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Foundations of Multidimensional and Metric Data Structures

By Hanan Samet, *University of Maryland at College Park* **1024 pages**

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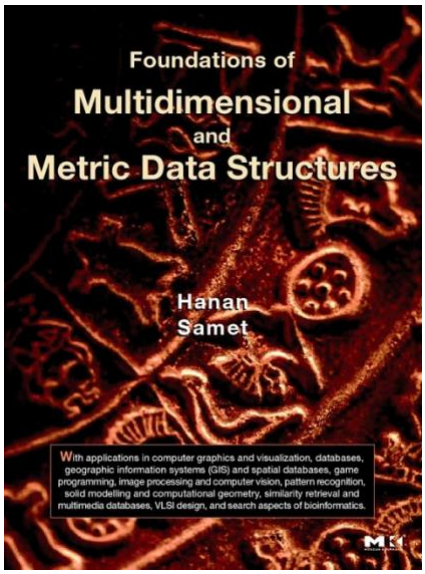

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The field of multidimensional and metric data structures is large and growing very quickly. Here, for the first time, is a thorough treatment of multidimensional point data, object and image-based object representations, intervals and small rectangles, high-dimensional datasets, as well as datasets for which we only know that they reside in a metric space.

The book includes a thorough introduction; a comprehensive survey of multidimensional (including spatial) and metric data structures and algorithms; and implementation details for the most useful data structures. Along with the hundreds of worked exercises and hundreds of illustrations, the result is an excellent and valuable reference tool for professionals in many areas, including computer graphics and visualization, databases, geographic information systems (GIS), and spatial databases, game programming, image processing and computer vision, pattern recognition, solid modelling and computational geometry, similarity retrieval and multimedia databases, and VLSI design, and search aspects of bioinformatics.

Features

- First comprehensive work on multidimensional and metric data structures available, a thorough and authoritative treatment.
- An algorithmic rather than mathematical approach, with a liberal use of examples that allows the readers to easily see the possible implementation and use.
- Each section includes a large number of exercises and solutions to self-test and confirm the reader's understanding and suggest future directions.
- Written by a well-known authority in the area of multidimensional (including spatial) data structures who has made many significant contributions to the field.

Hanan Samet is the dean of "spatial indexing"... This book is encyclopedic... this book will be invaluable for those of us who struggle with spatial data, scientific datasets, graphics, vision problems involving volumetric queries, or with higher dimensional datasets common in data mining.

- From the foreword by Jim Gray, Microsoft Research

Samet's book on multidimensional and metric data structures is the most complete and thorough presentation on this topic. It has broad coverage of material from computational geometry, databases, graphics, GIS, and similarity retrieval literature. Written by the leading authority on hierarchical spatial representations, this book is a "must have" for all instructor, researches, and developers working and teaching in these areas.

- Dinesh Manocha, University of North Carolina at Chapel Hill

To summarize, this book is excellent! It's a very comprehensive survey of spatial and multidimensional data structures and algorithms, which is badly needed. The breadth and depth of coverage is astounding and I would consider several parts of it required reading for real time graphics and game developers.

- Bretton Wade, University of Washington and Microsoft Corp.

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About the Author

Hanan Samet is Professor in the Department of Computer Science at the University of Maryland at College Park, and a member of the Center for Automation Research and the Institute for Advanced Computer Studies. He is widely published in the fields of spatial databases and data structures, computer graphics, image databases and image processing, and geographic information systems (GIS), and is considered an authority on the use and design of hierarchical spatial data structures such as the quadtree and octree for geographic information systems, image processing, and computer graphics. He is the author of the first two books on spatial data structures: *The Design and Analysis of Spatial Data Structures* and *Applications of Spatial Data Structures: Computer Graphics, Image Processing and GIS*. He holds a Ph.D. in computer science from Stanford University