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This book combines clear explanations of theory and design, broad coverage of models and real systems, and excellent examples with up-to-date introductions to modern database technologies. Now in its third edition, this book has been revised and updated to reflect the latest trends in technological and application development. - Introduces UML modeling and how it is used right alongside ER modeling. - Provides updated and expanded material on SQL including a new chapter, which discusses Web databases and SQL, including JDBC/ODBC. - Applies ideas from the book to a fully-developed case study that implements the data needed

to design a bookstore. - Expanded coverage of important database topics like security, data warehousing, and data mining. - A new chapter featuring the relationship to XML and Internet databases keeps students on the edge of database technology. - Gives examples of real database systems. - Provides coverage of the object-oriented and object/relational approach to data management. - Includes discussion of decision support applications of data warehousing and data mining, as well as emerging technologies of web databases, multimedia, and mobile databases. - Covers the important requirements of teaching databases with a modular and progressive perspective. This book can be used for a full course (or pair of courses), but its first half can be profitably used for a shorter course. This text includes material on distributed databases, object-oriented databases, data mining, data warehouses, multimedia databases and the Internet and provides a strong foundation in good design practice. This product is a complete reference to both classical material and advanced topics that are otherwise scattered in sometimes hard-to-find papers. A major effort in writing the book was made to highlight the intuitions behind the theoretical development. This book places spatial data within the broader domain of information technology (IT) while providing a comprehensive and coherent explanation of the guiding principles, methods, implementation and operational management of spatial databases within the workplace. The text explains the key concepts, issues and processes of spatial data implementation and provides a holistic management perspective. Modern biological databases comprise not only data, but also sophisticated query facilities and bioinformatics data analysis tools. This book provides an exploration through the world of Bioinformatics Database Systems. The book summarizes the popular and innovative bioinformatics repositories currently available, including popular primary genetic and protein sequence databases, phylogenetic databases, structure and pathway databases, microarray databases and boutique databases. It also

explores the data quality and information integration issues currently involved with managing bioinformatics databases, including data quality issues that have been observed, and efforts in the data cleaning field. Biological data integration issues are also covered in-depth, and the book demonstrates how data integration can create new repositories to address the needs of the biological communities. It also presents typical data integration architectures employed in current bioinformatics databases. The latter part of the book covers biological data mining and biological data processing approaches using cloud-based technologies. General data mining approaches are discussed, as well as specific data mining methodologies that have been successfully deployed in biological data mining applications. Two biological data mining case studies are also included to illustrate how data, query, and analysis methods are integrated into user-friendly systems. Aimed at researchers and developers of bioinformatics database systems, the book is also useful as a supplementary textbook for a one-semester upper-level undergraduate course, or an introductory graduate bioinformatics course. About the Authors Kevin Byron is a PhD candidate in the Department of Computer Science at the New Jersey Institute of Technology. Katherine G. Herbert is Associate Professor of Computer Science at Montclair State University. Jason T.L. Wang is Professor of Bioinformatics and Computer Science at the New Jersey Institute of Technology. The latest edition of a popular text and reference on database research, with substantial new material and revision; covers classical literature and recent hot topics. Lessons from database research have been applied in academic fields ranging from bioinformatics to next-generation Internet architecture and in industrial uses including Web-based e-commerce and search engines. The core ideas in the field have become increasingly influential. This text provides both students and professionals with a grounding in database research and a technical context for understanding recent innovations in the field. The readings included treat the most important issues in the database area--the basic material for any DBMS

professional. This fourth edition has been substantially updated and revised, with 21 of the 48 papers new to the edition, four of them published for the first time. Many of the sections have been newly organized, and each section includes a new or substantially revised introduction that discusses the context, motivation, and controversies in a particular area, placing it in the broader perspective of database research. Two introductory articles, never before published, provide an organized, current introduction to basic knowledge of the field; one discusses the history of data models and query languages and the other offers an architectural overview of a database system. The remaining articles range from the classical literature on database research to treatments of current hot topics, including a paper on search engine architecture and a paper on application servers, both written expressly for this edition. The result is a collection of papers that are seminal and also accessible to a reader who has a basic familiarity with database systems. Architecture of a Database System presents an architectural discussion of DBMS design principles, including process models, parallel architecture, storage system design, transaction system implementation, query processor and optimizer architectures, and typical shared components and utilities. Introduces techniques for building applications that integrate large databases with web interfaces. Using a three-tier architecture, the book focuses on the middle tier and the application logic that brings together the fundamentally different client and database tiers. The authors explain the principles behind searching, browsing, storing user data, validating user input, managing user transactions, and security. Annotation copyrighted by Book News, Inc., Portland, OR. This book provides a concise but comprehensive guide to the disciplines of database design, construction, implementation, and management. Based on the authors' professional experience in the software engineering and IT industries before making a career switch to academia, the text stresses sound database design as a necessary precursor to successful development and administration of database

