Perfect Amicable And Sociable Numbers A Computational Approach

Song Y. Yan

Perfect Amicable And Sociable Numbers A Computational Approach:

Perfect, Amicable And Sociable Numbers: A Computational Approach Song Y Yan,1996-09-30 This book is about perfect amicable and sociable numbers with an emphasis on amicable numbers from both a mathematical and particularly a computational point of view Perfect and amicable numbers have been studied since antiquity nevertheless many problems still remain The book introduces the basic concepts and results of perfect amicable and sociable numbers and reviews the long history of the search for these numbers It examines various methods both numerical and algebraic of generating these numbers and also includes a set of important and interesting open problems in the area The book is self contained and accessible to researchers students and even amateurs in mathematics and computing science The only prerequisites are some familiarity with high school algebra and basic computing techniques **Computational Number Theory and Modern Cryptography** Song Y. Yan,2013-01-29 The only book to provide a unified view of the interplay between computational number theory and cryptography Computational number theory and modern cryptography are two of the most important and fundamental research fields in information security In this book Song Y Yang combines knowledge of these two critical fields providing a unified view of the relationships between computational number theory and cryptography The author takes an innovative approach presenting mathematical ideas first thereupon treating cryptography as an immediate application of the mathematical concepts The book also presents topics from number theory which are relevant for applications in public key cryptography as well as modern topics such as coding and lattice based cryptography for post quantum cryptography The author further covers the current research and applications for common cryptographic algorithms describing the mathematical problems behind these applications in a manner accessible to computer scientists and engineers Makes mathematical problems accessible to computer scientists and engineers by showing their immediate application Presents topics from number theory relevant for public key cryptography applications Covers modern topics such as coding and lattice based cryptography for post quantum cryptography Starts with the basics then goes into applications and areas of active research Geared at a global audience classroom tested in North America Europe and Asia Incudes exercises in every chapter Instructor resources available on the book s Companion Website Computational Number Theory and Modern Cryptography is ideal for graduate and advanced undergraduate students in computer science communications engineering cryptography and mathematics Computer scientists practicing cryptographers and other professionals involved in various security schemes will also find this book to be a helpful reference **An Introduction to Formal Languages and Machine Computation** Song Y. Yan,1998 This book provides a concise and modern introduction to Formal Languages and Machine Computation a group of disparate topics in the theory of computation which includes formal languages automata theory turing machines computability complexity number theoretic computation public key cryptography and some new models of computation such as quantum and biological computation As the theory of computation is a subject based on

mathematics a thorough introduction to a number of relevant mathematical topics including mathematical logic set theory graph theory modern abstract algebra and particularly number theory is given in the first chapter of the book The book can be used either as a textbook for an undergraduate course for a first year graduate course or as a basic reference in the field

The Enchantment of Numbers Eric L. F. Roettger,Hugh C. Williams,2025-07-01 Inspired by the classic Recreations in the Theory of Numbers The Queen of Mathematics Entertains by Albert H Beiler this book brings the excitement of recreational number theory into the 21st century through the lens of computational techniques While Beiler s work originally published in 1964 captivated readers with its breadth and charm some sections have become dated Here we re examine most of the key topics Beiler covered while introducing fresh updates and insights rooted in computational number theory The authors aim to present efficient computer algorithms to tackle various problems that arise in the theory of numbers providing a deeper and more modern perspective on these timeless puzzles Though we cannot rival Beiler s exuberant prose we hope our enduring fascination with these topics cultivated over decades of study and teaching will shine through and resonate with readers The book is structured into 21 chapters each focusing on different facets of number theory with which the authors have extensive expertise From ancient problems to contemporary computational challenges this volume will reignite the joy and wonder found in numbers while incorporating the power of modern computation Whether you re a seasoned mathematician or a curious learner this book promises a journey through the rich and playful landscape of number theory making both historical and new discoveries accessible to all   **Cybercryptography: Applicable Cryptography for Cyberspace Security** Song Y. Yan,2018-12-04 This book provides the basic theory techniques and algorithms of modern cryptography that are applicable to network and cyberspace security It consists of the following nine main chapters Chapter 1 provides the basic concepts and ideas of cyberspace and cyberspace security Chapters 2 and 3 provide an introduction to mathematical and computational preliminaries respectively Chapters 4 discusses the basic ideas and system of secret key cryptography whereas Chapters 5 6 and 7 discuss the basic ideas and systems of public key cryptography based on integer factorization discrete logarithms and elliptic curves respectively Quantum safe cryptography is presented in Chapter 8 and offensive cryptography particularly cryptovirology is covered in Chapter 9 This book can be used as a secondary text for final year undergraduate students and first year postgraduate students for courses in Computer Network and Cyberspace Security Researchers and practitioners working in cyberspace security and network security will also find this book useful as a reference   Program of the First International Conference on Smarandache Type Notions in Number Theory (University of Craiova, 1997) editors C. Dumitrescu, V. Seleacu,   **Quantum Attacks on Public-Key Cryptosystems** Song Y. Yan,2014-07-08 The cryptosystems based on the Integer Factorization Problem IFP the Discrete Logarithm Problem DLP and the Elliptic Curve Discrete Logarithm Problem ECDLP are essentially the only three types of practical public key cryptosystems in use The security of these cryptosystems relies heavily on these three infeasible problems as no polynomial time algorithms exist for them so far

