CHAPTER 4: ENTITY RELATIONSHIP (ER) MODELING

1. The entity relationship model (ERM) is dependent on the database type.
   a. True
   b. False

   ANSWER: False
   PTS: 1 DIF: Difficulty: Easy REF: p.118
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
   KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

2. The Crow's Foot notation is less implementation-oriented than the Chen notation.
   a. True
   b. False

   ANSWER: False
   PTS: 1 DIF: Difficulty: Easy REF: p.118
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
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3. An entity in the entity relationship model corresponds to a table in the relational environment.
   a. True
   b. False

   ANSWER: True
   PTS: 1 DIF: Difficulty: Easy REF: p.118
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
   KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

4. In the entity relationship model, a table row corresponds to an entity instance.
   a. True
   b. False

   ANSWER: True
   PTS: 1 DIF: Difficulty: Easy REF: p.118
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
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5. In the Chen and Crow's Foot notations, an entity is represented with a rectangle containing the entity's name.
   a. True
   b. False

   ANSWER: True
   PTS: 1 DIF: Difficulty: Easy REF: p.118
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
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6. In the original Chen notation, each attribute is represented by an oval with the attribute name connected to an entity rectangle with a line.
   a. True
   b. False

   ANSWER: True
   PTS: 1 DIF: Difficulty: Easy REF: p.118
   NAT: BUSPROG: Analytic STATE: DISC: Information Technology
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7. Software vendors have adopted the Chen representation because of its compact representation.
   a. True
   b. False

   ANSWER: False
   PTS: 1 DIF: Difficulty: Moderate REF: p.119
   NAT: BUSPROG: Analytic STATE: DISC: Information Technology
   KEY: Bloom's: Comprehension TOP: The Entity Relationship Model (ERM)

8. A composite identifier is a primary key composed of more than one attribute.
   a. True
   b. False

   ANSWER: True
   PTS: 1 DIF: Difficulty: Easy REF: p.120
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
   KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

9. The Crow's Foot notation easily identifies multivalued attributes.
   a. True
   b. False

   ANSWER: False
   PTS: 1 DIF: Difficulty: Easy REF: p.121
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
   KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

10. Composite attributes make it easier to facilitate detailed queries.
    a. True
    b. False

    ANSWER: False
    PTS: 1 DIF: Difficulty: Easy REF: p.121
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

11. Connectivities and cardinalities are established by concise statements known as business rules.
    a. True
    b. False

ANSWER: True
PTS: 1 DIF: Difficulty: Easy REF: p.126
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12. In Chen notation, there is no way to represent cardinality.
    a. True
    b. False

ANSWER: False
PTS: 1 DIF: Difficulty: Easy REF: p.126
NAT: BUSPROG: Technology STATE: DISC: Information Technology
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13. In implementation terms, an entity is existence-dependent if it has a mandatory primary key.
    a. True
    b. False

ANSWER: False
PTS: 1 DIF: Difficulty: Easy REF: p.126
NAT: BUSPROG: Technology STATE: DISC: Information Technology
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14. A weak relationship exists if the primary key of the related entity contains at least one primary key component of the parent entity.
    a. True
    b. False

ANSWER: False
PTS: 1 DIF: Difficulty: Easy REF: p.127
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15. A weak entity has a primary key that is partially or totally derived from the parent entity in the relationship.
    a. True
    b. False

ANSWER: True
PTS: 1 DIF: Difficulty: Easy REF: p.129
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16. In a 1:M relationship, to avoid the possibility of referential integrity errors, the data of the "1" side must be loaded first.
    a. True
    b. False

ANSWER: True

PTS: 1 DIF: Difficulty: Moderate REF: p.129
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17. Relationships between entities always operate in one direction.
    a. True
    b. False

    ANSWER: False
    PTS: 1 DIF: Difficulty: Easy REF: p.131
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
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18. The existence of a mandatory relationship indicates that the minimum cardinality is 0 or 1 for the mandatory entity.
    a. True
    b. False

    ANSWER: False
    PTS: 1 DIF: Difficulty: Easy REF: p.131
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

19. Unary relationships are common in manufacturing industries.
    a. True
    b. False

    ANSWER: True
    PTS: 1 DIF: Difficulty: Easy REF: p.136
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

20. Referential integrity and participation are both bidirectional, meaning that they must be addressed in both directions along a relationship.
    a. True
    b. False

    ANSWER: False
    PTS: 1 DIF: Difficulty: Easy REF: p.137
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
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21. To implement a small database, a database designer must know the "1" and the "M" sides of each relationship and whether the relationships are mandatory or optional.
    a. True
    b. False

