TOP 25

SQL

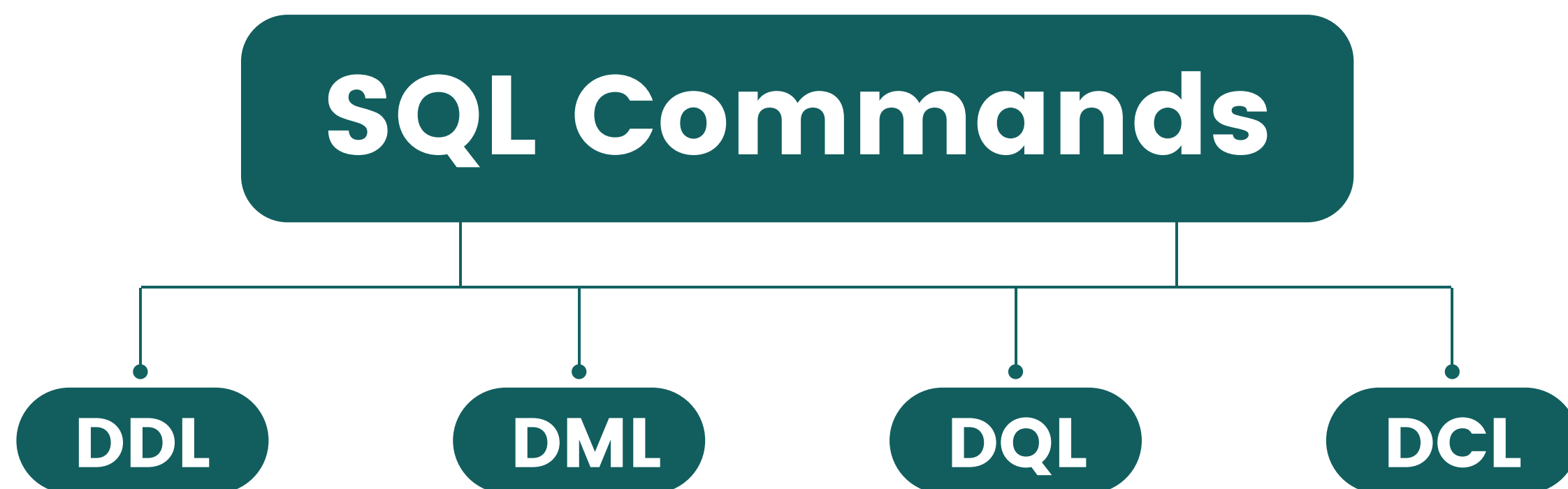## INTERVIEW QUESTIONS

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Q.1   What are the different types of SQL commands?

SQL commands can be categorized into four main types:

SQL Commands

DDL   DML   DQL   DCL

▷ **DDL (Data Definition Language)** commands for defining and managing database structures.

▷ **DML (Data Manipulation Language)** commands for working with data.

▷ **DQL (Data Query Language)** commands for retrieving data.

▷ **DCL (Data Control Language)** commands for managing access and permissions.

Q.2 What are the primary SQL data types?

▷ SQL data types include numeric, string, date/time, and boolean. Each type is used to store different kinds of data.

