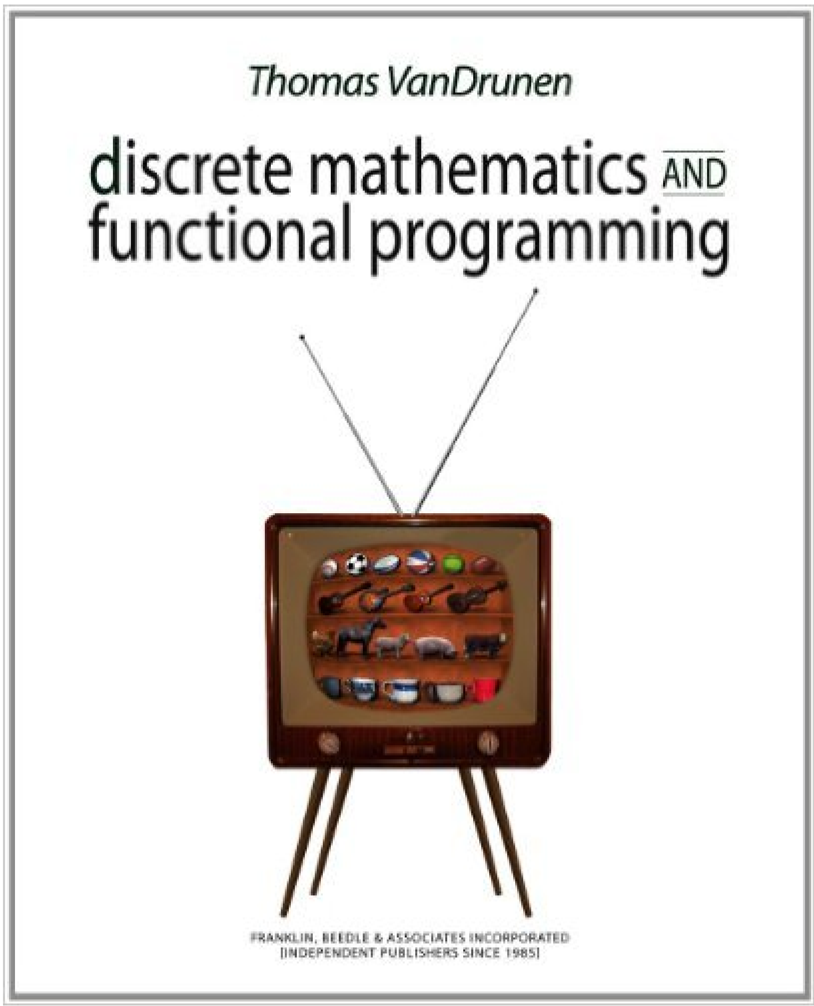
Discrete Mathematics And Functional Programming



Synopsis

This book provides a distinct way to teach discrete mathematics. Since discrete mathematics is crucial for rigorous study in computer science, many texts include applications of mathematical topics to computer science or have selected topics of particular interest to computer science. This text fully integrates discrete mathematics with programming and other foundational ideas in computer science. In fact, this text serves not only the purpose of teaching discrete math. It is also an introduction to programming, although a non-traditional one. Functional programming is a paradigm in which the primary language construct is the function and function here is essentially the same as what it is in mathematics. In the functional paradigm we conceive the program as a collection of composed functions, as opposed to a sequence of instructions (in the imperative paradigm) or a set of interacting objects (in the object-oriented paradigm). Dominant computer science curricula emphasize object-oriented and imperative programming, but competence in all paradigms is important for serious programmers and functional programming in particular may be appropriate for many casual programmers, too. For our purposes, the concepts underlying functional programming are especially grounded in those of discrete mathematics. Discrete mathematics and functional programming are equal partners in this endeavor, with the programming topics giving concrete applications and illustrations of the mathematical topics, and the mathematics providing the scaolding for explaining the programming concepts. The two work together in mutual illumination.

Book Information

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Customer Reviews

Edu designers jokingly call discrete math "all the math that’s now been removed from High School math requirements." In essence, discrete math is the study of logic and proof functions, and the logic behind programming and proofs in both math and programs. Functional programming captures this well, as it IS functions. This book is designed to cover 60% discrete math and 40% functional programming in ML, and pedagogically link and unite them as happens in the real world of applications. All the other texts in the field are silos, and it is really tough to "grok" either topic without the other.Why ML? ML ("Meta Language") is a functional language that is a foundation (lamda-like proof discipline) for proof assistants like Coq and Isabelle, and this author’s "hidden agenda" is writing proofs, which he (rightfully) sees at the foundation for discrete math, and how it unifies math and programming proofs. I’ve used ML, and in some ways it is closer to Python than Lisp!It doesn’t have the memory sparing features of Haskell like lazy evaluation, but you can fake it with closures. You’ll probably never use ML again unless you get into Coq and language or compiler development, but the material in this book is an easy jump to F# if you’re going .net, or Haskell if you’re going more mainstream in functional, CAS, math, etc. Coq itself is OCaml (which I personally love), and ML isn’t too far from that, either. I’ve seen four line Haskell algorithms that can solve the hardest Sudoku puzzles in a fifth of a second, so functional is not dead by any means, even though Lisp goes back to the Fortran days.What’s odd about this text, is that it covers VERY advanced topics at an undergrad sophmore level.

Programming: Linear, Quadratic and Discrete Java: The Simple Guide to Learn Java Programming In No Time (Programming,Database, Java for dummies, coding books, java programming) (HTML,Javascript,Programming,Developers,Coding,CSS,PHP) (Volume 2) Functional Programming with Hope (Ellis Horwood Series in Computers and Their Applications) Haskell: The Craft of Functional Programming (3rd Edition) (International Computer Science Series) Introduction to Functional Programming (Prentice Hall International Series in Computing Science) Functional Python Programming Programming Elixir 1.2: Functional |> Concurrent |> Pragmatic |> Fun