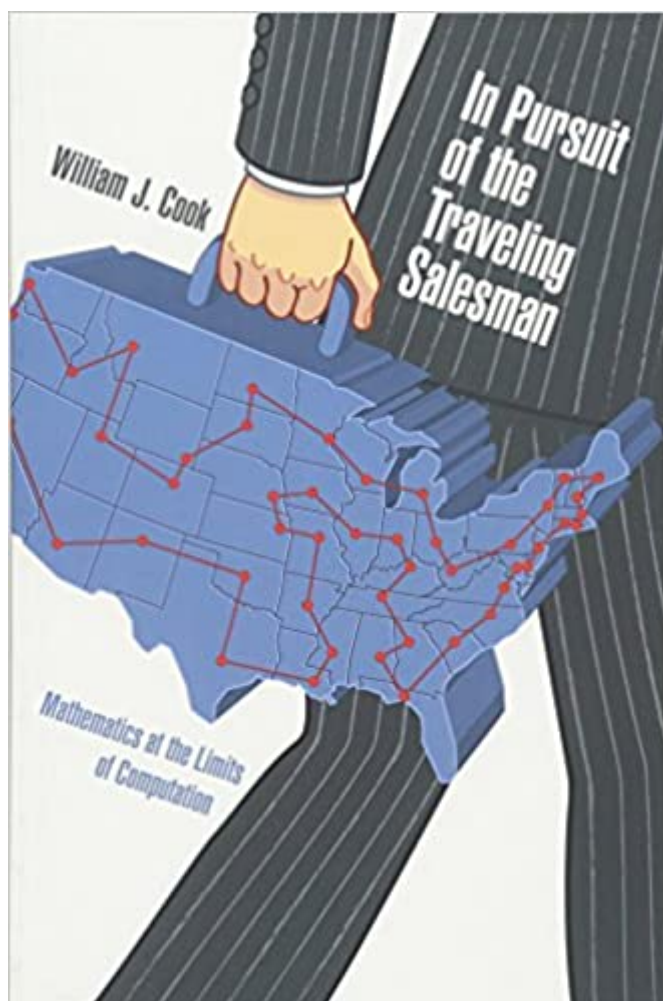The book was found

In Pursuit Of The Traveling Salesman: Mathematics At The Limits Of Computation

Synopsis

What is the shortest possible route for a traveling salesman seeking to visit each city on a list exactly once and return to his city of origin? It sounds simple enough, yet the traveling salesman problem is one of the most intensely studied puzzles in applied mathematicsâ•and it has defied solution to this day. In this book, William Cook takes readers on a mathematical excursion, picking up the salesman's trail in the 1800s when Irish mathematician W. R. Hamilton first defined the problem, and venturing to the furthest limits of todayâ™s state-of-the-art attempts to solve it. He also explores its many important applications, from genome sequencing and designing computer processors to arranging music and hunting for planets.In Pursuit of the Traveling Salesman travels to the very threshold of our understanding about the nature of complexity, and challenges you yourself to discover the solution to this captivating mathematical problem.

Book Information

Paperback: 248 pages

Publisher: Princeton University Press; Reprint edition (November 9, 2014)

Language: English

ISBN-10: 0691163529

ISBN-13: 978-0691163529

Product Dimensions: 6.3 x 0.6 x 9.2 inches

Shipping Weight: 15.2 ounces (View shipping rates and policies)

Average Customer Review: 4.0 out of 5 stars   19 customer reviews

Best Sellers Rank: #190,871 in Books (See Top 100 in Books)   #23 inÂ Books > Science & Math > Mathematics > Applied > Graph Theory   #63 inÂ Books > Humor & Entertainment > Puzzles & Games > Math Games   #117 inÂ Books > Science & Math > Mathematics > Mathematical Analysis

Customer Reviews

"Fascinating . . . describes the history, personalities, challenges, applications and techniques used to find solutions of the famous 'Traveling Salesman Problem' and related problems."--Pradeep Mutalik, Wordplay blog at New York Times"The Traveling Salesman Problem, or TSP, might seem to be of purely recreational interest . . . but in fact, as William J. Cook's In Pursuit of the Traveling Salesman ably shows, the problem remains a topic of hot interest. . . . [This book is] an excellent place for an interested amateur to get the gist of these big ideas in a down-to-earth discussion. . . . Mr. Cook's affable style means that you're never too far from an enjoyable historical anecdote or an offbeat application of a problem that has interested some of the best minds in applied math for most

