

## Database Management Systems

*The book is intended to provide an insight into the DBMS concepts. An effort has been made to familiarize the readers with the concepts of database normalization, concurrency control, deadlock handling and recovery etc., which are extremely vital for a clear understanding of DBMS. To familiarize the readers with the equivalence amongst Relational Algebra, Tuple Relational Calculus, and SQL, a large number of equivalent queries have been provided. The concepts of normalization have been elaborated very systematically by fully covering the underlying concepts of functional dependencies, multi-valued dependencies, join dependencies, loss-less-join decomposition, dependency-preserving decomposition etc. It is hoped that with the help of the information provided in the text, a reader will be able to design a flawless database. Also, the concepts of serializability, concurrency control, deadlock handling and log-based recovery have been covered in full detail. An overview has also been provided of the issues related to distributed-databases.*

*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.*

*Easy-to-read writing style. Comprehensive coverage of all database topics. Bullet lists and tables. More detailed examples of database implementations. More SQL, including significant information on planned revisions to the language. Simple and easy explanation to complex topics like relational algebra, relational calculus, query processing and optimization. Covers topics on implementation issues like security, integrity, transaction management, concurrency control, backup and recovery etc. Latest advances in database technology.*

*Zygiaris provides an accessible walkthrough of all technological advances of databases in the business environment. Readers learn how to design, develop, and use databases to provide business analytical reports with the three major database management systems: Microsoft Access, Oracle Express and MariaDB (formerly MySQL).*

*Database Management System (DBMS) A Practical Approach*

*Distributed Database Management Systems*

*Fundamental of Database Management System*

*Principles of Database Management*

General Post's Database Management Systems takes an introductory approach to developing database applications: teaching students to evaluate a business situation and then build and design a database application. From systems design to distribution and integration of the system --and everything in between--, students will gain knowledge by getting a hands-on experience. The Third Edition has been revised to offer a more flexible way to deliver database management applications. Post continues to have a textbook that covers the core theories and ideas of database management. Now, it offers two different workbooks depending on the software that the instructor utilizes. One workbook covers Oracle and the other workbook covers Access: thus enabling the instructor to pick the workbook that will be employed in the course and to go more in-depth with either tool.

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.

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.

Concepts of Database Management System is designed to meet the syllabi requirements of undergraduate students of computer applications and computer science. It describes the concepts in an easy-to-understand language with sufficient number of examples. The overview of emerging trends in databases is thoroughly explained. A brief introduction to PL/SQL, MS-Access and Oracle is discussed to help students get a flavor of different types of database management systems.

*Fundamentals of Database Systems*

*RDf Database Systems*

*Access Control for Databases*

*Non-Volatile Memory Database Management Systems*

*Access Control in Data Management Systems*

*Introductory, theory-practice balanced text teaching the fundamentals of databases to advanced undergraduates or graduate students in information systems or computer science.*

The success of many organizations depends upon information stored in database management systems. Given the importance of such systems, it is essential that managers with responsibility for IT understand the underlying database management system (DBMS) principles, are aware of the strengths and weaknesses of existing database technology and of likely future developments in the field.

Students using this book will already have some knowledge of databases and will have completed an introductory course in database systems. This book supports a course aimed at deepening the students' understanding of the technologies covered earlier by introducing other conceptual models which have been proposed to tackle deficiencies of the relational model. It also addresses advanced application development and it aims to familiarise students with the current technological developments and trends. The book covers the following areas: Transaction management Concurrency control Recovery Query Optimisation Distributed Management Systems Object-oriented data models Object-relational database management systems Data warehousing

Introduction to Database Management Systems is designed specifically for a single semester, namely, the first course on Database Systems. The book covers all the essential aspects of database systems, and also covers the areas of RDBMS. The book in Database Management Systems provides comprehensive and up-to-date coverage of the fundamentals of database systems. Coherent explanations and practical examples have made this one of the leading texts in the field. The third edition continues in this tradition, enhancing it with more practical material. The new edition has been reorganized to allow more flexibility in the way the course is

choose whether they would like to teach a course which emphasizes database application development or a course that emphasizes database systems issues. New overview chapters at the beginning of parts make it possible to skip other chapters in the part if you don't want the detail. More applications and examples have been added throughout the book, including SQL and Oracle examples. It is enhanced by the two new database applications chapters.

