Transaction Management

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

Transactions: The ACID properties

- Atomicity: All actions in a Xact happen, or none happen
- Consistency: Each Xact transforms the database from one consistent state to another
- Isolation: Execution of concurrent transactions is as though they are evaluated in some serial order
- Durability: If a Xact commits, its effects persist

Transactions: The ACID properties

- Consistency
  - Responsibility of application
- Isolation
  - Responsibility of Concurrency Control manager
- Atomicity, Durability
  - Responsibility of Recovery manager

Transactions API

- Client Application
  - Begin transaction
  - SQL Query 1
  - if (...) then SQL Update 2
  - else SQL Update 3
  - End transaction
- Database System
  - ODBC/JDBC Connection