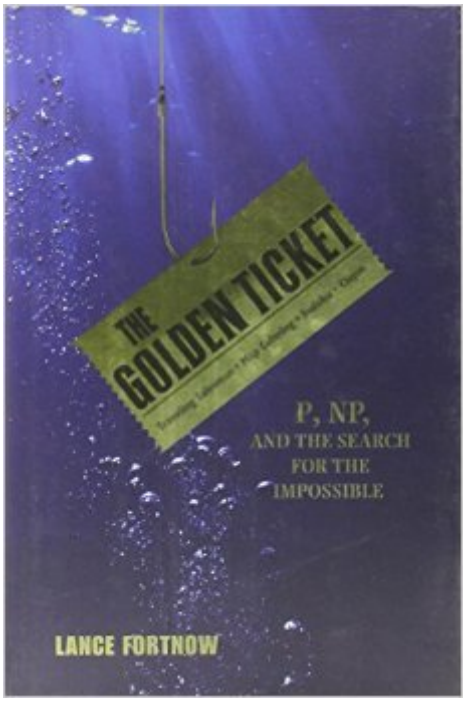
The Golden Ticket: P, NP, And The Search For The Impossible



Synopsis

The P-NP problem is the most important open problem in computer science, if not all of mathematics. The Golden Ticket provides a nontechnical introduction to P-NP, its rich history, and its algorithmic implications for everything we do with computers and beyond. In this informative and entertaining book, Lance Fortnow traces how the problem arose during the Cold War on both sides of the Iron Curtain, and gives examples of the problem from a variety of disciplines, including economics, physics, and biology. He explores problems that capture the full difficulty of the P-NP dilemma, from discovering the shortest route through all the rides at Disney World to finding large groups of friends on Facebook. But difficulty also has its advantages. Hard problems allow us to safely conduct electronic commerce and maintain privacy in our online lives.The Golden Ticket explores what we truly can and cannot achieve computationally, describing the benefits and unexpected challenges of the P-NP problem.

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Customer Reviews

Everyone knows that computers are getting more powerful and better at doing almost anything. Finding you the fastest route cross country is easy. Translating a page of prose from one language to another is harder, but it’s getting better all the time. Finding the shortest route that will get you to all of five different cities, no problem; finding the provably shortest route that will get you to all of a thousand cities - that’s a toughie. It’s so hard that perhaps no computer, no matter how big or how fast, can ever do it. Perhaps. Are there tasks beyond computing? It is a deep question bridging

mathematics and computer science, and it is the subject of _The Golden Ticket: P, NP, and the Search for the Impossible_ (Princeton University Press) by Lance Fortnow. The question is so hard, and so important, that it is one of the seven Millennium Problems for which the Clay Mathematics Institute will give you one million dollars when you prove it. (Programming genius Donald Knuth will also give you a turkey.) This is deeper mathematical territory than most of us will ever penetrate, but Fortnow, a professor of computer science, keeps the explanations light, knowing that those of us reading this sort of book aren't really in the running for the prize, but at the same time showing how important the answer to the question might be for the future of computing.It is best to call it the P/NP problem; the abbreviation P comes from "polynomial;" and in giving us the second, Fortnow jokes, "NP (which stands for `nondeterministic polynomial time,' if you really need to know)." He does not get much deeper into polynomials, but P is the group of problems we know computers can solve quickly.

What an awesome book! P-NP is essentially the question of whether we can find solutions quickly if we can define or know there is a solution quickly-- in layman's terms, it means we know, and then can solve, the traveling salesman problem in "P" -- polynomial -- rather than exponential or infinite time, or not at all. (MAHDI emailed and corrected this by saying: "The second sentence is wrong. P-NP is whether we can find solutions nearly as efficiently as we can verify them. The statement that we can find solutions if we can know there is a solution is a known fact and an easy exercise to prove").There are a lot of technical books on the topic, but this is the first recent book that explores the golden ticket (finding the ONE in your batch of many that will allow you into Willy Wonka's factory tour) in layman's terms, but without talking down to the reader, and covering and focusing on all the aspects of the question. "How not to prove that P does not equal NP" as the author says, is an example of the complex and convoluted logic that's needed to explore the field of computational complexity.Most authors, including this one, use public key crytography, factoring, etc. as examples of the "good" things about intractable problems, yet they also point out that if you could solve this problem, all the other millenium prize problems would likely also fall before you! That's more than $5 million US, so this book is definitely worth a careful read! (Ok, little tongue in cheek). The current "go to" text on the topic, from 2010, is Goldreich's

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