

# 100 SQL Interview Q&A

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## 1.What is SQL?

SQL (Structured Query Language) is a programming language used for managing relational databases. It is used to perform various operations like creating, modifying, and querying databases.

## 2. What are the different types of SQL statements?

The different types of SQL statements are:

**DDL (Data Definition Language):** Used for creating, modifying, and deleting database objects (e.g., CREATE, ALTER, DROP).

**DML (Data Manipulation Language):** Used for manipulating data within the database (e.g., SELECT, INSERT, UPDATE, DELETE).

**DCL (Data Control Language):** Used for controlling access to data in the database (e.g., GRANT, REVOKE).

**TCL (Transaction Control Language):** Used for managing transactions (e.g., COMMIT, ROLLBACK).

## 3.What is a primary key?

A primary key is a column or a combination of columns that uniquely identifies each row in a table. It ensures the uniqueness and integrity of the data in the table.

## 4.What is a foreign key?

A foreign key is a column or a combination of columns that establishes a link between two tables. It represents a relationship between the data in the two tables, enforcing referential integrity.

## 5.What is a join in SQL?

A join is used to combine rows from two or more tables based on a related column between them. It allows retrieving data from multiple tables simultaneously.

## **6.What are the different types of joins in SQL?**

The different types of joins are:

**INNER JOIN:** Returns only the matching rows from both tables.

**LEFT JOIN:** Returns all rows from the left table and the matching rows from the right table.

**RIGHT JOIN:** Returns all rows from the right table and the matching rows from the left table.

**FULL JOIN:** Returns all rows from both tables, including the unmatched rows.

**CROSS JOIN:** Returns the Cartesian product of the two tables.

## **7. What is normalization in SQL?**

Normalization is the process of organizing data in a database to minimize redundancy and dependency. It involves breaking down a table into smaller tables and establishing relationships between them to eliminate data anomalies.

## **8. What is a subquery?**

A subquery is a query nested within another query. It is used to retrieve data from one or more tables and use the result of the subquery as a condition or value in the outer query.

## **9.What is the difference between DELETE and TRUNCATE in SQL?**

**DELETE:** It is a DML statement used to delete specific rows from a table based on a condition. It can be rolled back and can use a WHERE clause.

**TRUNCATE:** It is a DDL statement used to delete all rows from a table, resetting the table to its initial state. It cannot be rolled back and does not use a WHERE clause.

## **10.What is an index in SQL?**

An index is a database object that improves the speed of data retrieval operations on a table. It is created on one or more columns of a table and

allows faster searching, sorting, and filtering of data.

### **11.What is the difference between UNION and UNION ALL in SQL?**

**UNION:** It is used to combine the result sets of two or more SELECT statements into a single result set. It removes duplicate rows from the result set.

**UNION ALL:** It also combines the result sets of two or more SELECT statements into a single result set but does not remove duplicate rows. It is faster than UNION as it does not perform duplicate removal.

### **12. What is ACID in the context of database transactions?**

**ACID** stands for Atomicity, Consistency, Isolation, and Durability. It is a set of properties that guarantee reliable and consistent transactions in a database.

**Atomicity:** Ensures that a transaction is treated as a single unit of work, either fully completed or fully rolled back.

**Consistency:** Ensures that a transaction brings the database from one valid state to another. It preserves the integrity of the data.

**Isolation:** Ensures that concurrent transactions do not interfere with each other. Each transaction is isolated and operates as if it is the only transaction running.

**Durability:** Ensures that once a transaction is committed, its changes are permanent and will survive any subsequent failures.

### **13. What is a view in SQL?**

A view is a virtual table derived from one or more tables or views. It acts as a stored query and does not store any data itself. Views simplify complex queries, provide security, and present a customized representation of the data.

### **14.What is the difference between CHAR and VARCHAR in SQL?**

**CHAR:** It is a fixed-length character data type. It stores a specific number of characters, padding the remaining space with spaces if the data is shorter.

**VARCHAR:** It is a variable-length character data type. It stores a varying number of characters, using only the required space without padding.

### **15. What is the difference between a clustered and non-clustered index?**

**Clustered index:** It determines the physical order of data rows in a table. Each table can have only one clustered index, and it affects the way data is stored on disk.

**Non-clustered index:** It is a separate structure that contains a sorted copy of selected columns from a table. A table can have multiple non-clustered indexes, and they do not affect the physical order of data rows.