    ANSWER: True

PTS: 1 DIF: Difficulty: Moderate REF: p.139
NAT: BUSPROG: Analytic STATE: DISC: Information Technology
KEY: Bloom's: Comprehension TOP: The Entity Relationship Model (ERM)

22. The process of database design is a sequential process.
a. True
b. False

ANSWER: False
PTS: 1 DIF: Difficulty: Easy REF: p.140
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Developing an ER Diagram

23. The entity relationship diagram (ERD) represents the_____database as viewed by the end user.
a. condensed b. physical
c. logical d. conceptual

ANSWER: d
PTS: 1 DIF: Difficulty: Easy REF: p.118
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24. The_____notation of entity-relationship modelling can be used for both conceptual and implementation modelling.
a. Bachman b. UML
c. Chen d. Crow's Foot

ANSWER: b
PTS: 1 DIF: Difficulty: Easy REF: p.118
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25. A(n)_____is the set of possible values for a given attribute.
a. domain b. range
c. identifier d. key

ANSWER: a
PTS: 1 DIF: Difficulty: Easy REF: p.119
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26. Ideally, an entity identifier is composed of_____attribute(s).
a. three b. one
c. two d. six

ANSWER: b
PTS: 1 DIF: Difficulty: Easy REF: p.120
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27. A_____attribute can be further subdivided to yield additional attributes.
    a. composite b. simple
    c. single-valued d. multivalued

    ANSWER: a
    PTS: 1 DIF: Difficulty: Easy REF: p.120
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

28. A_____attribute is one that cannot be subdivided.
    a. composite b. simple
    c. single-valued d. multivalued

    ANSWER: b
    PTS: 1 DIF: Difficulty: Easy REF: p.121
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

29. The conceptual model can handle_____relationships and multivalued attributes.
    a. 1:1 b. M:N
    c. 1:M d. 1:N

    ANSWER: b
    PTS: 1 DIF: Difficulty: Easy REF: p.122
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

30. A derived attribute is indicated in the Chen notation by a_____that connects the attribute and an entity.
    a. single line b. dashed line
    c. double dashed line d. double line

    ANSWER: b
    PTS: 1 DIF: Difficulty: Easy REF: p.123
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

31. The decision to store_____attributes in database tables depends on the processing requirements and the constraints placed on a particular application.
    a. multivalued b. derived
    c. single-valued d. composite

    ANSWER: b
    PTS: 1 DIF: Difficulty: Easy REF: p.123-124
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

32. A relationship is an association between_____.
    a. objects b. entities
    c. databases d. fields

ANSWER: b
PTS: 1 DIF: Difficulty: Easy REF: p.124
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

33. _____expresses the minimum and maximum number of entity occurrences associated with one occurrence of the related entity.
a. Connectivity b. Relationship
c. Dependence d. Cardinality

ANSWER: d
PTS: 1 DIF: Difficulty: Easy REF: p.125
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KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

34. In the entity relationship diagram (ERD), cardinality is indicated using the_____notation, where max is the maximum number of associated entities and min represents the minimum number of associated entities.
a. (max, min) b. (min, max)
c. [min ... max] d. {min|max}

ANSWER: b
PTS: 1 DIF: Difficulty: Moderate REF: p.125
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KEY: Bloom's: Comprehension TOP: The Entity Relationship Model (ERM)

35. When the specific cardinalities are not included on the diagram in Crow's Foot notation, cardinality is implied by the use of _____.
a. symbols b. attributes
c. images d. tables

ANSWER: a
PTS: 1 DIF: Difficulty: Easy REF: p.125
NAT: BUSPROG: Technology STATE: DISC: Information Technology
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36. Knowing the minimum and maximum number of_____occurrences is very helpful at the application software level.
a. object b. attribute
c. data d. entity

ANSWER: d
PTS: 1 DIF: Difficulty: Easy REF: p.125
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37. An entity is said to be_____-dependent if it can exist in the database only when it is associated with another related entity occurrence.
a. existence b. relationship
c. business d. data

ANSWER: a
PTS: 1 DIF: Difficulty: Easy REF: p.126
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38. If an entity can exist apart from all of its related entities, then it is existence-independent, and it is referred to as a(n) _____entity.
a. weak b. alone
c. unary d. strong

ANSWER: d
PTS: 1 DIF: Difficulty: Easy REF: p.126
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39. A_____entity has a primary key that is partially or totally derived from the parent entity in the relationship.
a. strong b. weak
c. business d. child

ANSWER: b
PTS: 1 DIF: Difficulty: Easy REF: p.129
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40. The existence of a(n)_____entity indicates that its minimum cardinality is zero.
a. ternary b. optional
c. strong d. weak

