

Prime Numbers A Computational Perspective

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Prime Numbers: A Computational Perspective. 2nd Edition. by Richard Crandall (Author), Carl B. Pomerance (Author) 4.7 out of 5 stars 12 ratings. ISBN-13: 978-0387252827. ISBN-10: 0387252827.

Prime Numbers: A Computational Perspective: Crandall ...

The authors also list new computational records and survey new developments in the theory of prime numbers, including the magnificent proof that there are arbitrarily long arithmetic progressions of primes, and the final resolution of the Catalan problem. Numerous exercises have been added.

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Prime numbers beckon to the beginner, the basic notion of primality being accessible to a child. Yet, some of the simplest questions about primes have stumped humankind for millennia. In this book, the authors concentrate on the computational aspects of prime numbers, such as recognizing primes and discovering the fundamental prime factors of a given number.

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Prime numbers: a computational perspective. Richard Crandall, Carl B. Pomerance. Prime numbers beckon to the beginner, the basic notion of primality being accessible to a child. Yet, some of the simplest questions about primes have stumped humankind for millennia. In this book, the authors concentrate on the computational aspects of prime numbers, such as recognizing primes and discovering the fundamental prime factors of a given number.

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Prime Numbers: A Computational Perspective Volume 182 of Lecture notes in statistics. Authors: Richard Crandall, Carl Pomerance. Edition: illustrated: Publisher: Springer Science & Business Media,...

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Prime Numbers: A Computational Perspective 2, Crandall ...

Number theory is known as the queen of math, and prime numbers are her beautiful building blocks, which occurs highly irregularly and yet "predictably", as spelt out by one of the most famous math breakthroughs, the PNT (Prime Number Theorem), which gives us an asymptotic estimate to the overall distribution of primes over a large interval!

"Prime Numbers: A Computational Perspective" Richard ...

The number of digits of the numbers we can factor is about eight times as large as just 30 years ago, and the number of digits of the numbers we can routinely prove prime is about 500 times larger. It is important to observe that computational progress is two-pronged: There is progress in technology, but also progress in algorithm development.

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Prime Numbers: A Computational Perspective by. Richard Crandall, Carl Pomerance. 4.30 · Rating details · 23 ratings · 2 reviews Bridges the gap between theoretical and computational aspects of prime numbers Exercise sections are a goldmine of interesting examples, pointers to the literature and potential research projects Authors are well ...

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Prime Numbers: A Computational Perspective (Paperback ...

In this volume we have endeavored to provide a middle ground—hopefully even a bridge-between “theory” and “experiment” in the matter of prime numbers. Of course, we speak of number theory and computer experiment. There are great books on the abstract properties of prime numbers. Each of us working in the field enjoys his or her favorite classics.

Prime Numbers | SpringerLink

This book bridges the gap between theoretical and computational aspects of prime numbers. It considers such matters as how to recognize primes, how to compute them, how to count them, and how to test conjectures about them.The book is clearly written and is a pleasure to read. It is largely self-contained.

Prime Numbers: A Computational Perspective / Edition 2 by ...

Prime numbers : a computational perspective. [Richard E Crandall, Carl Pomerance] -- Prime numbers beckon to the beginner, as the basic notion of primality is accessible even to children. Yet, some of the simplest questions about primes have confounded humankind for millennia.

Prime numbers : a computational perspective (eBook, 2005 ...

Prime Numbers: A Computational Perspective Hardcover – Aug. 4 2005 by Richard Crandall (Author), Carl B. Pomerance (Author)

Prime Numbers: A Computational Perspective: Crandall ...

From the reviews: MATHEMATICAL REVIEWS "There are many books about the theory of prime numbers and a few about computations concerning primes. This book bridges the gap between theoretical and computational aspects of prime numbers. It considers such matters as how to recognize primes, how to compute them, how to count them, and how to test conjectures about them?The book is clearly written and is a pleasure to read.

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Bridges the gap between theoretical and computational aspects of prime numbers Exercise sections are a goldmine of interesting examples, pointers to the literature and potential research projects Authors are well-known and highly-regarded in the field

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The title has enhancement files, program code and other data available for delivery via the TELOS Web site; www.telospub.com, including updates to this algorithm library. sound and graphics files. All programs are coded in C and Fortran.

A description of 148 algorithms fundamental to number-theoretic computations, in particular for computations related to algebraic number theory, elliptic curves, primality testing and factoring. The first seven chapters guide readers to the heart of current research in computational algebraic number theory, including recent algorithms for computing class groups and units, as well as elliptic curve computations, while the last three chapters survey factoring and primality testing methods, including a detailed description of the number field sieve algorithm. The whole is rounded off with a description of available computer packages and some useful tables, backed by numerous exercises. Written by an authority in the field, and one with great practical and teaching experience, this is certain to become the standard and indispensable reference on the subject.

