Final Review

Friday, June 1st, 2007

The Final

- Date: Tuesday, June 5th
- Time: 10:30 - 12:20
- 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

Problem 3: Transactions

- ACID properties
- Recovery
- Concurrency

Recovery

- Undo log
- Redo log
- Undo/redo log

Concurrency control

- Serializability
- Conflict serializability
- Locks
- Timestamps
- Validation

Problem 4: Query Evaluation

- Indexes
- Physical operators
- Optimizations

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

Grading

–Homework 30%

–Project: 25%

–Midterm: 15%

–Final: 25%

–Intangibles: 5%

COMMIT
(The End)