Discrete Structures, Logic, and Computability

FOURTH EDITION

James L. Hein

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Discrete Structures, Logic, and Computability James L. Hein,2015-12-11 Following the recent updates to the 2013 ACM IEEE Computer Science curricula Discrete Structures Logic and Computability Fourth Edition has been designed for the discrete math course that covers one to two semesters Dr Hein presents material in a spiral medthod of learning introducing basic information about a topic allowing the students to work on the problem and revisit the topic as new information and skills are established Written for prospective computer scientist computer engineers or applied mathematicians who want to learn about the ideas that inspire computer science this edition contains an extensive coverage of logic setting it apart from similar books available in the field of Computer Science   *Discrete Structures, Logic, and Computability* James L. Hein,2009-02-25   **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 Structures Logic and Computability 4E (Paper)** Jones & Bartlett Learning, LLC,2023-12-29   **Discrete Structures, Logic, and Computability, 3/e** Hein,2010-07 Written for the prospective computer scientist computer engineer or applied mathematician Discrete Structures Logic and Computability Third Edition 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 highlighted in the reports put forth by the IEEE ACM Joint Task Force on Computing Curricula for both computer science and computer engineering programs The author supports a spiral method of learning by introducing the basics of a given topic and then revisiting the topic whenever new skills or knowledge about the topic are needed to solve problems This approach allows students to master key material and maximizes their problem solving ability   Discrete Mathematics James L. Hein,2003 Discrete Mathematical Structures B. V. Senthil Kumar,Hemen Dutta,2019-07-08 This book contains fundamental concepts on discrete mathematical structures in an easy to understand style so that the reader can grasp the contents and explanation easily The concepts of discrete mathematical structures have application to computer science engineering and information technology including in coding techniques switching circuits pointers and linked allocation error corrections as well as in data networking Chemistry Biology and many other scientific areas The book is for undergraduate and graduate levels learners and educators associated with various courses and progammes in Mathematics Computer Science Engineering and Information Technology The book should serve as a text and reference guide to many undergraduate and graduate programmes offered by many institutions including colleges and universities Readers will find solved examples and

end of chapter exercises to enhance reader comprehension Features Offers comprehensive coverage of basic ideas of Logic Mathematical Induction Graph Theory Algebraic Structures and Lattices and Boolean Algebra Provides end of chapter solved examples and practice problems Delivers materials on valid arguments and rules of inference with illustrations Focuses on algebraic structures to enable the reader to work with discrete structures *Discrete Structures* Harriet Fell,Javed Aslam,2016-12-19 Discrete Structures introduces readers to the mathematical structures and methods that form the foundation of computer science and features multiple techniques that readers will turn to regularly throughout their careers in computer and information sciences Over the course of five modules students learn specific skills including binary and modular arithmetic set notation methods of counting evaluating sums and solving recurrences They study the basics of probability proof by induction growth of functions and analysis techniques The book also discusses general problem solving techniques that are widely applicable to real problems Each module includes motivation applications technique theory and further opportunities for application Informed by extensive experience teaching in computer science programs Discrete Structures has been developed specifically for first year students in those programs The material is also suitable for courses in computer engineering as well as those for students who are transferring from other disciplines and just beginning their computer science or engineering education *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 Computable Structures and the Hyperarithmetical Hierarchy C.J. Ash,J. Knight,2000-06-16 This book describes a program of research in computable structure theory The goal is to find definability conditions corresponding to bounds on complexity which persist

under isomorphism The results apply to familiar kinds of structures groups fields vector spaces linear orderings Boolean algebras Abelian p groups models of arithmetic There are many interesting results already but there are also many natural questions still to be answered The book is self contained in that it includes necessary background material from recursion theory ordinal notations the hyperarithmetical hierarchy and model theory infinitary formulas consistency properties **A Short Course in Discrete Mathematics** Edward A. Bender,S. Gill Williamson,2005-01-01 What sort of mathematics do I need for computer science In response to this frequently asked question a pair of professors at the University of California at San Diego created this text Its sources are two of the university s most basic courses Discrete Mathematics and Mathematics for Algorithm and System Analysis Intended for use by sophomores in the first of a two quarter sequence the text assumes some familiarity with calculus Topics include Boolean functions and computer arithmetic logic number theory and cryptography sets and functions equivalence and order and induction sequences and series Multiple choice questions for review appear throughout the text Original 2005 edition Notation Index Subject Index   Discrete Structures Fletcher R. Norris,1985   **Discrete Mathematics and Its Applications** Kenneth H. Rosen,2003 Discrete Mathematics and its Applications is a focused introduction to the primary themes in a discrete mathematics course as introduced through extensive applications expansive discussion and detailed exercise sets These themes include mathematical reasoning combinatorial analysis discrete structures algorithmic thinking and enhanced problem solving skills through modeling Its intent is to demonstrate the relevance and practicality of discrete mathematics to all students The Fifth Edition includes a more thorough and linear presentation of logic proof types and proof writing and mathematical reasoning This enhanced coverage will provide students with a solid understanding of the material as it relates to their immediate field of study and other relevant subjects The inclusion of applications and examples to key topics has been significantly addressed to add clarity to every subject True to the Fourth Edition the text specific web site supplements the subject matter in meaningful ways offering additional material for students and instructors Discrete math is an active subject with new discoveries made every year The continual growth and updates to the web site reflect the active nature of the topics being discussed The book is appropriate for a one or two term introductory discrete mathematics course to be taken by students in a wide variety of majors including computer science mathematics and engineering College Algebra is the only explicit prerequisite