NUMERIC	DATE/TIME	STRING	BOOLEAN

SQL DATA TYPES
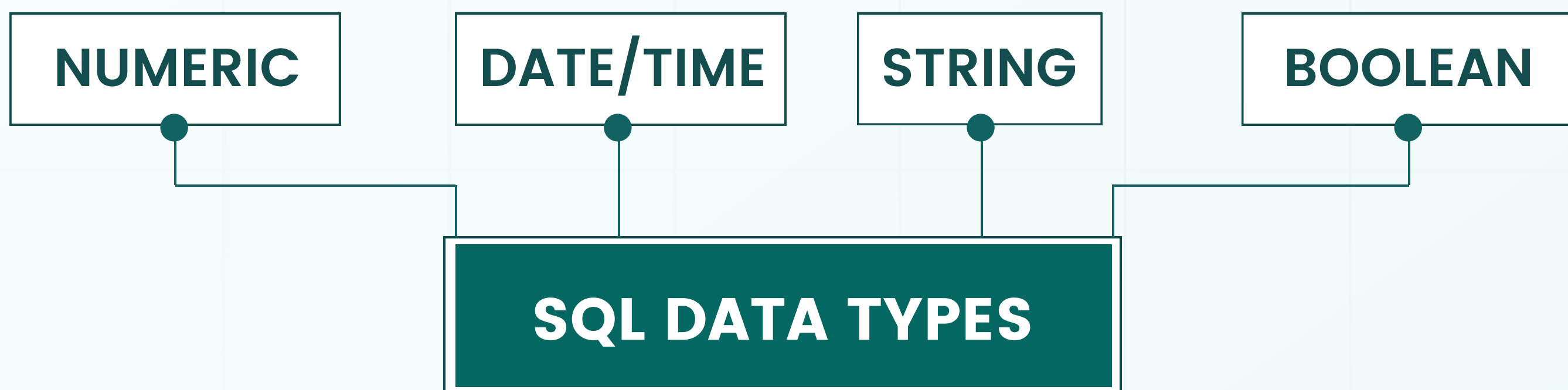
Q.3 What is the purpose of the SQL SELECT statement?

▷ The SELECT statement is used to retrieve data from one or more tables in a database. It allows you to specify which columns and rows you want to retrieve.

Q.4 What are the different types of joins in SQL?

The different types of SQL joins are:

▷ **INNER JOIN**: Returns matching rows from both tables.

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

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

▷ **FULL OUTER JOIN**: Returns all rows from both tables.

▷ **CROSS JOIN**: Returns all possible combinations of rows from both tables.

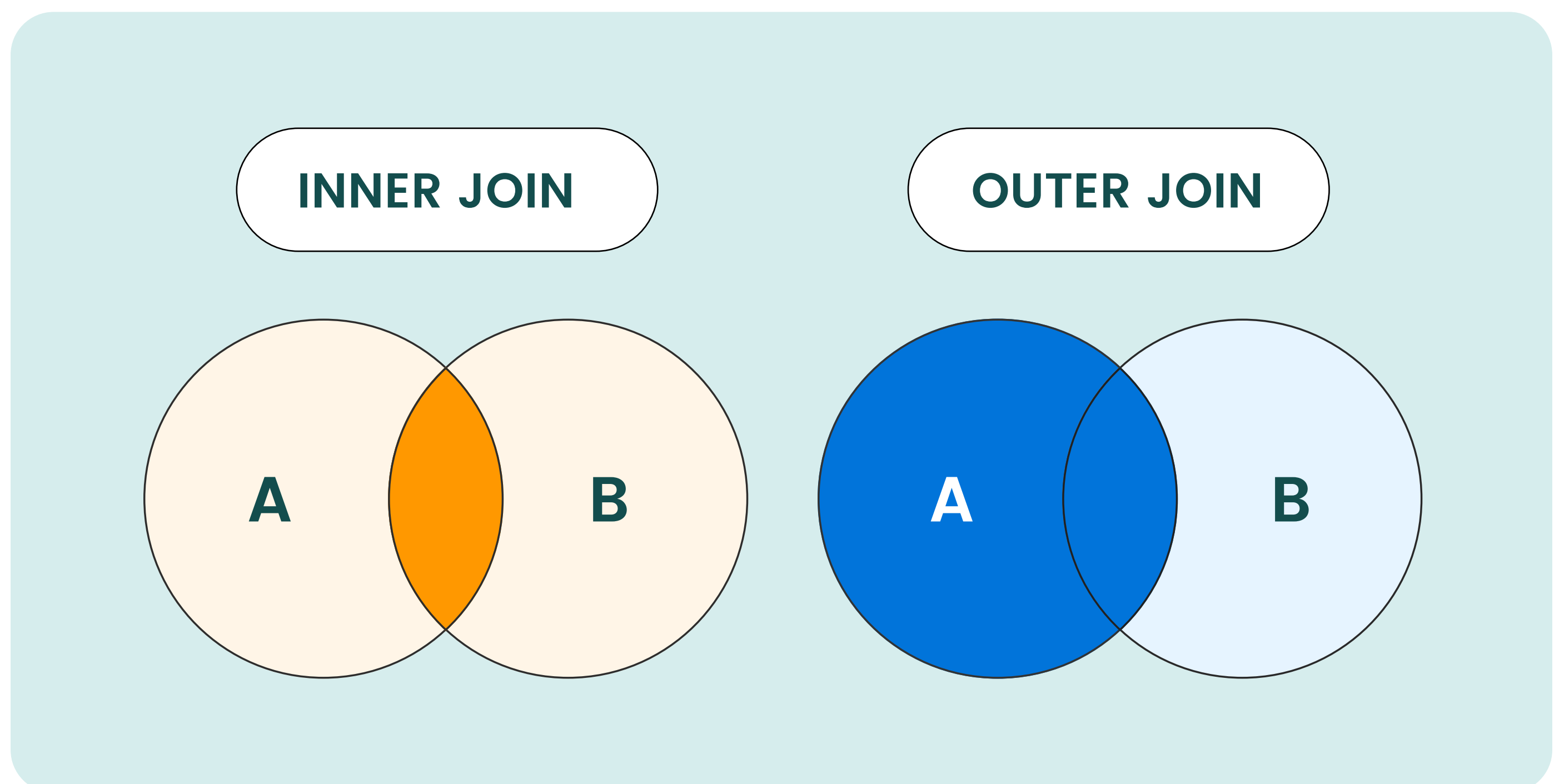▷ **SELF JOIN**: Joins a table with itself, often for hierarchical data.