of a century and that shows no signs of getting stale."--Jordan Ellenberg, Wall Street Journal"The author, William Cook, writes in an easy to understand style and explores the various algorithms and branches of mathematics used to solve TSP, including the branch of mathematics known as linear programming, which is known to most of us through grade school algebra and word problems. . . . In Pursuit of the Traveling Salesman is a thoroughly entertaining nerd-fest for the science minded reader."--Robert Schaefer, New York Journal of Books"Along with a heady dose of algorithms, Cook also offers a diverting survey of the lore and history of the TSP. . . . The new volume addresses a wider audience [than The Traveling Salesman Problem: A Computational Study], with more pictures and fewer equations, explaining how things are done rather than how to do them, but it covers all the same territory as the larger book. The path through that territory seems reasonably close to optimal."--Brian Hayes, American Scientist"In Pursuit of the Traveling Salesman is a first-hand and a first-class introduction into the evolution of TSP, with chapters devoted to related mathematics and algorithmic topics. TSP is really at the heart of much of the research and development of modern computer science, so the author leads the reader through the past and emerging landscape of relevant research up to the very end of the mapped territory. Reading the book looks like an exciting adventure, with the itinerary mapped for the reader by a master story-teller whose work squarely places him in the forefront of the TSP research."--Alexander Bogomolny, Cut the Knot Insights blog"Bill takes his readers down a beautiful path covering the history, applications, and algorithms associated with the TSP. It is a fascinating story, and one that shows a researcher who truly loves his research area. . . . Through this book, you'll learn all about the Traveling Salesman Problem and, more broadly, about the different research directions in combinatorial optimization."--Michael Trick's Operations Research Blog"In his new book, aptly titled In Pursuit of the Traveling Salesman, William Cook enlists us to join him on a personal journey through all-things past and present regarding this mammoth of a mathematical problem. . . . I would highly recommend this book to interested readers and high school mathematics teachers, especially those of upper-level coursework. A great deal of mathematics is covered here and the TSP can easily spark debate and inquiry in the classroom."--Christopher Thompson, Loci: Convergence"In Pursuit of the Traveling Salesman: Mathematics at the Limits of Computation, does a wonderful job presenting the history and significance of the TSP and an overview of cutting-edge research. It's a beautiful, visually rich book, full of color photographs and diagrams that enliven both the narrative and mathematical presentation. And it includes a wealth of information."--Math Less Traveled"This book introduces the TSP, its applications, and computational methods for its solution to a general audience."--Choice"Cook is spot-on in his delivery of what could be considered by most as an

arcane mathematical problem to be solved by only those in the engineering world but like Hawking, peaks interest in a field in which lowly MIT professors could only dream. . . . His witty commentary complements his own casual insertion into the mathematical world and drive to solve the greatest of mathematics' problems. This book is proof that good science writing and mathematics add up."--Robert Terpstra, Business Today Egypt"The technical details are described with precision, but the inherent mathematical concepts are explained in an informal way so that readers without a deep mathematical background can also follow the story. . . . The book is full of examples, real applications and historical anecdotes, making it really enjoyable to read."--Gregorio Tirado DomÃnguez, European Mathematical Society"The book is highly recommended to any one with a mathematical curiosity and interest in the development of ideas."--Haris Aziz, ACM SIGACT News"[T]here is sufficient mathematical detail to provide a good start to readers interested in a more technical treatment. The style is congenial, breezy, and entertaining; many anecdotes and pop culture references are included. Even seasoned researchers will find the book a truly enjoyable read, and it can serve as an ideal basis for a college level freshman seminar."--Gabor Pataki, INFORMS Journal on Computing"The author has a solid understanding of the material and tries to present it in an accessible and sometimes entertaining way. . . . I recommend it to anyone interested in gaining a deeper understanding of the TSP and modern developments in solving TSP-like problems."--S. Leigh Nataro, Mathematics Teacher"[T]his book presents the history and significance of the TSP, and provides an overview of this cutting-edge research in a wonderful way. I recommend it to anybody who is interested in a down-to-earth discussion that provides the most current information on the TSP."--Roberto Baldacci, Interfaces"This book covers all facets of the TSP and ventures into some very deep theory of complexity and computability. It is written for the general mathematician or scientist but would also be useful to the OR specialist. Overall it is entertaining, richly illustrated and well-referenced. It tells us much about general problem solving as well as the TSP."--Francis McGonigal, Mathematics Today