systems. The discipline of database systems design and management is discussed within the context of the bigger picture of software engineering. Students are led to understand from the outset of the text that a database is a critical component of a software infrastructure, and that proper database design and management is integral to the success of a software system. Additionally, students are led to appreciate the huge value of a properly designed database to the success of a business enterprise. The text was written for three target audiences. It is suited for undergraduate students of computer science and related disciplines who are pursuing a course in database systems, graduate students who are pursuing an introductory course to database, and practicing software engineers and information technology (IT) professionals who need a quick reference on database design. Database Systems: A Pragmatic Approach, 3rd Edition discusses concepts, principles, design, implementation, and management issues related to database systems. Each chapter is organized into brief, reader-friendly, conversational sections with itemization of salient points to be remembered. This pragmatic approach includes adequate treatment of database theory and practice based on strategies that have been tested, proven, and refined over several years. Features of the third edition include: Short paragraphs that express the salient aspects of each subject Bullet points itemizing important points for easy memorization Fully revised and updated diagrams and figures to illustrate concepts to enhance the student's understanding Real-world examples Original methodologies applicable to database design Step-by-step, student-friendly guidelines for solving generic database systems problems Opening chapter overviews and concluding chapter summaries Discussion of DBMS alternatives such as the Entity-Attributes-Value model, NoSQL databases, database-supporting frameworks, and other burgeoning database technologies A chapter with sample assignment questions and case studies This textbook may be used as a one-semester or two-semester course in database systems, augmented by a DBMS (preferably Oracle). After its usage, students will come

away with a firm grasp of the design, development, implementation, and management of a database system. *RDF Database Systems* is a cutting-edge guide that distills everything you need to know to effectively use or design an RDF database. This book starts with the basics of linked open data and covers the most recent research, practice, and technologies to help you leverage semantic technology. With an approach that combines technical detail with theoretical background, this book shows how to design and develop semantic web applications, data models, indexing and query processing solutions. Understand the Semantic Web, RDF, RDFS, SPARQL, and OWL within the context of relational database management and NoSQL systems Learn about the prevailing RDF triples solutions for both relational and non-relational databases, including column family, document, graph, and NoSQL Implement systems using RDF data with helpful guidelines and various storage solutions for RDF Process SPARQL queries with detailed explanations of query optimization, query plans, caching, and more Evaluate which approaches and systems to use when developing Semantic Web applications with a helpful description of commercial and open-source systems A comprehensive survey of the foundational models and recent research trends in access control models and mechanisms for database management systems. Written by well-known computer scientists, this accessible and succinct introduction to database systems focuses on database design and use. Provides a more extensive treatment of query processing than other books on the market. The authors provide 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 books. Now includes coverage of the technologies used to connect database programming with C or Java code—SQL/PSM, SQL/CLI, and JDBC. For database systems and database design and application professionals. 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 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

A breakthrough sourcebook to the challenges and solutions for mobile database systems This text enables readers to effectively manage mobile database systems (MDS) and data dissemination via wireless channels. The author explores the mobile communication platform and analyzes its use in the development of a distributed database management system. Workable solutions for key challenges in wireless information management are presented throughout the text. Following an introductory chapter that includes important milestones in the history and development of mobile data processing, the text provides the information, tools, and resources needed for MDS management, including:

- * Fundamentals of wireless communication
- * Location and handoff management
- * Fundamentals of conventional database management systems and why existing approaches are not adequate for mobile databases
- * Concurrency control mechanism schemes
- * Data processing and mobility

