CGS 2545: Database Concepts
Spring 2014

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, and 3.
- 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.

Introductory Notes 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 1 Details

Database Development Process

- Enterprise data model.
- SDLC and prototyping.
- Difference between data and information.

- 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 2 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.

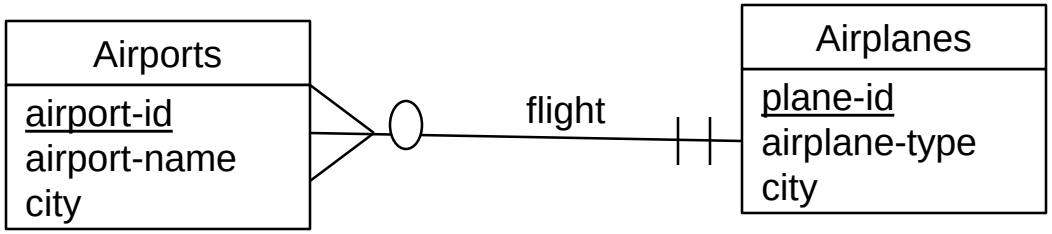
Chapter 3 Details

EER Model And More On Business Rules

- Supertype – subtype specifications.
  - Attribute inheritance
  - Relationship participation inheritance.
- Generalization – specialization.
  - Completeness constraints. Total and partial specializations.
  - Disjointness constraints. Disjoint and overlapping specializations.
  - Subtype discriminators.
- Entity clusters. Just know what purpose they serve.
- Expanded ER to incorporate business rules.
  - Derivations, structural assertions, action assertions.
  - Just read this section, don't worry about the details – no exam questions.

Some Example Problems

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



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. Also assume that a single location is only serviced by one bus.

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

8. Answer these questions regarding the ERD shown below:

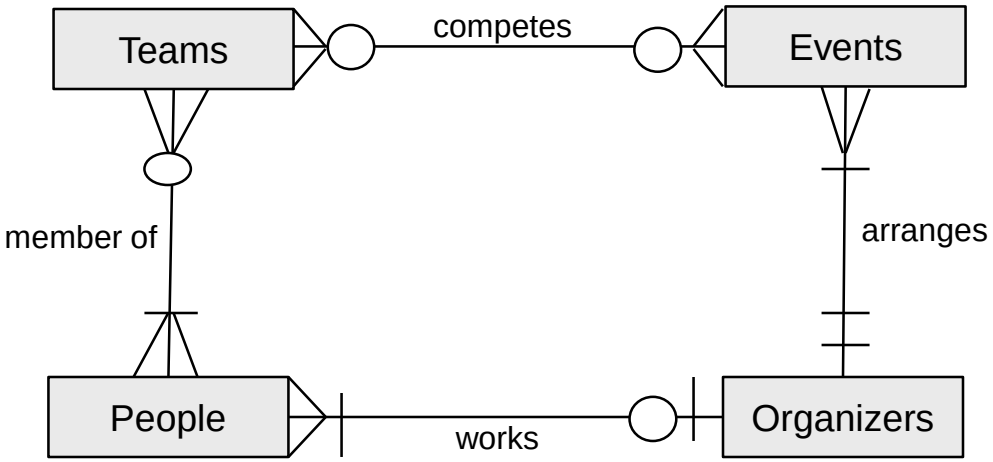
a) Does every team compete in an event? Yes No