"A gripping insider's account of one of the great mathematical problems. This book shows how deep mathematical insights can arise from apparently simple questions, and how the results can be applied to that most human of objectives: to achieve a desired outcome in the best possible way. In Pursuit of the Traveling Salesman deserves to become an instant classic."--Ian Stewart, author of Professor Stewart's Hoard of Mathematical Treasures"I found this to be a wonderful book on many levels. The writing is informal but precise, and a lot of ground is covered. Cook ties together so many diverse topics and includes informative discussions about the history. I now know a lot more

about every aspect of the traveling salesman problem."--Stan Wagon, Macalester College, author of Mathematica in Action"Cook makes a compelling case for the importance of the traveling salesman problem, revealing that while many brilliant minds have worked on the problem, the next key insight could really come from anyone. Because of his centrality to the research, he writes with a depth of knowledge and experience that few--if any--can surpass. I know of no other book like this."--Mitchel T. Keller, London School of Economics and Political Science

Solving a most important problem!This book is for mathematicians, computer scientists, computer programmers, and geeks in general. If you are not a member of one these groups, then read no further: this book is not for you. But, if you are a member, this may be exactly what you are looking for!The traveling salesman problem (TSP) is probably the single most important real world problem that must solved every day in many different domains. Simply said, it is a problem of trying to find the shortest possible circuit that visits all cities in a salesman area.Sounds easy? Right?Well, this problem is not easy! If n is number of points that must be reached, there are n factorial ([n-1]!) possible paths! For example, if there are 6 points, then there are 120 possible paths. But if there are 7 cities, then there are 5040 paths! This number grows so fast that for reasonable problems, where there are over 100 points such as in a major airline problem, no computer on the face of the earth can find the optimal path by brute force!Some of the domains include: scheduling aircraft by an airline, determining communication lines by a telephone server, determining the drill pattern on a printed circuit board, industrial process planning in a job shop, determining natural gas flow in a network, etc. In most cases, the problem is solved but not optimally or "best" or "least cost" manners. This book is all about trying to solve this problem to find the best possible solution!While it is very mathematical, the book is actually in a style that is very easy to read and understand. The author is a long time researcher of the TSP. He examines the history of trying to solve the TSP ending with his own major contribution, the Concorde program which found the optimal solution of 85,900 points!Well, is the problem solved? I am sorry to say, despite the looks at the problem by thousands of researchers including Nobel Prize winners, the answer is a hard "NO!" The problem is that the TSP is described as a NP Complete problem, one for which if one can find a polynomial time solution algorithm for, one could win the $1,000,000 Clay Millennium Prize for its solution.This book is outstanding! It describes many of the techniques that have been tried to solve the problem and the problems that were found. For anybody trying their hand at the TSP, I would consider this book a primer, a necessary to read book.Good luck, fellow geeks! There is at least a $1,000,000 out there waiting to reward your brilliance!

I am in IT and do data modeling and analytics for a living. I am not highly trained in advanced mathematics, but I found this book very easy to follow from a math perspective. However it is not just a surface level investigation, there is plenty of meat on the bone in describing the mathematical concepts at work. Also this book is as much a history book as a math book, telling the very interesting story of the root of the subject problem from the ancients to the modern computing age. Overall a great book for someone who is somewhat familiar with the subject matter.

We've all had the experience of trying to figure out the best driving route for a circuit of a few places, or at least finding the shortest route through all stops when running a few errands in our own city or town. In mathematics, this conundrum is known as the Traveling Salesman Problem, or TSP, and has been attacked by mathematicians for many decades. The TSP and its wider implications are the subject of this book by William Cook, "In Pursuit of the Traveling Salesman."Cook reviews some of the history of the TSP and recalls some of the mathematicians who made progress on it, and some of the different plans of attack for the problem and the limitations of those approaches are noted. The author explains how the TSP applies not just to road trips, and describes some of the other applications of the TSP in areas such as genome mapping; aiming telescopes, X-rays, and lasers; organizing data; industrial uses; computing; and more. Cook also reports the verdict of mathematicians as to whether they believe TSP will ever be fully solved.This book is significantly more challenging for the general reader than most other popular math books that have come out in the last few years--I CLEPped out of college algebra but was lost in some of the places where Cook broke down some of the more rigorous algorithms used to find better solutions to the TSP. However, the book contains ample diagrams and pictures that help the reader absorb a lot of the material, and the sections of the volume that describe the TSP's wider applications to today's technology would be found accessible by a fairly wide audience.

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