

## **Chapter 2: The Relational Model 1: Introduction, QBE, and Relational Algebra**

### **True / False**

1. A relational database handles entities, attributes, and relationships by storing each entity in its own table.

- a. True
- b. False

*ANSWER:* True

*POINTS:* 1

*REFERENCES:* 31

2. The attributes of an entity become the fields or columns in a table.

- a. True
- b. False

*ANSWER:* True

*POINTS:* 1

*REFERENCES:* 31

3. Each column in a table should have a unique name, and entries in each column should all “match” this column name.

- a. True
- b. False

*ANSWER:* True

*POINTS:* 1

*REFERENCES:* 31

4. In a relation, the order of the columns is important.

- a. True
- b. False

*ANSWER:* False

*POINTS:* 1

*REFERENCES:* 31

5. In a relation, the order of rows is important.

- a. True
- b. False

*ANSWER:* False

*POINTS:* 1

*REFERENCES:* 31

6. A relational database is a collection of relations.

- a. True
- b. False

*ANSWER:* True

*POINTS:* 1

*REFERENCES:* 31

7. An unnormalized relation is a table that has more than one row.

- a. True

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b. False

*ANSWER:* False

*POINTS:* 1

*REFERENCES:* 31

8. A column whose value uniquely identifies a given row in the table is the secondary key.

a. True

b. False

*ANSWER:* False

*POINTS:* 1

*REFERENCES:* 32

9. A query is a question represented in a way that the DBMS can recognize and process.

a. True

b. False

*ANSWER:* True

*POINTS:* 1

*REFERENCES:* 32

10. QBE is a visual approach to writing queries.

a. True

b. False

*ANSWER:* True

*POINTS:* 1

*REFERENCES:* 32

11. Access automatically adds double quotation marks around values in the design grid that are formatted as Short Text fields when you run the query or move the insertion point to another cell in the design grid.

a. True

b. False

*ANSWER:* True

*POINTS:* 1

*REFERENCES:* 37

12. The comparison operators are +, \*, %, and /.

a. True

b. False

*ANSWER:* False

*POINTS:* 1

*REFERENCES:* 37

13. The comparison operators are also known as relational operators.

a. True

b. False

*ANSWER:* True

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*POINTS:* 1

*REFERENCES:* 37

14. In an AND criterion, the overall criterion is true if either of the individual criteria is true.

- a. True
- b. False

*ANSWER:* False

*POINTS:* 1

*REFERENCES:* 37

15. The concept of grouping means that statistics will be calculated for individual records.

- a. True
- b. False

*ANSWER:* False

*POINTS:* 1

*REFERENCES:* 44

### **Multiple Choice**

16. A relation is a(n) \_\_\_\_.

- a. attribute
- b. column
- c. field
- d. table

*ANSWER:* d

*POINTS:* 1

*REFERENCES:* 31

17. Based on the statement below, which of the following is the primary key?

*Rep (RepNum, LastName, FirstName, Street, City, State, PostalCode Commission, Rate)*

- a. RepNum
- b. LastName
- c. FirstName
- d. State

*ANSWER:* a

*POINTS:* 1

*REFERENCES:* 32

18. When duplicate column names exist in a database and you need to indicate the column to which you are referring, \_\_\_\_\_.

- a. do not use these two tables together
- b. do not use the column names in the same statement
- c. write both the table name and the column name, separated by a period
- d. write the table name only

*ANSWER:* c

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*POINTS:* 1

*REFERENCES:* 32

19. Rows are also called \_\_\_\_.

- a. fields
- b. columns
- c. tuples
- d. attributes

*ANSWER:* c

*POINTS:* 1

*REFERENCES:* 32

20. The \_\_\_\_ key of a table is the column or collection of columns that uniquely identifies a given row in that table.

- a. primary
- b. secondary
- c. foreign
- d. minor

*ANSWER:* a

*POINTS:* 1

*REFERENCES:* 32

21. The compound criteria (conditions) are created by using \_\_\_\_.

- a. AND, OR
- b. AND, NOR
- c. OR, NOT
- d. NOT, ONLY

*ANSWER:* a

*POINTS:* 1

*REFERENCES:* 37

22. Count, Sum, Avg, Max, and Min are a few of the built-in statistics or \_\_\_\_ functions that can be used in a query.