b) Does every event have an organizer? Yes No

c) Does every person work for an organizer? Yes No

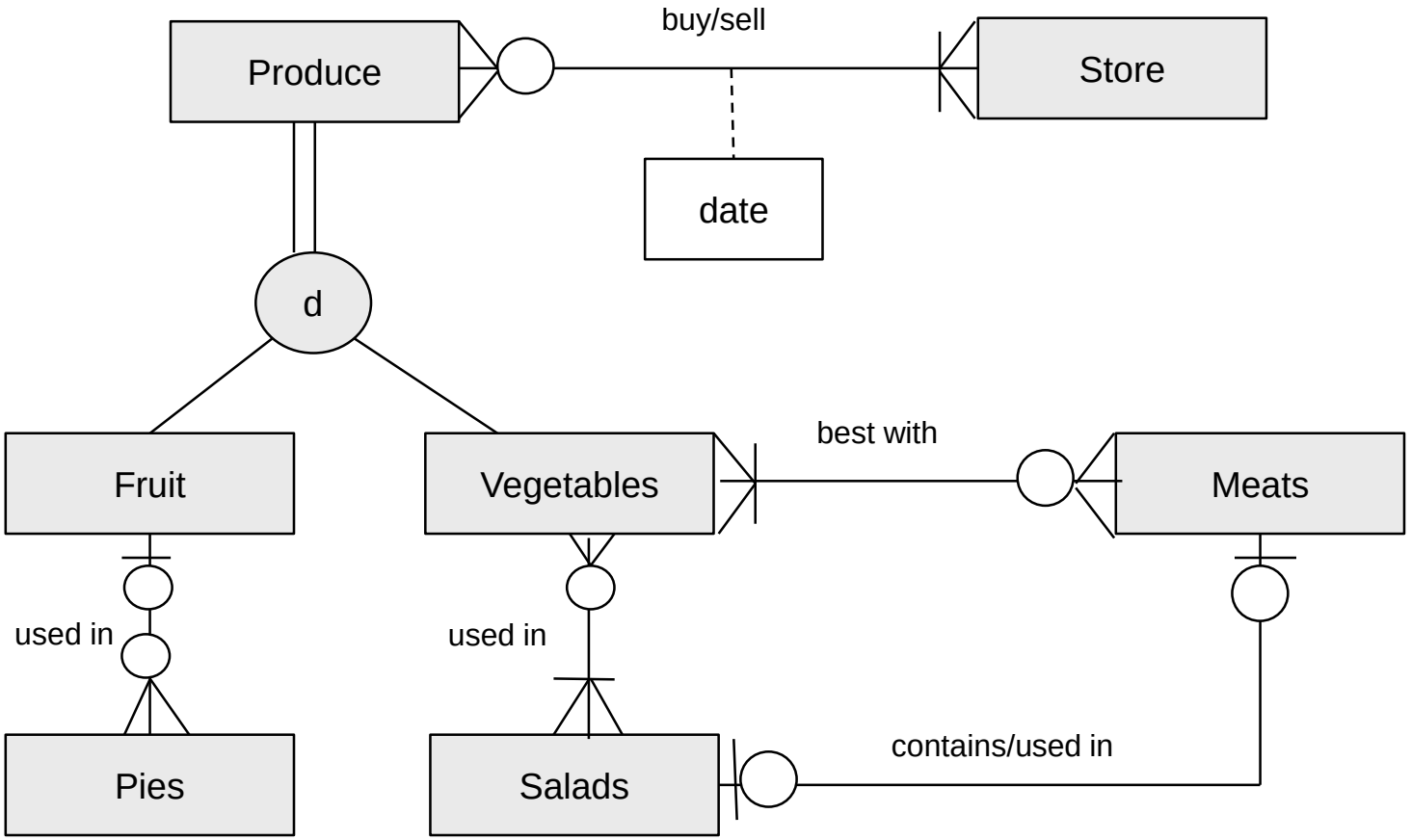
d) Does every event have more than one team compete? Yes No

e) Does every organizer have people working for them? Yes No



Some Example Problems

9. Given the ERD shown below, answer the questions on the following page.



Questions for Problem 9

(a) Does every store sell produce? Yes No

(b) Does every salad contain meat? Yes No

(c) Does every pie contain a fruit? Yes No

(d) Is every kind of produce either a fruit or vegetable? Yes No

(e) What type of variable must be added to the Produce table to determine the type of produce? Simple Composite

(f) Can a pie contain more than one fruit? Yes No

(g) Can a specific fruit be used in more than one kind of pie? Y N

(h) Can we tell the exact date that each type of produce was purchased from a given store? Yes No

(i) Is every vegetable best with a meat? Yes No

(j) Is every meat best with a vegetable? Yes No

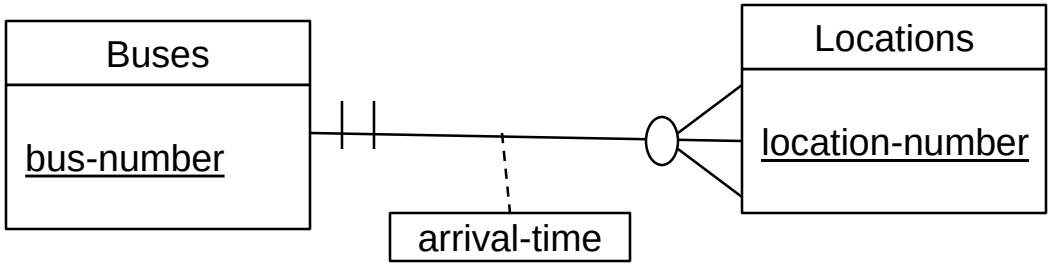
(k) Is every type of vegetable purchased at a store? Yes No