Management of transactions * Mobile database recovery schemes * Data dissemination via wireless channels Case studies and examples are used liberally to aid in the understanding and visualization of complex concepts. Various exercises enable readers to test their grasp of each topic before advancing in the text. Each chapter also concludes with a summary of key concepts as well as references for further study. Professionals in the mobile computing industry, particularly e-commerce, will find this text indispensable. With its extensive use of case studies, examples, and exercises, it is also highly recommended as a graduate-level textbook. Introductory, theory-practice balanced text teaching the fundamentals of databases to advanced undergraduates or graduate students in information systems or computer science. Database and Data Communication Network Systems examines the utilization of the Internet and Local Area/Wide Area Networks in all areas of human endeavor. This three-volume set covers, among other topics, database systems, data compression, database architecture, data acquisition, asynchronous transfer mode (ATM) and the practical application of these technologies. The international collection of contributors was culled from exhaustive research of over 100,000 related archival and technical journals. This reference will be indispensable to engineering and computer science libraries, research libraries, and telecommunications, networking, and computer companies. It covers a diverse array of topics, including: * Techniques in emerging database system architectures * Techniques and applications in data mining * Object-oriented database systems * Data acquisition on the WWW during heavy client/server traffic periods * Information exploration on the WWW * Education and training in multimedia database systems * Data structure techniques in rapid prototyping and manufacturing * Wireless ATM in data networks for mobile systems * Applications in corporate finance * Scientific data visualization * Data compression and information retrieval * Techniques in medical systems, intensive care units The Fourth edition of Database System Concepts has been extensively revised from the 3rd edition. The new

edition provides improved coverage of concepts, extensive coverage of new tools and techniques, and updated coverage of database system internals. This text is intended for a first course in databases at the junior or senior undergraduate, or first-year graduate level. Database System Concepts, 4th ed. offers a complete background in the basics of database design, languages, and system implementations. Concepts are presented using intuitive descriptions, and important theoretical results are covered, but formal proofs are omitted. The fundamental concepts and algorithms covered in Database System Concepts 4th ed. are based on those used in existing commercial or experimental database systems. The authors present these concepts and algorithms in a general setting that is not tied to one particular database system. Business Database Systems arms you with the knowledge to analyse, design and implement effective, robust and successful databases. This book is ideal for students of Business/Management Information Systems, or Computer Science, who will be expected to take a course in database systems for their degree programme. It is also excellently suited to any practitioner who needs to learn, or refresh their knowledge of, the essentials of database management systems. An introductory, yet comprehensive, database textbook intended for use in undergraduate and graduate information systems database courses. This text also provides practical content to current and aspiring information systems, business data analysis, and decision support industry professionals. Database Systems: Introduction to Databases and Data Warehouses covers both analytical and operations database as knowledge of both is integral to being successful in today's business environment. It also provides a solid theoretical foundation and hands-on practice using an integrated web-based data-modeling suite. For Database Systems and Database Design and Application courses offered at the junior, senior and graduate levels in Computer Science departments. 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. With the rapid growth in the use of computers to manipulate, process, and reason about multimedia data, the problem of how to store and retrieve such data is becoming increasingly important. Thus, although the field of multimedia database systems is only about 5 years old, it is rapidly becoming a focus for much excitement and research effort. Multimedia database systems are intended to provide unified frameworks for requesting and integrating information in a wide variety of formats, such as audio and video data, document data, and image data. Such data often have special storage requirements that are closely coupled to the various kinds of devices that are used for recording and presenting the data, and for each form of data there are often multiple representations and multiple standards - all of which make the database integration task quite complex. Some of the problems include: - what a multimedia database query means - what kinds of languages to use for posing queries - how to develop compilers for such languages - how to develop indexing structures for storing media on ancillary devices - data compression techniques - how to present and author presentations based on user queries. Although approaches are being developed for a number of these problems, they have often been ad hoc in nature, and there is a need to provide a principled theoretical foundation. The database field has experienced a rapid and incessant growth since the development of relational databases. The progress in database systems and applications has produced a diverse landscape of specialized technology areas that have often become the exclusive domain of research specialists. Examples include active databases, temporal databases, object-oriented databases, deductive databases, imprecise reasoning and queries, and multimedia information systems. This book provides a systematic introduction to and an in-depth treatment of these advanced database areas. It supplies practitioners and researchers with authoritative