However polynomial time quantum algorithms for IFP DLP and ECDLP do exist provided that a practical quantum computer exists Quantum Attacks on Public Key Cryptosystems presemts almost all known quantum computing based attacks on public key cryptosystems with an emphasis on quantum algorithms for IFP DLP and ECDLP It also discusses some quantum resistant cryptosystems to replace the IFP DLP and ECDLP based cryptosystems This book is intended to be used either as a graduate text in computing communications and mathematics or as a basic reference in the field **Cryptanalytic Attacks on RSA** Song Y. Yan,2007-11-15 RSA is the first workable and practicable public key cryptographic system based on the use of large prime numbers It is also the most popular and widely used cryptographic system in today s digital world for which its three inventors Rivest Shamir and Adleman received the year 2002 Turing Award the equivalent Nobel Prize in Computer Science Cryptanalytic Attacks on RSA covers almost all major known cryptanalytic attacks and defenses of the RSA cryptographic system and its variants Since RSA depends heavily on computational complexity theory and number theory background information on complexity theory and number theory is presented first This is followed by an account of the RSA cryptographic system and its variants Cryptanalytic Attacks on RSA is designed for a professional audience of practitioners and researchers in industry and academia and as a reference or secondary text for advanced level students in computer science applied mathematics electrical communication engineering *Primality Testing and Integer Factorization in Public-Key Cryptography* Song Y. Yan,2013-06-29 Primality Testing and Integer Factorization in Public Key Cryptography introduces various algorithms for primality testing and integer factorization with their applications in public key cryptography and information security More specifically this book explores basic concepts and results in number theory in Chapter 1 Chapter 2 discusses various algorithms for primality testing and prime number generation with an emphasis on the Miller Rabin probabilistic test the Goldwasser Kilian and Atkin Morain elliptic curve tests and the Agrawal Kayal Saxena deterministic test for primality Chapter 3 introduces various algorithms particularly the Elliptic Curve Method ECM the Quadratic Sieve QS and the Number Field Sieve NFS for integer factorization This chapter also discusses some other computational problems that are related to factoring such as the square root problem the discrete logarithm problem and the quadratic residuosity problem **Perfect And Amicable Numbers** Elena Deza,2023-02-10 This book contains a detailed presentation on the theory of two classes of special numbers perfect numbers and amicable numbers as well as some of their generalizations It also gives a large list of their properties facts and theorems with full proofs Perfect and amicable numbers as well as most classes of special numbers have many interesting properties including numerous modern and classical applications as well as a long history connected with the names of famous mathematicians The theory of perfect and amicable numbers is a part of pure Arithmetic and in particular a part of Divisibility Theory and the Theory of Arithmetical Functions Thus for a perfect number n it holds n 2n where is the sum of divisors function while for a pair of amicable numbers n m it holds n m n m This is also an important part of the history of prime numbers since the main formulas that

generate perfect numbers and amicable pairs are dependent on the good choice of one or several primes of special form Nowadays the theory of perfect and amicable numbers contains many interesting mathematical facts and theorems alongside many important computer algorithms needed for searching for new large elements of these two famous classes of special numbers This book contains a list of open problems and numerous questions related to generalizations of the classical case which provides a broad perspective on the theory of these two classes of special numbers Perfect and Amicable Numbers can be useful and interesting to both professional and general audiences *Mathematics Today* ,1996 *Mathematical Reviews* ,1999 **Exploring the Beauty of Fascinating Numbers** Shyam Sunder Gupta,2025-03-07 This book is a great treasure for everyone who enjoys the beauty of the fascinating world of recreational mathematics It focuses on recreational aspects of numbers to create interest and motivate readers to learn to be creative in improving their problem solving techniques The book would help ignite interest in numbers which will benefit teachers trying to teach math especially to students who don t like math by supplementing their regular curriculum with the module containing material from the book which provides an opportunity for fun and joy while developing mathematical skills The ideas for further exploration given in the book offer food for thought to delve into the world of research and fun in addition to testing computational skills The book communicates the excitement and fascination of numbers to the students in schools and colleges The theory behind the subject matter has been kept to a minimum to retain the recreational nature of the book The book has a delightful coverage of numerical curiosities coincidences and wonders revealing many new eye opening properties of numbers Organized into 23 chapters the book contains a large variety of topics digital root wonders the elegance of squares triangular numbers Smith numbers amicable numbers perfect multiple perfect and sociable numbers happy numbers Fibonacci numbers Lucas numbers and the Golden ratio Kaprekar numbers self numbers repunit numbers equal product of reversible numbers EPRNs rare numbers fascinating factorials Ulam numbers mystery of cab and vampire numbers digital invariants and narcissistic numbers special numbers like autobiographical numbers Harshad numbers parasite numbers polydivisible numbers Ramanujan numbers number curiosities such as lucky mistakes Pascal s triangle and Pythagorean triplets Pythagoras attributed mystical qualities to some of the numbers Even the religious properties of numbers were extensively studied So four chapters are exclusively devoted to such numbers namely the amazing number 108 the unlucky 13 the beauty of 153 and the number of the beast with lots of new curiosities and miraculous coincidences *Computational Methods in Number Theory* H. W. Lenstra,R. Tijdeman,1982 CRC Concise Encyclopedia of Mathematics Eric W. Weisstein,2002-12-12 Upon publication the first edition of the CRC Concise 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 **The Encyclopedia Americana** Grolier Educational Staff,2001-04 **Encyclopedia Americana: A to Anjou** ,2005 Essentials of Programming in

Mathematica® Paul Wellin,2016 This book covers Mathematica for beginners An example driven text covering a wide variety of applications containing over 350 exercises with solutions available online   **Subject Guide to Books in Print** ,1991
  Forthcoming Books Rose Arny,1997

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