### **16. What is the difference between a stored procedure and a function in SQL?**

**Stored procedure:** It is a named set of SQL statements that are stored in the database. It can have input and output parameters, and it may or may not return a value. Stored procedures are used for performing complex database operations.

**Function:** It is a named program unit that returns a value. It always returns a value and can be used in SQL statements wherever an expression can be used. Functions are used for calculations and data manipulation.

### **17. What is the difference between a candidate key and a primary key?**

**Candidate key:** It is a column or a combination of columns that can uniquely identify a row in a table. There can be multiple candidate keys in a table, and one of them is chosen as the primary key.

**Primary key:** It is a candidate key that is selected as the main unique identifier for a table. It uniquely identifies each row in the table and enforces data integrity.

### **18. What is the difference between a clustered and non-clustered index?**

**Clustered index:** It determines the physical order of data rows in a table. Each table can have only one clustered index, and it affects the way data is stored on disk.

**Non-clustered index:** It is a separate structure that contains a sorted copy of selected columns from a table. A table can have multiple non-clustered indexes, and they do not affect the physical order of data rows.

### **19. What is a self-join in SQL?**

A self-join is a type of join where a table is joined with itself. It is used when data in a table relates to other data within the same table. By using aliases for the table, different rows in the table can be joined together.

## **20. What is the difference between the HAVING and WHERE clauses in SQL?**

**WHERE clause:** It is used to filter rows before grouping and aggregation operations are performed. It is used with the SELECT, UPDATE, and DELETE statements.

**HAVING clause:** It is used to filter groups of rows after grouping and aggregation operations are performed. It is used with the SELECT statement, specifically with GROUP BY.

## **21. What is the difference between a database and a schema in SQL?**

**Database:** It is a collection of related data stored and organized in a structured format. It can contain multiple tables, views, indexes, etc.

**Schema:** It is a logical container within a database. It is used to group database objects together, such as tables, views, and procedures. A database can have multiple schemas.

## **22. What is a transaction in SQL?**

A transaction is a sequence of one or more SQL statements that are treated as a single unit of work. It allows multiple operations to be grouped together, ensuring that either all of them are successfully completed, or none of them are applied.

## **23. What is the difference between a clustered and non-clustered index?**

**Clustered index:** It determines the physical order of data rows in a table. Each table can have only one clustered index, and it affects the way data is stored on disk.

**Non-clustered index:** It is a separate structure that contains a sorted copy of selected columns from a table. A table can have multiple non-clustered indexes, and they do not affect the physical order of data rows.

## **24. What is the difference between UNION and UNION ALL in SQL?**

**UNION:** It is used to combine the result sets of two or more SELECT statements into a single result set. It removes duplicate rows from the

result set.

**UNION ALL:** It also combines the result sets of two or more **SELECT** statements into a single result set but does not remove duplicate rows. It is faster than **UNION** as it does not perform duplicate removal.

## **25. What is a correlated subquery in SQL?**

A correlated subquery is a subquery that refers to a column from the outer query. It executes once for each row of the outer query and is used to perform calculations or filtering based on values from the outer query.

## **26. What is the difference between a primary key and a unique key?**

**Primary key:** It is a column or a combination of columns that uniquely identifies each row in a table. It enforces data integrity and does not allow duplicate or null values.

**Unique key:** It is a column or a combination of columns that ensures the uniqueness of data in a table. Unlike the primary key, it allows null values.

## **27. What is the difference between a correlated and non-correlated subquery?**

**Correlated subquery:** It is a subquery that refers to a column from the outer query. It is executed once for each row of the outer query.

**Non-correlated subquery:** It is a subquery that can be executed independently of the outer query. It is executed only once and its result is used by the outer query.

## **28. What is a constraint in SQL?**

A constraint is a rule defined on a column or a set of columns in a table to enforce data integrity. It can be used to enforce uniqueness, primary key, foreign key, and other rules on the data.

## **29. What is the difference between a LEFT JOIN and a RIGHT JOIN?**

**LEFT JOIN:** It returns all rows from the left table and the matching rows from the right table. If there is no match, NULL values are returned for the columns of the right table.

**RIGHT JOIN:** It returns all rows from the right table and the matching rows from the left table. If there is no match, NULL values are returned for the columns of the left table.

