Introduction to Database Systems
CSE 444

Lecture 23:
Final Review

June 5, 2008

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The Final

- Date: Thursday, June 12
- Time: **8:30** - 10:20
- Place: this room
- Open book exam (textbook, course slides)

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Topic 1

- Data modeling
- Relational model
- SQL

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Data Modeling

- E/R diagrams
- Keys
- Relationships
- Inheritance
- Mapping to relations

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Relational Model

- Relations
- Keys
- Functional dependencies
- Decomposition
- Normal forms

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SQL

- Select-from-where
- Subqueries
- Aggregation
- Nulls
- Outer joins

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SQL (continued)

- Database modification
- Defining and modifying relation schemas
- Constraints
  - On attribute values
  - Keys
  - Foreign keys

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Topic 2: XML

- Xquery/Xpath: expressions and queries
- XML syntax
- DTD
- From relations to XML
- From XML to relations

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Topic 3: Transactions

- ACID properties
- Recovery
- Concurrency

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Recovery

- Undo log
- Redo log
- Undo/redo log

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Concurrency control

- Serializability
- Conflict serializability
- Locks
- Timestamps
- Validation

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Topic 4: Query Evaluation

- Indexes
- Physical operators
- Optimizations

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Index Structures

- Terminology:
  - Dense/sparse index
  - Primary/secondary index
- B^+-trees

Physical Operators

- One-pass algorithms
- Nested-loop joins
- Two-pass algorithms based on sorting
- Two-pass algorithms based on hash tables
- Index-based algorithms

Optimizations

- Algebra
  - Check that you know how to convert from SQL
- Algebraic laws
  - Which of these expressions are equal ? What if we have keys/foreign keys ?
- Dynamic programming
- Pipelining
- You should be able to discuss alternative choices of query plans

General Advice

- Some problems will require thinking
  - Use judgment
- Problem difficulty may be uneven:
  - do the easy ones first