

Principles Of Distributed Database Systems Solution Manual

Database Recovery presents an in-depth discussion on all aspects of database recovery. Firstly, it introduces the topic informally to set the intuitive understanding, and then presents a formal treatment of recovery mechanism. In the past, recovery has been treated merely as a mechanism which is implemented on an ad-hoc basis. This book elevates the recovery from a mechanism to a concept, and presents its essential properties. A book on recovery is incomplete if it does not present how recovery is practiced in commercial systems. This book, therefore, presents a detailed description of recovery mechanisms as implemented on Informix, OpenIngres, Oracle, and Sybase commercial database systems. Database Recovery is suitable as a textbook for a graduate-level course on database recovery, as a secondary text for a graduate-level course on database systems, and as a reference for researchers and practitioners in industry.

This book describes the theory, algorithms, and practical implementation techniques behind transaction processing in information technology systems.

NoSQL was developed to overcome the limitations of relational databases in the largest Web applications at companies such as Google, Yahoo and Facebook. As it is applied more widely, developers are finding that it can simplify scalability while requiring far less coding and management overhead. However, NoSQL requires fundamentally different approaches to database design and modeling, and many conventional relational techniques lead to

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suboptimal results. *;* NoSQL for Mere Mortals is an easy, practical guide to succeeding with NoSQL in your environment. Following the classic, best-selling format pioneered in SQL Queries for Mere Mortals, enterprise database expert Dan Sullivan guides you step-by-step through choosing technologies, designing high-performance databases, and planning for long-term maintenance. *;* Sullivan introduces each type of NoSQL database, shows how to install and manage them, and demonstrates how to leverage their features while avoiding common mistakes that lead to poor performance and unmet requirements. He uses four popular NoSQL databases as reference models: MongoDB, a document database; Cassandra, a column family data store; Redis, a key-value database; and Neo4j, a graph database. You'll find explanations of each database's structure and capabilities, practical guidelines for choosing amongst them, and expert guidance on designing databases with them. *;* Packed with examples, NoSQL for Mere Mortals is today's best way to master NoSQL -- whether you're a DBA, developer, user, or student.

The Internet and World Wide Web have revolutionized access to information. Users now store information across multiple platforms from personal computers to smartphones and websites. As a consequence, data management concepts, methods and techniques are increasingly focused on distribution concerns. Now that information largely resides in the network, so do the tools that process this information. This book explains the foundations of XML with a focus on data distribution. It covers the many facets of distributed data management on the Web, such as description logics, that are already emerging in today's data integration applications and herald tomorrow's semantic Web. It also introduces the machinery used to manipulate the unprecedented amount of data collected on the Web. Several 'Putting into Practice' chapters

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describe detailed practical applications of the technologies and techniques. The book will serve as an introduction to the new, global, information systems for Web professionals and master's level courses.

The fourth edition of this classic textbook provides major updates. This edition has completely new chapters on Big Data Platforms (distributed storage systems, MapReduce, Spark, data stream processing, graph analytics) and on NoSQL, NewSQL and polystore systems. It also includes an updated web data management chapter that includes RDF and semantic web discussion, an integrated database integration chapter focusing both on schema integration and querying over these systems. The peer-to-peer computing chapter has been updated with a discussion of blockchains. The chapters that describe classical distributed and parallel database technology have all been updated. The new edition covers the breadth and depth of the field from a modern viewpoint. Graduate students, as well as senior undergraduate students studying computer science and other related fields will use this book as a primary textbook. Researchers working in computer science will also find this textbook useful. This textbook has a companion web site that includes background information on relational database fundamentals, query processing, transaction management, and computer networks for those who might need this background. The web site also includes all the figures and presentation slides as well as solutions to exercises (restricted to instructors).

Micro-Facts has proved to be a useful ready reference for practising food microbiologists and others concerned with ensuring the microbiological safety of foods. Micro-Facts 6th Edition is an invaluable tool for food microbiologists everywhere, as a source book of information relevant to the prevention of food-poisoning hazards worldwide.