*An Introduction to Database Systems*

*Introduction to Database Management Systems:*

*Database Management Systems*

*Triples Storage and SPARQL Query Processing*

*A Practical Approach*

*A database management system (DBMS) is a collection of programs that enable users to create and maintain a database; it also consists of a collection of interrelated data and a set of programs to access that data. Hence, a DBMS is a general-purpose software system that facilitates the processes of defining, constructing, and manipulating databases for various applications. The primary goal of a DBMS is to provide an environment that is both convenient and efficient to use in retrieving and storing database information. It is an interface between the user of application programs, on the one hand, and the database, on the other. The objective of Database Management System: An Evolutionary Approach, is to enable the learner to grasp a basic understanding of a DBMS, its need, and its terminologies discern the difference between the traditional file-based systems and a DBMS code while learning to grasp theory in a practical way study provided examples and case studies for better comprehension This book is intended to give under- and postgraduate students a fundamental background in DBMS. The book follows an evolutionary learning approach that emphasizes the basic concepts and builds a strong foundation to learn more advanced topics including normalizations, normal forms, PL/SQL, transactions, concurrency control, etc. This book also gives detailed knowledge with a focus on entity-relationship (ER) diagrams and their reductions into tables, with sufficient SQL codes for a more practical understanding.*

*This book can be used as an introductory course in database management systems, as a supplementary text for professionals in information processing, or as a reference for end-users in areas supporting data management systems. This edition provides added and expanded coverage of areas affected by technological advances in data management. The examples, comparison charts, and end-of-chapter exercises have been substantially increased, to ensure students can apply the materials presented.*

*Have you been asked to perform an information systems audit and don't know where to start? Examine a company's hardware, software, and data organization and processing methods to ensure qualitycontrol and security with this easy, practical guide to auditingcomputer systems--the tools necessary to implement an effective ISaudit. In nontechnical language and following the format of an ISaudit program, you'll gain insight into new types of securitycertifications (e.g., TrueSecure, CAP SysTrust, CPA WebTrust) as well as the importance of physical security controls, adequatensurance, and digital surveillance systems. Order your copy today!*

*Build a core level of competency in SQL so you can recognize the parts of queries and write simple SQL statements. SQL knowledge is essential for anyone involved in programming, data science, and data management. This book covers features of SQL that are standardized and common across most database vendors. You will gain a base of knowledge that will prepare you to go deeper into the specifics of any database product you might encounter. Examples in the book are worked in PostgreSQL and SQLite, but the bulk of the examples are platform agnostic and will work on any database platform supporting SQL. Early in the book you learn about table design, the importance of keys as row identifiers, and essential query operations. You then move into more advanced topics such as grouping and summarizing, creating calculated fields, joining data from multiple tables when it makes business sense to do so, and more. Throughout the book, you are exposed to a set-based approach to the language and are provided a good grounding in subtle but important topics such as the effects of null value on query results. With the explosion of data science, SQL has regained its prominence as a top skill to have for technologists and decision makers worldwide. SQL Primer will guide you from the very basics of SQL through to the mainstream features you need to have a solid, working knowledge of this important, data-oriented language. What You'll Learn Create and populate your own database tables Read SQL queries and understand what they are doing Execute queries that get correct results Bring together related rows from multiple tables Group and sort data in support of reporting applications Get a grip on nulls, normalization, and other key concepts Employ subqueries, unions, and other advanced features Who This Book Is For Anyone new to SQL who is looking for step-by-step guidance toward understanding and writing SQL queries. The book is aimed at those who encounter SQL statements often in their work, and provides a sound baseline view/ use/ all across all SQL database systems. Programmers, database managers, data scientists, and*

*Students analyze all can benefit from the baseline of SQL knowledge provided in this book.*

