The Theory of Database Concurrency Control

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Concurrency Control and Recovery in Database Systems

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Transaction Information Systems

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Distributed and Parallel Database Object Management

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Concurrency can be extremely difficult to get right. Fortunately, the Go open source programming language makes working with concurrency tractable and easy. If you’re a developer familiar with Go, this practical book demonstrates best practices and patterns to help you incorporate concurrency into your systems. Author Katherine Cox-Buday takes you step-by-step through the process. You’ll understand how to choose to model concurrency, what errors can arise from modeling, and how to compose primitives within this model to solve problems. Learn the skills and tools that you need to confidently write and implement concurrent systems at any scale. Understand how to address fundamental problems that make concurrency difficult to do correctly. Leave the key differences between concurrency and parallelism big into the sytols of Go’s concurrency synchronization primitives. Form patterns with these primitives to write maintainable concurrent code. Computers patterns into a series of patterns that enable you to write large, distributed systems that scale. Learn the principles behind generation and have the knowledge critical to everything together.

### Transaction Processing

**Seppo Sippu** - 2015-01-27

Transactions are a concept related to the logical database as seen from the perspective of database application programmers: a transaction is a sequence of database actions that is to be executed as an atomic unit of work. The processing of transactions on databases is a well-established area with many of its foundations having already been laid in the late 1970s and early 1980s. The unique feature of this textbook is that it bridges the gap between the theory of transactions on the logical database and the implementation of the related actions on the underlying physical database. The authors relate the logical database, which is composed of a dynamically changing set of data items with unique keys, and the underlying physical database with a set of fixed-size data and index pages on disk. Their treatment of transaction processing builds on the “do-redo-undo” recovery paradigm, and all methods and algorithms presented are carefully designed to be compatible with this paradigm as well as with techniques like logging, structured buffer handling, and fine-grained concurrency control. Chapter 1 introduces the basic notions related to transaction processing on a representative database system within the context of our transaction model, covering topics like ACID properties, database integrity, buffering, rollbacks, isolation, and the interplay of logical locks and physical latches. Chapters 1 and 7 present advanced features, including deadlock-free algorithms for reading, inserting and deleting tuples, while the remaining chapters cover additional advanced topics extending on the preceding foundational chapters, including multi-granular locking, bulk data manipulation, distributed rollbacks, and the design of transactional databases.

This book is primarily intended as a text for advanced undergraduate or graduate courses in database management or transaction processing in particular.

### Atomic Transactions

**Nancy A. Lynch** - 1996

This book presents a framework for precise design and verification of distributed and concurrent systems that use atomic transactions as a high-level abstraction. The authors present the most well-known algorithms for transaction processing in the context of distributed systems, and include a well-developed data processing case study.

### Concurrent and Distributed Systems

**Katherine Cox-Buday** - 2017-07-19

Concurrency can be notoriously difficult to get right, but fortunately, the Go open source programming language makes working with concurrency tractable and even easy. If you’re a developer familiar with Go, this practical book demonstrates best practices and patterns to help you incorporate concurrency into your systems. Author Katherine Cox-Buday takes you step-by-step through the process. You’ll understand how to choose to model concurrency, what errors can arise from modeling, and how to compose primitives within this model to solve problems. Learn the skills and tools that you need to confidently write and implement concurrent systems at any scale. Understand how to address fundamental problems that make concurrency difficult to do correctly. Leave the key differences between concurrency and parallelism big into the sytols of Go’s concurrency synchronization primitives. Form patterns with these primitives to write maintainable concurrent code. Computers patterns into a series of patterns that enable you to write large, distributed systems that scale. Learn the principles behind generation and have the knowledge critical to everything together.

## About the Author

Katherine Cox-Buday is a researcher at Microsoft Research and an adjunct professor at the University of Washington. She received her Ph.D. from Stanford University in 2010, where her thesis focused on the design and implementation of concurrent data structures. Prior to Microsoft, she was a research scientist at Google, where she worked on distributed systems. She is a co-founder and board member of the XML-Link project, a non-profit organization dedicated to advancing the understanding and use of XML technology. She is a member of the Association for Computing Machinery (ACM) and the Association for the Advancement of Artificial Intelligence (AAAI). She is an active member of the database and distributed systems communities, and has served on the program committees of numerous conferences, including the ACM SIGMOD Conference and the USENIX Annual Technical Conference.