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▷ **INNER JOIN** returns only the rows that have matching values in both tables, while **OUTER JOIN** returns all rows from both tables and fills in missing values with NULL.

INNER JOIN

OUTER JOIN

A   B

A   B

Q.6 Define primary key and foreign key in sql?

Primary Key:
A primary key is a unique identifier for each row in a table, ensuring no duplicates and no NULL values in its column(s).

Foreign Key:
A foreign key links a column in one table to the primary key column in another table, enforcing data integrity and creating relationships between tables.

Primary VS Foreign Key
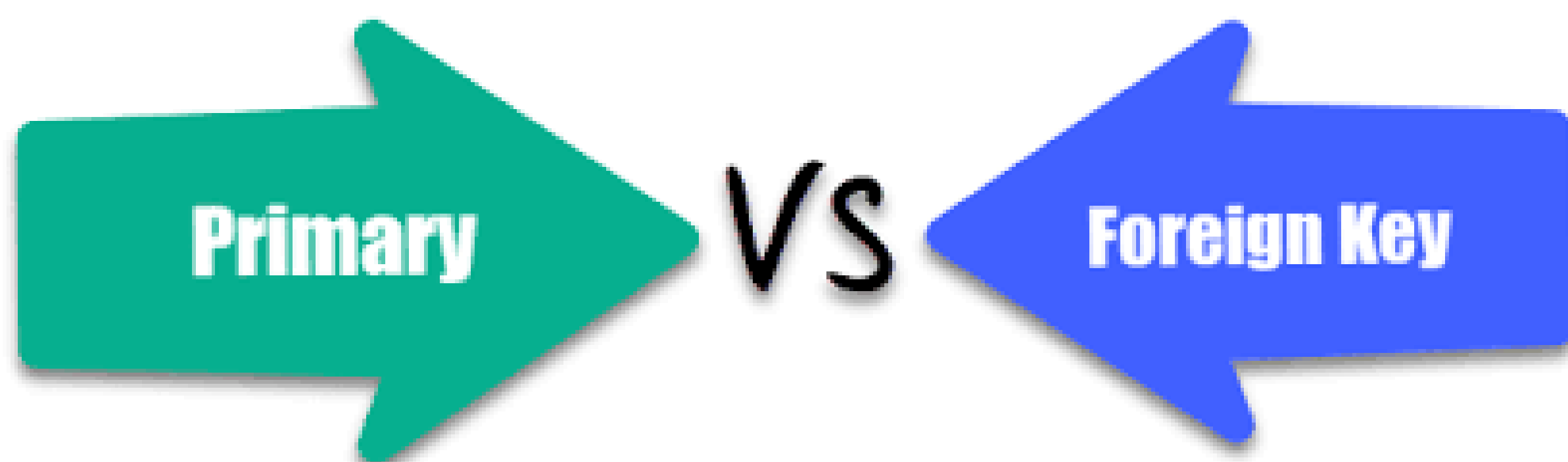
In summary, primary keys uniquely identify rows within a table, while foreign keys establish relationships between tables by linking to primary keys in other tables.

