CSC 370

Quiz:
Conceptual Design

Sean Chester

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Questions

1. (1 point) Assume that you have a general class, Student, and specialisations, Computer Science Student, Biology Student, and Software Engineering Student. What type of generalisation abstraction does this most likely represent?

   ◯ total, overlapping (t, o)

   ◯ partial, exclusive (p, e)

   ◯ total, exclusive (t, e)

   ◯ partial, overlapping (p, o)

2. (1 point) Which of the following would be an invalid schema in the Entity-Relationship data model?

   □ One in which an entity set does not have an identifier.

   □ One that has more relationships than entity sets.

   □ One in which a relationship involves more than two entity sets.

   □ One with a subset hierarchy applied to a relationship.

3. (1 point) Consider the Entity-Relationship Diagram from the Batini et al. text in Figure 1. Which of the following statements are correct, according to that schema?

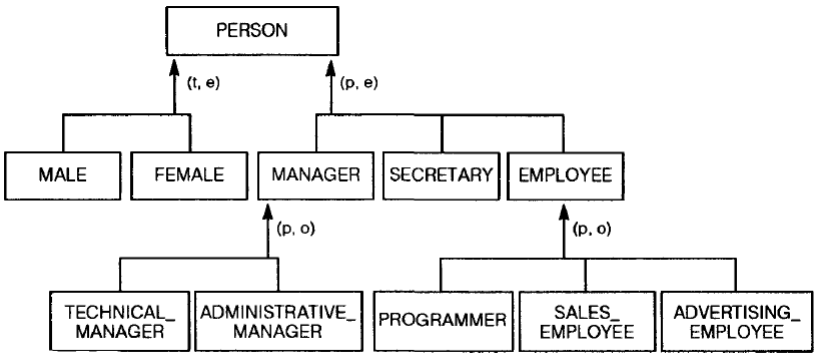

Figure 2.23 Generalization hierarchy for the entity PERSON

Figure 1: Generalization hierarchy for the entity PERSON

   □ Every TECHNICAL_MANAGER must also be an ADMINISTRATIVE_MANAGER.

   □ No PERSON can be both a TECHNICAL_MANAGER and a PROGRAMMER.

   □ Every ADVERTISING_EMPLOYEE is a PERSON.

   □ Every ADMINISTRATIVE_MANAGER must be MALE or FEMALE.

4. (1 point) Consider the Entity-Relationship Diagram taken from the Batini et al. text in Figure 2 and in which MAN has cardinality (1, 1) with RESIDENCE_OF. Which of the following statements are correct?

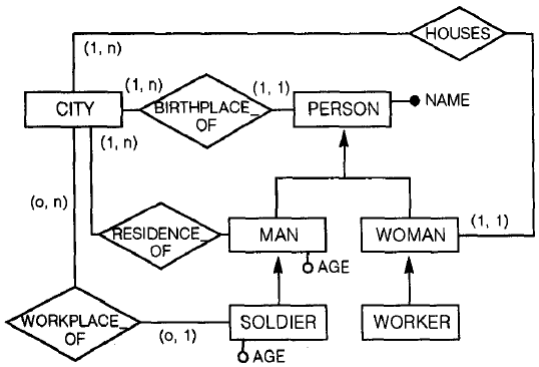

Figure 2.36 Schema for exercises 2.12 and 2.13

Figure 2: Generalization hierarchy for the entity PERSON

- ☐ We could simplify this schema by removing relationships RESIDENCE_OF and HOUSES and adding a one-many relationship LIVES_IN between CITY and PERSON.
- ☐ We could simplify this schema by removing the "AGE" attribute from SOLDIER and MAN and adding it instead to PERSON.
- ☐ CITY is the only entity set that does not have an identifier.
- ☐ If WORKPLACE_OF had cardinalities of (1, n) and (1, 1) instead of (0, n) and (0, 1), then every MAN would have exactly three relationships to CITY.

Answer Key

Question 1

partial, overlapping (p, o)

Question 2

One in which an entity set does not have an identifier.
One with a subset hierarchy applied to a relationship.

Notes: Indeed, The schema is not complete if not every entity set has an identifier. Indeed. The generalisation abstraction is only applied to entity sets.

Question 3

No Person can be both a technical manager and a programmer.
Every administrative manager must be male or female.
Every advertising employee is a Person.

Notes: Indeed. A Person is exclusively either a manager or an employee, so cannot be a subclass of each. Indeed. An administrative manager is a specialisation of person, and, due to the exclusive hierarchy, all persons must be one of the specialisations male or female. Indeed. All instances of any specialisation are automatically instances of all generalisations thereof.

Question 4

City is the only entity set that does not have an identifier.

Notes: To be equivalent to this design, lives_in would need to be many-one This is true, because Man, Woman, Soldier, and Worker all inherit the identifier name from Person.