Chapter 2: Database Design Fundamentals

True / False

1. The process of determining the particular tables and columns that will comprise a database is known as database design.
   a. True
   b. False

ANSWER: True
POINTS: 1
REFERENCES: 21

2. A tabular database is a collection of tables.
   a. True
   b. False

ANSWER: False
POINTS: 1
REFERENCES: 22

3. A relation is a characteristic or property of an entity.
   a. True
   b. False

ANSWER: False
POINTS: 1
REFERENCES: 24

4. Because there is a one-to-many relationship between sales reps and customers in the TAL Distributors database, one sales rep can be associated with zero, one, or more customers.
   a. True
   b. False

ANSWER: True
POINTS: 1
REFERENCES: 24

5. In a relational database, each entity has its own table.
   a. True
   b. False

ANSWER: True
POINTS: 1
REFERENCES: 24

6. A matrix is the association between entities.
   a. True
   b. False

ANSWER: False
POINTS: 1
REFERENCES: 24

7. In the one-to-many type of relationship, the word many always indicates a large number.

a. True
b. False
ANSWER: False
POINTS: 1
REFERENCES: 24

8. In a relational database, relationships are implemented by having common columns in two or more tables.
a. True
b. False
ANSWER: True
POINTS: 1
REFERENCES: 25

9. Each column in a table of a relational database should have a distinct name.
a. True
b. False
ANSWER: True
POINTS: 1
REFERENCES: 26

10. In a relation, all values in a column are values of the same attribute.
a. True
b. False
ANSWER: True
POINTS: 1
REFERENCES: 26

11. A relation is essentially a three-dimensional table.
a. True
b. False
ANSWER: False
POINTS: 1
REFERENCES: 26

12. Columns are sometimes called tuples.
a. True
b. False
ANSWER: False
POINTS: 1
REFERENCES: 26

13. The concept of functional dependence is trivial to understanding database concepts.
a. True
b. False
ANSWER: False

POINTS: 1
REFERENCES: 27

14. In a relation, the order of the rows and columns is immaterial.
    a. True
    b. False
ANSWER: True
POINTS: 1
REFERENCES: 26

15. The same column name can appear in two different tables in a relational database.
    a. True
    b. False
ANSWER: True
POINTS: 1
REFERENCES: 27

16. The statement "A sales rep's pay class functionally determines his or her pay rate" means that if you know the pay class, you can determine the pay rate.
    a. True
    b. False
ANSWER: True
POINTS: 1
REFERENCES: 28

17. You can determine functional dependence by viewing sample data.
    a. True
    b. False
ANSWER: False
POINTS: 1
REFERENCES: 29

18. A secondary key is the unique identifier for a table.
    a. True
    b. False
ANSWER: False
POINTS: 1
REFERENCES: 30

19. A primary key always comprises a single column.
    a. True
    b. False
ANSWER: False
POINTS: 1
REFERENCES: 30

20. You can indicate a table's primary key by underlining the column or collection of columns that comprises the primary key for each table in the database.

a. True

b. False

ANSWER: True

POINTS: 1

REFERENCES: 31

21. The definition for a primary key really defines a candidate key as well.

a. True

b. False

ANSWER: True

POINTS: 1

REFERENCES: 31

22. Many organizations and institutions are moving toward using Social Security numbers as primary keys because of privacy issues.

a. True

b. False

ANSWER: False

POINTS: 1

REFERENCES: 32

23. If a table contained both employee numbers and Social Security numbers, both columns would be referred to as candidate keys.

a. True

b. False

ANSWER: True

POINTS: 1

REFERENCES: 31

24. A programmer interviews users, examines existing and proposed documents, and examines organizational policies to determine exactly the type of data needs the database must support.

a. True

b. False

ANSWER: False

POINTS: 1

REFERENCES: 32

25. It is possible for the computer to generate values that are used as the primary key column.

a. True

b. False

ANSWER: True

POINTS: 1

REFERENCES: 32

26. Normalization is done before creating the database design.
    a. True
    b. False
ANSWER: False
POINTS: 1
REFERENCES: 40

27. An unnormalized relation is a relation that may contain repeating groups.
    a. True
    b. False
ANSWER: True
POINTS: 1
REFERENCES: 40

28. When you convert an unnormalized table to a table in first normal form, the primary key of the table in first normal form is usually the concatenation of at least two columns.
    a. True
    b. False
ANSWER: True
POINTS: 1
REFERENCES: 42

29. Qualification is an update anomaly.
    a. True
    b. False
ANSWER: False
POINTS: 1
REFERENCES: 43|44

30. A table is in third normal form if it is in second normal form and no nonkey column is dependent on only a portion of the primary key.
    a. True
    b. False
ANSWER: False
POINTS: 1
REFERENCES: 48