ANSWER: b
PTS: 1 DIF: Difficulty: Easy REF: p.131
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41. A_____relationship exists when an association is maintained within a single entity.
a. unary b. ternary
c. strong d. weak

ANSWER: a
PTS: 1 DIF: Difficulty: Easy REF: p.134
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42. A____relationship exists when three entities are associated.
a. unary b. ternary
c. strong d. weak

ANSWER: a
PTS: 1 DIF: Difficulty: Easy REF: p.134
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43. If an employee within an EMPLOYEE entity has a relationship with itself, that relationship is known as a_____ relationship.

a. self b. self-referring

c. looping d. recursive

ANSWER: d
PTS: 1 DIF: Difficulty: Easy REF: p.135
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44. To simplify the conceptual design, most higher-order relationships are decomposed into appropriate equivalent _____relationships whenever possible.

a. unary b. binary

c. strong d. weak

ANSWER: b
PTS: 1 DIF: Difficulty: Easy REF: p.135
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45. The entity relationship model uses the associative entity to represent a(n)_____relationship between two or more entities.

a. M:N b. 1:M

c. N:1 d. M:1

ANSWER: a
PTS: 1 DIF: Difficulty: Easy REF: p.139
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46. When using the Crow's Foot notation, the associative entity is indicated by_____relationship lines between the parents and the associative entity.

a. dotted b. double

c. triple d. solid

ANSWER: d
PTS: 1 DIF: Difficulty: Easy REF: p.139
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KEY: Bloom's: Knowledge TOP: The Entity Relationship Model (ERM)

47. The first step in building an entity-relationship diagram (ERD) is_____.

a. developing the initial ERD

b. creating a detailed narrative of the organization's description of operations

c. identifying the attributes and primary keys that adequately describe the entities

d. identifying the business rules based on the description of operations

ANSWER: b
PTS: 1 DIF: Difficulty: Moderate REF: p.140
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48. The Crow's foot symbol with two vertical parallel lines indicates_____cardinality.
a. (0,N) b. (1,N)
c. (1,1) d. (0,1)

ANSWER: c
PTS: 1 DIF: Difficulty: Easy REF: p.141
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KEY: Bloom's: Knowledge TOP: Developing an ER Diagram

49. If Tiny College has some departments that are classified as "research only" and do not offer courses, the COURSE entity of the college database would be_____the DEPARTMENT entity.
a. existence-dependent on b. independent of
c. mandatory for d. optional to

ANSWER: d
PTS: 1 DIF: Difficulty: Easy REF: p.142
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50. In organizations that generate large number of transactions,_____are often a top priority in database design.
a. relationships among entities b. logical design standards
c. naming conventions d. high processing speeds

ANSWER: d
PTS: 1 DIF: Difficulty: Easy REF: p.148
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51. Complex_____requirements may dictate data transformations, and they may expand the number of entities and attributes within the design.
a. information b. entity
c. design d. processing

ANSWER: a
PTS: 1 DIF: Difficulty: Easy REF: p.149
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52. _____are characteristics of entities.

ANSWER: Attributes
PTS: 1 DIF: Difficulty: Easy REF: p.118
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53. A(n)_____attribute is an attribute that must have a value.

ANSWER: required
PTS: 1 DIF: Difficulty: Easy REF: p.119
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54. _____are underlined in an ER diagram.

ANSWER: Identifiers
PTS: 1 DIF: Difficulty: Easy REF: p.119
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55. A person's Social Security number would be an example of a(n)_____attribute.

ANSWER: single-valued
PTS: 1 DIF: Difficulty: Easy REF: p.121
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56. A(n)_____attribute need not be physically stored within the database.

ANSWER: derived
PTS: 1 DIF: Difficulty: Easy REF: p.123
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57. A relationship_____is difficult to establish if only one side of the relationship is known.

ANSWER: classification
PTS: 1 DIF: Difficulty: Easy REF: p.124
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58. When indicating cardinality, the first value represents the_____number of associated entities.

ANSWER: minimum
PTS: 1 DIF: Difficulty: Easy REF: p.125
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59. The concept of relationship strength is based on how the_____of a related entity is defined.

ANSWER: primary key
PTS: 1 DIF: Difficulty: Easy REF: p.126
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60. A(n)_____relationship is also known as an identifying relationship.

ANSWER: strong
PTS: 1 DIF: Difficulty: Easy REF: p.128
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61. The Crow's Foot notation depicts the strong relationship with a(n)_____line between the entities.

ANSWER: solid
PTS: 1 DIF: Difficulty: Easy REF: p.128
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62. A weak entity must be_____-dependent.

