Review of the book
"Handbook of Discrete & Combinatorial Mathematics"
Chief Editor Kenneth Rosen
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1 What the book is about

The importance of discrete math has increased dramatically the last two decades especially during this internet age. Before the year 2000 it has been difficult to find a single reference book that effectively covers this vast subject. This 1248 page-massive handbook came in at the right time to fill this gap. It presents a comprehensive collection of ready reference materials (written by over 70 experts from industry and academia) for all the important areas of discrete mathematics that one will encounter in computer science, math and engineering.

2 What the book is like

A quick glance at the list of contributors reveals a list of carefully chosen experts who are great expositors in their fields. Examples abound, such as Bruce Sagan (Young tableaux), Ed Bender (Mobius Inversion), George Andrews (partitions), Ralph Grimaldi (generating functions and recurrence relations), Ken Rosen (topics in number theory), Carl Pomerance (factorization of numbers, discoverer of the quadratic sieve), Joe Barr (probability), Jeff Dinitz (combinatorial block designs), Menezes and Oorschot (coding and cryptology), S Kannan (dynamic graph algorithms) to name just a few. This inspires confidence to those who wants nothing but the most authoritative account.

There are 17 chapters in the handbook with more than 100 subchapters: foundations, counting, sequences, number theory, algrebraic structures, linear algebra, probability, graph theory, trees, networks and flows, partially ordered sets, combinatorial designs, disceret and computational geometroes, coding theory and cryptology, discrete optimization, theoretical computer science and information structures with a bonus index on biographies of famous people who have made great contributions in the field of discrete mathematics. To list down all the sub-chapters will be too long; those interested should take a look at the book website or google the book images for detailed contents.

Desrciption of each chapter:
It starts off with a content page of topics to be covered in that chapter and a short introduction, followed by a glossary of definitions of important terms and a list of important results. Important facts are listed in point forms and frequently accompanied by useful tables, diagrams and many examples. Pseudocodes are given for the more important algorithms (complexity of the algorithms are there as well). As far as I can tell, all the algorithms are tabulated in a very clear display. This is most helpful to implementers. Many practical examples are also given. A list of open

problems is also there for potential researchers (just be careful to check if these problems are still open as the book is published in 2000). I have observed that the contributors have actively include the genesis of important results and the people who have found them. This certainly makes the handbook a more interesting read!
Each chapter ends with an extensive list of references for anyone who chooses to dive deeper. Web resources with their url addresses are also there at the end of each chapter.

This handbook is still fairly up to date as it has only been published in 2000. There are hardly any new topic of interest that the team did not cover. A minor handicap is of course the fact that some important recent discoveries are not found in the book, such as the important AKS primality tests (deterministic and polynomial time) by Agrawal-Kayal-Saxena which is only discovered in 2002. Do check out the latest results on the web if you are working on any topic in the handbook.

3 What I like about this book

The typeface and the presentation are done professionally. The handbook is really inviting to the eyes, as the font is dark and the layout on each page is spacious.

What are the qualities of a great handbook on technical knowledge such as discrete math? Is it readable and clear? Is it written by experts in the fields? Are all the important results listed? Are the references comprehensive? Are the topics chosen useful and important? Re all the important topics found there? Is the printing and layout clear for reading?

One would have to answer a resounding yes to all these questions. This Handbook of discrete and combinatorial math fulfills all these admirably. It will be extremely hard to come up with a better handbook on discrete mathematics!

4 Possible Improvements

None really. The publisher only need to update the latest results for possible future editions at this time, and include new important topics as and when they arise.

5 Would you recommend this book?

A resounding YES. It is suitable for motivated math, computer science or engineering students and professionals. The Handbook of Discrete and combinatorial mathematics is THE handbook of discrete mathematics. Edited by a superb team of industry leaders, headed by Kenneth Rosen from AT& T Bell labs, ably assisted by a team of editors which includes Andrew Odlyzko, Ron Gaham etc, one can rest assured that the topics chosen in the handbook is not just academic but also highly practical. it is certainly a valuable resource for mathematicians, scientists and engineers now and in the years to come.
I really love this book and will certainly treasure it.

The reviewer is a researcher in infocomm security with specialty in math and cryptography. He was formerly a professor in math.