Database Management System – cs422 DE

Assignment 5 – Week 6

This assignment is based on lecture 6 (chapter 12).

- Submit your *own work* on time. No credit will be given if the assignment is submitted after the due date.
- Note that the completed assignment should be submitted in .doc, .docx, .rtf or .pdf format only.
- In MCQs, if you think that your answer needs more explanation to get credit then please write it down.
- You are encouraged to discuss these questions in the Sakai forum.

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(1) A student can take not more than 5 subjects in a semester. The number of students allowed in a subject in a semester is not more than 40. The student – subject relationship is:

(A) 5:40 (B) 40:5
(C) N:5 (D) 40:M
ANS: B

(2) Which of the following is NOT a basic element of all versions of the E-R model?

(A) Entities
(B) Attributes
(C) Relationships
(D) Primary keys
ANS: D

(3) The attribute *name* could be structured as a attribute consisting of first name, middle initial, and last name. This type of attribute is called

(A) Simple attribute
(B) Composite attribute
(C) Multivalued attribute
(D) Derived attribute
ANS: B

(4) Which of the following indicates the minimum number of entities that must be involved in a relationship?

(A) Maximum cardinality
(B) Minimum cardinality
(C) ERD
(D) Keys
ANS: B

(5) Which of the following is a single valued attribute

(A) Register_number
(B) Address
(C) SUBJECT_TAKEN
(D) Reference
ANS: A

(6) In a one-to-many relationship, the entity that is on the many side of the relationship is called as
(A) Strong entity
(B) Weak entity
(C) Entity that has optional participation in the relationship
(D) Entity that has mandatory participation in the relationship
ANS: D

(7) Describe what attributes represent in an ER model and provide examples of simple, composite, single-valued, multi-valued, and derived attributes.
(Review Question 12.3 in 5th edition/ 11.3 in 4th edition)
ANS:

Attributes represented in an ER model:

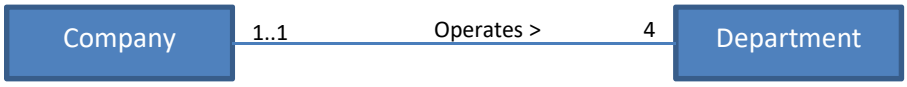
- Simple attribute – attributes that have atomic values
  - Example: name, dob, etc.
- Key attribute – an attribute that uniquely identifies each entity
  - Example: student_id, course_number, etc.
- Composite attribute – an attribute composed of many other attributes
  - Example: Address - can be composed of street, city, zipCode, and state
- Multivalued-attribute – an attribute with more than one value
  - Example: phone_number
- Derived attribute – an attribute that can be derived from other attributes
  - Examples:
    - Age - it can be derived from dob
    - Balance in Account entity - it can be derived from debit and credit amounts

(8) Describe how strong and weak entity types differ and provide an example of each.
(Review Question 12.8 in 5th edition/ 11.8 in 4th edition)
ANS:

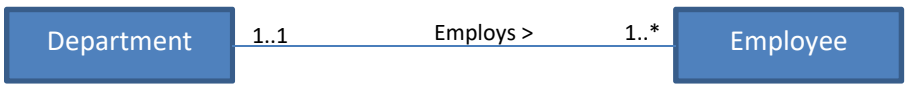
Strong entity	Weak entity
The Strong entity is independent of any other entity in a schema	Weak entity depends on the strong entity for its existence
Strong entity is denoted by a single rectangle	Weak entity is denoted with the double rectangle
Strong entity may or may not have total participation in the relationship	Weak entity always has total participation in the identifying relationship shown by double line
Example: **Customer**	Example: **Loan**

(9) Create an ER diagram for each of the following descriptions:
(Exercise 12.10 in 5th edition/ 11.10 in 4th edition)

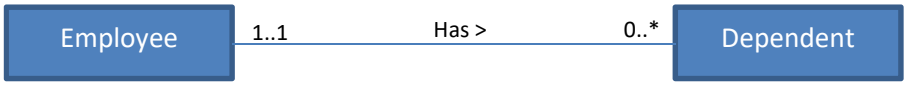
a. Each company operates four departments, and each department belongs to one company.
ANS:



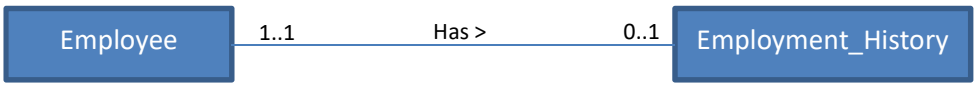
b. Each department in part (a) employs one or more employees, and each employee works for one department.
ANS:



