SQL Interview questions

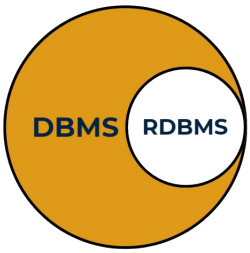
- Prepared by 'The ML Mine'

[Refer video for detail explanation - https://youtu.be/OLusO6Wdkqw]

1) What is the difference between DBMS and RDBMS?

DBMS stands for Database Management System, and RDBMS is the acronym for the Relational Database Management system

DBMS is a software package that allows users to store, retrieve, and manipulate data in a database.
While, RDBMS is an advanced version of DBMS (subset of DBMS). It is used to store or manage only the data that are in the form of tables



2) What is the difference between SQL and MySQL?

SQL is the Structured Query Language which is used to manage data in an RDBMS(Relational Database Management System), where data is stored in a structured or tabular form.

MySQL is the RDBMS software owned by Oracle corporation.

Other examples of RDBMS -

- Microsoft SQL Server
- PostgreSQL
- SQLite
- MariaDB

3) Explain normalization in SQL

Normalization is a process of structuring a relational database, in accordance with the various normal-forms.

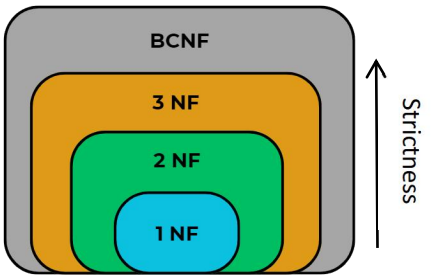
It is used to reduce the data redundancy in a relational database and ensure that the data is well-organized and accurate.

4) What are normal forms and their types?

Normal forms are a series of guidelines

Most common types of normal-forms include -

- First Normal Form (1 NF)
- Second Normal Form (2 NF)
- Third Normal Form (3 NF)
- Boyce Codd Normal Form (BCNF)



5) What are Primary and Foreign keys in SQL ?

Primary key is a column(or a set of columns) in a table that is used as a unique identifier for each row. The constraints imposed on primary column -

- Unique
- Not Null

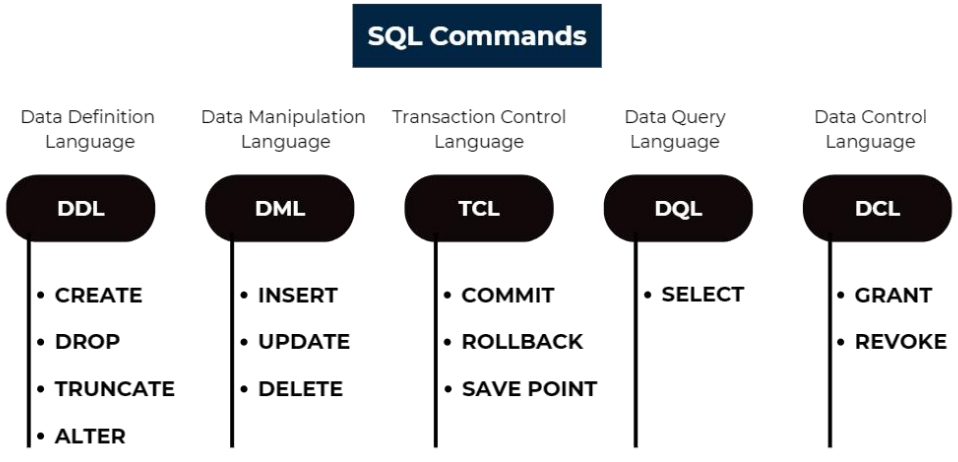
Foreign key* is also a column (or a set of columns) that is linked to the primary key in the parent table. (*Should only contain the values that are referenced in the primary key)

The relation between tables using primary key and foreign key is a parent-child relation.

