between Different Structures and Fields Discrete Structures and Their Interactions highlights the connections among various discrete structures including graphs directed graphs hypergraphs partial orders finite topologies and simplicial complexes It also explores their relationships to classical areas of mathematics such as linear and multilinear algebra analysis probability logic and topology The text introduces a number of discrete

structures such as hypergraphs finite topologies preorders simplicial complexes and order ideals of monomials that most graduate students in combinatorics and even some researchers in the field seldom experience The author explains how these structures have important applications in many areas inside and outside of combinatorics He also discusses how to recognize valuable research connections through the structures Intended for graduate and upper level undergraduate students in mathematics who have taken an initial course in discrete mathematics or graph theory this book shows how discrete structures offer new insights into the classical fields of mathematics It illustrates how to use discrete structures to represent the salient features and discover the underlying combinatorial principles of seemingly unrelated areas of mathematics

Basic Discrete Structures (UUM Press) Roshidi Din,Siti Sakira Kamaruddin,Angela Amphawan ,Mohd Nizam Omar,2015-11-01 Digital technology has pervaded almost all spheres of life Due to the importance of discrete information in our increasingly digital world familiarity with the underlying principles concepts and operations on discrete information is inevitable This book is intended as a basic course for introducing students to abstract mathematical structures to represent discrete information and relationships between them These discrete structures include sets sequences permutations combinations functions trees and finite state machines which are predominantly used in computer science and data networking and extended to fields which involve the organization computation or optimization of objects from a large data set such as to botany geography chemistry genetics zoology finance and linguistics While the book is light a good balance is struck between the teaching of basic concepts and the exposure to practical applications to demonstrate the relevance and practicality of discrete structures in modeling and solving real world problems Fundamentals of Discrete Structures Gary M. Weiss,Damian M. Lyons,Christina Papadakis-Kanaris,Arthur G. Werschulz,2010-08-13 *Discrete Structures of Computer Science* Leon S. Levy,1980 Applied Discrete Structures - Part 1 Ken Levasseur,Al Doerr,2017-05-02 This is Part 1 of Applied Discrete Structures containing the fundamental concepts taught in a one semester course in discrete mathematics It corresponds with the content of Discrete Structures I at UMass Lowell which is a required course for students in Computer Science Mathematics and Information Technology Part II Applied Abstract Algebra would normally be used in a second semester course such as Discrete Structures II at UMass Lowell Applied Discrete Structures has been approved by the American Institute of Mathematics as part of their Open Textbook Initiative For more information on open textbooks visit <http://www.aimath.org/textbooks> This version was created using Mathbook XML <https://mathbook.pugetsound.edu> Version 3 6 May 2019

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