CPEN 211 - DATABASE SYSTEMS DESIGN

QUIZ 2

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| --- | --- | --- | --- |
| Name: |  | ID: |  |

1. What type of join returns all rows when there is a match in one of the tables?

A. INNER JOIN

B. LEFT JOIN

C. RIGHT JOIN

D. FULL JOIN

1. In SQL, which join returns all rows from both tables, filling in with NULLs when there is no match?

A. INNER JOIN

B. LEFT JOIN

C. RIGHT JOIN

D. FULL JOIN

1. Which join combines all rows from the right table with matching rows from the left table?

A. INNER JOIN

B. LEFT JOIN

C. RIGHT JOIN

D. FULL JOIN

1. What is the purpose of the CROSS JOIN in SQL?

A. Combine rows from both tables with a specified condition

B. Return all possible combinations of rows from both tables

C. Combine rows only when there is a match

D. Merge rows from two tables based on common columns

1. In a self-join, what is being joined?

A. Two different tables

B. Rows within the same table

C. Columns with different names

D. Tables from different databases

1. What is the primary purpose of an index in a database?

A. To enforce data integrity

B. To speed up data retrieval

C. To create primary keys

D. To establish relationships between tables

1. Which type of index is created automatically when a primary key or unique constraint is defined?

A. Clustered Index

B. Non-Clustered Index

C. Composite Index

D. Unique Index

1. What is a covering index in SQL?

A. An index that covers all columns in a table

B. An index used for encryption

C. An index that covers only non-nullable columns

D. An index used for sorting data

1. How does an index impact INSERT and UPDATE operations on a table?

A. Speeds up INSERT and UPDATE operations

B. Slows down INSERT and UPDATE operations

C. No impact on INSERT and UPDATE operations

D. Depends on the type of index

1. In which normal form is a relation if it is in 1NF and all non-prime attributes are fully functionally dependent on the primary key?

A. First Normal Form (1NF)

B. Second Normal Form (2NF)

C. Third Normal Form (3NF)

D. Boyce-Codd Normal Form (BCNF)

1. What is the purpose of database normalization?

A. To eliminate data redundancy

B. To increase data redundancy

C. To improve data security

D. To speed up data retrieval

1. Which normal form deals with transitive dependencies?

A. First Normal Form (1NF)

B. Second Normal Form (2NF)

C. Third Normal Form (3NF)

D. Fourth Normal Form (4NF)

1. In 2NF, a table is in 1NF, and all non-prime attributes are fully functionally dependent on the \_\_\_\_\_\_.

A. Primary key

B. Foreign key

C. Composite key

D. Candidate key

1. What is the ACID property in database transactions?

A. Atomicity, Consistency, Isolation, Durability

B. Aggregate, Constraint, Inheritance, Division

C. Association, Concurrency, Integration, Duplication

D. Access, Control, Isolation, Distribution

1. What does the Isolation property of ACID ensure in a transaction?

A. The transaction is atomic

B. The transaction is consistent

C. The transaction is isolated from other transactions

D. The changes made by a transaction are durable

1. Which isolation level allows a transaction to read uncommitted data from other transactions?
2. READ COMMITTED
3. READ UNCOMMITTED
4. REPEATABLE READ
5. SERIALIZABLE
6. What does the Durability property of ACID ensure?
7. The transaction is atomic
8. The transaction is consistent
9. The changes made by a transaction are permanent
10. The transaction is isolated from other transactions
11. In the context of transactions, what is a savepoint?

A. A point in time when a transaction starts

B. A point in time when a transaction is committed

C. A point in time within a transaction to which you can roll back

D. A point in time when a transaction is aborted

1. What does the COUNT() function in SQL do?
2. Counts the total number of rows in a table
3. Counts the number of distinct values in a column
4. Counts the number of NULL values in a column
5. Counts the number of non-NULL values in a column
6. Which SQL aggregate function calculates the average of numeric values in a column?

