



Applied Combinatorics, Second Edition

By Fred Roberts, Barry Tesman

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Applied Combinatorics, Second Edition By Fred Roberts, Barry Tesman

Now with solutions to selected problems, **Applied Combinatorics, Second Edition** presents the tools of combinatorics from an applied point of view. This bestselling textbook offers numerous references to the literature of combinatorics and its applications that enable readers to delve more deeply into the topics.

After introducing fundamental counting rules and the tools of graph theory and relations, the authors focus on three basic problems of combinatorics: counting, existence, and optimization problems. They discuss advanced tools for dealing with the counting problem, including generating functions, recurrences, inclusion/exclusion, and Pólya theory. The text then covers combinatorial design, coding theory, and special problems in graph theory. It also illustrates the basic ideas of combinatorial optimization through a study of graphs and networks.

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Editorial Review

Review

The book has been substantially rewritten with more than 200 pages of new materials and many changes in the exercises. There are also many new examples to reflect the new developments in computer science and biology since 1990. ... Many important topics are covered and they are done in detail. This book is one of the rare ones that does the job really well. ... I strongly endorse this book. It is suitable for motivated math, computer science or engineering sophomores and even beginning graduate students. In fact bright high school students would love this book and if they are exposed early (through reading this book and being guided by their teachers), many of them might end up doing combinatorics for their careers! I really love this book. It is a gem.

?IACR Book Reviews, 2011

... the overall organization is excellent. ... Many inviting exercises are included. They cover both theoretical aspects and practical problems from state-of-the-art scientific research in various areas, such as biology and telecommunications. ... I can heartily recommend expanding your library with a copy of this work. It is so much fun to just open the book at random and explore the material that jumps out of the pages.

?*Computing Reviews*, March 2010

This is an overwhelmingly complete introductory textbook in combinatorics. It not only covers nearly every topic in the subject, but gives several realistic applications for each topic. ... much more breadth than its competitors. ... valuable as a source of applications and for enrichment reading.

?*MAA Reviews*, December 2009

The writing style is excellent. ... The explanations are detailed enough that the students can follow the arguments readily. The motivating examples are a truly strong point for the text. No other text with which I am familiar comes even close to the number of applications presented here.

?John Elwin, San Diego State University, California, USA

This book is a required textbook for my graduate course in discrete mathematics. Both my students and I have found it to be an excellent resource with interesting application examples from a variety of fields interspersed throughout the text. The book is very well organized and clearly reinforces both the practical and theoretical understanding in a way students are able to correlate. Because the level of difficulty for selected problems range from simple to challenging, it makes an appropriate text for junior, senior, and graduate students alike. I am particularly pleased with the relevancy and inclusion of computer science applications

?Dawit Haile, Virginia State University, Petersburg, USA

Roberts and Tesman's book covers all the major areas of combinatorics in a clear, insightful fashion. But what really sets it apart is its impressive use of applications. I know of no other text which comes close. There are entire sections devoted to subjects like computing voting power, counting organic compounds built up from benzene rings, and the use of orthogonal arrays in cryptography. And in exercises and examples, students test psychic powers, consider the UNIX time problem, plan mail carriers' routes, and assign state legislators to committees. This really helps them to understand the mathematics and also to see how this field

is useful in the real world.

?Thomas Quint, University of Nevada, Reno, USA

From the Back Cover

Applied Combinatorics provides readers with an extensive look at combinatorics. Covers many new detailed applications, including material on list colorings, expanding discussion of scheduling legislative committees, material on DNA sequence alignment, and material on cryptography. Includes a section dealing with stable marriages and their many modern applications, including the assignment of interns to hospitals, dynamic labor markets, and strategic behavior. Uses real applications from the current literature and the extensive modern literature citations. Covers problem-solving through a variety of exercises that test routine ideas, introduce new concepts and applications, or attempt to challenge the reader to use the combinatorial techniques developed. Ideal as an introduction to Combinatorics.

About the Author

Fred S. Roberts is Professor of Mathematics and Director of DIMACS at Rutgers University.

Barry Tesman is Professor of Mathematics at Dickinson College.

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