Q.7 What is the difference between a subquery and a JOIN?

▷ A subquery is a query nested inside another query, while a JOIN combines data from multiple tables into a single result set. Subqueries are often used to retrieve data for a specific condition.

**Q.8 Explain the ACID properties in the context of database transactions.**

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

Q.9 What is the difference between GROUP BY and HAVING clauses in SQL?

▷ GROUP BY is used to group rows that have the same values into summary rows, while HAVING is used to filter grouped rows based on a specified condition.

Q.10 What is a subquery, and how is it different from a JOIN?

▷ A subquery is a query embedded within another query. It returns a single value or a set of values to be used by the outer query. JOIN combines rows from two or more tables based on a related column.

QUERY ⟶ Parent Query

SUBQUERY ⟶ Inner Query
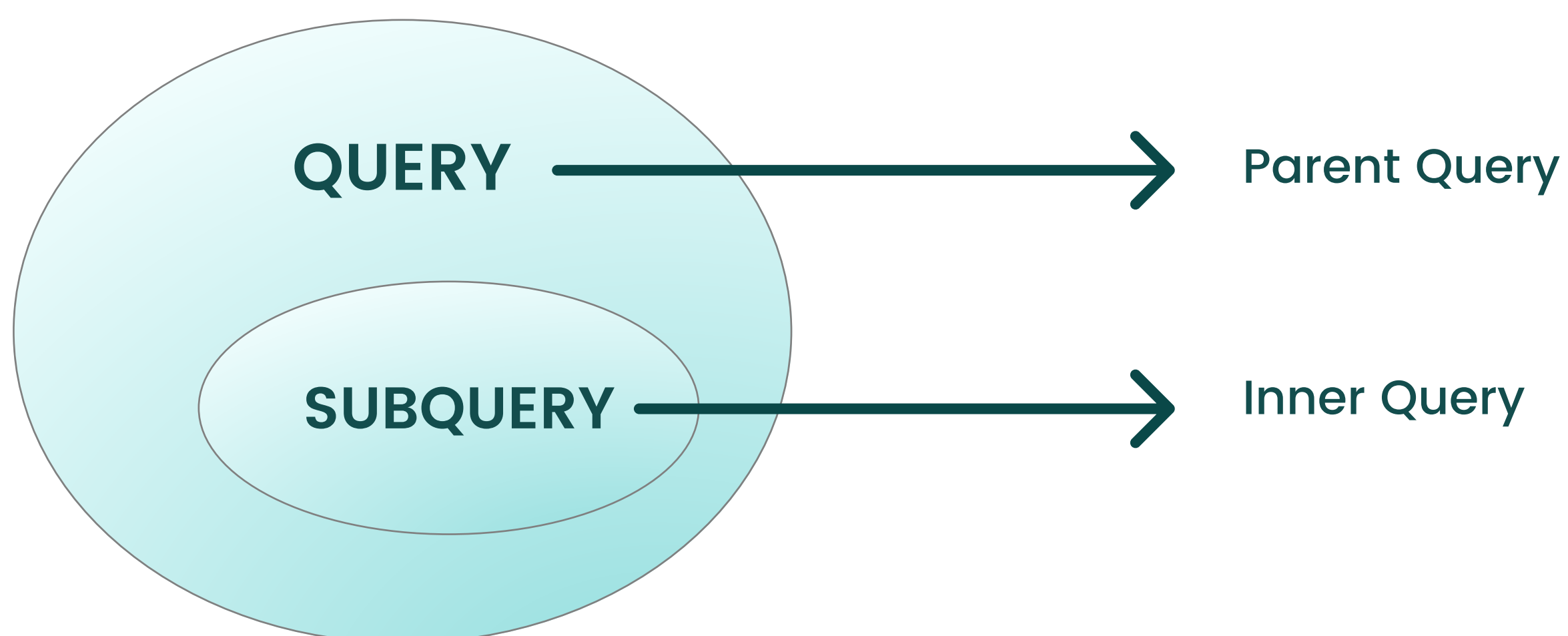
Q.11 Defining SQL order of execution.