*DATABASE MANAGEMENT SYSTEMS*

*Multimedia Database Management Systems*

*Concepts of Database Management Systems (BCA)*

*SQL Primer*

*Fundamentals of Database Management Systems, 2nd Edition*

**Market\_Desc:** This book is a valuable source of information for academics, practitioners, post and under graduate students with a good overview of basic notions, methods and techniques, as well as important issues and trends across the broad spectrum of data management. **Special Features:** . Provides simple, clear and concise language, which makes the book easy and enjoyable to read. . Follows a code centric approach and provides code snippets wherever applicable. . Provides well-structured text and illustrative block diagrams and figures wherever required. . Provides case studies involving the latest technologies, such as Java, J2EE, and ASP.NET with backend database, such as Oracle and SQL Server with clear illustrations and step-wise approach on how to develop a real-life project. . Includes chapter objectives and advance organizer at the beginning of each chapter to describe what the reader would learn in the chapter. . Includes comprehensive and detailed coverage of each topic to meet the requirements of the target audience, including postgraduates, undergraduates, and professionals. **About The Book:** This book provides a systematic approach with an in-depth analysis of advanced database areas as well as the basics of database management systems. It explores the different normalization techniques starting from the very basic first normal form and extends up to sixth normal form. The theme of this book is the potential of new advanced database systems. This book combines advanced techniques with practical advice and many new ideas, methods, and examples for database management students, system specialists, and programmers. It provides a wealth of technical information on database methods and an encyclopedic coverage of advanced techniques. Summing up, this book is a valuable source of information for academics, practitioners, post and under graduate students with a good overview of basic notions, methods and techniques, as well as important issues and trends across the broad spectrum of data management. For over 25 years, C. J. Dates An Introduction to Database Systems has been the authoritative resource for readers interested in gaining insight into and understanding of the principles of database systems. This exciting revision continues to provide a solid grounding in the foundations of database technology and to provide some ideas as to how the field is likely to develop in the future. The material is organized into six major parts. Part I provides a broad introduction to the concepts of database systems in general and relational systems in particular. Part II consists of a careful description of the relational model, which is the theoretical foundation for the database field as a whole. Part III discusses the general theory of database design. Part IV is concerned with transaction management. Part V shows how relational concepts are relevant to a variety of further aspects of database technology--security, distributed databases, temporal data, decision support, and so on. Finally, Part VI describes the impact of object technology on database systems. This Seventh Edition of An Introduction to Database Systems features widely rewritten material to improve and amplify treatment o

Designed to provide an insight into the database concepts DESCRIPTION Book teaches the essentials of DBMS to anyone who wants to become an effective and independent DBMS Master. It covers all the DBMS fundamentals without forgetting few vital advanced topics such as from installation, configuration and monitoring, up to the backup and migration of database covering few database client tools. **KEY FEATURES** Book contains real-time executed commands along with screenshot Parallel execution and explanation of Oracle and MySQL Database commands A Single comprehensive guide for students of Database Management Systems who are familiar with the concepts of database normalization, SQL Queries, SQL Joins, Aggregate Functions, Oracle and Mysql tools **WHO THIS BOOK IS FOR** Students of Polytechnic Diploma Classes-- Computer Science/ Information Technology Graduate Students-- Computer Science/ CSE / IT/ Computer Applications Master Class Students-Msc (CS/IT) / MCA/ M.Phil, M.Tech, M.S. Industry Professionals-- Preparing for Certifications Table of Contents 21. Fundamentals of data and Database management system 2. Database Architecture and Models 3. Relational Database and normalization 4. Open source technology & SQL 5. Database queries 6. SQL operators 7. Introduction to database joins 8. Aggregate functions, subqueries and users 9. Backup & Recovery 10. Database installation 11. Oracle and MySQL tools 12. Exercise This book has become the necessary tool for managing and storing data. It provides an up-to-date coverage of the database systems and explains the concepts in a simple, elegant and easy understandable format. Apart from theoretical explanations, it includes a practical approach and includes many diagrammatic illustrations, database security, transaction management, embedded SQL, dynamic SQL, indexing, hashing, data warehousing and data mining. The book can act as a complete reference for Oracle on line examination