(l) How many different kinds of fruit can be in one pie? _____

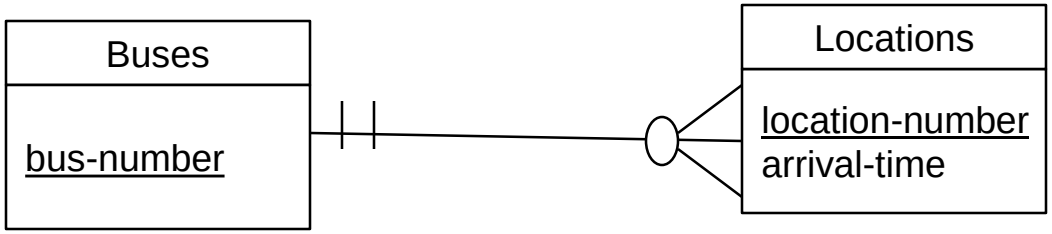
Some Example Problems - ANSWERS

1. Every airport must have only one flight of an airplane. A given airplane might have many flights to airports or it might not have any flights at all.

2.



or -



3. Both (a) and (b) are correct.
4. (b)
5. FALSE
6. (c)
7. (d)

Some Example Problems - ANSWERS

8. Answer these questions regarding the ERD shown below:

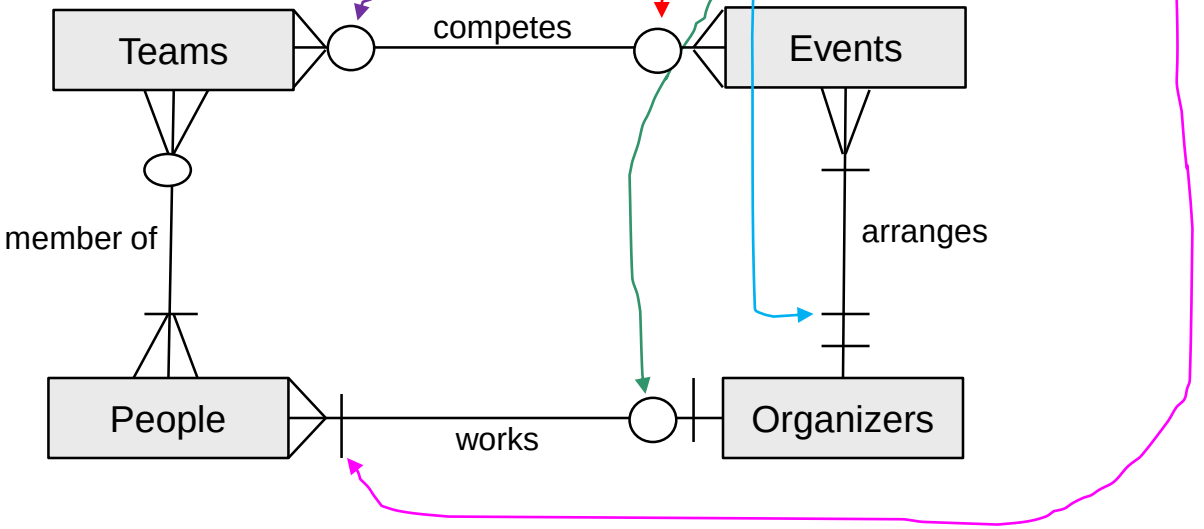
a) Does every team compete in an event? **No**

b) Does every event have an organizer? **Yes**

c) Does every person work for an organizer? **No**

d) Does every event have more than one team compete? **No**

e) Does every organizer have people working for them? **Yes**



Answers for Problem 9

(a) Does every store sell produce? Yes **No**
(b) Does every salad contain meat? Yes **No**
(c) Does every pie contain a fruit? Yes **No**
(d) Is every kind of produce either a fruit or vegetable? **Yes** No
(e) What type of variable must be added to the Produce table to determine the type of produce? **Simple** Composite
(f) Can a pie contain more than one fruit? Yes **No**
(g) Can a specific fruit be used in more than one kind of pie? **Y** N
(h) Can we tell the exact date that each type of produce was purchased from a given store? **Yes** No
(i) Is every vegetable best with a meat? Yes **No**
(j) Is every meat best with a vegetable? **Yes** No
(k) Is every type of vegetable purchased at a store? **Yes** No
(l) How many different kinds of fruit can be in one pie? **0 or 1**

Answer Reasons for Problem 9