

CONCRETE MATHEMATICS

A FOUNDATION FOR COMPUTER SCIENCE

GRAHAM ○ KNUTH ○ PATASHNIK



Concrete Mathematics A Foundation For Computer Science 2nd Edition

Oren Patashnik, Donald E. Knuth



Concrete Mathematics A Foundation For Computer Science 2nd Edition:

Concrete Mathematics Ronald L. Graham, Donald E. Knuth, Oren Patashnik, 1994-02-28 This book introduces the mathematics that supports advanced computer programming and the analysis of algorithms. The primary aim of its well known authors is to provide a solid and relevant base of mathematical skills, the skills needed to solve complex problems, to evaluate horrendous sums, and to discover subtle patterns in data. It is an indispensable text and reference not only for computer scientists; the authors themselves rely heavily on it, but for serious users of mathematics in virtually every discipline. Concrete Mathematics is a blending of CONTinuous and disCRETE mathematics. More concretely, the authors explain it is the controlled manipulation of mathematical formulas using a collection of techniques for solving problems. The subject matter is primarily an expansion of the Mathematical Preliminaries section in Knuth's classic *Art of Computer Programming*, but the style of presentation is more leisurely, and individual topics are covered more deeply. Several new topics have been added, and the most significant ideas have been traced to their historical roots. The book includes more than 500 exercises, divided into six categories. Complete answers are provided for all exercises except research problems, making the book particularly valuable for self study. Major topics include Sums, Recurrences, Integer functions, Elementary number theory, Binomial coefficients, Generating functions, Discrete probability, Asymptotic methods. This second edition includes important new material about mechanical summation. In response to the widespread use of the first edition as a reference book, the bibliography and index have also been expanded, and additional nontrivial improvements can be found on almost every page. Readers will appreciate the informal style of Concrete Mathematics. Particularly enjoyable are the marginal graffiti contributed by students who have taken courses based on this material. The authors want to convey not only the importance of the techniques presented, but some of the fun in learning and using them.

Concrete Mathematics Ronald L. Graham, Donald Ervin Knuth, Oren Patashnik, 2000 *Concrete Mathematics* Oren Patashnik, Donald E. Knuth, 1989

Mathematical Foundations of Computer Science Ashwin Lall, 2024-11-05 Mathematical Foundations of Computer Science introduces students to the discrete mathematics needed later in their Computer Science coursework with theory of computation topics interleaved throughout. Students learn about mathematical concepts just in time to apply them to theory of computation ideas. For instance, sets motivate the study of finite automata, direct proof is practised using closure properties, induction is used to prove the language of an automaton, and contradiction is used to apply the pumping lemma. The main content of the book starts with primitive data types such as sets and strings and ends with showing the undecidability of the halting problem. There are also appendix chapters on combinatorics, probability, elementary number theory, asymptotic notation, graphs, loop invariants, and recurrences. The content is laid out concisely with a heavy reliance on worked examples, of which there are over 250 in the book. Each chapter has exercises totalling 550. This class-tested textbook is targeted to intermediate Computer Science majors and is primarily intended for a discrete math proofs course in a Computer Science

major It is also suitable for introductory theory of computation courses The authors hope this book breeds curiosity into the subject and is designed to satisfy this to some extent by reading this book The book will prepare readers for deeper study of game theory applications in many fields of study **Mathematical Foundations of Computer Science** Bhavanari Satyanarayana,T.V. Pradeep Kumar,Shaik Mohiddin Shaw,2019-08-29 This book presents topics from mathematics which are relevant and useful to computer science This book treats basic topics such as number theory set theory functions etc in a simple way Each chapter has been planned as independent unit so that various interrelated topics can also be read independently Ample amount of examples and problems are given at the end of each chapter to help both the students and researchers Hints and answers are also given for the problems in the exercise to help the students for self learning Please note Taylor Francis does not sell or distribute the Hardback in India Pakistan Nepal Bhutan Bangladesh and Sri Lanka

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CRC Concise Encyclopedia of Mathematics Eric W. Weisstein,2002-12-12 Upon publication the first edition of the CRCConcise Encyclopedia of Mathematics received overwhelming accolades for its unparalleled scope readability and utility It soon took its place among the top selling books in the history of Chapman Hall CRC and its popularity continues unabated Yet also unabated has been the d **Applied Combinatorics** Alan Tucker,2012-02-01 The new 6th edition of Applied Combinatorics builds on the previous editions with more in depth analysis of computer systems in order to help develop proficiency in basic discrete math problem solving As one of the most widely used book in combinatorial problems this edition explains how to reason and model combinatorically while stressing the systematic analysis of different possibilities exploration of the logical structure of a problem and ingenuity Although important uses of combinatorics in computer science operations research and finite probability are mentioned these applications are often used solely for motivation Numerical examples involving the same concepts use more interesting settings such as poker probabilities or logical games This book is designed for use by students with a wide range of ability and maturity sophomores through beginning graduate students The stronger the students the harder the exercises that can be assigned The book can be used for one quarter two quarter or one

semester course depending on how much material is used *Numerical Analysis for Science, Engineering and Technology*
 Said Gamil Ahmed, Hossein Jafari, Mukhtar Yagoub Youssif, Roberto Datja, 2018-05-02 This textbook is intended as a guide for undergraduate and graduate students in engineering science and technology courses Chapters of the book cover the numerical concepts of errors approximations differential equations and partial differential equations The simple presentation of numerical concepts and illustrative examples helps students and general readers to understand the topics covered in the text Symbolic and Quantitative Approaches to Reasoning with Uncertainty Lluís Godó, 2005-08-25 These are the proceedings of the 8th European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty ECSQARU 2005 held in Barcelona Spain July 6 8 2005 The ECSQARU conferences are biennial and have become a major forum for advances in the theory and practice of reasoning under uncertainty The first ECSQARU conference was held in Marseille 1991 and after in Granada 1993 Fribourg 1995 Bonn 1997 London 1999 Toulouse 2001 and Aalborg 2003 The papers gathered in this volume were selected out of 130 submissions after a strict review process by the members of the Program Committee to be presented at ECSQARU 2005 In addition the conference included invited lectures by three outstanding researchers in the area Serafin Moral Imprecise Probabilities Rudolf Kruse Graphical Models in Planning and Jerome Lang Social Choice Moreover the application of uncertainty models to real world problems was addressed at ECSQARU 2005 by a special session devoted to successful industrial applications organized by Rudolf Kruse Both invited lectures and papers of the special session contribute to this volume On the whole the programme of the conference provided a broad rich and up to date perspective of the current high level research in the area which is reflected in the contents of this volume I would like to warmly thank the members of the Program Committee and the additional referees for their valuable work the invited speakers and the invited session organizer

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