Discrete Structures in Five Chapters Amin Witno,2010-07 This book serves a semester course in Discrete Mathematics covering selected topics in number theory logic and proofs set theory combinatorics and graph theory Although small in size the text is quite self contained and rigorous loaded with worked examples and exercises including many multiple choice questions to inspire a possible practice exam for students preparing for the Major Field Test   **Discrete Mathematical Algorithm, and Data Structures** Sanjib Sinha,2020-05-28 Readers will learn discrete mathematical abstracts as well as its implementation in algorithm and data structures shown in various programming languages such as C C PHP Java C Python

and Dart This book combines two major components of Mathematics and Computer Science under one roof Without the core conceptions and tools derived from discrete mathematics one cannot understand the abstract or the general idea involving algorithm and data structures in Computer Science The objects of data structures are basically objects of discrete mathematics This book tries to bridge the gap between two major components of Mathematics and Computer Science In any computer science course studying discrete mathematics is essential although they are taught separately except in a few cases Yet a comprehensive book combining these two major components is hard to find out not only that it is almost impossible to understand one without the help of other Hope this book will fill the gap Readers will learn discrete mathematical abstracts as well as its implementation in algorithm and data structures shown in various programming language such as C Java C Python and Dart 1 Introduction to the Discourse Is Discrete Mathematics enough to study Computer Science A short Introduction to Discrete Mathematics What is Discrete Mathematics What is the relationship between Discrete Mathematics and Computer Science Introducing necessary conceptions 2 Introduction to Programming Language and Boolean Algebra Logic Mathematics and Programming Language Introduction to Boolean Algebra 3 De Morgan s Laws on Boolean Algebra Logical Expression and Algorithm Logical Expression Short Circuit Evaluation Syntax Semantics and Conditional Execution Why we need Control Constructs Discrete Mathematical Notations and Algorithm 4 Data Structures in different Programming languages Mean Median and Mode Array the First Step to Data Structure Let us understand some Array features Set Theory Probability and Array Skewed Mean Maximized Median Complex Array Algorithm 5 Data Structures Abstractions and Implementation How objects work with each other More Algorithm and Time Complexity Introducing Data Structures How Calculus and Linear Algebra are Related to this Discourse 6 Data Structures in Detail Frequently Asked Questions about Data Structures Abstract Data Type ADT Linear Data Structures Modeling of a Structure ArrayList to overcome limitations of Array ArrayList or LinkedList which is faster Collection Framework in programming languages Stack and Queue in Java Deque a high performance Abstract Data Type 7 Algorithm Data Structure Collection Framework and Standard Template Library STL Introducing Algorithm Library Different types of Algorithms Binary Tree and Data Structure Collection Framework in Java Discrete Mathematical Abstractions and Implementation through Java Collection Comparator Comparable and Iterator Standard Template Library in C 8 Time Complexity Order of n or O n Big O Notation 9 Set Symmetric Difference and Propositional Logic Why Set is important in Data Structures How Symmetric Difference and Propositional Logic combine 10 Combinatorics and Counting Permutation and Combinations Permutation and Combination What Next   **Logic and Discrete Mathematics** Winfried Karl Grassmann,Jean-Paul Tremblay,1996 This book covers all the traditional topics of discrete mathematics logic sets relations functions and graphs and reflects recent trends in computer science Shows how to use discrete mathematics and logic for specifying new computer applications and how to reason about programs in a systematic way Describes Prolog a programming language

based on logic and a section on Miranda language bad on functions Features numerous examples which relate the mathematical concepts to problems in computer science   **Discrete Mathematical Structures** D. S. Malik,M. K. Sen,2004 Discrete Mathematical Structures teaches students the mathematical foundations of computer science including logic Boolean algebra basic graph theory finite state machines grammars and algorithms Authors Malik and Sen employ a classroom tested student focused approach that is conducive to effective learning Each chapter motivates students through the use of real world concrete examples and ample exercise sets provide additional practice All chapters contain extensive Worked Out Exercises designed to demonstrate problem solving techniques

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