


Transaction Management

Database Management Systems 3ed, R. Ramakrishnan and J. Gehrke

1




Motivation

- ❖ Concurrent execution
 - Why is this desirable?
- ❖ Crash recovery
 - Not desirable but unavoidable!
- ❖ Transaction
 - Abstracts away concurrency and crash recovery issues
 - Application developers need not worry about this

Database Management Systems 3ed, R. Ramakrishnan and J. Gehrke

2




Transactions: The ACID properties

- ❖ **A**tomicity: All actions in a Xact happen, or none happen
- ❖ **C**onsistency: Each Xact transforms the database from one consistent state to another
- ❖ **I**solation: Execution of concurrent transactions is as though they are evaluated in some serial order
- ❖ **D**urability: If a Xact commits, its effects persist

Database Management Systems 3ed, R. Ramakrishnan and J. Gehrke

3




Transactions: The ACID properties

- ❖ **C**onsistency
 - Responsibility of application
- ❖ **I**solation
 - Responsibility of Concurrency Control manager
- ❖ **A**tomicity, **D**urability
 - Responsibility of Recovery manager

Database Management Systems 3ed, R. Ramakrishnan and J. Gehrke

4



Transactions API

Client Application

Begin transaction
 SQL Query 1
 if (...) then SQL Update 2
 else SQL Update 3
 ...
 End transaction

ODBC/JDBC
Connection

Database System

Database Management Systems 3ed, R. Ramakrishnan and J. Gehrke

5