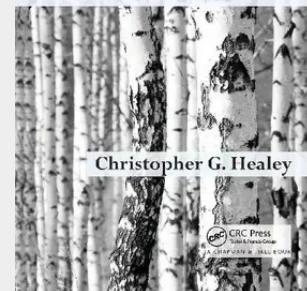


Disk-Based Algorithms for Big Data

Disk-Based Algorithms for Big Data is a product of recent advances in the areas of big data, data analytics, and the underlying file systems and data management algorithms used to support the storage and analysis of massive data collections. The book discusses hard disks and their impact on data management, since Hard Disk Drives continue to be common in large data clusters. It also explores ways to store and retrieve data through primary and secondary indices. This includes a review of different in-memory sorting and searching algorithms that build a foundation for more sophisticated on-disk approaches like mergesort, B-trees, and extendible hashing. Following this introduction, the book transitions to more recent topics, including advanced storage technologies like solid-state drives and holographic storage; peer-to-peer (P2P) communication; large file systems and query languages like Hadoop/HDFS, Hive, Cassandra, and Presto; and NoSQL databases like Neo4j for graph structures and MongoDB for unstructured document data. Designed for senior undergraduate and graduate students, as well as professionals, this book is useful for anyone interested in understanding the foundations and advances in big data storage and management, and big data analytics. About the Author Dr. Christopher G. Healey is a tenured Professor in the Department of Computer Science and the Goodnight Distinguished Professor of Analytics in the Institute for Advanced Analytics, both at North Carolina State University in Raleigh, North Carolina. He has published over 50 articles in major journals and conferences in the areas of visualization, visual and data analytics, computer graphics, and artificial intelligence. He is a recipient of the National Science Foundation's CAREER Early Faculty Development Award and the North Carolina State University Outstanding Instructor Award. He is a Senior Member of the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE), and an Associate Editor of ACM Transactions on Applied Perception, the leading worldwide journal on the application of human perception to issues in computer science.

This book is designed to provide a comprehensive introduction to algorithms and data structures for on-disk based sorting and searching, as well as advanced disk technology. With a focus on big data, the book will cover comprehensively a number of key topics, including physical disk storage, file management, large file systems, and NoSQL s

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