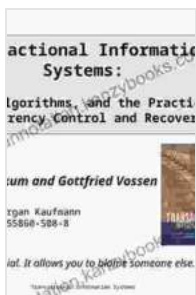


Unveiling the Secrets of Concurrency Control and Recovery: Theory, Algorithms, and Practical Implementation

In the realm of modern computing, where data integrity and accessibility are paramount, concurrency control and recovery mechanisms play a pivotal role. This book, "Theory, Algorithms, and the Practice of Concurrency Control and Recovery," serves as an invaluable resource for professionals, researchers, and students seeking a comprehensive understanding of these fundamental concepts.

Exploring the Foundations of Concurrency Control

Concurrency control lies at the heart of ensuring data integrity when multiple transactions access a shared database concurrently. This book delves into the theoretical foundations of concurrency control, introducing concepts such as schedules, serializability, and conflict analysis. It elucidates various concurrency control algorithms, including timestamp Free Downloading, two-phase locking, and optimistic concurrency control, providing insights into their strengths and limitations.



Transactional Information Systems: Theory, Algorithms, and the Practice of Concurrency Control and Recovery (The Morgan Kaufmann Series in Data Management Systems) by Gerhard Weikum

★★★★☆ 4.1 out of 5

Language : English

File size : 11486 KB

Print length : 872 pages



Unraveling Recovery Techniques

Database recovery is crucial for ensuring data availability and consistency in the event of failures. This book presents a comprehensive analysis of recovery techniques, ranging from basic log-based recovery to more advanced approaches like shadow paging and write-ahead logging. It explores the intricacies of recovery mechanisms, including techniques for handling transaction aborts, system crashes, and media failures.