A. AVG()

B. SUM()

C. MAX()

D. MIN()

1. What is the purpose of the GROUP BY clause in conjunction with aggregate functions?

A. To filter rows in a table

B. To sort rows in a table

C. To group rows based on a specified column

D. To perform mathematical operations on rows

1. Which aggregate function returns the highest value in a column?

A. MAX()

B. MIN()

C. AVG()

D. COUNT()

1. What does the SUM() function do in SQL?

A. Adds up all values in a column

B. Multiplies all values in a column

C. Finds the average of values in a column

D. Counts the number of values in a column

1. When using the GROUP BY clause, which aggregate function is used to find the total number of groups?

A. COUNT()

B. AVG()

C. SUM()

D. MAX()

1. What is the purpose of the HAVING clause in SQL?

A. To filter rows before grouping

B. To filter rows after grouping

C. To sort rows in a table

D. To perform mathematical operations on rows

1. Which aggregate function is used to find the lowest value in a column?

A. MIN()

B. MAX()

C. AVG()

D. SUM()

1. What is the result of applying the COUNT() function to a column with only NULL values?

A. 0

B. 1

C. Does not compile

D. Error message

1. Describes high-level conceptual structuring of data
2. schema
3. data model
4. data structure
5. Describes how data is to be structured and stored in a database
6. schema
7. data model
8. data structure
9. \_\_\_\_\_\_\_\_ is a communications tool to facilitate interaction among the designer, the applications programmer, and the end user
10. schema
11. data model
12. data structure
13. \_\_\_\_\_\_\_\_\_\_ is a relatively simple representation, usually graphical, of complex real-world data structures
14. schema
15. data model
16. data structure
17. What does the SQL COMMIT statement do?
    * 1. Rolls back the current transaction
      2. Saves all changes made during the current transaction
      3. Initiates a new transaction
      4. Deletes all records from a table
18. What does the SQL ROLLBACK statement do?
    * 1. Saves all changes made during the current transaction
      2. Initiates a new transaction
      3. Rolls back the current transaction, undoing any changes
      4. Commits the current transaction
19. What does the term "Entity" represent in the Entity-Relationship Model?
    1. A specific record in a database
    2. A table in a relational database
    3. A real-world object or concept with data
    4. A relationship between tables
20. In an ER diagram, what symbol is used to represent an attribute?
21. Circle
22. Rectangle
23. Diamond
24. Oval
25. What is the purpose of a "Primary Key" in the Entity-Relationship Model?
26. It defines a unique identifier for an entity
27. It establishes relationships between entities
28. It represents a foreign key in a table
29. It is used for indexing purposes
30. In the ER Model, what is a "Relationship" between entities?
31. A foreign key linking two tables
32. A connection between two attributes
33. An association between two entities
34. A unique identifier for an entity
35. What does "Cardinality" describe in the context of the ER Model?
36. The number of attributes in an entity
37. The number of records in a table
38. The degree of a relationship between entities
39. The data type of an attribute
40. What symbol is commonly used to represent a "Weak Entity" in an ER diagram?
41. Double rectangle
42. Dashed ellipse
43. Double diamond
44. Dashed rectangle
45. What is the purpose of a "Foreign Key" in the Entity-Relationship Model?
46. It represents a primary key in another table
47. It defines a unique identifier for an entity
48. It establishes a relationship between entities
49. It is used for indexing purposes

SECTION B.

Choose one Question

Q1. Explain the process of translating an Entity-Relationship (ER) diagram into a PostgreSQL database schema. Detail the steps involved in mapping entities, relationships, attributes, and their cardinalities from the ER model to tables, columns, constraints, and relationships in PostgreSQL. Provide an example of an ER diagram and its corresponding PostgreSQL schema with explanations for each step of the translation process.

**Q2.** Discuss the relationship between normalization and the design of an ER diagram in the context of a PostgreSQL database. Explain how normalization principles, such as reducing data redundancy and maintaining data integrity, influence the creation of an ER diagram. Provide examples illustrating how normalization techniques like 1NF, 2NF, and 3NF are applied during the design phase using an ER diagram and how these concepts are reflected in the PostgreSQL database schema resulting from the diagram.