### **30. What is a trigger in SQL?**

A trigger is a database object that is automatically executed in response to a specific event, such as an INSERT, UPDATE, or DELETE operation on a table. Triggers are used to enforce business rules, perform auditing, or maintain data consistency.

### **31.What is the difference between a unique constraint and a unique index?**

Unique constraint: It is a database constraint that ensures the uniqueness of values in one or more columns. It is implemented internally as a unique index.

Unique index: It is an index created explicitly on one or more columns to enforce uniqueness. It can be used for fast searching of unique values.

### **32. What is the difference between the GROUP BY and HAVING clauses?**

GROUP BY clause: It is used to group rows based on one or more columns. It is typically used with aggregate functions to perform calculations on groups of rows.

HAVING clause: It is used to filter groups of rows after the GROUP BY operation has been performed. It is used with aggregate functions and conditions.

### **33. What is the purpose of the COMMIT statement in SQL?**

The COMMIT statement is used to permanently save the changes made within a transaction to the database. It marks the successful completion of a transaction and makes the changes visible to other users.

### **34. What is the purpose of the ROLLBACK statement in SQL?**

The ROLLBACK statement is used to undo the changes made within a transaction and restore the database to its state before the transaction began. It is used to discard the changes in case of errors or failures.

### **35. What is the purpose of the SAVEPOINT statement in SQL?**

The SAVEPOINT statement is used to define a point within a transaction to which you can roll back later. It allows you to undo a part of a transaction without rolling back the entire transaction.

### **36. What is the difference between the MINUS and EXCEPT operators in SQL?**

**MINUS:** It is used to return the rows from the first query that are not present in the second query. It removes duplicates from the result set.

**EXCEPT:** It is used to return the rows from the first query that are not present in the second query. It preserves duplicates in the result set.

### **37. What is the difference between the EXISTS and IN operators in SQL?**

**EXISTS:** It is used to check the existence of rows returned by a subquery. It returns true if the subquery returns at least one row.

**IN:** It is used to compare a value with a set of values returned by a subquery or a list of explicit values. It returns true if the value is found in the set.

### **38. What is the purpose of the CASE statement in SQL?**

The CASE statement is used to perform conditional branching within SQL queries. It allows you to conditionally evaluate expressions and return different results based on the conditions.

### **39. What is the purpose of the COALESCE function in SQL?**

The COALESCE function is used to return the first non-null expression in a list of expressions. It is often used to provide a default value when a column has a null value.

### **40. What is a recursive query in SQL?**

A recursive query is a query that references its own output in the query definition. It is used to perform hierarchical or self-referencing queries, such as traversing tree structures or calculating running totals.

### **41. What is the purpose of the GROUPING SETS clause in SQL?**

The GROUPING SETS clause is used to specify multiple grouping sets in a single query. It allows you to generate multiple levels of grouping in a single result set.

### **42. What is the purpose of the PIVOT and UNPIVOT operators in SQL?**

**PIVOT:** It is used to rotate rows into columns, creating a crosstab report from a normalized table.



**UNPIVOT:** It is used to rotate columns into rows, converting the columns of a crosstab report into rows.

#### **43. What is the purpose of the WITH clause in SQL?**

The WITH clause, also known as a Common Table Expression (CTE), is used to define temporary result sets that can be referenced within a query. It simplifies complex queries and improves query readability.

#### **44. What is the purpose of the ROW\_NUMBER() function in SQL?**

The ROW\_NUMBER() function is used to assign a unique sequential number to each row within a result set. It is often used for pagination or ranking purposes.

#### **45. What is the purpose of the TOP clause in SQL?**

The TOP clause is used to limit the number of rows returned by a query. It specifies the maximum number of rows to be included in the result set.

#### **46. What is the purpose of the OFFSET-FETCH clause in SQL?**

The OFFSET-FETCH clause is used to implement pagination in SQL queries. It allows you to specify the starting point and the number of rows to fetch from the result set.

#### **47. What is the purpose of the MERGE statement in SQL?**

The MERGE statement is used to perform INSERT, UPDATE, or DELETE operations on a target table based on the values from a source table. It combines the capabilities of INSERT, UPDATE, and DELETE statements in a single statement.

#### **48. What is the purpose of the CROSS APPLY and OUTER APPLY operators in SQL?**

**CROSS APPLY:** It applies a table-valued function to each row of a table expression, producing the result as a derived table.

