Final Exam Review/Topics

ECS 165A Winter 2011
TJ Green
Scope of Exam

- Cumulative, will cover material from entire quarter
- Wednesday 10:30am-12:30pm (2hrs), here
- Similar in flavor to midterm + sample finals (but hopefully less time pressure than midterm)
What Won’t Be on Final

• SQL assertions
• Details of trigger syntax
  – But there may be high-level/conceptual questions
• Dependency theory, BCNF and 3NF decompositions
• Database connection libraries and PHP
• Stratified negation (Datalog)
  – But Datalog will be on final
What *Will* Be on Final

- Database design and the E/R model
- Relational model and relational algebra
- SQL
- Integrity constraints
- Storage and file organization
- Indexing
- Query processing
- Transactions
- Datalog and recursive queries
Database Design and the ER Model

• Basic concepts: entities and entity types, attributes and keys, relationships and relationship types
• Entity-Relationship schema (aka ER diagram)
• Constraints on relationship types
• Design choices
• Enhanced Entity-Relationship model features
• Steps in designing an ER schema
• Translation of an ER schema to tables
Relational Model and Relational Algebra

- Fundamental concepts of the relational model
- Integrity constraints
- Translation of ER diagram -> relational schema
- Relational algebra
- Modifications of the database
  - you don’t have to know the notation presented at the end of slides for Section 3
SQL

- Basic queries in SQL (select-from-where)
- Set operations on relations
- Nested subqueries
- Null values
- Aggregate functions and grouping
- DDL (data definition language)
- Insert, update, and delete statements
- View definitions
Integrity Constraints

• Referential integrity

• “Granularity” of constraint checking
  – per-table versus per-row

• Assertions

• Event-condition-action triggers
  – at the level of pseudocode, don’t need to memorize actual syntax
Storage and File Structures

- Tradeoffs of physical storage media
- Magnetic disks, tertiary storage
- Buffer management
- Storage access
- File organization
  - fixed size versus variable length records
Indexing

• Single-level ordered indexes
• Multi-level indexes
• Dense, sparse, primary, secondary
• B+ tree indexes
• Index definition in SQL
  – should know the basic syntax
Query Processing

• Catalog information for cost estimation
• Measures of query cost
• Physical operator implementations
  – Selection
  – Join
  – Set operations
• Evaluation and transformation of expressions
• Holistic view of “the life of a query”
Transactions

• ACID requirements
• Violations of isolation: lost updates, dirty reads, inconsistent analysis
• Serializability
• Two-phase locking protocol
Datalog

• Syntax (head, body, subgoal, rule, ...) and semantics
• Safety
• EDBs versus IDBs
• Recursion
• Translating among Datalog, SQL, RA, English