6) What are different types of constraints in SQL ?

a) **UNIQUE**: Ensures that all the values in column are unique
b) **NOT NULL**: Ensures that the values in column should not be empty
c) **PRIMARY KEY**: Combination of UNIQUE and NOT NULL constraint
d) **FOREIGN KEY**: Ensures that the column should only contain the values that exists in the primary key
e) **CHECK**: Ensures that the values in a column satisfies a specific condition
f) **DEFAULT**: Sets a default value for a column when no value is specified
g) **CREATE INDEX**: Used to create the index and retrieve data from the database very quickly

7) What are different types of SQL Commands ? [Frequently asked]



8) What is the difference between DELETE, DROP and TRUNCATE command?

[Frequently asked]

DELETE/ TRUNCATE - Remove data from table
DROP - Remove the table itself

DELETE is used to remove specific rows based on conditions, and it's logged as individual row deletions, allowing for rollback within a transaction.

TRUNCATE is used to remove all rows from a table efficiently in a single operation, without logging individual row deletions, but it cannot be rolled back within a transaction.

DROP is used to remove entire database objects, including their structure and data, and it cannot be rolled back.

9) What is ALIAS and what is the keyword for aliasing in SQL?

In SQL, an alias is a temporary name assigned to a table or column in a query.

Aliases are used to make queries more readable, concise, and to simplify complex queries involving multiple tables or calculations.

Keyword used for aliasing - 'AS'

```
SELECT employee_id AS id, employee_name AS name
FROM employees;
```

10) What are different types of JOINs in SQL?

a) **INNER JOIN**: Returns only the rows that have matching values in both tables.
b) **LEFT JOIN**: Returns all rows from the left table (table1), and the matched rows from the right table (table2)
c) **RIGHT JOIN**: Returns all rows from the right table (table2), and the matched rows from the left table (table1).
d) **FULL OUTER JOIN**: Returns all rows when there's a match in either table
e) **CROSS JOIN**: Returns the Cartesian product of the two tables

11) What is Self-JOIN in SQL?

A self join is a type of join in SQL where a table is joined with itself

This is useful when you need to connect information from one row in a table with information from another row in the same table.

[Refer video for example-based explanation]

12) What is a sub-query in SQL?

A subquery, also known as a nested query or inner query, is a query nested within another SQL query.

```sql
SELECT student_id
FROM grades
WHERE score > (SELECT AVG(score) FROM grades)
```

13) Explain the difference between nested and correlated sub-query?

Nested subquery

- The inner query is nested within another query.
- The inner query references columns from the outer query.
- The result of the inner query is independent of the outer query

Correlated subquery

- The inner query is dependent on the values of the current row of the outer query
- The inner query is executed only once
- The inner query is executed repeatedly for each row processed by the outer query

[Refer video for example-based explanation]

14) What is pattern matching in SQL?

Pattern matching in SQL refers to the ability to search for specific patterns or substrings within textual data stored in a database.

Wildcard characters used for pattern matching -

- **Percentage (%)**: matches zero or more characters

```sql
-- Finding all emails ending with ".com"
SELECT * FROM users
WHERE email LIKE '%.com';
```

- **Underscore (_)**: matches single character

```sql
-- Finding all words with "a" as the second character
SELECT * FROM dictionary
WHERE word LIKE '_a%';
```

15) Explain ACID properties in SQL

ACID are essential properties that ensure the reliability and integrity of database transactions

The acronym stands for -

- **Atomicity** - The entire transaction takes place at once or does not happen at all
- **Consistency** - The database must be consistence before and after the transaction
- **Isolation** - Multiple transactions occur independently without interference
- **Durability** - The changes of the successful transaction occurs even if the system failure occurs

16) What is the difference between SQL and NoSQL databases?

They both are broad categories of database management systems

SQL databases

- They typically use a relational data model, where data is organized into tables with rows and columns.
- The structure of the data must be defined before storing it

NoSQL (not only SQL/ non SQL) databases

- They support various data models, including document-oriented, key-value, wide-column, and graph.
- The structure of the data is not defined and hence allow for more dynamic data storage

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