Here's the order of execution of SQL statements:

▷ **FROM Clause:**   Identify tables/views.

▷ **JOINs:**   Combine data.

▷ **WHERE Clause:**   Filter rows.

▷ **GROUP BY Clause:**   Group rows.

▷ **HAVING Clause:**   Filter grouped data.

▷ **SELECT Clause:**   Choose columns.

▷ **DISTINCT:**   Eliminate duplicates.

▷ **ORDER BY Clause:**   Sort rows.

▷ LIMIT/OFFSET or FETCH/FIRST, Computed Columns, Window Functions, Row limits, Aliases, Aggregate Functions, UNION/INTERSECT/EXCEPT.

Q.12 What is the difference between UNION and UNION ALL in SQL?

▷ UNION removes duplicate rows from the result set, while UNION ALL includes all rows, even if they are duplicates.

Q.13 How can you optimize a slow-running SQL query?

▷ You can optimize a query by creating indexes, minimizing the use of wildcards in WHERE clauses, and ensuring that tables are properly normalized.

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Q.14 Explain the purpose of the SQL CASE statement.

▷ The CASE statement allows you to perform conditional logic in SQL queries, similar to an IF-ELSE statement in other programming languages.
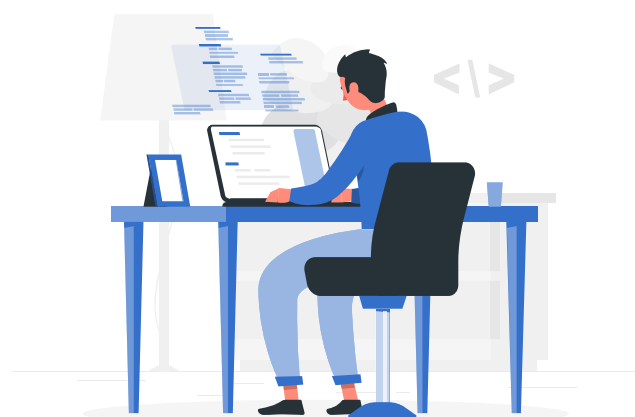
Q.15 What is a self-join, and when would you use it?

▷ A self-join is a query in which a table is joined with itself. It's useful when you need to retrieve related data from the same table, such as hierarchical data.
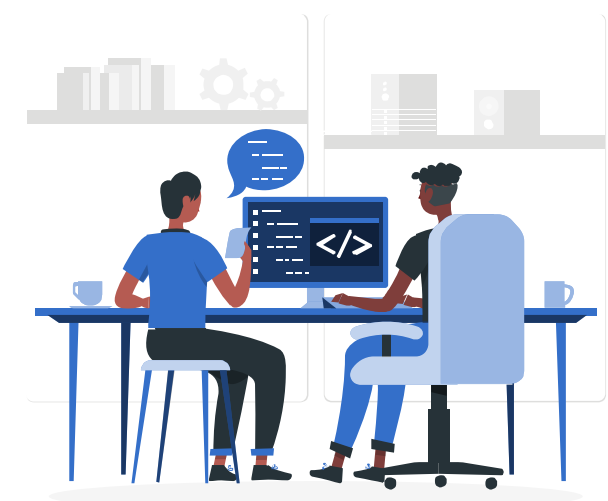
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Q.16 What is the purpose of the SQL LIMIT clause?

▷ The LIMIT clause is used to restrict the number of rows returned by a query, which is useful for pagination or retrieving a specific subset of data.

Q.17 What are window functions and different types of window functions in SQL ?

▷ Window functions, also known as analytic functions or windowing functions, are powerful SQL features that allow you to perform calculations across a set of table rows related to the current row. They are commonly used for tasks such as ranking, aggregation, and moving averages.

Here are some important window functions in SQL:

▷ **ROW_NUMBER()**: Assigns a unique integer to each row within a result set based on a specified order. It's often used for ranking and pagination. Example - SELECT name, score, ROW_NUMBER() OVER (ORDER BY score DESC) AS rank FROM students;

Here are some important window functions in SQL:

▷ **RANK() and DENSE_RANK()**: Rank rows based on a specified order, with RANK() handling ties by assigning the same rank to tied values, while DENSE_RANK() leaves no gaps in ranking for tied values.

