

Microsoft SQL Interview Questions and Answers

Here are some of the questions you may face, answers included.

Basic SQL Questions

1. What is SQL?

Answer: SQL (Structured Query Language) is a language for getting information from databases and updating (adding, modifying, deleting) data in databases.

2. What are the types of SQL commands?

Answer: There are five types of SQL commands:

- DDL (Data Definition Language): CREATE, ALTER, DROP
- DML (Data Manipulation Language): SELECT, INSERT, UPDATE, DELETE
- DCL (Data Control Language): GRANT, REVOKE
- TCL (Transaction Control Language): COMMIT, ROLLBACK, SAVEPOINT
- DQL (Data Query Language): SELECT

3. What is a primary key?

Answer: A primary key is a column (or combination of columns) in a table that uniquely identifies each row in that table. No duplicate or NULL values are allowed in that column(s).

4. What is a foreign key?

Answer: A foreign key is a column in a table that references the primary key of another table. It ensures referential integrity.

5. What is the difference between WHERE and HAVING?

Answer: WHERE is used to filter records before any grouping is done. HAVING is used to filter groups after GROUP BY.

Intermediate SQL Questions

6. What is normalization and why?

Answer: Normalization is the process of organizing data in a database to reduce redundancy and improve data integrity. It involves dividing large tables into smaller ones and defining relationships between them.

7. What is a JOIN and what are the types?

Answer: A JOIN is used to combine rows from two or more tables based on a related column. The types of joins include:

- INNER JOIN: Returns only the matching rows.
- LEFT JOIN (or LEFT OUTER JOIN): Returns all rows from the left table and the matched rows from the right table.
- RIGHT JOIN (or RIGHT OUTER JOIN): Returns all rows from the right table and the matched rows from the left table.
- FULL OUTER JOIN: Returns all rows when there is a match in either table.

8. What are indexes and why?

Answer: Indexes are special lookup tables that the database search engine can use to speed up the retrieval of data. Indexes are created on columns that are frequently used in WHERE clauses or as part of JOINS.

9. What is SQL Server Integration Services (SSIS)?

Answer: SSIS is a component of Microsoft SQL Server that provides tools for data integration and workflow applications. It can be used for data extraction, transformation and loading (ETL) operations.

10. What are the ACID properties?

Answer: ACID stands for Atomicity, Consistency, Isolation, and Durability:

- Atomicity: Ensures that all operations within a transaction are completed; if not, the transaction is aborted.
- Consistency: Ensures that the database remains in a consistent state before and after the transaction.
- Isolation: Ensures that transactions are isolated from each other.
- Durability: Ensures that once a transaction is committed, it remains permanent even in the case of a system failure.

Advanced SQL Questions

11. What is a view in SQL?

Answer: A view is a virtual table based on the result-set of an SQL query. It has rows and columns like a real table but doesn't store the data itself.

12. What is the difference between UNION and UNION ALL?

Answer: UNION combines the result-set of two or more SELECT statements and removes duplicates. UNION ALL does the same but doesn't remove duplicates.

13. What are triggers in SQL?

Answer: Triggers are special stored procedures that are automatically executed in response to certain events on a table or view, like INSERT, UPDATE or DELETE.

14. What is a cursor and when would you use it?

Answer: A database object uses a cursor to retrieve, manipulate, and navigate through a result set one row at a time. Users often employ it when they need to process a result set row by row rather than as a whole set.

15. Explain the concept of indexing and its types.

Answer: Indexing is a technique used to speed up the retrieval of data in a database by creating an index on a column or set of columns. Types of indexes are:

- Clustered Index: Sorts and stores the data rows of the table or view in order.
- Non-Clustered Index: Contains a sorted list of references to the table's rows.
- Unique Index: Ensures all values in the indexed column are unique.

16. What is the difference between DELETE and TRUNCATE?

Answer: DELETE removes rows one by one and logs each deletion so you can roll back if needed. TRUNCATE removes all rows from a table quickly and doesn't log individual row deletions but can't be rolled back.

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17. What are common table expressions (CTEs)?

Answer: A CTE is a temporary result set defined within the scope of a single SELECT, INSERT, UPDATE or DELETE statement. CTEs can be referenced by the main query.

18. What is a deadlock in SQL Server?

Answer: A deadlock occurs when two or more transactions are waiting for each other to release locks on resources, creating a cycle of dependency that prevents any of the transactions from proceeding.

19. What is partitioning in SQL Server?

Answer: Partitioning in SQL Server is dividing a large table into smaller more manageable pieces without altering the data. It helps improve query performance by allowing SQL Server to only scan relevant partitions.

20. What is the purpose of GROUP BY clause?

Answer: GROUP BY clause is used to group rows that have the same values in specified columns into summary rows, often used with aggregate functions like COUNT, SUM, AVG etc.

Scenario-Based SQL Questions

21. How do you handle big data in SQL Server?

Answer: Big data can be optimized by:

- Indexing
- Partitioning large tables
- Optimized queries and not selecting unnecessary columns
- Proper transaction management

22. How do you detect and resolve deadlocks in SQL Server?

Answer: Detect deadlocks using SQL Server Profiler or by enabling trace flags. To resolve deadlocks consider:

- Using the lowest isolation level
- Short and efficient transactions
- Accessing resources in the same order in different transactions

23. How do you backup and recover a database?

Answer: Backup is creating a copy of the database at a point in time. Recovery is restoring the database to the state at the time of the backup. SQL Server supports full, differential and transaction log backups.

24. How do you optimize a slow running query?

Answer: Query optimization can be done by:

- Reviewing and refining the query logic
- Adding or modifying indexes
- Avoiding complex joins and subqueries
- Analyze and improve the query execution plan
- Proper normalization and partitioning

25. How do you enforce data integrity in SQL Server?

Answer: Data integrity can be enforced by:

- Primary keys and foreign keys
- Unique constraints
- Check constraints

- Triggers
- Proper normalization

Behavioral SQL Questions

26. Describe a time when you had to troubleshoot a complex SQL query.

Answer: Your answer should include the problem, steps you took to identify and resolve the issue and the outcome.

27.How do you keep up with new SQL Server features?

Answer: How do you follow industry blogs, attend conferences or webinars, participate in forums or take courses to stay updated with the latest SQL Server features and best practices.

28. How do you learn a new database management system?

Answer: How do you approach learning new systems, reading documentation, hands-on practice and maybe courses.

29. Tell me about a difficult SQL problem you solved.

Answer: Scenario where you faced a complex SQL problem, steps you took to solve it and the impact it had on your project or team.

30.How do you prioritize when working with big data?

Answer: How do you manage your time and resources when dealing with big data, prioritizing based on urgency, complexity and business impact.

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