CGS 2545: Database Concepts
Fall 2010

FINAL EXAM REVIEW

Instructor : Dr. Mark Llewellyn
markl@cs.ucf.edu
HEC 236, 407-823-2790
http://www.cs.ucf.edu/courses/cgs2545/fall2010

Department of Electrical Engineering and Computer Science
University of Central Florida

Material Covered On Exam

- The material covered on the exam is taken only from the on-line lecture notes. There will be no questions on the exam which are Access specific.
- Much of this material also appears in the textbook, however, material that appears **only** in the textbook will not appear on the exam.
- The exam is comprehensive. Emphasis is placed on the material covered in Exams 1 and 2.
- The exam covers the material found in Chapters 1, 2, 3, 4, 5 7, 8, 11, and 14 (an online chapter only).
- Format of the exam will consist of mostly multiple choice and true/false questions with a few work type problems.

Chapter 1 Details

Introduction To Database Systems

- Know definition of a database and DBMS.
- Components of a database system.
- Architecture of a database system.
- Various advantages and disadvantages of a database system.
- Levels of abstraction in a database system: external, conceptual, and physical.
- Schemas and instances.
- Data independence.
- DDLs and DMLs.
- Data models.

Chapter 2 Details

Database Development Process

- Enterprise data model.
- SDLC and prototyping.
- Basic project management issues.

- Not a lot of specific details in this chapter to worry about, just get a general overview of the database design as a project that requires management.
- Know the basic phases in SDLC and prototyping.

Chapter 3 Details

Modeling Data In The Organization

- Business rules and characteristics of good business rules.
- How to obtain business rules.
- Good data naming conventions.
- ER model.
  - Entities and attributes of entities. What is an entity and what is not.
  - Relationships between entities. Attributes of relationships.
  - Attributes. Simple, composite, derived, and multi-valued.
  - Strong entities and weak entities. Identifying relationships for weak entities.
  - Unary, binary, and ternary relationships.
  - Relationship cardinality. 1:1, 1:M, and M:M.
  - Participation constraints. Mandatory and optional.
  - Associative entities.

Chapter 4 Details

EER Model And More On Business Rules

- Supertype – subtype specifications.
  - Attribute inheritence
  - Relationship participation inheritence.
- Generalization – specialization.
  - Completeness constraints. Total and partial specializations.
  - Disjointness constraints. Disjoint and overlapping specializations.
  - Subtype discriminators.
- Entity clusters.
- Expanded ER to incorporate business rules.
  - Derivations, structural assertions, action assertions.

Chapter 5 Details

Logical Database Design And The Relational Data Model

- Relation, attribute, domain, tuple, degree, cardinality, and related terminology.
- You can ignore the more mathematical definition of a relation.
- Be familiar with the definition of a relation as shown on page 11.
- Know the difference between a schema and an instance.
- Be able to convert basic ER diagrams into a set of relational tables.
  - Strong entities with simple, composite, and multi-valued dependencies.
  - Weak entities.
  - Binary 1:M and M:M relationships.
  - Binary 1:1 relationships.
  - Associative entities both with and without defined identifiers.
  - Unary relationships – **Don't worry about this one for the exam.**
  - Supertype/subtype hierarchies.

Chapter 5 – Part 2 Details

Normalization

- Know what normalization is and how it is achieved.
- Concept of a functional dependency.
- Normal forms based upon functional dependencies: (1NF), 2NF, 3NF, and BCNF.
- Insertion, deletion, and update anomalies.
- Be able to convert N2NF tables into 2NF tables.
- Be able to convert N3NF tables into 3NF tables.

Chapter 7 Details

Introduction To SQL

- Table creation in SQL.
- Referential integrity constraints in tables in SQL.
- Inserting, deleting, and updating rows in tables in SQL.
- Queries in SQL.
  - Basic SELECT statement.

    SELECT (attributes)
    FROM (tables)
    WHERE condition
    GROUP BY
    HAVING
    ORDER BY

Also see "SQL – In class exercises" for more SQL query examples.

Chapter 8 Details

Advanced SQL

- Table joins in SQL queries.
  - Natural joins
  - Equijoins
  - Union Joins
  - Outer Joins
- Subqueries
  - Correlated
  - Non-correlated

Ignore pages 24-36 for the exam.

Also see "SQL – In class exercises" for more SQL query examples.

Chapter 6 Details

The Physical Database

- Know the basic decisions (inputs vs. outputs) that need to be made when designing the physical database. (See page 5 in the notes.)
- Denormalization.
- Basic file organizations. Pros and cons of design vs. usage.
- RAID. What is its primary purpose? Pros and cons.

Chapter 12 Details

Data and Database Administration

- Know the differences between data and database administration.
- What functions do DAs perform? What functions to DBAs perform? What functions overlap? See page 6 in the notes.
- Basic types of security threats.
- Authentication schemes.
- Basic concurrency control.
- Locking and deadlock issues.
- Recovery schemes.

Distributed Database Systems - Details

- Shared memory, shared disk, and shared nothing parallel systems.
- Speed-up and scale-up in parallel systems.
- Parallel systems designed to primarily enhanced execution speed. Distributed systems designed to primarily enhanced data availability and data reliability.
- Homogeneous versus heterogeneous distributed database systems.
- The fundamental principle of distributed database systems.
- Twelve primary objectives of a distributed database system.
- Synchronous versus asynchronous distributed technology.
- Data replication.
- Data fragmentation.
- Functions of a DDBMS.
- Processing local transactions.
- Processing global transactions.

Ignore pages 63-82 for the exam.

Chapter 11 Details

Data Warehousing

- Know the definition of a data warehouse.
- Differences between a data warehouse and a data mart.
- Know the basic steps involved in ETL (Extraction-Transformation-Loading) for a warehouse.
- Basic types of data mining operations.