CGS 2545: Database Concepts
Summer 2007

EXAM #1 Review

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Material Covered On Exam

- The material covered on the exam is taken only from the on-line lecture notes.

- 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 covers the material in Chapters 1, 2, 3, and 4.

- Format of the exam will consist of mostly multiple choice and true/false questions with a few work type problems. The work problems will consist of interpreting and/or drawing simple ER diagrams.

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.
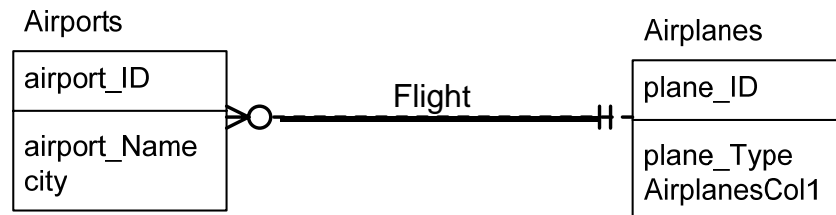   - Associative entities.

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.

Some Example Problems

1. Give an English description of the scenario modeled by the ER diagram shown below.

    Airports
airport_ID
airport_Name city

    Flight

    Airplanes
plane_ID
plane_Type AirplanesCol1

2. Given a transportation db in which we are modeling the routes of buses (bus# = only attribute), suppose that a specific bus operates on a route in which it stops at 8 different locations (loc# = only attribute). For each of the locations we want to record the time of day that the bus actually arrived at that location. Draw an ERD shown below so that this situation will correctly modeled. Assume the db represents information for only a single day.

Some Example Problems

3.   Which of the following are disadvantages of the file system approach to storing and managing data?

   a)   duplication of data

   b)   software/application development times

   c)   high degree of data sharing is possible

   d)   program-data independence

   e)   none of the above are a disadvantage of the file system approach

4.   This type of independence insulates the users of a database from changes made to the conceptual database.

   a)   Physical

   b)   Logical

   c)   Conceptual

   d)   Democratic

Some Example Problems

5.   A composite attribute and a multi-valued attribute are the same thing. TRUE FALSE

6.   The main difference between *Data* and *Information* is:
   a)   Only data can be transferred via any Data Communication System.
   b)   Information is not structured whereas Data is always structured.
   c)   Information is data that has been processed in such way that the knowledge of the person who uses the data increases.
   d)   There is no difference, Data is always information.

7.   A business rule:
   a)   Defines or constrains some aspect of the business.
   b)   Asserts business structure.
   c)   Controls or influence the behavior of the business.
   d)   All of the above.

Some Example Problems - ANSWERS

1. Every airport must have a flight, but not all airplanes need to have a flight.

2.

Bus			Location	
bus_number			location_number	
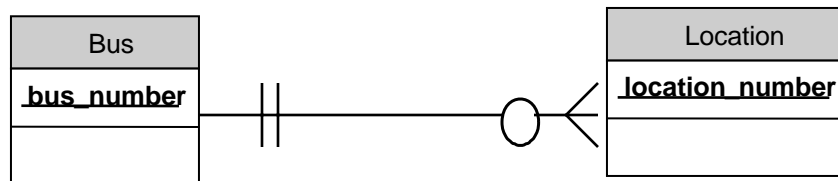
3. Both (a) and (b) are correct.

4. (b)

5. FALSE

6. (c)

7. (d)