ANSWER: existence
PTS: 1 DIF: Difficulty: Easy REF: p.129
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63. The Chen notation identifies a weak entity by using a double-walled entity_____.

ANSWER: rectangle
PTS: 1 DIF: Difficulty: Easy REF: p.130
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64. Participation is_____if one entity occurrence does not require a corresponding entity occurrence in a particular relationship.

ANSWER: optional
PTS: 1 DIF: Difficulty: Easy REF: p.131
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65. In Crow's Foot notation, an optional relationship between entities is shown by drawing a(n)_____on the side of the optional entity.

ANSWER: small circle (O)
PTS: 1 DIF: Difficulty: Easy REF: p.131
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66. Failure to understand the distinction between mandatory and optional_____in relationships might yield designs in which awkward (and unnecessary) temporary rows (entity instances) must be created just to accommodate the creation of required entities.

ANSWER: participation
PTS: 1 DIF: Difficulty: Easy REF: p.133
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67. A relationship_____indicates the number of entities or participants associated with a relationship.

ANSWER: degree
PTS: 1 DIF: Difficulty: Easy REF: p.134
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68. A(n)_____process is based on repetition of processes and procedures.

ANSWER: iterative
PTS: 1 DIF: Difficulty: Easy REF: p.140
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69. Identifying the attributes of entities helps in the better understanding of_____among entities.

ANSWER: relationships
PTS: 1 DIF: Difficulty: Easy REF: p.146
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KEY: Bloom's: Knowledge TOP: Developing an ER Diagram

70. _____not only helps database designers to stay on track during the design process, it also enables them to pick up the design thread when the time comes to modify the design.

ANSWER: Documentation
PTS: 1 DIF: Difficulty: Easy REF: p.152
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71. Explain multivalued attributes with the help of examples. How are multivalued attributes indicated in the Chen Entity Relationship model?

ANSWER: Multivalued attributes are attributes that can have many values. For instance, a person may have several college degrees, and a household may have several different phones, each with its own number.

Similarly, a car's color may be subdivided into many colors for the roof, body, and trim. In the Chen Entity Relationship model, multivalued attributes are shown by a double line connecting the attribute to the entity.

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72. What is a weak relationship? Provide an example.

ANSWER: A weak relationship, also known as a non-identifying relationship, exists if the primary key of the related entity does not contain a primary key component of the parent entity. By default, relationships are established by having the primary key of the parent entity appear as a foreign key (FK) on the related entity (also known as the child entity). For example, suppose the 1:M relationship between COURSE and CLASS is defined as:

COURSE (**CRS_CODE**, DEPT_CODE, CRS_DESCRIPTION, CRS_CREDIT)

CLASS (**CLASS_CODE**, CRS_CODE, CLASS_SECTION, CLASS_TIME, ROOM_CODE, PROF_NUM)

In this case, a weak relationship exists between COURSE and CLASS because CRS_CODE (the primary key of the parent entity) is only a foreign key in the CLASS entity. In this example, the CLASS primary key did not inherit a primary key component from the COURSE entity.

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73. Explain mandatory participation in an entity relationship.

ANSWER: Mandatory participation means that one entity occurrence requires a corresponding entity occurrence in a particular relationship. If no optionality symbol is depicted with the entity, the entity is assumed to exist in a mandatory relationship with the related entity. If the mandatory participation is depicted graphically, it is typically shown as a small hash mark across the relationship line, similar to the Crow's Foot depiction of a connectivity of 1. The existence of a mandatory relationship indicates that the minimum cardinality is at least 1 for the mandatory entity.

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74. What is a ternary relationship? Provide some business rules examples that specify the need for a ternary or higher- order relationship.

ANSWER: A ternary relationship implies an association among three different entities. Although most relationships are binary, the use of ternary and higher-order relationships does allow the designer some latitude regarding the semantics of a problem. Some business rules examples that specify the need for a ternary relationship are:

- A DOCTOR writes one or more PRESCRIPTIONs.
- A PATIENT may receive one or more PRESCRIPTIONs.
- A DRUG may appear in one or more PRESCRIPTIONs. (Assume that the business rule states that each prescription contains only one drug. In short, if a doctor prescribes more than one drug, a separate prescription must be written for each drug.)

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75. Explain recursive relationships with the help of an example.

ANSWER: A recursive relationship is one in which a relationship can exist between occurrences of the same entity set. Such a condition is found within a unary relationship. For example, a 1:M unary relationship can be expressed by "an EMPLOYEE may manage many EMPLOYEEs, and each EMPLOYEE is managed by one EMPLOYEE." Finally, the M:N unary relationship may be expressed by "a COURSE may be a prerequisite to many other COURSEs, and each COURSE may have many other COURSEs as prerequisites."

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