- a. accumulated
- b. allowed
- c. primary
- d. aggregate

*ANSWER:* d

*POINTS:* 1

*REFERENCES:* 42

23. If you are sorting records by more than one field, the more important field is called the \_\_\_\_.

- a. primary sort key
- b. secondary sort key
- c. maximum sort key
- d. minor sort key

*ANSWER:* a

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*POINTS:* 1

*REFERENCES:* 45

24. A query that changes data is a(n) \_\_\_\_\_ query.

- a. addition
- b. update
- c. update
- d. select

*ANSWER:* c

*POINTS:* 1

*REFERENCES:* 52

25. A \_\_\_\_\_ query creates a new table using the query results.

- a. new-table
- b. make-table
- c. create-table
- d. merge-table

*ANSWER:* b

*POINTS:* 1

*REFERENCES:* 53

26. The \_\_\_\_\_ command within relational algebra takes a vertical subset of a table.

- a. SELECT
- b. DELETE
- c. PROGRAM
- d. PROJECT

*ANSWER:* d

*POINTS:* 1

*REFERENCES:* 57

27. Based on the *Customer* table below, which command lists all information from the table concerning customer 260?

<u>CustomerNum</u>	<u>CustomerName</u>	<u>Street</u>	<u>City</u>	<u>State</u>	<u>PostalCode</u>
126	Toys Galore	28 Laketon St.	Fulton	CA	90085
260	Brookings Direct	452 Columbus Dr.	Grove	CA	90092

- a. SELECT Customer 260 GIVING Answer
- b. SELECT Customer WHERE CustomerNum=260 GIVING Answer
- c. SELECT Customer WHERE Customernum='260' GIVING Answer
- d. SELECT Customer WHERE CustomerName='260' GIVING Answer

*ANSWER:* b

*POINTS:* 1

*REFERENCES:* 56

28. The \_\_\_\_\_ command within relational algebra includes the word OVER followed by a list of the columns to be included.

- a. DELETE

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- b. PROJECT
- c. INTERSECT
- d. UNION

*ANSWER:* b

*POINTS:* 1

*REFERENCES:* 57

29. Which operation will allow you to extract data from more than one table?

- a. Select
- b. Merge
- c. Project
- d. Join

*ANSWER:* d

*POINTS:* 1

*REFERENCES:* 57

30. You can restrict the output from a join to include only certain columns by using the \_\_\_\_ command.

- a. DELETE
- b. UNION
- c. PROJECT
- d. INTERSECT

*ANSWER:* c

*POINTS:* 1

*REFERENCES:* 58

31. Two tables are considered to be \_\_\_\_ compatible if they have the same number of columns and their corresponding columns represent the same type of data.

- a. union
- b. intersection
- c. difference
- d. product

*ANSWER:* a

*POINTS:* 1

*REFERENCES:* 59

32. The \_\_\_\_ operation is performed by the SUBTRACT command in relational algebra.

- a. union
- b. difference
- c. product
- d. intersection

*ANSWER:* b

*POINTS:* 1

*REFERENCES:* 60

33. The \_\_\_\_ operator is used to concatenate every row in the first table with every row in the second table.

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- a. union
- b. difference
- c. product
- d. intersection

*ANSWER:* c

*POINTS:* 1

*REFERENCES:* 61

34. The product of two tables is also called the \_\_\_\_ product.

- a. Cartesian
- b. aggregate
- c. Cathode
- d. exponential

*ANSWER:* a

*POINTS:* 1

*REFERENCES:* 61

35. Using the product operator, if table A has 4 rows and table B has 4 rows, the number of rows in the product of these two tables is \_\_\_\_.

