

REVIEW QUESTIONS 5

1. What are the basic modeling components of the E-R models? How would you (graphically) identify each of them?
2. The Hudson Engineering Group (HEG) has contacted you to create a conceptual model whose application will meet the expected database requirements for its training program. The HEG administrator gives you the following description of the training group's operating environment:

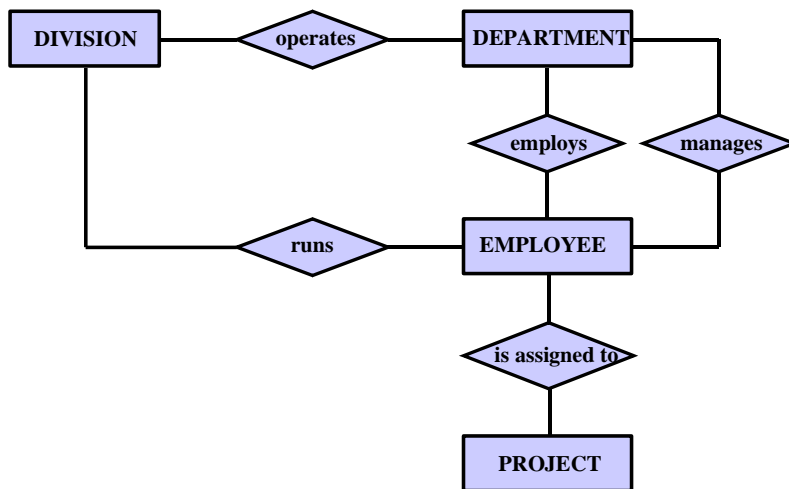
The HEG has 12 instructors and can handle up to 30 trainees per class. HEG offers five courses, each of which may generate several classes. If a class has fewer than 10 trainees in it, it will be canceled. It is, therefore, possible for a course not to generate any classes during a session. Each class is taught by one instructor. Each instructor may teach up to two classes or may be assigned to do research. Each trainee may take up to two classes per session.

Given this information, do the following:

- a. Draw the E-R diagram for HEG.
 - b. Describe the relationship between instructor and course in terms of connectivity and cardinality.
3. What two actions are available to a designer when a multivalued attribute is encountered?
 4. What is a derived attribute? Give an example.
 5. Briefly, explain the difference between single-valued attributes and simple attributes. Give an example of each.

PROBLEMS 5

The first three problems are based on the Chen E-R model below.



1. Use the following business rules to write all appropriate connectivities in the E-R diagram:
 - a) A department employs many employees, but each employee is employed by one department.
 - b) Some employees, known as "rovers," are not assigned to any department.
 - c) A division operates many departments, but each department is operated by one division
 - d) An employee may be assigned to many projects, and a project may have many employees assigned to it.
 - e) A project must have at least one employee assigned to it.
 - f) One of the employees manages each department, and each department is managed by only one employee.
 - g) One of the employees runs each division, and each division is run by one employee.
2. Write all the cardinalities into the model.

3. Modify the E-R model by splitting the M:N relationship into two 1:M relationships that are connected through a composite entity. Then, rewrite the connectivities and cardinalities to match the changes you have made.
4. Create an ERD model, using the following requirements.
 - An INVOICE is written by a SALESREP. Each sales representative can write many invoices, but each invoice is written by a single sales representative.
 - The INVOICE is written for a single CUSTOMER. However, each customer can have many invoices.
 - An INVOICE may include many detail lines (LINE) which describe the products bought by the customer.
 - The product information is stored in a PRODUCT entity.
 - The product's vendor information is found in a VENDOR entity.
 - Each VENDOR sells many PRODUCTS, each product is purchased from many VENDORS.
5. Given the following summary of business rules for the ROBCOR catering service, draw the ERD. Make sure to include all appropriate entities, relationships, connectivities, and cardinalities.

<p>Note: Limit your ERD to entities and relationships based on the business rules shown here. In other words, do NOT add "realism" to your design by expanding or refining the business rules! However, make sure that you include the attributes that would permit the model to be successfully implemented.</p>

Each dinner is based on a single entree, but each entree can be served at many dinners. A guest can attend many dinners, and each dinner can be attended by many guests. Each dinner invitation can be mailed to many guests, and each guest can receive many invitations.