coverage of recent technological advances that are shaping the future of commercial database systems and intelligent information systems. *Advanced Database Systems* was written by a team of six leading specialists who have made significant contributions to the development of the technology areas covered in the book. Benefiting from the authors' long experience teaching graduate and professional courses, this book is designed to provide a gradual introduction to advanced research topics and includes many examples and exercises to support its use for individual study, desk reference, and graduate classroom teaching. The second edition of this bestselling title is a perfect blend of theoretical knowledge and practical application. It progresses gradually from basic to advanced concepts in database management systems, with numerous solved exercises to make learning easier and interesting. New to this edition are discussions on more commercial database management systems. *"Component Database Systems"* is a collection of invited chapters by the researchers making the most influential contributions in the database industry's trend toward componentization. This book represents the sometimes-divergent, sometimes-convergent approaches taken by leading database vendors as they seek to establish commercially viable componentization strategies. Together, these contributions form the first book devoted entirely to the technical and architectural design of component-based database systems. In addition to detailing the current state of their research, the authors also take up many of the issues affecting the likely future directions of component databases. If you have a stake in the evolution of any of today's leading database systems, this book will make fascinating reading. It will also help prepare you for the technology that is likely to become widely available over the next several years. * Is comprised of contributions from the field's most highly respected researchers, including key figures at IBM, Oracle, Informix, Microsoft, and POET. * Represents the entire spectrum of approaches taken by leading software companies working on DBMS componentization strategies. * Covers component-focused architectures,

methods for hooking components into an overall system, and support for component development. * Examines the component technologies that are most valuable to Web-based and multimedia databases. * Presents a thorough classification and overview of component database systems. 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 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. Computer Science Workbench is a monograph series which will provide you with an in depth working knowledge of current developments in computer technology. Every volume in this series will deal with a topic of importance in computer science and elaborate on how you yourself can build systems related to the main theme. You will be able to develop a variety of systems, including computer software tools, computer graphics, computer animation, database management systems, and computer-aided design and manufacturing systems. Computer Science Workbench represents an important new contribution in the field of practical computer technology.

Tosiyasu L. Kunii Preface The goal of this book is to give concrete answers to questions such as what object oriented databases are, why they are needed, how they are implemented, and how they are applied, by describing a research prototype object-oriented database system called Jasmine. That is, this book is aimed at creating a consistent view to object-oriented databases. The contents of this book are directly based on the results of the Jasmine project conducted at Fujitsu Laboratories, Ltd. The book is a polished version of my doctoral dissertation, which includes research papers which I have authored and

published. This lean, focused text concentrates on giving students a clear understanding of database fundamentals while providing a broad survey of all the major topics of the field. The result is a text that is easily covered in one semester, and that only includes topics relevant to the database course. Mark Gillenson, an associate editor of the *Journal of Database Management*, has 15 years experience of working with and teaching at IBM Corp. and 15 years of teaching experience at the college level. He writes in a clear, friendly style that progresses step-by-step through all of the major database topics. Each chapter begins with a story about a real company's database application, and is packed with examples. When students finish the text, they will be able to immediately apply what they've learned in business. In recent years, tremendous research has been devoted to the design of database systems for real-time applications, called real-time database systems (RTDBS), where transactions are associated with deadlines on their completion times, and some of the data objects in the database are associated with temporal constraints on their validity. Examples of important applications of RTDBS include stock trading systems, navigation systems and computer integrated manufacturing. Different transaction scheduling algorithms and concurrency control protocols have been proposed to satisfy transaction timing data temporal constraints. Other design issues important to the performance of a RTDBS are buffer management, index accesses and I/O scheduling. *Real-Time Database Systems: Architecture and Techniques* summarizes important research results in this area, and serves as an excellent reference for practitioners, researchers and educators of real-time systems and database systems. Introduced forty years ago, relational databases proved unusually successful and durable. However, relational database systems were not designed for modern applications and computers. As a result, specialized database systems now proliferate trying to capture various pieces of the database market. Database research is pulled into different directions, and specialized database conferences are created. Yet the current chaos in

databases is likely only temporary because every technology, including databases, becomes standardized over time. The history of databases shows periods of chaos followed by periods of dominant technologies. For example, in the early days of computing, users stored their data in text files in any format and organization they wanted. These early days were followed by information retrieval systems, which required some structure for text documents, such as a title, authors, and a publisher. The information retrieval systems were followed by database systems, which added even more structure to the data and made querying easier. In the late 1990s, the emergence of the Internet brought a period of relative chaos and interest in unstructured and "semistructured data" as it was envisioned that every web page would be like a page in a book. However, with the growing maturity of the Internet, the interest in structured data was regained because the most popular websites are, in fact, based on databases. The question is not whether future data stores need structure but what structure they need. This book provides comprehensive coverage of fundamentals of database management system. It contains a detailed description on Relational Database Management System Concepts. There are a variety of solved examples and review questions with solutions. This book is for those who require a better understanding of relational data modeling, its purpose, its nature, and the standards used in creating relational data model. 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 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.

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