

Fibonacci and Catalan numbers : an introduction

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Abstrak

In this one-of-a-kind book, Ralph Grimaldi uses his extensive experience from the classroom and as a leader of mini-courses to present an accessible, single resource on the topics of Fibonacci Numbers and Catalan Numbers. The book first embarks on a complete treatment of Fibonacci numbers. Starting with a historical background on the topic, the author goes on to present the properties of Fibonacci numbers, a slew of introductory-level examples, and in-depth discussion of related topics including compositions and palindromes; tiling and Fibonacci numbers; solving linear recurrence relations; graph theory; Lucas numbers; and alternate Fibonacci numbers. The second half of the book explores Catalan numbers, and the author builds a complete foundation to the topic using a historical background and introductory examples, along with coverage of partial orders, total orders, topological sorting, graph theory, rooted ordered binary trees, pattern avoidance, and the Narayana numbers. Coverage of both topics are accompanied by interesting, real-world examples from areas such as sports, botany, and computer science. Each section concludes with detailed exercise sets that can also serve as extended examples of the presented material along with selected solutions. An Instructor's Manual featuring complete solutions is available upon written request, and extensive reference sections outline resources for further study of the discussed topics.