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Principles of Transaction Processing is a comprehensive guide to developing applications, designing systems, and evaluating engineering products. The book provides detailed discussions of the internal workings of transaction processing systems, and it discusses how these systems work and how best to utilize them. It covers the architecture of Web Application Servers and transactional communication paradigms. The book is divided into 11 chapters, which cover the following: Overview of transaction processing application and system structure Software abstractions found in transaction processing systems Architecture of multitier applications and the functions of transactional middleware and database servers Queued transaction processing and its internals, with IBM's Websphere MQ and Oracle's Stream AQ as examples Business process management and its mechanisms Description of the two-phase locking function, B-tree locking and multigranularity locking used in SQL database systems and nested transaction locking System recovery and its failures Two-phase commit protocol Comparison between the tradeoffs of replicating servers versus replication resources Transactional middleware products and standards Future trends, such as cloud computing platforms, composing scalable systems using distributed computing components, the use of flash storage to replace disks and data streams from sensor devices as a source of transaction requests. The text meets the needs of systems professionals, such as IT application programmers who construct TP applications, application analysts, and product developers. The book will also be invaluable to students and novices in application programming. Complete revision of the classic "non mathematical" transaction processing reference for systems professionals. Updated to focus on the needs of transaction processing via the Internet-- the main focus of business data processing investments, via web application servers, SOA, and

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important new TP standards. Retains the practical, non-mathematical, but thorough conceptual basis of the first edition.

Many applications process high volumes of streaming data, among them Internet traffic analysis, financial tickers, and transaction log mining. In general, a data stream is an unbounded data set that is produced incrementally over time, rather than being available in full before its processing begins. In this lecture, we give an overview of recent research in stream processing, ranging from answering simple queries on high-speed streams to loading real-time data feeds into a streaming warehouse for off-line analysis. We will discuss two types of systems for end-to-end stream processing: Data Stream Management Systems (DSMSs) and Streaming Data Warehouses (SDWs). A traditional database management system typically processes a stream of ad-hoc queries over relatively static data. In contrast, a DSMS evaluates static (long-running) queries on streaming data, making a single pass over the data and using limited working memory. In the first part of this lecture, we will discuss research problems in DSMSs, such as continuous query languages, non-blocking query operators that continually react to new data, and continuous query optimization. The second part covers SDWs, which combine the real-time response of a DSMS by loading new data as soon as they arrive with a data warehouse's ability to manage Terabytes of historical

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data on secondary storage. Table of Contents: Introduction / Data Stream Management Systems / Streaming Data Warehouses / Conclusions

This book presents the most important fault-tolerant distributed programming abstractions and their associated distributed algorithms, in particular in terms of reliable communication and agreement, which lie at the heart of nearly all distributed applications. These programming abstractions, distributed objects or services, allow software designers and programmers to cope with asynchrony and the most important types of failures such as process crashes, message losses, and malicious behaviors of computing entities, widely known under the term "Byzantine fault-tolerance". The author introduces these notions in an incremental manner, starting from a clear specification, followed by algorithms which are first described intuitively and then proved correct. The book also presents impossibility results in classic distributed computing models, along with strategies, mainly failure detectors and randomization, that allow us to enrich these models. In this sense, the book constitutes an introduction to the science of distributed computing, with applications in all domains of distributed systems, such as cloud computing and blockchains. Each chapter comes with exercises and bibliographic notes to help the reader approach, understand, and master the fascinating field of fault-tolerant distributed computing.

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Designing distributed computing systems is a complex process requiring a solid understanding of the design problems and the theoretical and practical aspects of their solutions. This comprehensive textbook covers the fundamental principles and models underlying the theory, algorithms and systems aspects of distributed computing. Broad and detailed coverage of the theory is balanced with practical systems-related issues such as mutual exclusion, deadlock detection, authentication, and failure recovery. Algorithms are carefully selected, lucidly presented, and described without complex proofs. Simple explanations and illustrations are used to elucidate the algorithms. Important emerging topics such as peer-to-peer networks and network security are also considered. With vital algorithms, numerous illustrations, examples and homework problems, this textbook is suitable for advanced undergraduate and graduate students of electrical and computer engineering and computer science. Practitioners in data networking and sensor networks will also find this a valuable resource. Additional resources are available online at www.cambridge.org/9780521876346.