Example :

SELECT name, score, RANK() OVER (ORDER BY score DESC) AS rank FROM students;

▷ **NTILE()**: Divides rows into a specified number of roughly equal parts (buckets) and assigns each row to a bucket.
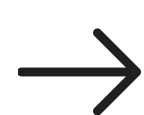
Example :

SELECT name, score, NTILE(4) OVER (ORDER BY score DESC) AS quartile FROM students;

Nikesh Bisen

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JPMORGAN CHASE & CO.

To
Microsoft

Placed with
120% Hike

Here are some important window functions in SQL:

▷ **LEAD() and LAG()**: Access data from subsequent or previous rows in the result set. Useful for calculating differences between rows.

Example :

SELECT date, revenue, LAG(revenue) OVER (ORDER BY date) AS prev_revenue FROM sales;

▷ **SUM() and AVG() as Window Functions**: Compute cumulative sums or averages for a set of rows within a window frame.

Example :

SELECT date, revenue, SUM(revenue) OVER (ORDER BY date) AS cumulative_revenue FROM sales;

▷ **FIRST_VALUE() and LAST_VALUE()**: Retrieve the first or last value within a window frame.

Example :

SELECT date, revenue, FIRST_VALUE(revenue) OVER (ORDER BY date) AS first_revenue FROM sales;

Here are some important window functions in SQL:

▷ **LAG() and LEAD() with PARTITION BY**: Apply LAG() and LEAD() functions within partitions, allowing for calculations within specific groups of rows.

> Example :

SELECT category, date, revenue, LAG(revenue) OVER (PARTITION BY category ORDER BY date) AS prev_revenue FROM sales;

▷ PERCENT_RANK(): Calculates the relative rank of a row within a result set as a percentage.

> Example :

SELECT name, score, PERCENT_RANK() OVER (ORDER BY score DESC) AS percentile FROM students;

▷ **CUME_DIST()**: Computes the cumulative distribution of a value within a result set as a percentage.

> Example :

SELECT name, score, CUME_DIST() OVER (ORDER BY score DESC) AS cumulative_percent FROM students;

Q.18 Difference between RANK(), DENSE_RANK() and ROW_NUMBER().

▷ RANK() and DENSE_RANK() assign the same rank to tied rows but differ in whether they leave gaps between ranks.

▷ ROW_NUMBER() assigns a unique rank to each row without regard to ties.

Which one to use depends on your specific requirements. If you want to leave gaps in ranks for tied values and have consecutive rank numbers, use RANK(). If you want to assign consecutive rank numbers without gaps, use DENSE_RANK(). If you need a unique rank for each row regardless of ties, use ROW_NUMBER().

Saumya Mishra

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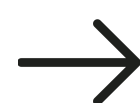
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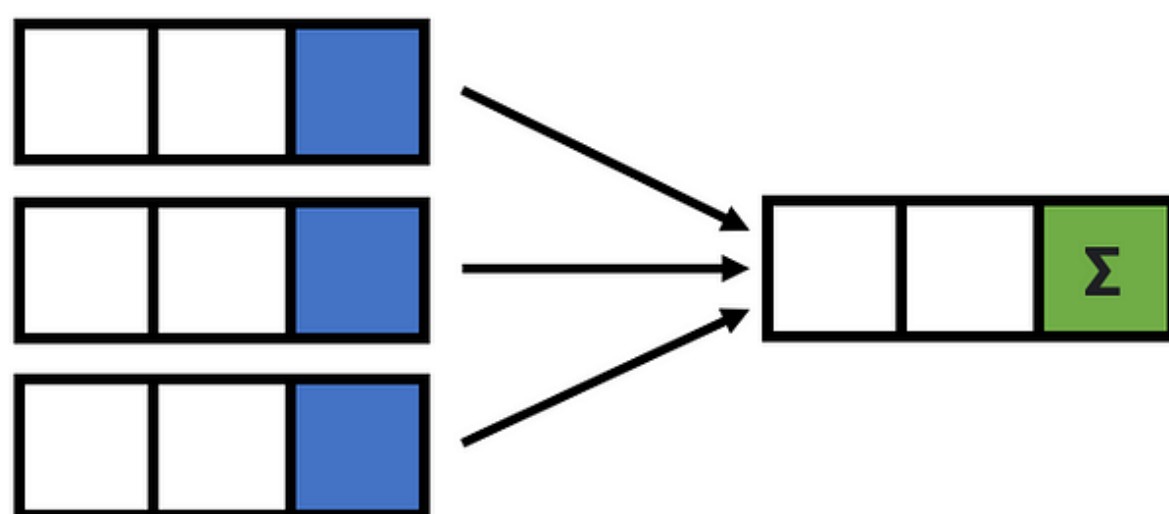
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Q.19 **How can you calculate the total number of rows in a table without using the COUNT function?**