*An Accelerated Introduction to SQL Basics*

*Readings in Database Systems*

*A Business-Oriented Approach Using ORACLE, MySQL and MS Access*

*Geographic Database Management Systems*

*ADVANCED DATABASE MANAGEMENT SYSTEM (With CD )*

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 applications and both written expressly for this edition. The rest is a collection of papers that are seminal and also accessible to a reader who has a basic familiarity with database systems. **Primarily designed for the postgraduate students of computer science, information technology, software engineering and management, this book, now in its Third Edition, continues to provide an excellent coverage of the basic concepts involved in database management systems. It provides a thorough treatment of some important topics such as data structure, data models and database design through presentation of well-defined algorithms, examples and real-life cases. A detailed coverage of Database Structure, Implementation Design, Hierarchical Database Management Systems, Network Database Management Systems and Relational Database Management Systems, is also focused in this book. This book will also be useful for B.E./B.Tech. students of Computer Science and Engineering and Software Engineering. NEW TO THIS EDITION** \* Introduces three new chapters on rational database languages, namely, Relational Database Management Systems: Oracle 11g SQL, Relational Database Management Systems: Oracle 11g PL/SQL, and Relational Database Management Systems: Access 2013. \* Text interspersed with numerous screenshots for practical under-standing of the text. \* Clearly explained procedures in a step-by-step manner with chapter-end questions. \* Self-explanatory, labelled figures and tables to conceptual discussion.

The latest previous developments in access control for data management systems. Discretionary, mandatory, and role-based access control will be discussed, by surveying the most relevant proposals and analyzing the benefits and drawbacks of each paradigm in view of the requirements of different application domains. Access control mechanisms provided by commercial Data Management Systems are presented and discussed. Finally, the last part of the book is devoted to discussion of some of the most challenging and innovative research trends in the area of access control, such as those related to the Web 2.0 revolution or to the Database as a Service paradigm. --

The contents of this second edition have been appropriately enhanced to serve the growing needs of the students pursuing undergraduate engineering courses in Computer Science, Information Technology, as well as postgraduate programmes in Computer Applications (MCA), MSc (IT) and MSc (Computer Science). The book covers the fundamental and theoretical concepts in an elaborate manner using SQL of leading RDBMS--Oracle, MS SQL Server and Sybase. This book is recommended in Guwahati University, Assam. Realizing the importance of RDBMS in all types of architectures and applications, both traditional and modern topics are included for the benefit of IT-savvy readers. A strong understanding of the relational database design is provided in chapters on Entity-Relationship, Relational, Hierarchical and Network Data Models, Normalisation, Relational Algebra and Relational Calculus. The architecture of the legacy relational database R system, the hierarchical database IMS of IBM and the network data model DBM are also given due importance to bring completeness and to show thematic interrelationships among them. Several chapters have been devoted to the latest database features and technologies such as Data Partitioning, Data Mirroring, Replication, High Availability, Security and Auditing. The architecture of Oracle, SQL of Oracle known as PL/SQL, SQL of both Sybase and MS SQL Server known as T-SQL have been covered. **KEY FEATURES** : Gives wide coverage to topics of network, hierarchical and relational data models of both traditional and generic modern databases. Discusses the concepts and methods of Data Partitioning, Data Mirroring and Replication required to build the centralized architecture of very large databases. Provides several examples, listings, exercises and solutions to selected exercises to stimulate and accelerate the learning process of the readers. Covers the concept of database mirroring and log shipping to demonstrate how to build disaster recovery solution through the use of database technology. Contents: Preface 1. Introduction 2. The Entity-Relationship Model 3. Data Models 4. Storage Structure 5. Relational Data Structure 6. Architecture of System R and Oracle 7. Normalization 8. Structured Query Language 9. T-SQL--Triggers and Dynamic Execution 10. Procedure Language--SQL 11. Cursor Management and Advanced PL/SQL 12. Relational Algebra and Relational Calculus 13. Concurrency Control and Automatic Recovery 14. Distributed Database and Replication 15. High Availability and RAID Technology 16. Security Features Built in RDBMS 17. Queries Optimization 18. Architecture of a Hierarchical DBMS 19. The Architecture of Network based DBMS System 20. Comparison between Different Data Models 21. Performance Improvement and Partitioning 22. Database Mirroring and Log Shipping for Disaster Recovery