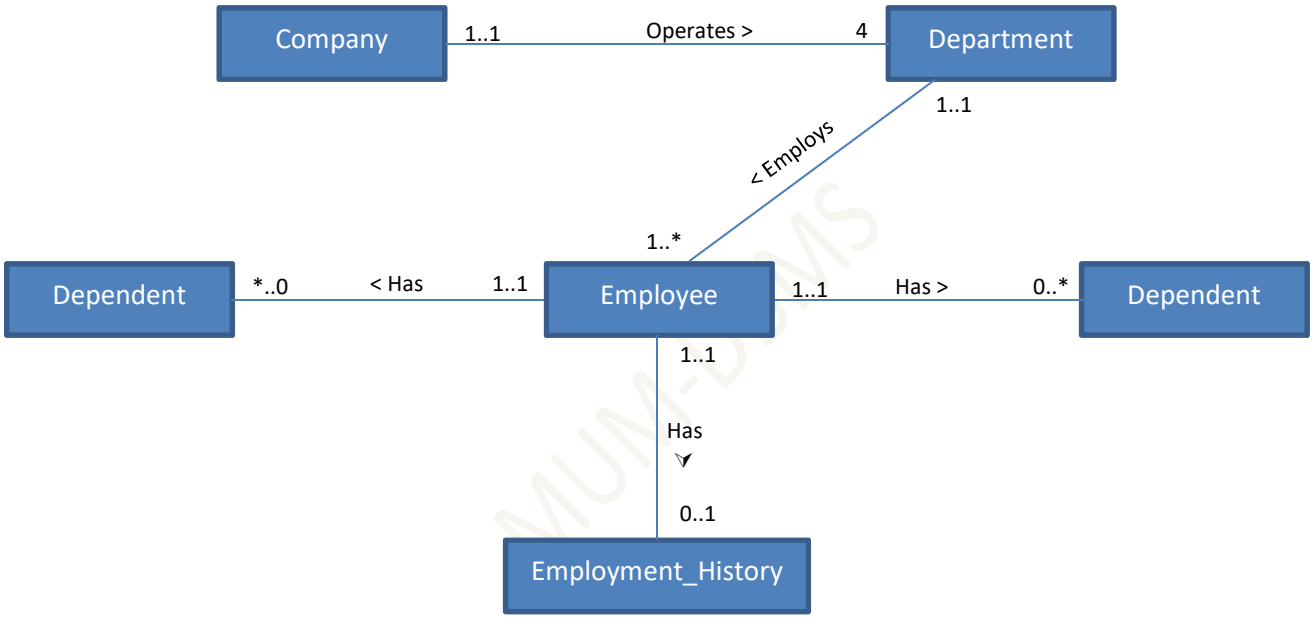
c. Each of the employees in part (b) may or may not have one or more dependants, and each dependant belongs to one employee.
ANS:



d. Each employee in part (c) may or may not have an employment history.
ANS:



e. Represent all the ER diagrams described in (a), (b), (c), and (d) as a single ER diagram.
ANS:

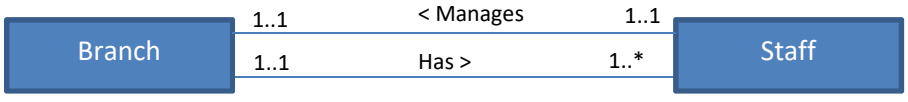


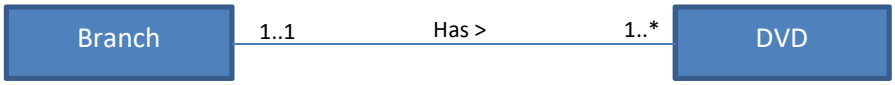
(10) Solve exercise 12.12 from the 5th edition (11.12 from the 4th edition). If time permits, solve from *a-f*. Otherwise, it's ok if you just solve *f*.
ANS:

a) Main entity types:
   a. Branch: branchNo, TelephoneNo, Address (Street, City, State, Zip Code)
   b. Staff: StaffNo, Name, Position, Salary
   c. DVD: CatalogNo, DVD No, title, category, status, dailyRentalCost, mainActors, directors
   d. Member: memberNo, fname, lname, address

b) Main relationship types and

c) Determine the multiplicity





d) Identify attributes and associates them with entity or relationship types
e) Determine candidate and primary key attributes
f) Single ER diagram