Replication Techniques in Distributed Systems organizes and surveys the spectrum of replication protocols and systems that achieve high availability by replicating entities in failure-prone distributed computing environments. The entities discussed in this book vary from passive untyped data objects, to typed

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and complex objects, to processes and messages. Replication Techniques in Distributed Systems contains definitions and introductory material suitable for a beginner, theoretical foundations and algorithms, an annotated bibliography of commercial and experimental prototype systems, as well as short guides to recommended further readings in specialized subtopics. This book can be used as recommended or required reading in graduate courses in academia, as well as a handbook for designers and implementors of systems that must deal with replication issues in distributed systems.

This book adopts a practical approach, reviewing the fundamentals of database technology and developments in data communications (including standards) before reviewing the principles of distributed DB systems. It includes case studies of the leading products.

Principles of Distributed Database Systems Springer Science & Business Media Database management is attracting wide interest in both academic and industrial contexts. New application areas such as CAD/CAM, geographic information systems, and multimedia are emerging. The needs of these application areas are far more complex than those of conventional business applications. The purpose of this book is to bring together a set of current research issues that addresses a broad spectrum of topics related to database systems and applications. The book

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is divided into four parts: - object-oriented databases, - temporal/historical database systems, - query processing in database systems, - heterogeneity, interoperability, open system architectures, multimedia database systems.

Network-based computing domain unifies all best research efforts presented from single computer systems to networked systems to render overwhelming computational power for several modern day applications. Although this power is expected to grow with respect to time due to technological advancements, application requirements impose a continuous thrust on network utilization and on the resources to deliver supreme quality of service. Strictly speaking, network-based computing domain has no confined scope and each element offers considerable challenges. Any modern day networked application strongly thrives on efficient data storage and management system, which is essentially a Database System. There have been number of books-to-date in this domain that discuss fundamental principles of designing a database system. Research in this domain is now far matured and many researchers are venturing in this domain continuously due to a wide variety of challenges posed. In this book, our domain of interest is in exposing the underlying key challenges in designing algorithms to handle unpredictable requests that arrive at a Distributed Database System (DDBS) and evaluating their performance. These requests are otherwise called as on-line requests arriving at a system to process. Transactions in an on-line Banking service, Airline Reservation system, Video-on-Demand system, etc, are few examples of on-line requests. This second edition of Distributed Systems, Principles & Paradigms, covers the principles, advanced concepts, and technologies of distributed systems in detail, including:

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communication, replication, fault tolerance, and security. Intended for use in a senior/graduate level distributed systems course or by professionals, this text systematically shows how distributed systems are designed and implemented in real systems.

This book addresses issues related to managing data across a distributed database system. It is unique because it covers traditional database theory and current research, explaining the difficulties in providing a unified user interface and global data dictionary. The book gives implementers guidance on hiding discrepancies across systems and creating the illusion of a single repository for users. It also includes three sample frameworks—implemented using J2SE with JMS, J2EE, and Microsoft .Net—that readers can use to learn how to implement a distributed database management system. IT and development groups and computer sciences/software engineering graduates will find this guide invaluable.

When it comes to choosing, using, and maintaining a database, understanding its internals is essential. But with so many distributed databases and tools available today, it's often difficult to understand what each one offers and how they differ. With this practical guide, Alex Petrov guides developers through the concepts behind modern database and storage engine internals. Throughout the book, you'll explore relevant material gleaned from numerous books, papers, blog posts, and the source code of several open source databases. These resources are listed at the end of parts one and two. You'll discover that the most significant distinctions among many modern databases reside in subsystems that determine how storage is organized and how data is distributed. This book examines: Storage engines: Explore storage classification and taxonomy, and dive into B-Tree-based and immutable Log Structured storage engines, with differences and use-cases for each Storage building blocks: Learn how

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database files are organized to build efficient storage, using auxiliary data structures such as Page Cache, Buffer Pool and Write-Ahead Log Distributed systems: Learn step-by-step how nodes and processes connect and build complex communication patterns Database clusters: Which consistency models are commonly used by modern databases and how distributed storage systems achieve consistency

Database: Principles Programming Performance provides an introduction to the fundamental principles of database systems. This book focuses on database programming and the relationships between principles, programming, and performance. Organized into 10 chapters, this book begins with an overview of database design principles and presents a comprehensive introduction to the concepts used by a DBA. This text then provides grounding in many abstract concepts of the relational model. Other chapters introduce SQL, describing its capabilities and covering the statements and functions of the programming language. This book provides as well an introduction to Embedded SQL and Dynamic SQL that is sufficiently detailed to enable students to immediately start writing database programs. The final chapter deals with some of the motivations for database systems spanning multiple CPUs, including client-server and distributed transactions. This book is a valuable resource for database administrators, application programmers, specialist users, and end users.

