FINAL REVIEW

Final Exam

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- December 14th at 12:30pm (2.5 hours)
- No aids allowed
- Practice final exam solutions on Avenue
  - 'Content' → 'Practice Final'

Relational Model

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- Logical model, physical model
- Data Independence
- Schemas
- Integrity Constraints (tuple, domain)
- Keys (superkey, PK, FK)
- Referential integrity (what is it, enforcement)

E-R Model

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- Read and interpret an ER diagram
- How to translate English requirements to an ER diagram
- Avoid redundancy
- Different types of relationships (one-many, many-many, one-one)
- Total vs. partial participation
- Weak entities
- ISA hierarchies
- Covering and overlap constraints

SQL

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- DDL, DML
- Create table, update, delete statements
- Relational predicates, clauses, operators
- Joins (outer, full, equijoin, self), aggregation, grouping, sub-queries, etc.
- Keys: PKs, FKs, referential integrity (ways of enforcement)
- Bag semantics vs. set semantics
- Given a schema:
  - Evaluate the results (output) of an SQL query
  - Translate English statement to write an SQL query
- No embedded SQL

Views and Indexes

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- View definition
- Distinction between virtual vs. materialized views
  - Benefits, disadvantages of each
- Insertions and updates on views
- Clustered vs. unclustered index
- B+ tree index, hash index, composite index
- When are indexes best used
- How to select the best index for a workload

Relational Algebra

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- RA operators and operands (selection, projection, joins, renaming, set operations, and others…)
- Set vs. bag semantics
- Extended operators
- Given a schema, know how to:
  - Write an RA expression from English statement
  - Evaluate an RA expression for its output

Database Design

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- Redundancy, and how this causes anomalies
- Functional Dependencies (FDs)
- Keys, superkeys
- Armstrong's Axioms
- Dependency inference
- Closure
- Minimum Cover

Database Design (cont'd)

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- Projection of FDs
- Given R, and set of FDs F, find the keys
- Schema decomposition (properties, goals)

Normalization

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- Lossless join decomposition
  - What does this mean
  - Test to determine if a decomposition is lossless
- Dependency preserving
  - What does this mean
  - How to check if a decomposition is dependency preserving
- BCNF, 3NF
  - Distinction between the two
  - Properties of each
  - Is a decomposition BCNF or 3NF?
  - Find a BCNF, 3NF decomposition: decomposition algorithms

Transactions

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- Transaction properties (ACID)
- Schedules
  - properties such as: serial, equivalent, serializable, conflict serializable, avoid cascading aborts, recoverable, 2PL, strict 2PL
  - How to check for these properties
- Conflict operations
- Precedence graph
- Given a schedule, determine its properties

Locking

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- Types of locks
- Strict 2PL, 2PL
- Phantom problem
- Performance/overhead of locks
- Isolation levels

Locking

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- Deadlocks
  - Detection: Waits-for-graph
  - Prevention: Wait-die, Wound-wait
- Multiple Granularity Locking
  - Intention locks, lock conversions (upgrades/downgrades)

Advanced Topics: Data Mining

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- Data mining techniques
- Frequent itemsets, association rules

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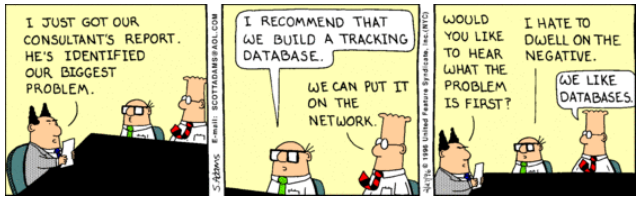

Online Course Evaluations

Your course evaluations are critical to future course development and instructor assessment processes. Log in with your MACID to evaluate your courses.

Evaluations for FALL TERM 1 2017 Courses in Faculty of Engineering:

Start: Thursday, November 23, 2017 at 10:00 a.m.
Close: Thursday, December 7, 2017 at 11:59 p.m.

Results from the evaluations are not made available to instructors until after they have submitted the final marks for the course.

https://evals.mcmaster.ca

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