This book is about the theory and practice of integer factorisation presented in a historic perspective. It describes about twenty algorithms for factoring and a dozen other number theory algorithms that support the factoring algorithms. Most algorithms are described both in words and in pseudocode to satisfy both number theorists and computer scientists. Each of the ten chapters begins with a concise summary of its contents. The book starts with a general explanation of why factoring integers is important. The next two chapters present number theory results that are relevant to factoring. Further on there is a chapter discussing, in particular, mechanical and electronic devices for factoring, as well as factoring using quantum physics and DNA molecules. Another chapter applies factoring to breaking certain cryptographic algorithms. Yet another chapter is devoted to practical vs. theoretical aspects of factoring. The book contains more than 100 examples illustrating various algorithms and theorems. It also contains more than 100 interesting exercises to test the reader's understanding. Hints or answers are given for about a third of the exercises. The book concludes with a dozen suggestions of possible new methods for factoring integers. This book is written for readers who want to learn more about the best methods of factoring integers, many reasons for factoring, and some history of this fascinating subject. It can be read by anyone who has taken a first course in number theory.

From the original hard cover edition: In the modern age of almost universal computer usage, practically every individual in a technologically developed society has routine access to the most up-to-date cryptographic technology that exists, the so-called RSA public-key cryptosystem. A major component of this system is the factorization of large numbers into their primes. Thus an ancient number-theory concept now plays a crucial role in communication among millions of people who may have little or no knowledge of even elementary mathematics. Hans Riesel's highly successful first edition of this book has now been enlarged and updated with the goal of satisfying the needs of researchers, students, practitioners of cryptography, and non-scientific readers with a mathematical inclination. It includes important advances in computational prime number theory and in factorization as well as re-computed and enlarged tables, accompanied by new tables reflecting current research by both the author and his coworkers and by independent researchers. The book treats four fundamental problems: the number of primes below a given limit, the approximate number of primes, the recognition of primes and the factorization of large numbers. The author provides explicit algorithms and computer programs, and has attempted to discuss as many of the classically important results as possible, as well as the most recent discoveries. The programs include are written in PASCAL to allow readers to translate the programs into the language of their own computers. The independent structure of each chapter of the book makes it highly readable for a wide variety of mathematicians, students of applied number theory, and others interested in both study and research in number theory and cryptography. ?

An introduction to computational complexity theory, its connections and interactions with mathematics, and its central role in the natural and social sciences, technology, and philosophy Mathematics and Computation provides a broad, conceptual overview of computational complexity theory—the mathematical study of efficient computation. With important practical applications to computer science and industry, computational complexity theory has evolved into a highly interdisciplinary field, with strong links to most mathematical areas and to a growing number of scientific endeavors. Avi Wigderson takes a sweeping survey of complexity theory, emphasizing the field's insights and challenges. He explains the ideas and motivations leading to key models, notions, and results. In particular, he looks at algorithms and complexity, computations and proofs, randomness and interaction, quantum and arithmetic computation, and cryptography and learning, all as parts of a cohesive whole with numerous cross-influences. Wigderson illustrates the immense breadth of the field, its beauty and richness, and its diverse and growing interactions with other areas of mathematics. He ends with a comprehensive look at the theory of computation, its methodology and aspirations, and the unique and fundamental ways in which it has shaped and will further shape science, technology, and society. For further reading, an extensive bibliography is provided for all topics covered. Mathematics and Computation is useful for undergraduate and graduate students in mathematics, computer science, and related fields, as well as researchers and teachers in these fields. Many parts require little background, and serve as an invitation to newcomers seeking an introduction to the theory of computation. Comprehensive coverage of computational complexity theory, and beyond High-level, intuitive exposition, which brings conceptual clarity to this central and dynamic scientific discipline Historical accounts of the evolution and motivations of central concepts and models A broad view of the theory of computation's influence on science, technology, and society Extensive bibliography

This introductory book emphasises algorithms and applications, such as cryptography and error correcting codes.

This book presents material suitable for an undergraduate course in elementary number theory from a computational perspective. It seeks to not only introduce students to the standard topics in elementary number theory, such as prime factorization and modular arithmetic, but also to develop their ability to formulate and test precise conjectures from experimental data. Each topic is motivated by a question to be answered, followed by some experimental data, and, finally, the statement and proof of a theorem. There are numerous opportunities throughout the chapters and exercises for the students to engage in (guided) open-ended exploration. At the end of a course using this book, the students will understand how mathematics is developed from asking questions to gathering data to formulating and proving theorems. The mathematical prerequisites for this book are few. Early chapters contain topics such as integer divisibility, modular arithmetic, and applications to cryptography, while later chapters contain more specialized topics, such as Diophantine approximation, number theory of dynamical systems, and number theory with polynomials. Students of all levels will be drawn in by the patterns and relationships of number theory uncovered through data driven exploration.

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