31. A determinant is any column (or collection of columns) that determines another table.
    a. True
    b. False
ANSWER: False
POINTS: 1
REFERENCES: 48

Multiple Choice

32. The process of determining the particular tables and columns that will comprise a database is known as ____.
    a. normalization
    b. database design
    c. qualification
    d. relational management

ANSWER: b
POINTS: 1
REFERENCES: 21

33. At TAL Distributors, there is a ____ relationship between sales reps and customers.
    a. one-to-one
    b. one-to-two
    c. one-to-many
    d. many-to-many

ANSWER: c
POINTS: 1
REFERENCES: 24

34. A(n) ____ is the association between entities.
    a. qualification
    b. functional dependency
    c. relationship
    d. join

ANSWER: c
POINTS: 1
REFERENCES: 24

35. A(n) ____ is a property of an entity.
    a. field
    b. attribute
    c. column
    d. All of the above

ANSWER: d
POINTS: 1
REFERENCES: 24|26

36. In a relational database each ____ should be unique.
    a. row
    b. record
    c. tuple
    d. All of the above

ANSWER: d
POINTS: 1
REFERENCES: 24|26

37. There is a commonly accepted shorthand representation to show the structure of a relational database: After the name of the table, all the columns in the table are listed within a set of ____.

a. square brackets
b. parentheses
c. back slashes
d. curly braces

ANSWER: b
POINTS: 1
REFERENCES: 26

38. A field is another term for a(n) ____.

a. tuple
b. row
c. column
d. entity

ANSWER: c
POINTS: 1
REFERENCES: 26

39. A record is another term for a(n) ____.

a. row
b. field
c. attribute
d. property

ANSWER: a
POINTS: 1
REFERENCES: 26

40. Which of the following symbols is used to qualify column names?

a. period (.)
b. comma (,)
c. backslash (/)
d. pound sign (#)

ANSWER: a
POINTS: 1
REFERENCES: 27

41. Which of the following is the primary key of the ORDER_LINE (ORDER_NUM, ITEM_NUM, NUM_ORDERED, QUOTED_PRICE) table?

a. ORDER_NUM
b. ITEM_NUM
c. QUOTED_PRICE
d. ORDER_NUM and ITEM_NUM

ANSWER: d
POINTS: 1

REFERENCES: 31

42. A relation is in ____ if it does not contain any repeating groups.
    a. first normal form
    b. second normal form
    c. third normal form
    d. Boyce-Codd normal form

ANSWER: a
POINTS: 1
REFERENCES: 40

43. ____ is the formal term for combining two or more columns to form a primary key.
    a. Qualification
    b. Joining
    c. Normalization
    d. Concatenation

ANSWER: d
POINTS: 1
REFERENCES: 42

44. ____ is the duplication of data.
    a. Repeating group
    b. Redundancy
    c. Replication
    d. Anomaly

ANSWER: b
POINTS: 1
REFERENCES: 43

45. ____ is one of the categories of update anomalies.
    a. Functional dependence
    b. Functional splitting
    c. Inconsistent data
    d. Qualification

ANSWER: c
POINTS: 1
REFERENCES: 43|44

46. A ____ column is a column that is not part of the primary key.
    a. determinant
    b. candidate
    c. functional
    d. nonkey

ANSWER: d
POINTS: 1

REFERENCES: 44

47. ____ can occur when there is a column in a table that is dependent on only a portion of the primary key.
    a. Qualification
    b. Update anomalies
    c. Function splitting
    d. Determination

ANSWER: b
POINTS: 1
REFERENCES: 43|44

48. Any column (or collection of columns) that determines another column is called a(n) ____.
    a. nonkey column
    b. primary key
    c. dependency
    d. determinant

ANSWER: d
POINTS: 1
REFERENCES: 48

49. In this text, Boyce-Codd normal form is the same as ____.
    a. unnormalized
    b. first normal form
    c. second normal form
    d. third normal form

ANSWER: d
POINTS: 1
REFERENCES: 48

50. In an entity-relationship (E-R) diagram, ____ are used to represent an entity.
    a. rectangles
    b. ovals
    c. circles
    d. diamonds

ANSWER: a
POINTS: 1
REFERENCES: 51

51. In an entity-relationship (E-R) diagram, one-to-many relationships between entities are drawn as ____.
    a. ovals
    b. equal signs
    c. lines
    d. circles

ANSWER: c
POINTS: 1

REFERENCES: 51

Completion

52. A(n) _____ is a person, place, thing, or event for which you want to store and process data.
ANSWER: entity
POINTS: 1
REFERENCES: 23

53. A(n) _____ is the association between entities.
ANSWER: relationship
POINTS: 1
REFERENCES: 24

54. A relationship is an association between _____.
ANSWER: entities
POINTS: 1
REFERENCES: 24

55. A table's design should be as simple as possible; you should restrict each position in a table to a single entry by not allowing multiple entries (called a(n) _____ group) in an individual location in the table.
ANSWER: repeating
POINTS: 1
REFERENCES: 25