*Bibliography Answers to Selected Exercises Index*

*Auditing Information Systems*

*The Practical Guide to Storing, Managing and Analyzing Big and Small Data*

*Fundamentals of Relational Database Management Systems*

*Advanced Database Systems*

*Database Management Systems - Designing and Building Business Applications*

Multimedia Database Management Systems presents the issues and the techniques used in building multimedia database management systems. Chapter 1 provides an overview of multimedia databases and underlines the new requirements for these applications. Chapter 2 discusses the techniques used for storing and retrieving multimedia objects. Chapter 3 presents the techniques used for generating metadata for various media objects. Chapter 4 examines the mechanisms used for storing the index information needed for accessing different media objects. Chapter 5 analyzes the approaches for modeling media objects, both their temporal and spatial characteristics. Object-oriented approach, with some additional features, has been widely used to model multimedia information. The book discusses two systems that use object-oriented models: OVID (Object Video Information Database) and Jasmine. The models for representing temporal and spatial requirements of media objects are then studied. The book also describes authoring techniques used for specifying temporal and spatial characteristics of multimedia databases. Chapter 6 explains different types of multimedia queries, the methodologies for processing them and the language features for describing them. The features offered by query languages such as SQL/MM (Structured Query Language for Multimedia), PICQUERY+, and Video SQL are also studied. Chapter 7 deals with the communication requirements for multimedia databases. A client accessing multimedia data over computer networks needs to identify a schedule for retrieving various media objects composing the database. The book identifies possible ways for generating a retrieval schedule. Chapter 8 ties together the techniques discussed in the previous chapters by providing a simple architecture of a distributed multimedia database management system. Multimedia Database Management Systems can be used as a text for graduate students and researchers working in the area of multimedia databases. In addition, the book serves as essential reading material for computer professionals who are in (or moving to) the area of multimedia databases.

This comprehensive book, now in its Fifth Edition, continues to discuss the principles and concept of Database Management System (DBMS). It introduces the students to the different kinds of database management systems and explains in detail the implementation of DBMS. The book provides practical examples and case studies for better understanding of concepts and also incorporates the experiments to be performed in the DBMS lab. A competitive pedagogy includes Summary, MCQs, Conceptual Short Questions (with answers) and Exercise Questions.

Many books on Database Management Systems (DBMS) are available in the market, they are incomplete very formal and dry. My attempt is to make DBMS very simple so that a student feels as if the teacher is sitting behind him and guiding him. This text is bolstered with many examples and Case Studies. In this book, the experiments are also included which are to be performed in DBMS lab. Every effort has been made to alleviate the treatment of the book for easy flow of understanding of the students as well as the professors alike. This textbook of DBMS for all graduate and post-graduate programmes of Delhi University, GGSIPU, Rajiv Gandhi Technical University, UPTU, WBUT, BPUT, PTU and so on. The salient features of this book are: - 1. Multiple Choice Questions 2. Conceptual Short Questions 3. Important Points are highlighted / Bold faced. 4. Very lucid and simplified approach 5. Bolstered with numerous examples and CASE Studies 6. Experiments based on SQL incorporated. 7. DBMS Projects added Question Papers of various universities are also included.

Database Management Systems: Understanding and Applying Database Technology focuses on the processes, methodologies, techniques, and approaches involved in database management systems (DBMSs). The book first takes a look at ANSI database standards and DBMS applications and components. Discussion focus on application components and DBMS components, implementing the dynamic relationship application, problems and benefits of dynamic relationship DBMSs, nature of a dynamic relationship application, ANSINDL, and DBMS standards. The manuscript then ponders on logical database, interrogation, and physical database. Topics include choosing the right interrogation language, procedure-oriented language, system control capabilities, DBMSs and language orientation, logical database components, and data definition language. The publication examines system control, including system control components, audit trails, reorganization, concurrent operations, multiple database processing, security and privacy, system control static and dynamic differences, and installation and maintenance. The text is a valuable source of information for computer engineers and researchers interested in exploring the applications of database technology.

