SQL Interview Questions and Answers

Credits - Manthan Godha

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1. **What is SQL?**

SQL (Structured Query Language) is a domain-specific language used for managing relational databases. It enables users to interact with databases for querying, updating, and managing data.

2. **Differentiate between SQL and MySQL.**

SQL is a language used to interact with databases, whereas MySQL is an open-source relational database management system that uses SQL as its language.

3. **What are the different types of SQL commands?**

SQL commands are categorized into four types: DDL (Data Definition Language), DML (Data Manipulation Language), DCL (Data Control Language), and TCL (Transaction Control Language).

4. **Explain the primary key in SQL.**

A primary key is a unique identifier for each record in a table. It ensures that each row in the table is uniquely identifiable and cannot have a NULL value.

5. **What is a foreign key?**

A foreign key is a field in a table that refers to the primary key of another table. It establishes a link between two tables, enforcing referential integrity.

6. **What is normalization in SQL?**

Normalization is the process of organizing data in a database to eliminate redundancy and improve data integrity by dividing the database into multiple related tables.

7. **What is the difference between DELETE and TRUNCATE commands?**

DELETE command removes rows one by one, logging individual deletions. TRUNCATE command removes all rows from a table without logging individual deletions, making it faster but non-recoverable.

8. **Explain the JOIN clause in SQL.**

JOIN clause is used to combine rows from two or more tables based on a related column between them. There are various types of joins like INNER JOIN, LEFT JOIN, RIGHT JOIN, and FULL JOIN.

9. **What is a subquery?**

A subquery is a query within another query. It is used to retrieve data that will be used in the main query as a filter condition, computed value, or comparison.

10. **How can you prevent SQL injection attacks?**

To prevent SQL injection attacks, use parameterized queries or prepared statements with placeholders instead of directly inserting values into SQL queries.

11. **What is the use of the GROUP BY clause?**

The GROUP BY clause is used to group rows returned by a query based on one or more columns. It is often used in conjunction with aggregate functions like SUM, COUNT, AVG, etc.

12. **Explain the HAVING clause.**

The HAVING clause filters the results of a GROUP BY clause based on specified conditions. It is used to filter aggregated data.

13. **What is the difference between UNION and UNION ALL?**

UNION returns distinct rows from combined result sets, eliminating duplicates. UNION ALL returns all rows from combined result sets, including duplicates.

14. **Explain the difference between a clustered and a non-clustered index.**

A clustered index determines the physical order of data in a table, while a non-clustered index is a separate structure that contains a sorted list of table rows and their locations.

15. **What is the purpose of the COALESCE function?**

The COALESCE function returns the first non-null expression in a list. It is often used to handle NULL values more effectively.

16. **How can you find the nth highest/lowest value from a table?**

Use the LIMIT or TOP clause, along with ORDER BY, to find the nth highest/lowest value from a table.

17. **Explain the use of the CASE statement.**

The CASE statement is used for conditional logic in SQL queries. It allows you to perform different actions based on different conditions.

18. **What is a self-join?**

A self-join is a type of join where a table is joined with itself. It is used to retrieve related data from the same table.

19. **How can you create an alias in SQL?**

Use the AS keyword to create an alias for a table or column in the SELECT statement.

20. **Explain the difference between a view and a table.**

A table stores data physically, while a view is a virtual table derived from one or more tables or views. Views do not store data themselves.

21. **What is a correlated subquery?**

A correlated subquery is a subquery that depends on the outer query for its values. It executes once for each row processed by the outer query.

22. **What is the use of the ROLLUP and CUBE operators?**

ROLLUP and CUBE operators are used with the GROUP BY clause to generate multiple levels of aggregation in result sets.

23. **How can you calculate the total number of rows in a table?**

Use the COUNT function to calculate the total number of rows in a table.

24. **Explain the purpose of the COUNT() function with the GROUP BY clause.**

The COUNT() function, when used with GROUP BY, calculates the number of rows in each group.

25. **What is the difference between a stored procedure and a function?**

A stored procedure does not necessarily return a value but can perform actions, while a function always returns a value and is used for computation.