- a. 4
- b. 8
- c. 16
- d. 256

*ANSWER:* c

*POINTS:* 1

*REFERENCES:* 61

### **Completion**

36. A(n) \_\_\_\_\_ database is a collection of tables.

*ANSWER:* relational

*POINTS:* 1

*REFERENCES:* 31

37. The relationships between tables are handled through \_\_\_\_\_ columns.

*ANSWER:* common

*POINTS:* 1

*REFERENCES:* 31

38. Multiple entries in tables are often called \_\_\_\_\_.

*ANSWER:* repeating groups

*POINTS:* 1

*REFERENCES:* 31

39. When a structure satisfies all the properties of a relation except for the first item—in other words, some entries contain repeating groups and thus are not single-valued—it is referred to as a(n) \_\_\_\_\_.

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*ANSWER:* unnormalized relation

*POINTS:* 1

*REFERENCES:* 31

40. Columns in a table are often called \_\_\_\_\_.

*ANSWER:* fields  
attributes

*POINTS:* 1

*REFERENCES:* 32

41. Conditions that data must satisfy are called \_\_\_\_\_.

*ANSWER:* criteria

*POINTS:* 1

*REFERENCES:* 36

42. A(n) \_\_\_\_\_ field is a field that is the result of a calculation using one or more existing fields.

*ANSWER:* computed  
calculated

*POINTS:* 1

*REFERENCES:* 41

43. To list the records in a query's results in a particular order, you need to \_\_\_\_\_ the records.

*ANSWER:* sort

*POINTS:* 1

*REFERENCES:* 45

44. The field on which records are sorted is called the \_\_\_\_\_.

*ANSWER:* sort key

*POINTS:* 1

*REFERENCES:* 45

45. \_\_\_\_\_ is a theoretical way of manipulating a relational database.

*ANSWER:* Relational algebra

*POINTS:* 1

*REFERENCES:* 56

### **Essay**

46. Provide a definition for the term 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
3. All values in a column are values of the same attributes
4. The order of columns is immaterial
5. Each row is distinct
6. The order of rows is immaterial



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*POINTS:* 1

*REFERENCES:* 31

47. What is the difference between an AND criterion and an OR criterion? How is each criterion created in QBE?

*ANSWER:* In an AND criterion, both criteria must be true for the compound criterion to be true. In an OR criterion, the overall criterion is true if either of the individual criteria is true. In QBE, to create an AND criterion, place the criteria for multiple fields on the same Criteria row in the design grid; to create an OR criterion, place the criteria for multiple fields on different Criteria rows in the design grid.

*POINTS:* 1

*REFERENCES:* 37

48. List at least six of the aggregate functions available in Access. Explain how to use any of these functions in a query.

*ANSWER:* All products that support QBE, including Access, support the following built-in functions (called aggregate functions in Access): Count, Sum, Avg (average), Max (largest value), Min (smallest value), StDev (standard deviation), Var (variance), First, and Last. To use any of these functions in a query, you include them in the Total row for the desired column in the design grid. By default, the Total row does not appear automatically in the design grid. To include it, you must click the Totals button in the Show/Hide group on the Query Tools Design tab.

*POINTS:* 1

*REFERENCES:* 42

49. Discuss the difference between the major sort key and the minor sort key.

*ANSWER:* To list the records in query results in a particular way, you need to **sort** the records. The field on which records are sorted is called the **sort key**; you can sort records using more than one field when necessary. When you are sorting records by more than one field (such as sorting by rep number and then by customer name), the first sort field (RepNum) is called the **major sort key** (also called the **primary sort key**) and the second sort field (CustomerName) is called the **minor sort key** (also called the **secondary sort key**).

*POINTS:* 1

*REFERENCES:* 45

50. Explain what relational algebra is and how it is used.

*ANSWER:* Relational algebra is a theoretical way of manipulating a relational database. Relational algebra includes operations that act on existing tables to produce new tables, similar to the way the operations of addition and subtraction act on numbers to produce new numbers in the mathematical algebra with which you are familiar. Retrieving data from a relational database through the use of relational algebra involves issuing relational algebra commands to operate on existing tables to form a new table containing the desired information. Sometimes you might need to execute a series of commands to obtain the desired result.

*POINTS:* 1

*REFERENCES:* 56