**OUTER APPLY:** It is similar to CROSS APPLY but includes unmatched rows from the left table in the result set.

#### **49. What is the purpose of the STRING\_AGG function in SQL?**

The STRING\_AGG function is used to concatenate values from multiple rows into a single string, separated by a specified delimiter. It simplifies

the process of concatenating strings in SQL queries.

#### **50. What is the purpose of the LEAD and LAG functions in SQL?**

**LEAD:** It is used to access the value of a column from the next row in the result set.

**LAG:** It is used to access the value of a column from the previous row in the result set.

#### **51. What is the purpose of the TRUNCATE TABLE statement in SQL?**

The TRUNCATE TABLE statement is used to remove all rows from a table, effectively deleting all data in the table. Unlike the DELETE statement, it does not generate individual delete operations for each row and is faster for large tables.

#### **52. What is the purpose of the RANK() function in SQL?**

The RANK() function is used to assign a rank to each row within a result set based on a specified criteria. It assigns the same rank to rows with the same values and leaves gaps in the ranking sequence in case of ties.

#### **53. What is the purpose of the DENSE\_RANK() function in SQL?**

The DENSE\_RANK() function is used to assign a rank to each row within a result set based on a specified criteria. It assigns consecutive ranks to rows with the same values, without leaving gaps in the ranking sequence.

#### **54. What is the purpose of the NTILE() function in SQL?**

The NTILE() function is used to divide a result set into a specified number of groups, assigning a group number to each row. It is often used for data distribution or bucketing purposes.

#### **55. What is the purpose of the COALESCE function in SQL?**

The COALESCE function is used to return the first non-null expression in a list of expressions. It is often used to provide a default value when a column has a null value.

#### **56. What is the purpose of the NULLIF function in SQL?**

The NULLIF function is used to compare two expressions and return null if they are equal. It is often used to handle division by zero errors or to replace specific values with null.

**57. What is the purpose of the HAVING clause in SQL?**

The HAVING clause is used to filter groups of rows after the GROUP BY operation has been performed. It is used with aggregate functions and conditions.

**58. What is the purpose of the UNION operator in SQL?**

The UNION operator is used to combine the result sets of two or more SELECT statements into a single result set. It removes duplicate rows from the result set.

**59. What is the purpose of the UNION ALL operator in SQL?**

The UNION ALL operator is used to combine the result sets of two or more SELECT statements into a single result set, including duplicate rows. It is faster than UNION as it does not perform duplicate removal.

**60. What is the purpose of the INNER JOIN in SQL?**

The INNER JOIN is used to retrieve records that have matching values in both tables being joined. It returns only the rows where the join condition is satisfied.

**61. What is the purpose of the LEFT JOIN in SQL?**

The LEFT JOIN is used to retrieve all records from the left table and the matching records from the right table. If there is no match, NULL values are returned for the columns of the right table.

**62. What is the purpose of the RIGHT JOIN in SQL?**

The RIGHT JOIN is used to retrieve all records from the right table and the matching records from the left table. If there is no match, NULL values are returned for the columns of the left table.

**63. What is the purpose of the FULL JOIN in SQL?**

The FULL JOIN is used to retrieve all records from both tables being joined, regardless of whether there is a match or not. If there is no match, NULL values are returned for the columns of the non-matching table.

**64. What is the purpose of the GROUP BY clause in SQL?**

The GROUP BY clause is used to group rows based on one or more columns. It is typically used with aggregate functions to perform

calculations on groups of rows.

**65. What is the purpose of the ORDER BY clause in SQL?**

The ORDER BY clause is used to sort the result set based on one or more columns. It specifies the sort order, which can be ascending (ASC) or descending (DESC).

**66. What is the purpose of the DISTINCT keyword in SQL?**

The DISTINCT keyword is used to eliminate duplicate rows from the result set. It considers the entire row when determining duplicates.

**67. What is the purpose of the LIKE operator in SQL?**

The LIKE operator is used to search for a specified pattern in a column. It is often used with wildcard characters such as '%' (matches any sequence of characters) and '\_' (matches any single character).

**68. What is the purpose of the BETWEEN operator in SQL?**

The BETWEEN operator is used to select values within a specified range. It is inclusive of the endpoints.

**69. What is the purpose of the IN operator in SQL?**

The IN operator is used to specify multiple values in a WHERE clause. It checks if a value matches any value in a list or subquery.

