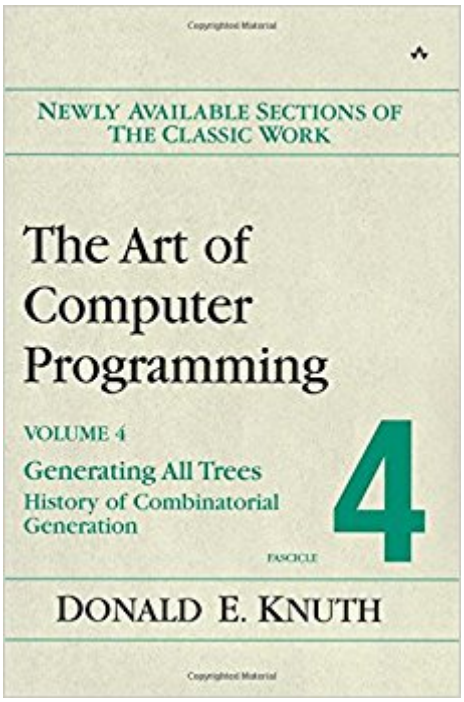
Art Of Computer Programming, Volume 4, Fascicle 4: Generating All Trees--History Of Combinatorial Generation



Synopsis

Finally, after a wait of more than thirty-five years, the first part of Volume 4 is at last ready for publication. Check out the boxed set that brings together Volumes 1 - 4A in one elegant case, and offers the purchaser a $50 discount off the price of buying the four volumes individually. Â The Art of Computer Programming, Volumes 1-4A Boxed Set, 3/e ISBN: 0321751043Â Â Â Art of Computer Programming, Volume 4, Fascicle 4,The: Generating All Trees--History of Combinatorial Generation: Generating All Trees--History of Combinatorial Generation Â This multivolume work on the analysis of algorithms has long been recognized as the definitive description of classical computer science.The three complete volumes published to date already comprise a unique and invaluable resource in programming theory and practice. Countless readers have spoken about the profound personal influence of Knuth's writings. Scientists have marveled at the beauty and elegance of his analysis, while practicing programmers have successfully applied his â œcookbookâ • solutions to their day-to-day problems. All have admired Knuth for the breadth, clarity, accuracy, and good humor found in his books. To begin the fourth and later volumes of the set, and to update parts of the existing three, Knuth has created a series of small books called fascicles, which will be published at regular intervals. Each fascicle will encompass a section or more of wholly new or revised material. Ultimately, the content of these fascicles will be rolled up into the comprehensive, final versions of each volume, and the enormous undertaking that began in 1962 will be complete. Volume 4, Fascicle 4 This latest fascicle covers the generation of all trees, a basic topic that has surprisingly rich ties to the first three volumes of The Art of Computer Programming. In thoroughly discussing this well-known subject, while providing 124 new exercises, Knuth continues to build a firm foundation for programming. To that same end, this fascicle also covers the history of combinatorial generation. Spanning many centuries, across many parts of the world, Knuth tells a fascinating story of interest and relevance to every artful programmer, much of it never before told. The story even includes a touch of suspense: two problems that no one has yet been able to solve.

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Customer Reviews

This multivolume work on the analysis of algorithms has long been recognized as the definitive description of classical computer science.The three complete volumes published to date already comprise a unique and invaluable resource in programming theory and practice. Countless readers have spoken about the profound personal influence of Knuth’s writings. Scientists have marveled at the beauty and elegance of his analysis, while practicing programmers have successfully applied his "cookbook" solutions to their day-to-day problems. All have admired Knuth for the breadth, clarity, accuracy, and good humor found in his books.To begin the fourth and later volumes of the set, and to update parts of the existing three, Knuth has created a series of small books called fascicles, which will be published at regular intervals. Each fascicle will encompass a section or more of wholly new or revised material. Ultimately, the content of these fascicles will be rolled up into the comprehensive, final versions of each volume, and the enormous undertaking that began in 1962 will be complete. Volume 4, Fascicle 4This latest fascicle covers the generation of all trees, a basic topic that has surprisingly rich ties to the first three volumes of "The Art of Computer Programming." In thoroughly discussing this well-known subject, while providing 124 new exercises, Knuth continues to build a firm foundation for programming. To that same end, this fascicle also covers the history of combinatorial generation. Spanning many centuries, across many parts of the world, Knuth tells a fascinating story of interest and relevance to every artful programmer, much of it never before told. The story even includes a touch of suspense: two problems that no one has yet been able to solve.

Donald E. Knuth is known throughout the world for his pioneering work on algorithms and programming techniques, for his invention of the Tex and Metafont systems for computer typesetting, and for his prolific and influential writing. Professor Emeritus of The Art of Computer Programming at Stanford University, he currently devotes full time to the completion of these fascicles and the seven volumes to which they belong.

