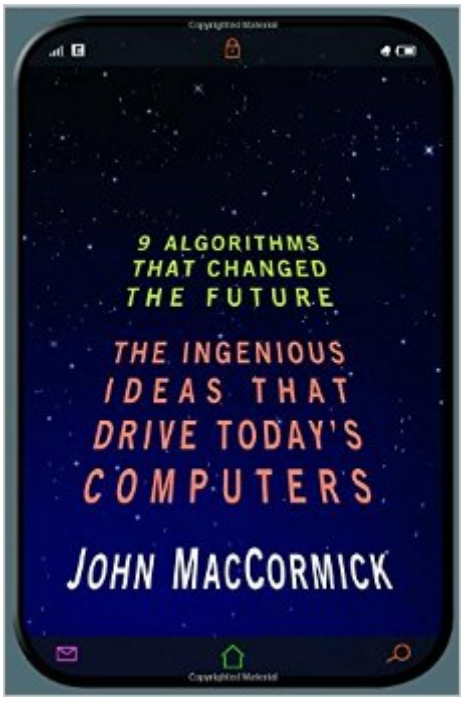
Nine Algorithms That Changed The Future: The Ingenious Ideas That Drive Today's Computers



Synopsis

Every day, we use our computers to perform remarkable feats. A simple web search picks out a handful of relevant needles from the world's biggest haystack: the billions of pages on the World Wide Web. Uploading a photo to Facebook transmits millions of pieces of information over numerous error-prone network links, yet somehow a perfect copy of the photo arrives intact. Without even knowing it, we use public-key cryptography to transmit secret information like credit card numbers; and we use digital signatures to verify the identity of the websites we visit. How do our computers perform these tasks with such ease? This is the first book to answer that question in language anyone can understand, revealing the extraordinary ideas that power our PCs, laptops, and smartphones. Using vivid examples, John MacCormick explains the fundamental "tricks" behind nine types of computer algorithms, including artificial intelligence (where we learn about the "nearest neighbor trick" and "twenty questions trick"), Google's famous PageRank algorithm (which uses the "random surfer trick"), data compression, error correction, and much more. These revolutionary algorithms have changed our world: this book unlocks their secrets, and lays bare the incredible ideas that our computers use every day.

Book Information

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Customer Reviews

MacCormick targets this book at intelligent laypeople, folks who use computers but don't have a formal background in either computer science or mathematics. The book's greatest strength is in the examples he structures to illustrate some fairly deep computer concepts using concrete metaphors

such as paint mixing and padlocks.The algorithms he describes include the key insights that have gone into building search engines such as Google and its predecessor Alta Vista, public key cryptography and digital signatures, data compression, error correction, pattern recognition techniques, and relational databases.The nature of the algorithms varies. Public-key cryptography and digital signatures are based on very elegant mathematics. Many of the other algorithms are simpler, insights into how people work and clever ways of programming. Many of the things he discusses involve whole families of different algorithms. There are lots of different schemes to compress data, each with advantages and disadvantages, most of which work better with some kinds of data than others. The same seems true of error detection and correction techniques. There is a lot of common sense, but nothing he describes in those realms seems like true genius.I made my living with relational databases. MacCormick does a good job of describing a couple of the tricks that ensure data integrity, which as he explains is absolutely vital to the functioning of a database. Those tricks include a two-phase commit, rollbacks, and transaction logging. I think he did not devote enough explanation to the power of joins, selects, and the other operators that enable a programmer to easily assemble data in a useful format.

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