SQL TESTS

COMMON *THEORY* QUESTIONS
+ ANSWERS

Q) WHAT IS A **RELATIONAL** DATABASE?

A relational database (based on the mathematical theory of relations) is a collection of tabular datasets (columns & rows) that relate to each other through shared columns

Q) EXPLAIN WHAT A **RELATIONAL DATABASE MANAGEMENT SYSTEM** (RDBMS) IS

A Relational Database Management System (RDBMS) is software that allows you to create and access a relational database, and execute commands & queries on the data within it

Q) EXPLAIN THE DIFFERENCE BETWEEN AN **INNER** JOIN & A **LEFT** JOIN

An inner join returns rows where there is a match (on the join condition) in BOTH tables

A left join returns all rows from the left table, even if there are no matches in the right table. Where no match is found, we are returned null values

Q) EXPLAIN THE DIFFERENCE BETWEEN THE **WHERE** CLAUSE AND THE **HAVING** CLAUSE

The WHERE clause is used to apply conditions/filters BEFORE any aggregation takes place (or where no aggregation takes place)

The HAVING clause is used to apply conditions/filters AFTER aggregation takes place

Q) EXPLAIN THE DIFFERENCE BETWEEN **UNION** & **UNION ALL**

Both are used to stack multiple datasets together (provided the datasets have matching columns)

UNION removes duplicate records from the resulting dataset...UNION ALL does not

>> UNION is often slower than UNION ALL due to the extra resource required to remove duplicates

Q) EXPLAIN THE DIFFERENCE BETWEEN **RANK** & **DENSE RANK**

RANK will give tied values the same ranking. Following the tie it will assign the next ranking based on the number of rows (essentially skipping rankings)

DENSE RANK also gives tied values the same ranking but following the tie will go to the next number sequentially

>> Example

For the values [10, 10, 10, 11, 12]

RANK gives [1, 1, 1, 4, 5]
DENSE RANK gives [1, 1, 1, 2, 3]

Q) EXPLAIN WHAT AN AGGREGATION FUNCTION DOES (AND LIST 3)

An Aggregation Function performs calculations on set of values, and returns a single value. (When aggregating value by group(s), we also use the GROUP BY statement)

Common ones are...

[COUNT, SUM, AVG, MAX, MIN]

Q) EXPLAIN WHAT A WINDOW FUNCTION DOES (AND LIST 3)

Window functions look at values from a set of rows (the window) and based on this, return a value for each row

Any of...

[RANK, DENSE RANK, ROW NUMBER, NTILE, LAG, LEAD, FIRST VALUE, LAST VALUE]

QUESTION 09

Q) EXPLAIN THE DIFFERENCE BETWEEN A **FULL OUTER JOIN** & A **CROSS JOIN**

A CROSS JOIN returns all possible combinations of rows in both tables (also - there is no ON condition)

A FULL OUTER JOIN returns all possible rows from each table. Where a match is found (based on the join condition) we are returned the values from the other table, otherwise we are returned null values.

>> A FULL OUTER JOIN is essentially like executing both a left join and right join at the same time

Q) WHAT IS MEANT BY THE "ORDER OF EXECUTION" IN SQL

The "order of execution" is the order in which clauses within a query are evaluated by the system

The order is...

- FROM
- JOIN + ON
- WHERE
- GROUP BY
- HAVING
- SELECT (& Window Functions)
- ORDER BY
- LIMIT

Knowing this can be useful when looking to optimise queries

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