Introductory, theory-practice balanced text teaching the fundamentals of databases to advanced undergraduates or graduate students in information systems or computer science. This third edition of a classic textbook can be used to teach at the senior undergraduate and graduate levels. The material concentrates on fundamental theories as well as techniques and algorithms. The advent of the Internet and the World Wide Web, and, more recently, the

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emergence of cloud computing and streaming data applications, has forced a renewal of interest in distributed and parallel data management, while, at the same time, requiring a rethinking of some of the traditional techniques. This book covers the breadth and depth of this re-emerging field. The coverage consists of two parts. The first part discusses the fundamental principles of distributed data management and includes distribution design, data integration, distributed query processing and optimization, distributed transaction management, and replication. The second part focuses on more advanced topics and includes discussion of parallel database systems, distributed object management, peer-to-peer data management, web data management, data stream systems, and cloud computing. New in this Edition: • New chapters, covering database replication, database integration, multidatabase query processing, peer-to-peer data management, and web data management. • Coverage of emerging topics such as data streams and cloud computing • Extensive revisions and updates based on years of class testing and feedback Ancillary teaching materials are available.

Innovations and Advanced Techniques in Systems, Computing Sciences and Software Engineering includes a set of rigorously reviewed world-class manuscripts addressing and detailing state-of-the-art research projects in the areas of Computer Science, Software Engineering, Computer Engineering, and Systems Engineering and Sciences. Innovations and Advanced Techniques in Systems, Computing Sciences and Software Engineering includes selected papers from the conference proceedings of the International Conference on

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Systems, Computing Sciences and Software Engineering (SCSS 2007) which was part of the International Joint Conferences on Computer, Information and Systems Sciences and Engineering (CISSE 2007).

SQL in a Nutshell applies the eminently useful "Nutshell" format to Structured Query Language (SQL), the elegant--but complex--descriptive language that is used to create and manipulate large stores of data. For SQL programmers, analysts, and database administrators, the new second edition of SQL in a Nutshell is the essential date language reference for the world's top SQL database products. SQL in a Nutshell is a lean, focused, and thoroughly comprehensive reference for those who live in a deadline-driven world. This invaluable desktop quick reference drills down and documents every SQL command and how to use it in both commercial (Oracle, DB2, and Microsoft SQL Server) and open source implementations (PostgreSQL, and MySQL). It describes every command and reference and includes the command syntax (by vendor, if the syntax differs across implementations), a clear description, and practical examples that illustrate important concepts and uses. And it also explains how the leading commercial and open sources database product implement SQL. This wealth of information is packed into a succinct, comprehensive, and extraordinarily easy-to-use format that covers the SQL

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syntax of no less than 4 different databases. When you need fast, accurate, detailed, and up-to-date SQL information, *SQL in a Nutshell, Second Edition* will be the quick reference you'll reach for every time. *SQL in a Nutshell* is small enough to keep by your keyboard, and concise (as well as clearly organized) enough that you can look up the syntax you need quickly without having to wade through a lot of useless fluff. You won't want to work on a project involving SQL without it.

This book is an anthology of the results of research and development in database query processing during the past decade. The relational model of data provided tremendous impetus for research into query processing. Since a relational query does not specify access paths to the stored data, the database management system (DBMS) must provide an intelligent query-processing subsystem which will evaluate a number of potentially efficient strategies for processing the query and select the one that optimizes a given performance measure. The degree of sophistication of this subsystem, often called the optimizer, critically affects the performance of the DBMS. Research into query processing thus started has taken off in several directions during the past decade. The emergence of research into distributed databases has enormously complicated the tasks of the optimizer. In a distributed environment, the database may be partitioned into

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horizontal or vertical fragments of relations. Replicas of the fragments may be stored in different sites of a network and even migrate to other sites. The measure of performance of a query in a distributed system must include the communication cost between sites. To minimize communication costs for queries involving multiple relations across multiple sites, optimizers may also have to consider semi-join techniques.

