Lecture 24: Final Review

Friday, March 10, 2006

The Final

• Date: Wednesday, March 15, 2006
• Time: 2:30-4:20
• Place: this room
• Open book exam
Problem 1

- Data modeling/relational model/SQL

Data Modeling

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

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

SQL

- Select-from-where
- Subqueries
- Aggregation
- Nulls
- Outer joins
SQL (continued)

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

Problem 2: XML

• Xquery/Xpath
• XML syntax
• DTD
• From relations to XML
• From XML to relations
XQuery

- Selecting data from XML (often in XPath)
- Constructing new XML values (RETURN)
- Aggregates
- Duplicate elimination (!!)

Problem 3: Transactions

- ACID properties
- Recovery
- Concurrency
Recovery

• Undo log
• Redo log
• Undo/redo log

• This was already on the midterm, so will likely be a small question or none

Concurrency control

• Serializability
• Conflict serializability
• Locks
• Timestamps
• Validation
Problem 4: Database Implementation

- Indexes
- Physical operators
- Optimizations
- Size estimation

Index Structures

- Terminology:
  - Dense/sparse index
  - Primary/secondary index
- $B^+$-trees
- Hash tables
  - Basic hash tables
  - Extensible hash table
Physical Operators

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

General Advice

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

– Homework 25%
– Project: 30%
– Midterm: 15%
– Final: 25%
– Intangibles: 5%

COMMIT
(The End)