DBMS Interview Questions

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1. **What are ACID properties in DBMS?**

   Atomicity - The entire transaction takes place at once or doesn't happen at all (abort or commit).

   Consistency - The Database must be consistent before and after the transaction.

   Isolation - Multiple transactions occur independently without interference.

   Durability - The changes of a successful transaction occurs even if the system failure occurs.

2. **When do you use Having and Where clauses?**

   "Where" clause can't be used with aggregate functions but the "**Having"** clause can.

   For example: SELECT student, SUM(score) as total from marks GROUP BY student HAVING total > 70

3. **What are different keys in RDBMS?**

   Candidate key - The minimal set of attributes which can uniquely identify a tuple is known as candidate key. It can be a composite key as well. For example - (student_no, course_no)

   Primary key - Out of all the candidate keys, only one can be chosen as the primary key.

Super key - The set of attributes which can uniquely identify a tuple is known as super key.

- Adding 0 or more attributes to the candidate key generates a super key.
- A candidate key is a super key but not vice-versa.

Alternate key - The candidate key other than the primary key is called an alternate key.

Foreign key - It is a column or a combination of columns whose values match a primary key in a different table.

4. **What are the different Normal Forms in RDBMS?**

First Normal Form: A relation is in first normal form if it does not contain any multi-valued or composite attribute.

Second Normal Form: A relation is in second normal form if it does not contain any partial dependency. A dependency is called partial dependency if any proper subset of candidate key determines non-prime (which are not part of candidate key) attribute.

Third Normal Form: A relation is in third normal form if it does not contain any transitive dependency. For a relation to be in Third Normal Form, either LHS of FD (Functional Dependency) should be super key or RHS should be prime attribute.

Boyce-Codd Normal Form: A relation is in Boyce-Codd Normal Form if LHS of every FD is super key.

5. **What is embedded and dynamic SQL?**

Static or Embedded SQL

- SQL statements in an application that do not change at runtime and, therefore, can be hard-coded into the application.

Dynamic SQL

- SQL statements that are constructed at runtime; for example, the application may allow users to enter their own queries.
- Dynamic SQL is a programming technique that enables you to build SQL statements dynamically at runtime. You can create more general purpose, flexible applications by using dynamic SQL because the full text of a SQL statement may be unknown at compilation.

6. **What is the difference between char and varchar?**
    - CHAR column length is fixed while VARCHAR length is variable.
    - The maximum no. of character CHAR data type can hold is 255 character while VARCHAR can hold up to 4000 character.
    - CHAR is 50% faster than VARCHAR.

7. **What are the advantages of DBMS over traditional file based systems?**

   Database management systems were developed to handle the following difficulties of typical File-processing systems.

   - Data redundancy and inconsistency
   - Data isolation
   - Integrity problems
   - Concurrent access by multiple users
   - Security problems

8. **What is database normalization?**

   It is the process of analysing the given relational schemas based on their functional dependencies and primary keys to achieve the following desirable properties:

   - Minimizing redundancy
   - Minimizing Insertion, Updation and Deletion anomalies.

9. Explain the categories of SQL commands.

- DDL - It stands for Data Definition Language. Commands under this category are CREATE, ALTER, DROP and RENAME.
- DML - It stands for Data Manipulation Language. Commands under this category are INSERT and UPDATE.
- DQL - It stands for Data Query Language. Command under this category is SELECT.
- DCL - It stands for Data Control Language. Commands under this category are GRANT and REVOKE.
- TCL - It stands for Transaction Control Language. Commands under this category are COMMIT and ROLLBACK.

10. What is a view in SQL?

A view is a virtual table based on the result-set of an SQL statement. We can create using the create view syntax.

CREATE VIEW view_name AS SELECT column_name(s) FROM table_name WHERE condition

11. What is a Trigger?

A Trigger is a code that is associated with insert, update or delete operations. The code is executed automatically whenever the associated query is executed on a table. Triggers can be useful to maintain integrity in databases.

12. What is a stored procedure?

A stored procedure is like a function that contains a set of operations compiled together. It contains a set of operations that are commonly used in an application to do some common database tasks.

13. What is a transaction in a database?

A Database Transaction is a set of database operations that must be treated as whole, meaning either all operations are executed or none of them.

An example can be a bank transaction from one account to another account. Either both debit and credit operations must be executed or none of them.

14. What are indexes?

A database index is a data structure that improves the speed of data retrieval operations on a database table at the cost of additional writes and the use of more storage space to maintain the extra copy of data.

NOTE: Solve Questions from HackerRank on SQL and also refer to Geeks for Geeks for more questions.