56. A relational database is a collection of _____.
ANSWER: relations
tables
POINTS: 1
REFERENCES: 26

57. In a relation, the _____ of the rows and columns is immaterial.
ANSWER: order
POINTS: 1
REFERENCES: 26

58. A(n) _____ is another name for a record or a row.
ANSWER: tuple
POINTS: 1
REFERENCES: 26

59. When you combine a column name with a table name, you are said to _____ the column name.
ANSWER: qualify
POINTS: 1
REFERENCES: 27

60. When you write a column in the format CUSTOMER.REP_NUM, you say that you _____ the column name.
ANSWER: qualify
POINTS: 1
REFERENCES: 27

61. In a relational database, column B is _____ on another column A, if at any point in time a value for A determines a single value for B.
ANSWER: functionally dependent
POINTS: 1
REFERENCES: 28

62. If B is functionally dependent on A, you also can say that A functionally _____ B.
ANSWER: determines
POINTS: 1
REFERENCES: 28

63. The _____ key of a table (relation) is the column or collection of columns that uniquely identifies a given row in that table.
ANSWER: primary
POINTS: 1
REFERENCES: 30

64. A relation is in _____ normal form if it does not contain any repeating groups.
ANSWER:
first
1NF
POINTS: 1
REFERENCES: 40

65. The four categories of update anomalies are additions, deletions, inconsistent data, and _____.
ANSWER: updates
POINTS: 1
REFERENCES: 43|44

66. A(n) _____ column is a column that is not part of the primary key.
ANSWER: nonkey
POINTS: 1
REFERENCES: 44

67. If the primary key of a table contains only a single column, the table is automatically in _____ normal form.
ANSWER: second
POINTS: 1
REFERENCES: 44

68. _____ is another name given to third normal form in this text.

ANSWER: BCNF (Boyce-Codd normal form)
Boyce-Codd normal form (BCNF)
Boyce-Codd
BCNF

POINTS: 1

REFERENCES: 48

69. In one style of entity-relationship (E-R) diagrams, a crow's foot is used to represent the _____ side of a relationship.

ANSWER: many

POINTS: 1

REFERENCES: 52

70. In one style of entity-relationship (E-R) diagrams, the letter n is used to represent the _____ side of a relationship.

ANSWER: many

POINTS: 1

REFERENCES: 52

71. In one style of entity-relationship (E-R) diagrams, diamonds are used to describe _____.

ANSWER: relationships

POINTS: 1

REFERENCES: 52

Essay

72. How does a DBMS that follows the relational model handle entities, attributes of entities, and relationships between entities?

ANSWER: Entities and attributes are fairly simple. Each entity has its own table. The attributes of an entity become the columns in the table. In a relational model database a one-to-many relationship is represented by using common columns in two or more tables. More formally, a relation is essentially a two-dimensional table. Each column in a table should have a unique name, and entries within each column should all "match" this column name. Also, each row (also called a record or a tuple in some programs) should be unique. After all, if two rows in a table contain identical data, the second row doesn't provide any information that you don't already have. In addition, for maximum flexibility in manipulating data, the order in which columns and rows appear in a table should be immaterial. Finally, a table's design should be as simple as possible; you should restrict each position in a table to a single entry by not allowing multiple entries (called a repeating group) in an individual location in the table.

POINTS: 1

REFERENCES: 23|26

73. Define a relation.

ANSWER: A relation is a two-dimensional table in which:
1. The entries in the table are single-valued; that is, each location in the table contains a single entry.
2. Each column has a distinct name (technically called the attribute name).
3. All values in a column are values of the same attribute (that is, all entries must match the column name).
4. The order of columns is immaterial.
5. Each row is distinct.

6. The order of rows is immaterial.

POINTS: 1

REFERENCES: 26

74. What is the precise definition of a primary key?

ANSWER: Column A (or a collection of columns) is the primary key for a table if:
Property 1: All columns in the table are functionally dependent on A.
Property 2: No subcollection of the columns in A (assuming A is a collection of columns and not just a single column) also has property 1.

POINTS: 1

REFERENCES: 30

75. What are the six steps necessary to design a database for a set of requirements?

ANSWER:
1. Read the requirements, identify the entities (objects) involved, and name the entities.
2. Identify the unique identifiers for the entities identified in step 1.
3. Identify the attributes for all the entities.
4. Identify the functional dependencies that exist among the attributes.
5. Use the functional dependencies to identify the tables by placing each attribute with the attribute or minimum combination of attributes on which it is functionally dependent.
6. Identify any relationships between tables.

POINTS: 1

REFERENCES: 32|33