*Learn essential concepts of database systems*

*Understanding and Applying Database Technology*

*Introduction to Database Management Systems on MTS.*

*Workshop Proceedings Capri, Italy, May 1991*

*Recommendations for Database Management System Standards*

*This edition combines clear explanations of database theory and design with up-to-date coverage of models and real systems. It features excellent examples and access to Addison Wesley's database Web site that includes further teaching, tutorials and many useful student resources.*

*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*

*This book is the acknowledged, authoritative guide to databases in all of their forms - PC, UNIX, and mainframe - a comprehensive reference on current database technology, architectures, an products that should find a place on every IS professional's bookshelf. Now in its second edition, it has been completely updated to include in-depth coverage of every major Internet-spanned database management development - from using Java and Visual Basic for database access to Web search engines and Web-connecting existing databases.*

*Database Management System*

*Concepts and Systems*

*Understanding Database Management Systems*

*Database Management System (DBMS): A Practical Approach, 5th Edition*

*Introduction to Database Management System*

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.

Geographical Information Systems are becoming increasingly important to geologists, geographers, and urban and environmental planners, amongst others. Although there is an increasing number of such systems available on the market, many questions of a theoretical nature need to be addressed, because of the inherently large amounts of data and the lack of appropriate models and languages. Also, there is a need for flexible and efficient usage of GIS, thus permitting their application in a broad range of new areas, such as navigation systems for transport and the automotive industry, ESPRIT Working Groups provide a structure that enables researchers to meet, interact and share research results, thus providing a platform for ad dressing fertile research areas with significant industrial promise. This particular volume is the result of a workshop organised by the "Basic GOODS" Working Group. The challenge has been to define richer and more powerful data definition and manipulation languages, and also to develop new and efficient algorithms. The challenge has been met, as presented in this volume, and the Working Group has succeeded in laying a good foundation for future research and eventual applications. We look forward to seeing the results of the recently launched "AMUSING" project, which will build on this foundation.

A comprehensive survey of the foundational models and recent research trends in access control models and mechanisms for database management systems.

This book explores the implications of non-volatile memory (NVM) for database management systems (DBMSs). The advent of NVM will fundamentally change the dichotomy between volatile memory and durable storage in DBMSs. These new NVM devices are almost as fast as volatile memory, but all writes to them are persistent even after power loss. Existing DBMSs are unable to take full advantage of this technology because their internal architectures are predicated on the assumption that memory is volatile. With NVM, many of the components of legacy DBMSs are unnecessary and will degrade the performance of data-intensive applications. We present the design and implementation of DBMS architectures that are explicitly tailored for NVM. The book focuses on three aspects of a DBMS: (1) logging and recovery, (2) storage and buffer management, and (3) indexing. First, we present a logging and recovery protocol that enables the DBMS to support near-instantaneous recovery. Second, we propose a storage engine architecture and buffer management policy that leverages the durability and byte-addressability properties of NVM to reduce data duplication and data migration. Third, the book presents the design of a range index tailored for NVM that is latch-free yet simple to implement. All together, the work described in this book illustrates that rethinking the fundamental algorithms and data structures employed in a DBMS for NVM improves performance and availability, reduces operational cost, and simplifies software development.

*An Evolutionary Approach*

*This book introduces the fundamental concepts necessary for designing, using, and implementing database systems and database applications. Our presentation stresses the fundamentals of database modeling and design, the languages and models provided by the database management systems, and database system implementation techniques. The book is meant to be used as a textbook for a one- or two-semester course in database systems at the junior, senior, or graduate level, and as a reference book. Our goal is to provide an in-depth and up-to-date presentation of the most important aspects of database systems and applications, and related technologies. We assume that readers are familiar with elementary programming and data structuring concepts and those they have had some exposure to the basics of computer organization.*