▷ You can use the SELECT statement with the TOP (or LIMIT) clause to retrieve the first row and the ORDER BY clause to order the results. Then, use the row number of the last row to determine the total number of rows.
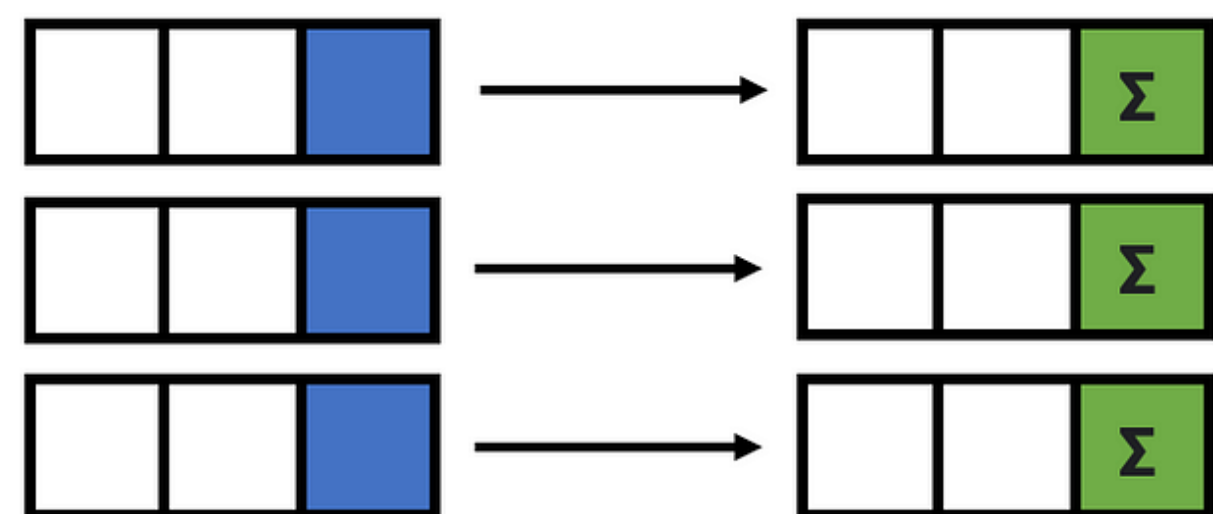
Q.20 How can you find the second-highest or nth-highest value in a column?

▷ You can use subqueries or window functions (e.g., ROW_NUMBER) to find the second-highest or nth-highest value in a column.