**70. What is the purpose of the EXISTS operator in SQL?**

The EXISTS operator is used to check the existence of rows returned by a subquery. It returns true if the subquery returns at least one row.

**71. What is the purpose of the NOT operator in SQL?**

The NOT operator is used to negate a logical condition. It reverses the result of a Boolean expression.

**72. What is the purpose of the COUNT() function in SQL?**

The COUNT() function is used to count the number of rows that match a specified condition in a SELECT statement. It can also be used without a condition to count all rows in a table.

**73. What is the purpose of the SUM() function in SQL?**

The SUM() function is used to calculate the sum of values in a column. It is often used with the GROUP BY clause to calculate sums per group.

**74. What is the purpose of the AVG() function in SQL?**

The AVG() function is used to calculate the average of values in a column. It is often used with the GROUP BY clause to calculate averages per group.

**75. What is the purpose of the MAX() function in SQL?**

The MAX() function is used to retrieve the maximum value in a column. It is often used with the GROUP BY clause to find the maximum per group.

**76. What is the purpose of the MIN() function in SQL?**

The MIN() function is used to retrieve the minimum value in a column. It is often used with the GROUP BY clause to find the minimum per group.

**77. What is the purpose of the UPPER() function in SQL?**

The UPPER() function is used to convert a string to uppercase.

**78. What is the purpose of the LOWER() function in SQL?**

The LOWER() function is used to convert a string to lowercase.

**79. What is the purpose of the CONCAT() function in SQL?**

The CONCAT() function is used to concatenate two or more strings together.

**80. What is the purpose of the SUBSTRING() function in SQL?**

The SUBSTRING() function is used to extract a substring from a string.

**81. What is the purpose of the DATE() function in SQL?**

The DATE() function is used to extract the date part from a datetime value.

**82. What is the purpose of the YEAR() function in SQL?**

The YEAR() function is used to extract the year part from a date or datetime value.

**83. What is the purpose of the MONTH() function in SQL?**

The MONTH() function is used to extract the month part from a date or datetime value.

**84. What is the purpose of the DAY() function in SQL?**

The DAY() function is used to extract the day part from a date or datetime value.

**85. What is the purpose of the GETDATE() function in SQL?**

The GETDATE() function is used to retrieve the current date and time.

**86. What is the purpose of the NOW() function in SQL?**

The NOW() function is used to retrieve the current date and time.

**87. What is the purpose of the COUNT() function in SQL?**

The COUNT() function is used to count the number of rows in a table.

**88. What is the purpose of the GROUP\_CONCAT() function in SQL?**

The GROUP\_CONCAT() function is used to concatenate values from multiple rows into a single string, separated by a specified delimiter. It is often used with the GROUP BY clause.

**89. What is the purpose of the CASE statement in SQL?**

The CASE statement is used to perform conditional branching within SQL queries. It allows you to conditionally evaluate expressions and return different results based on the conditions.

**90. What is the purpose of the COALESCE() function in SQL?**

The COALESCE() function is used to return the first non-null expression in a list of expressions. It is often used to provide a default value when a column has a null value.

**91. What is the purpose of the NULLIF() function in SQL?**

The NULLIF() function is used to compare two expressions and return null if they are equal. It is often used to handle division by zero errors or to replace specific values with null.

**92. What is the purpose of the TRIM() function in SQL?**

The TRIM() function is used to remove leading and trailing spaces from a string.

**93. What is the purpose of the REPLACE() function in SQL?**

The REPLACE() function is used to replace occurrences of a specified string with another string in a column.

**94. What is the purpose of the CAST() function in SQL?**

The CAST() function is used to convert a value of one data type to another data type.

**95. What is the purpose of the ISNULL() function in SQL?**

The ISNULL() function is used to replace null values with a specified value.

**96. What is the purpose of the ROUND() function in SQL?**

The ROUND() function is used to round a numeric value to a specified number of decimal places.

**97. What is the purpose of the TRUNC() function in SQL?**

The TRUNC() function is used to truncate a numeric value to a specified number of decimal places.

**98. What is the purpose of the AVG() function in SQL?**

The AVG() function is used to calculate the average of a set of values.

**99. What is the purpose of the DISTINCT keyword in SQL?**

The DISTINCT keyword is used to eliminate duplicate values from a result set.

**100. What is the purpose of the AS keyword in SQL?**

The AS keyword is used to alias a column or table with a different name. It is often used to provide more meaningful names to columns or to make column names unique in a result set.