Streaming data is a big deal in big data these days. As more and more businesses seek to tame the massive unbounded data sets that pervade our world, streaming systems have finally reached a level of maturity sufficient for mainstream adoption. With this practical guide, data engineers, data scientists, and developers will learn how to work with streaming data in a conceptual and platform-agnostic way. Expanded from Tyler Akidau's popular blog posts "Streaming 101" and "Streaming 102", this book takes you from an introductory level to a nuanced understanding of the what, where, when, and how of processing real-time data streams. You'll also dive deep into watermarks and exactly-once processing with co-authors Slava Chernyak and Reuven Lax. You'll explore: How streaming and batch data processing patterns compare The core principles and concepts behind robust out-of-order data processing How watermarks track progress and completeness in infinite datasets How exactly-

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once data processing techniques ensure correctness How the concepts of streams and tables form the foundations of both batch and streaming data processing The practical motivations behind a powerful persistent state mechanism, driven by a real-world example How time-varying relations provide a link between stream processing and the world of SQL and relational algebra This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. Database Systems: The Complete Book is ideal for Database Systems and Database Design and Application courses offered at the junior, senior and graduate levels in Computer Science departments. A basic understanding of algebraic expressions and laws, logic, basic data structure, OOP concepts, and programming environments is implied. Written by well-known computer scientists, this introduction to database systems offers a comprehensive approach, focusing on database design, database use, and implementation of database applications and database management systems. The first half of the book provides in-depth coverage of databases from the point of view of the database designer, user, and application programmer. It covers the latest database standards SQL:1999, SQL/PSM, SQL/CLI, JDBC, ODL, and XML, with broader coverage of SQL than most other texts. The second half of the book provides in-depth coverage of

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databases from the point of view of the DBMS implementor. It focuses on storage structures, query processing, and transaction management. The book covers the main techniques in these areas with broader coverage of query optimization than most other texts, along with advanced topics including multidimensional and bitmap indexes, distributed transactions, and information integration techniques. This textbook examines database systems from the viewpoint of a software developer. This perspective makes it possible to investigate why database systems are the way they are. It is of course important to be able to write queries, but it is equally important to know how they are processed. We e.g. don't want to just use JDBC; we also want to know why the API contains the classes and methods that it does. We need a sense of how hard is it to write a disk cache or logging facility. And what exactly is a database driver, anyway? The first two chapters provide a brief overview of database systems and their use. Chapter 1 discusses the purpose and features of a database system and introduces the Derby and SimpleDB systems. Chapter 2 explains how to write a database application using Java. It presents the basics of JDBC, which is the fundamental API for Java programs that interact with a database. In turn, Chapters 3-11 examine the internals of a typical database engine. Each chapter covers a different database component, starting with the lowest level of abstraction (the

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disk and file manager) and ending with the highest (the JDBC client interface); further, the respective chapter explains the main issues concerning the component, and considers possible design decisions. As a result, the reader can see exactly what services each component provides and how it interacts with the other components in the system. By the end of this part, s/he will have witnessed the gradual development of a simple but completely functional system. The remaining four chapters then focus on efficient query processing, and focus on the sophisticated techniques and algorithms that can replace the simple design choices described earlier. Topics include indexing, sorting, intelligent buffer usage, and query optimization. This text is intended for upper-level undergraduate or beginning graduate courses in Computer Science. It assumes that the reader is comfortable with basic Java programming; advanced Java concepts (such as RMI and JDBC) are fully explained in the text. The respective chapters are complemented by “end-of-chapter readings” that discuss interesting ideas and research directions that went unmentioned in the text, and provide references to relevant web pages, research articles, reference manuals, and books. Conceptual and programming exercises are also included at the end of each chapter. Students can apply their conceptual knowledge by examining the SimpleDB (a simple but fully functional database system created by the

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author and provided online) code and modifying it.

This, the third edition of the classic textbook explores fundamental theory as well as practical techniques and algorithms, and features fresh chapters on aspects such as database replication and integration as well as emerging topics such as cloud computing.

