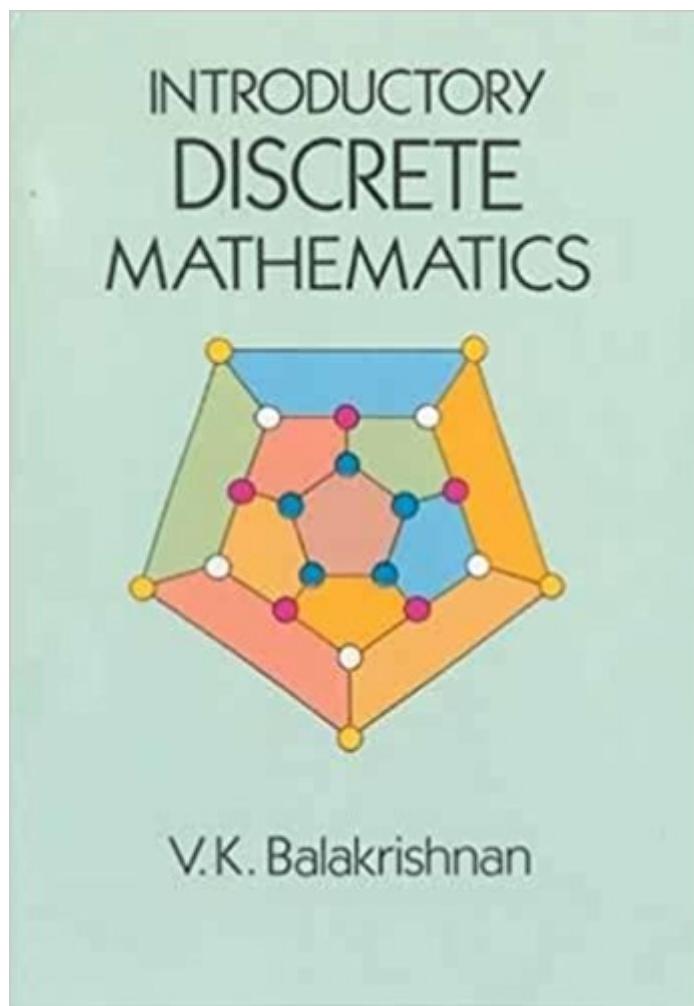


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Introductory Discrete Mathematics (Dover Books On Computer Science)



Synopsis

This concise text offers an introduction to discrete mathematics for undergraduate students in computer science and mathematics. Mathematics educators consider it vital that their students be exposed to a course in discrete methods that introduces them to combinatorial mathematics and to algebraic and logical structures focusing on the interplay between computer science and mathematics. The present volume emphasizes combinatorics, graph theory with applications to some stand network optimization problems, and algorithms to solve these problems. Chapters 0–3 cover fundamental operations involving sets and the principle of mathematical induction, and standard combinatorial topics: basic counting principles, permutations, combinations, the inclusion-exclusion principle, generating functions, recurrence relations, and an introduction to the analysis of algorithms. Applications are emphasized wherever possible and more than 200 exercises at the ends of these chapters help students test their grasp of the material. Chapters 4 and 5 survey graphs and digraphs, including their connectedness properties, applications of graph coloring, and more, with stress on applications to coding and other related problems. Two important problems in network optimization—the minimal spanning tree problem and the shortest distance problem—are covered in the last two chapters. A very brief nontechnical exposition of the theory of computational complexity and NP-completeness is outlined in the appendix.

Book Information

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Customer Reviews

V. K. Balakrishnan is Professor Emeritus at the University of Maine.

This book is full of great examples and loads of practice problems. Its descriptions, for students fairly comfortable with mathematical writing, are concise and no-nonsense, which can be great. It makes a good reference, in that way, but the book doesn't do much to guide your intuition. It's also full of tiny mistakes (seemingly due to rushed editing) that should be no problem for an advanced student or someone working closely with another guide to the subject (a teacher, tutor, or other textbook). But for learners who might struggle with the material, these mistakes in the book can really interrupt understanding. (As a result, I chose not to assign this book to my students.)

This is the best introduction to discrete math I have ever seen. I have used it as a textbook when teaching fundamentals of discrete math for cryptography.

Good, quality materials.

The student may read Professor Susanna Epp's "Discrete Mathematics with Applications" first before this "Introductory Discrete Mathematics". This book is very concise. This book has good examples and is a good review book.

An excellent introductory book on discrete mathematics. The book begins with a general overview of set theory, which I would agree is an appropriate starting point. The coverage of combinatorics is very good and easy for the reader to follow. I think this is a critical topic because my experience indicates that many mathematics students struggle with the subject of combinatorics. The clear description and excellent examples provided in this text are quite good. The discussions of generating functions is clear and concise. The chapter on graph theory is very good and easy to understand. As with all topics in any introductory book, much more could be written about graph theory, but enough is given to provide the reader a general understanding of the topic. An entire chapter is devoted to spanning tree problems, which is refreshing to see.

The reviews for this text seem to be split between educators with a solid grasp of the material within the text, and frustrated students. As a learning tool for new to discrete math, the average test scores of my class demonstrate this book to be a complete failure. This text may provide concise explanations for those in search of a quick review of concepts, but it sacrifices its effectiveness as a

learning tool for new students in exchange for a short page count. Professors choosing this text are setting both themselves and their students up for a semester of frustration. As a student myself, I'll go over a few of the reasons this text has proven to be a poor choice. Many of the examples within aren't thoroughly explained. The author prefers to bridge steps in problems by saying "of course" "obviously" "easily" and "thus" rather than provide a step-by-step breakdown. While these problems may be simple to understand and review for those with a solid grasp of the material, these gaps are unforgivable for students attempting to use the text to help guide learning. When I work through homework problems, I use the examples and lecture notes as tools. When the book's examples use phrases like "of course" and "we easily find" to jump to conclusions I do not easily see, the only result I get is frustration and wasted hours. In addition, problem sets contain errors. On at least 3 different occasions, my professor has had to correct errors found within assigned exercises from the book. As a student, it is my first instinct to assume I did something wrong when my answer does not match that of the author. I judge this text by the disproportionate amount of time I have to spend trying to google better explanations.

As with any Dover text, it is important to remember that this text is designed to teach the material, not to coddle the reader. This text provides broad and deep coverage of the various topics that fall under discrete mathematics (set theory, boolean logic, graph theory, etc.) with clarity and simplicity. This book is not designed to help you pass a test, but is instead designed to help you grasp and understand the topic, which it does very well. Easily the best book I own on this topic (I often joke that the author covered my first semester course on discrete math in the first chapter!).

I learned much more from the Schaum's Outline (ISBN: 0070380457 -Schaum's Outline of Theory and Problems of Discrete Mathematics (Schaum's Outline Series) by Seymour Lipschutz, Marc Lipson (Contributor), Seymour Lipschultz). That book overcomes the two shortcomings of this one: for a self-proclaimed introductory work on discrete mathematics, this text contains too few worked out in-chapter examples, and too many omitted steps in the reasoning. On this latter point, there were many times my reading brought me to the phrase "It follows from the definition that..." or "obviously..." when, for me, it didn't follow, or it wasn't obvious. Contrary to another reviewer's assessment, I found quite a lot of typos, but none too serious. To its credit, the book does contain a lot of end-of-chapter problems with solutions, and it is inexpensive. The author of the text I review here wrote another in this field, the Schaum's outline series offering with ISBN 007003575X, which is not the Schaum's text I recommend above. I express no opinion on this other work of his.

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