26. **How can you create a temporary table in SQL?**

Use the CREATE TEMPORARY TABLE statement to create a temporary table that exists only for the duration of the session.

27. **What is the use of the EXISTS operator?**

The EXISTS operator is used to check the existence of rows in a subquery and returns true if the subquery returns any rows.

28. **Explain the difference between the CHAR and VARCHAR data types.**

CHAR is a fixed-length data type that pads spaces to the end of the string, while VARCHAR is a variable-length data type that does not pad spaces.

29. **What are the ACID properties in database transactions?**

ACID stands for Atomicity, Consistency, Isolation, and Durability, which are properties that ensure database transactions are reliable and maintain data integrity.

30. **How can you find duplicate records in a table?**

Use the GROUP BY clause with HAVING COUNT() to find duplicate records in a table.

31. **Explain the difference between the INNER JOIN and OUTER JOIN.**

INNER JOIN returns only matching rows from both tables, while OUTER JOIN returns all rows from one or both tables, along with matching rows from the other table.

32. **What is a trigger in SQL?**

A trigger is a stored procedure that automatically executes when an event (like INSERT, UPDATE, DELETE) occurs on a table.

33. **What is a common table expression (CTE)?**

A common table expression is a temporary result set that can be referenced within the context of a single SQL statement. It helps simplify complex queries.

34. **How can you get the current date and time in SQL?**

Use the GETDATE() function in SQL Server or the CURRENT_TIMESTAMP() function in MySQL to get the current date and time.

35. **Explain the use of the ROW_NUMBER() function.**

The ROW_NUMBER() function assigns a unique number to each row returned by the query, based on the specified order.

36. **What is the purpose of the COMMIT and ROLLBACK statements?**

The COMMIT statement is used to save changes permanently, while the ROLLBACK statement is used to undo changes made within a transaction.

37. **How can you implement paging in SQL?**

Use the OFFSET FETCH or LIMIT OFFSET clauses to implement paging in SQL queries.

38. **What is the difference between a database and a schema?**

A database is a collection of related data, while a schema is a logical container within a database that contains tables, views, and other database objects.

39. **How can you find the length of a string in SQL?**

Use the LEN() or LENGTH() function to find the length of a string in SQL Server and MySQL, respectively.

40. **Explain the use of the MAX() and MIN() functions.**

The MAX() function returns the maximum value from a column, while the MIN() function returns the minimum value.

41. **What are triggers? How are they different from stored procedures?**

Triggers are special types of stored procedures that automatically execute in response to specific events (like INSERT, UPDATE, DELETE) on a table. The key difference is that triggers are event-driven, whereas stored procedures are executed explicitly.

42. **Explain the purpose of the UNIQUE constraint.**

Answer: The UNIQUE constraint ensures that all values in a column are unique and not repeated within the table.

43. **How can you add a new column to an existing table in SQL?**

Use the ALTER TABLE statement with the ADD column clause to add a new column to an existing table.

44. **What is a full-text search in SQL?**

A full-text search is a technique used to search for words or phrases in large text-based data like articles or documents.

45. **How can you update multiple columns in a table?**

Use the UPDATE statement with multiple SET clauses to update multiple columns in a table.

46. **Explain the difference between the CHARINDEX and INSTR functions.**

CHARINDEX is a function in SQL Server, while INSTR is used in Oracle. Both functions return the position of a substring within a string.

47. **What is the purpose of the COALESCE() and NULLIF() functions?**

The COALESCE() function returns the first non-null expression in a list, and the NULLIF() function returns null if two

expressions are equal; otherwise, it returns the first expression.

48. **What is a recursive SQL query?**

A recursive SQL query is a query that refers to itself. It is often used to traverse hierarchical data structures.

49. **How can you delete duplicate rows from a table?**

Use the DELETE statement with a subquery to remove duplicate rows from a table.

50. **What are SQL constraints?**

SQL constraints are rules defined on a table to enforce data integrity and maintain consistency. Common constraints include PRIMARY KEY, FOREIGN KEY, UNIQUE, NOT NULL, CHECK, etc.

Remember that while these questions and answers can be valuable for your interview preparation, it's essential to understand the concepts behind them rather than merely memorizing the answers. Good luck with your SQL interview!