Distributed computing is at the heart of many applications. It arises as soon as one has to solve a problem in terms of entities -- such as processes, peers, processors, nodes, or agents -- that individually have only a partial knowledge of the many input parameters associated with the problem. In particular each entity cooperating towards the common goal cannot have an instantaneous knowledge of the current state of the other entities. Whereas parallel computing is mainly concerned with 'efficiency', and real-time computing is mainly concerned with 'on-time computing', distributed computing is mainly concerned with 'mastering uncertainty' created by issues such as the multiplicity of control flows, asynchronous communication, unstable behaviors, mobility, and dynamicity. While some distributed algorithms consist of a few lines only, their behavior can be difficult to understand and their properties hard to state and prove. The aim of this book is to present in a comprehensive way the basic notions, concepts, and algorithms of distributed computing when the distributed entities cooperate by sending and receiving messages on top of an asynchronous network. The book is composed of seventeen chapters structured into six parts: distributed graph

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algorithms, in particular what makes them different from sequential or parallel algorithms; logical time and global states, the core of the book; mutual exclusion and resource allocation; high-level communication abstractions; distributed detection of properties; and distributed shared memory. The author establishes clear objectives per chapter and the content is supported throughout with illustrative examples, summaries, exercises, and annotated bibliographies. This book constitutes an introduction to distributed computing and is suitable for advanced undergraduate students or graduate students in computer science and computer engineering, graduate students in mathematics interested in distributed computing, and practitioners and engineers involved in the design and implementation of distributed applications. The reader should have a basic knowledge of algorithms and operating systems.

The overwhelming majority of a software system's lifespan is spent in use, not in design or implementation. So, why does conventional wisdom insist that software engineers focus primarily on the design and development of large-scale computing systems? In this collection of essays and articles, key members of Google's Site Reliability Team explain how and why their commitment to the entire lifecycle has enabled the company to successfully build, deploy, monitor, and maintain some of the largest software systems in the world. You'll learn the principles and practices that enable Google engineers to make systems more scalable, reliable, and efficient—lessons directly applicable to your organization. This book is divided into four

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sections: Introduction—Learn what site reliability engineering is and why it differs from conventional IT industry practices Principles—Examine the patterns, behaviors, and areas of concern that influence the work of a site reliability engineer (SRE) Practices—Understand the theory and practice of an SRE's day-to-day work: building and operating large distributed computing systems Management—Explore Google's best practices for training, communication, and meetings that your organization can use A thorough presentation of query processing techniques in a broad range of database systems for advanced applications. Provides the most effective query processing techniques and ways to optimize the information retrieval process. Intended for database systems designers creating advanced applications.

Until recently, databases contained easily indexed numbers and text. Today, in the age of powerful, graphically based computers, and the world wide web, databases are likely to contain a much greater variety of data forms, including images, sound, video clips, and even handwritten documents. When multimedia databases are the norm, traditional methods of working with databases no longer apply. How do you query a video library, or an image database containing x-rays, or sounds in an audio database? Principles of Multimedia Database Systems explains how to work with these new multimedia data forms. It is the first comprehensive treatment of the skills and techniques required to build, maintain, and query multimedia databases. This book presents the mix of techniques necessary for working with multimedia databases, including synthetic

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solutions for the design and deployment of multimedia database systems. Because rapid technological developments are constantly changing the landscape of multimedia databases, the book teaches basic theoretical principles applicable to any database. * Covers the major issues of multimedia database design, with a strong focus on distributed multimedia databases. * Discusses important topics including how to organize the vast data types, storage and retrieval, and creation and delivery of multimedia presentations. * Organized around the lively scenario of a crime-fighting database that evolves as new concepts are introduced. * Includes numerous exercises and suggestions for programming projects. * Additional materials on the web include updates, on-line supplements, and links to downloadable software.

Territorial behaviour among various herders and hunter-gatherers has been discussed in earlier studies, but this is the first time that a comparison of these three types of mobile populations has been attempted. The original papers presented in this volume discuss the conditions and problems of securing access to resources among pastoralists, peripatetics, and hunting, gathering and fishing communities in Africa, Asia, Europe and the Middle East. A comprehensive introductory chapter places these empirical studies in a broader theoretical context of the behavioural sciences.

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