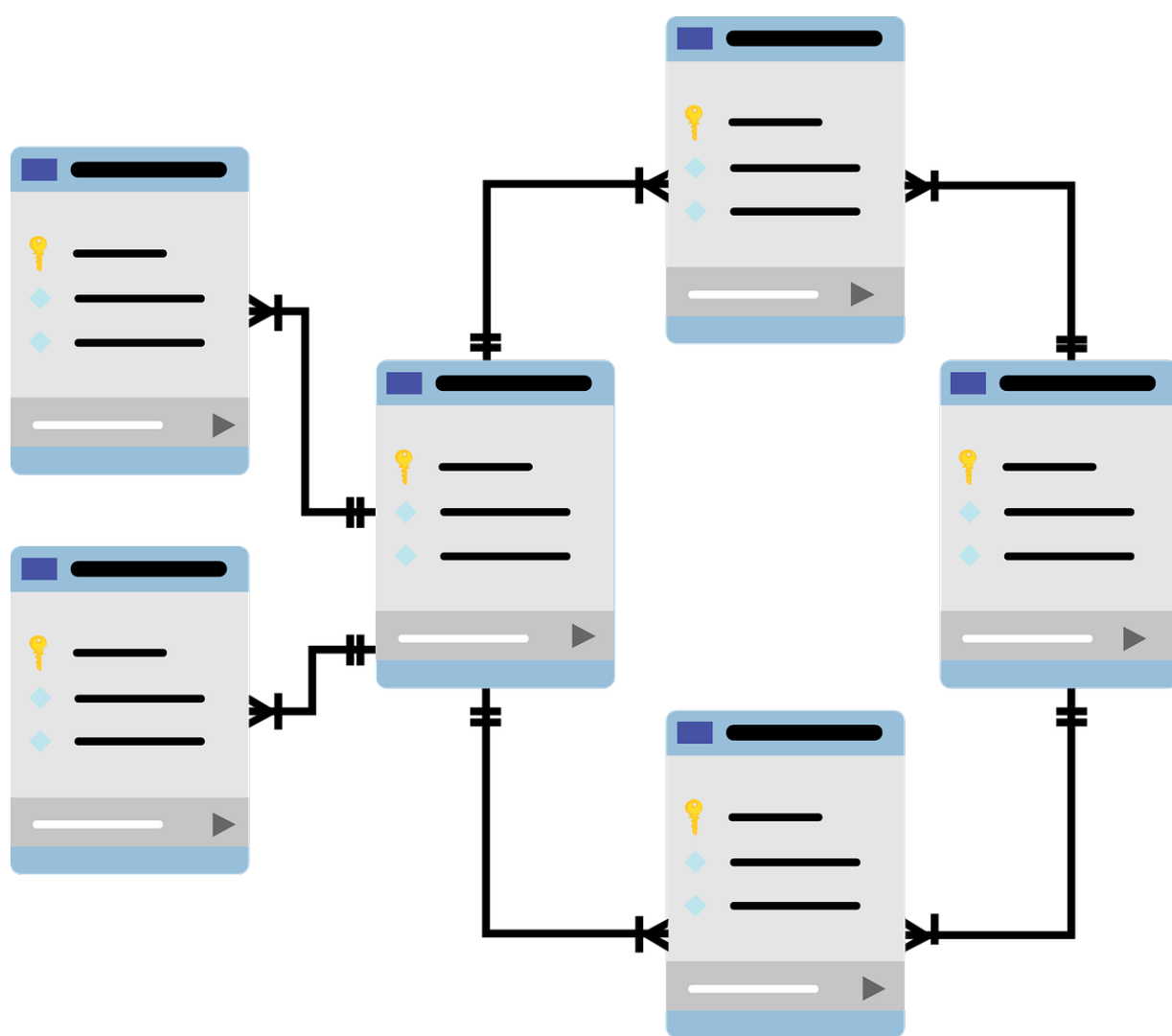Aggregate Functions (SUM, AVG, etc.)   Window Functions

Q.21 What is the purpose of the BETWEEN operator in SQL?

▷ The BETWEEN operator is used to filter results within a specified range of values.

Q.22 What is normalization in SQL, and why is it important?

▷ Normalization is the process of organizing data in a database to reduce data redundancy and improve data integrity.

Q.23 Difference between Delete, Truncate and Drop.

▷ **DELETE** is used to selectively remove specific rows from a table based on a condition and can be rolled back.

▷ **TRUNCATE** is used to quickly remove all rows from a table without deleting the table structure, and it cannot be rolled back.

▷ **DROP** is used to delete an entire database object (table, view, index, etc.) and is also irreversible.

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Q.24 How do you handle NULL values in SQL queries?

▷ Use functions like IS NULL or IS NOT NULL to check for NULL values and handle them appropriately in your queries.

Q.25 What are aggregate functions in SQL?

▷ Aggregate functions perform calculations on a set of values and return a single value. Common examples include COUNT, SUM, AVG, MAX, and MIN.

Arpita Basak

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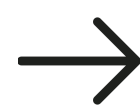
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