Lecture 30: Final Review

Wednesday, December 6, 2000

The Final

- Date: Friday, December 8
- Time: 2:30 – 4:20
- Place: BAG 260
- Open book exam !

What to Prepare for the Final

Everything !

- Data modeling
- Relational model
- XML
- Relational algebra
- SQL
- Storage
- Indexes
- Physical operators
- Optimization
- Recovery

Data Modeling

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

Relational Algebra

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

XML

- XML syntax
- DTD
- From relations to XML
- From XML to relations

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
- Embedded SQL

Data Storage

- The I/O model of computation
- Representing data elements:
  - Grouping records into blocks
  - Variable length records
  - Overflow blocks

Index Structures

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

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

- Extended logical operators
- Algebraic identities
- Heuristic based optimization:
  - Push down selections
  - Push down projections
- Cost based optimization:
  - Size estimation
  - Dynamic programming for join order

Recovery

- Undo logging
- Redo logging
- Undo/redo logging

General Advice

- Some problems will require thinking
  - Use judgment
  - Do not look for "similar" problem in HW or book
- Problem difficulty may be uneven:
  - do the easy ones first