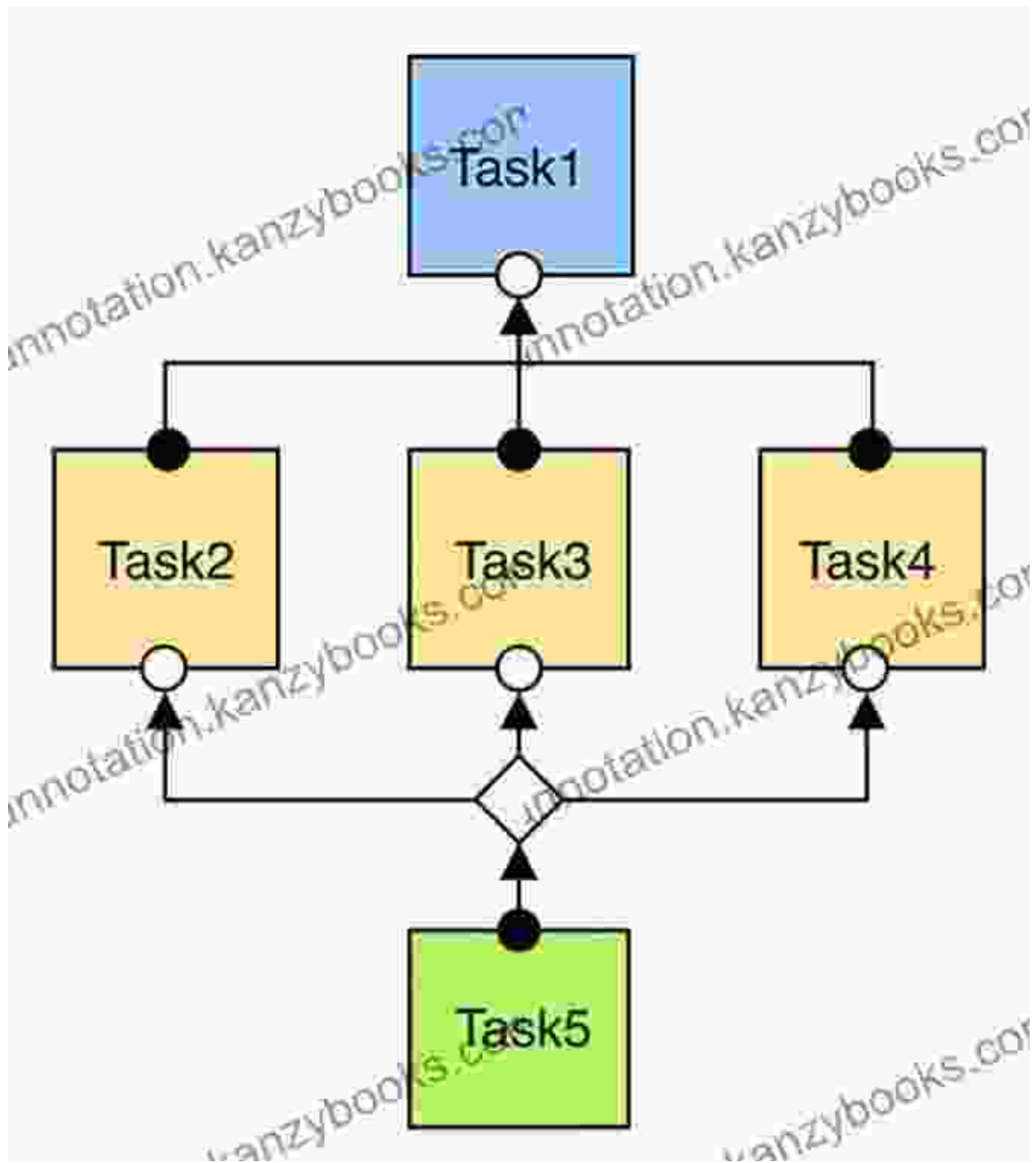
Diving into Practical Implementations

Beyond theoretical discussions, this book emphasizes the practical implementation of concurrency control and recovery techniques. It provides detailed explanations of real-world systems, such as PostgreSQL, MySQL, and Oracle, showcasing how these concepts are applied in practice. The book also addresses performance optimization techniques and scalability considerations, equipping readers with the knowledge to design and implement robust database systems.

Delving into Advanced Topics

For those seeking a deeper understanding, the book delves into advanced topics such as distributed concurrency control, multi-version concurrency control, and temporal databases. It presents cutting-edge research and innovative approaches, providing readers with a glimpse into the future of database management.

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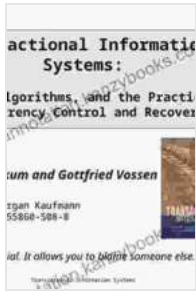
Log-Based Recovery

- Other special log records exist to record significant events during transaction processing, such as:
 - **Starting a transaction:** when transaction T_i starts, it registers itself by a log record $\langle T_i, \text{start} \rangle$.
 - **Writing new values:** Before T_i executes **write**(X), a log record $\langle T_i, X, V_1, V_2 \rangle$ is written, where V_1 is the value of X before the write, and V_2 is the value to be written to X .
 - The **log record** notes that T_i has performed a write on data item X ; X had value V_1 before the write, and will have value V_2 after the write.
 - **Committing a transaction:** When T_i finishes its last statement, the log record $\langle T_i, \text{commit} \rangle$ is written.
 - **Aborting a transaction:** Transaction T_i has aborted $\langle T_i, \text{abort} \rangle$.
- We assume for now that log records are written directly to stable storage (that is, they are not buffered)
- Two approaches for modifying the database when using logs
 - Deferred database modification
 - Immediate database modification



"Theory, Algorithms, and the Practice of Concurrency Control and Recovery" is an indispensable guide for anyone seeking to master the art of data management. Through its comprehensive coverage, practical insights, and exploration of cutting-edge topics, this book empowers readers to design, implement, and manage robust and scalable database systems that meet the demands of modern applications. Embark on your journey to data integrity and availability today, and unlock the secrets of concurrency control and recovery.

**Transactional Information Systems: Theory, Algorithms,
and the Practice of Concurrency Control and Recovery**



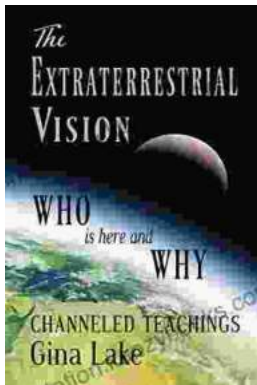
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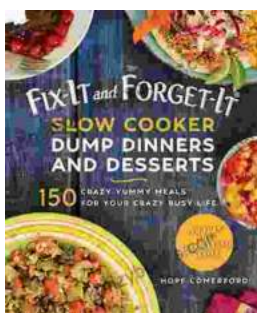
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