

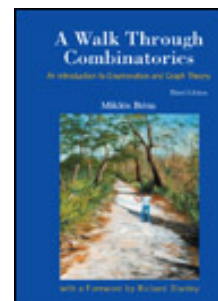


A WALK THROUGH COMBINATORICS

An Introduction to Enumeration and Graph Theory (Third Edition)

by **Miklós Bóna** (*University of Florida, USA*)

[About Miklós Bóna](#)



This is a textbook for an introductory combinatorics course lasting one or two semesters. An extensive list of problems, ranging from routine exercises to research questions, is included. In each section, there are also exercises that contain material not explicitly discussed in the preceding text, so as to provide instructors with extra choices if they want to shift the emphasis of their course.

Just as with the first two editions, the new edition walks the reader through the classic parts of combinatorial enumeration and graph theory, while also discussing some recent progress in the area: on the one hand, providing material that will help students learn the basic techniques, and on the other hand, showing that some questions at the forefront of research are comprehensible and accessible to the talented and hardworking undergraduate. The basic topics discussed are: the twelfold way, cycles in permutations, the formula of inclusion and exclusion, the notion of graphs and trees, matchings, Eulerian and Hamiltonian cycles, and planar graphs.

The selected advanced topics are: Ramsey theory, pattern avoidance, the probabilistic method, partially ordered sets, the theory of designs (new to this edition), enumeration under group action (new to this edition), generating functions of labeled and unlabeled structures and algorithms and complexity.

As the goal of the book is to encourage students to learn more combinatorics, every effort has been made to provide them with a not only useful, but also enjoyable and engaging reading.

Contents:

- **Basic Methods**
 - Seven is More Than Six. The Pigeon-Hole Principle
 - One Step at a Time. The Method of Mathematical Induction
- **Enumerative Combinatorics**
 - There are a Lot of Them. Elementary Counting Problems
 - No Matter How You Slice It. The Binomial Theorem and Related Identities
 - Divide and Conquer. Partitions
 - Not So Vicious Cycles. Cycles in Permutations
 - You Shall Not Overcount. The Sieve
 - A Function is Worth Many Numbers. Generating Functions
- **Graph Theory**
 - Dots and Lines. The Origins of Graph Theory

- Staying Connected. Trees
- Finding a Good Match. Coloring and Matching
- Do Not Cross. Planar Graphs
- **Horizons**
 - Does It clique? Ramsey Theory
 - So Hard to Avoid. Subsequence Conditions on Permutations
 - Who Knows What It Looks Like, But It Exists. The Probabilistic Method
 - At Least Some Order. Partial Orders and Lattices
 - As Evenly as Possible. Block Designs and Error Correcting Codes
 - Are They Really Different? Counting Unlabeled Structures
 - The Sooner the Better. Combinatorial Algorithms
 - Does Many Mean More Than One? Computational Complexity

Readership: Upper level undergraduates and graduate students in the field of combinatorics and graph theory.

Review of the 2nd Edition:

"Bóna's book is an excellent choice for anyone who wants an introduction to this beautiful branch of mathematics ... Plentiful examples illustrate each of the topics included in the book. Bóna does a supreme job of walking us through combinatorics."

Choice

568pp	Pub. date: May 2011
ISBN: 978-981-4335-23-2	US\$110 / £72
981-4335-23-1	

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