You might be wondering if the fascicle series is still worth getting, given the whole series has now been updated in a single text here:Â The Art of Computer Programming, Volume 4A: Combinatorial Algorithms, Part 1.The answer is: it depends on whether you have a specific area of combinatorics you're interested in (example: Fascicle 0 is great for logic gates and hence circuit designers), or if you're interested in the entire area of combinatorics and all 5 fascicles (0-4).All 5 are essentially covered in the 2011 book above, with some corrections and deletions. Don't be fooled by the "part 1" because this series can be confusing. Go to Dr. Knuth's website to see the entire map of current and planned volumes and editions, including this series in .pdf: just Google/Bing Knuth website art of programming and click on the dot cs dot faculty dot stanford link for the series.As you'll see on the site, part 1 (if the Dr's health holds out) has now been expanded with additional draft fascicles, especially in the essentially uncovered area of stochastic combinatorics. Probability wasn't even applied to computational combinatorics yet in the 60's, so this is not a flaw in Doc Knuth's coverage! There is a 4B, 4C, 4D etc. planned, mostly expanding recursion, statistics and other new areas of combinatorics.Great self study intro to everything computational complexity, as combinatorics greatly pushes the "big O" computing envelope, and the talented Doc Knuth even weighs in on P/NP. Many examples given with mem counts that are up to date. Areas not covered include parallel and objective/constraint combos, such as linear programming, but there are tons of dedicated texts on those out there. Nothing comes close to Dr. Knuth's approach, especially for self study, given the astonishing volume of problems and solutions included. In one form or another, must have for all programmers.

Donald Knuth is one of my favorite computer science authors. I hope that all of his published work remains available to the computer science community forever.

Product was as advertised and delivered on time.

good for math/comp sci people

This fascicle can perhaps best be read as a sequel to Knuth's Volume 3, on sorting and searching, where he discusses trees. The fascicle extends that into how does one generate every tree. Of the four fascicles thus published, this might be the skimpiest in terms of current mathematical knowledge. Though to a practising programmer, trees are a vital construct and the book could well

have germane analysis. And, as with his other books in this series, there is a tough set problems that can be just as instructive and interesting as the text.Still, to perhaps compensate for the thin length, the book contains a distinctive section on the history of combinatorial generation. Knuth delves into this subject while giving a deeper treatment of the maths than one would likely encounter in a popular text directed at a general audience. He cites the I Ching, as well as ancient Indian and Arab manuscripts. The I Ching is notable as it is still in print and likely to be familiar to many.With the publication of this fascicle, the collective set of four would make a respectable book in its own right. However, Knuth is scarcely done yet. We can expect more fascicles, and soon, one might hope. And eventually, a hardcover.

I’ve known about The Art of Computer Programming volumes by Donald E. Knuth for some time, but I’ve always avoided reviewing them for fear of not being able to do them justice. But after being contacted specifically by the publisher asking if I was interested in the latest - The Art of Computer Programming, Volume 4, Fascicle 4 : Generating All Trees--History of Combinatorial Generation - I decided to give it a try. For the right audience, this is really good stuff. But I can tell you that I’m not it...Content:Chapter 7 - Combinatorial Searching: 7.2 - Generating All Possibilities; 7.2.1 - Generating Basic Combinatorial Patterns; 7.2.1.1 - Generating all n-tuples; 7.2.1.2 - Generating all permutations; 7.2.1.3 - Generating all combinations; 7.2.1.4 - Generating all partitions; 7.2.1.5 - Generating all set partitions; 7.2.1.6 - Generating all trees; 7.2.1.7 - History and further references; Answers to Exercises; Index and GlossaryDon’t refresh your browser thinking the Content section didn’t load properly. There’s just chapter 7... For those who don’t understand the "fascicle" concept (like I didn’t before getting this volume), it’s a small book (120 pages) of material that either updates writings in previous volumes or a "preview" of material that will eventually be rolled into a single volume (in this case, volume 4). Knuth has a lot of information he wants to convey, and by using fascicles, the public can get a steady flow of information and help shape the continuing evolution of the series. Interesting concept, and one I can appreciate. Another review stated that this was probably one of the "skimpiest" volumes in terms of mathematical knowledge. If true, then I fear what will await me with future installments. To get the most of out Knuth’s work, you really do need to be well-grounded in computer science and mathematical theory. Every page is populated with numerous formulas to prove the subject matter, and I’ll admit to being completely lost in most of it. That doesn’t mean the book isn’t good. It *is* excellent work, but I’m definitely not the target audience. I don’t come from a formal computer science and mathematics background, so I’d have to really slog through everything from page 1 with supporting texts in order to fully benefit from it.It

wasn’t a total loss for me, though... I enjoyed the History and Further References chapter, where he shows the tree theory and how it affected such things as literature and culture through the ages. Whether the ancient Chinese had all this in mind when developing the I Ching is open to debate, but the theory and underpinnings of trees is definitely there. And for those readers who really want to work through and apply the material, there are exercises galore at the end (with answers graciously provided for those who get stuck). You could likely set up a college level course based on this (and associated) book, and it would be foundational to a computer science degree.So, for the right audience, this is the type of book that will allow for weeks of thought and learning. But if you’re more like me, someone who deals more with business systems and development (without a comp sci degree to back it up), you’ll likely miss most of the value here.

The fourth volume in the classic ART OF COMPUTER PROGRAMMING: GENERATING ALL TREES: HISTORY OF COMBINATORIAL GENERATION add to and expands upon a multi-volume work on the analysis of algorithms in classical programming, updating sections of the set using a series of small fascicle books. This covers the generatio of all trees, a topic covered in the first three volumes of ART OF COMPUTER PROGRAMMING, and provides over a hundred new exercises to programmers.

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