

# Why Study Discrete Structures?

- Graph Isomorphism

$$f(a)=1$$

$$f(b)=6$$

$$f(c)=8$$

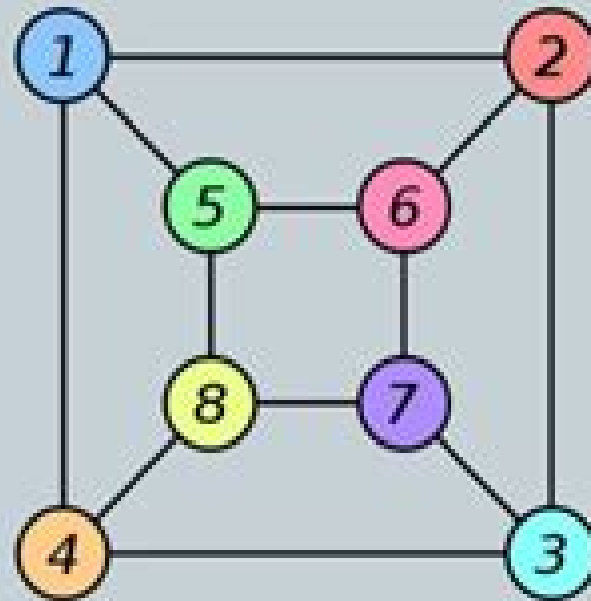
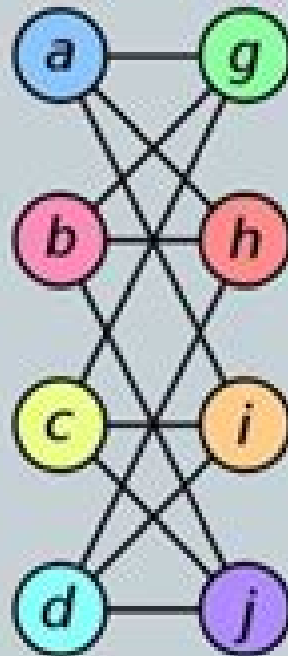
$$f(d)=3$$

$$f(g)=5$$

$$f(h)=2$$

$$f(i)=4$$

$$f(j)=7$$



$G$  &  $G'$  – isomorphic if there exists a fn  $f: V(G) \rightarrow V(G')$  if  $f$  is 1-1 onto and for each pair of vertices  $u$  &  $v$  of  $G$  belonging to  $E(G)$  iff  $f(u), f(v)$  belong to  $E(G')$

# Mathematics Of Discrete Structures For Computer Science

**Judith L. Gersting**



## **Mathematics Of Discrete Structures For Computer Science:**

Mathematics of Discrete Structures for Computer Science Gordon J. Pace, 2012-09-13 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

*Mathematics of Discrete Structures for Computer Science* Gordon J. Pace, 2012-09-14 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* 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 Structures** Fletcher R. Norris,1985     **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     **Applied Discrete Structures for Computer Science** Alan Doerr,Kenneth Levasseur,1989     **Discrete Mathematical Structures for Computer Science** Bernard Kolman,Robert C. Busby,1984

*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,Ben Stephenson,2012-08-28 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     Mathematical Structures for Computer Science Judith L. Gersting,2014-03-01 Judith Gerstings

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     Discrete Mathematical Structures with Applications to Computer Science Jean-Paul Tremblay,R. Manohar,1975     **Discrete Structures** Andreas Klappenecker,Hyunyoung Lee,2024-11-11     **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     *Logic and Discrete Mathematics* Winfried Karl Grassmann,Jean-Paul Tremblay,1996 For one two semester sophomore level courses in Discrete Mathematics This text covers all the traditional topics of discrete mathematics logic sets relations functions and graphs and reflects recent trends in computer science     Discrete Structures Harriet Fell,Javed Aslam,2016-12-21 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     **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 method 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 Mathematics and Its Applications Kenneth H. Rosen, 1999 This text is designed for the sophomore junior level introduction to discrete mathematics taken by students preparing for future coursework in areas such as math computer science and engineering Rosen has become a bestseller largely due to how effectively it addresses the main portion of the discrete market which is typically characterized as the mid to upper level in rigor The strength of Rosen's approach has been the effective balance of theory with relevant applications as well as the overall comprehensive nature of the topic coverage

Discrete Mathematics with Computer Science Applications Romualdas Skvarcius, William B. Robinson, 1986 *Discrete Structures and Their Interactions* Jason I. Brown, 2016-04-19 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 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

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