

Lecture 1: Question Bank

Topics: “Data, Database and Database Management System, Database-System Applications, View of Data: Data Abstraction, Instances and Schemas, Database Architecture, Data Models, SQL: Introduction.”

Q1	What is the primary difference between a relational and a hierarchical data model?
Q2	Explain the significance of ACID properties in the context of Oracle's database management system.
Q3	How does Oracle use views to implement data abstraction, and what advantages do views offer?
Q4	Differentiate between a database instance and a database schema in Oracle.
Q5	Provide an example of a real-world application where Oracle's partitioning feature significantly improved database performance.
Q6	How does Walmart utilize a distributed database architecture to handle its extensive transactional data?
Q7	In the context of Walmart's database systems, explain the importance of database schemas in organizing and managing data.
Q8	How might Walmart use a graph data model to optimize its supply chain management system?
Q9	Can you describe a database system implemented by TCS for a client, highlighting the challenges faced and the technologies employed?
Q10	How does TCS implement data abstraction through stored procedures, and what advantages does this approach offer?
Q11	What is SQL?
Q12	Differentiate between SQL vs MySQL?
Q13	What is a Query?
Q14	What are the different types of SQL commands?
Q15	What is DDL?
Q16	What is DML?
Q17	What is DCL?
Q18	What is TCL?
Q19	What is DQL?
Q20	What is the SELECT statement?
Q21	What are some common clauses used with SELECT query in SQL?
Q22	What is the difference between Drop, Delete and Truncate statements?

ANSWERS

Q1. What is the primary difference between a relational and a hierarchical data model?

Ans: In a **relational data model**, data is organized **into tables with rows and columns**, fostering flexibility. In a **hierarchical model**, data is structured in a **tree-like format, emphasizing parent-child relationships**.

Q2. Explain the significance of ACID properties in the context of Oracle's database management system.

Ans: **ACID (Atomicity, Consistency, Isolation, Durability)** properties ensure the reliability of database transactions in Oracle, maintaining data integrity and consistency.

Q3. How does Oracle use views to implement data abstraction, and what advantages do views offer?

Ans: Oracle uses views to provide a **virtual representation of data**, hiding the complexity of underlying tables. Views **enhance security, simplify query complexity, and allow for logical data organization**.

Q4. Differentiate between a database instance and a database schema in Oracle.

Ans: A database instance represents the **running environment of the Oracle database**, while a schema is **a logical container for database objects, such as tables and views, within a user account**.

Q5. Provide an example of a real-world application where Oracle's partitioning feature significantly improved database performance.

Ans: Partitioning in Oracle can greatly benefit applications dealing with large datasets, such as in e-commerce systems, by enhancing query performance and simplifying data management.

Q6. How does Walmart utilize a distributed database architecture to handle its extensive transactional data?

Ans: Walmart employs a distributed database architecture to ensure scalability and fault tolerance. Data is distributed across multiple servers, allowing for efficient data processing.

Q7. In the context of Walmart's database systems, explain the importance of database schemas in organizing and managing data.

Ans: Database schemas in Walmart's systems logically structure data, helping to categorize and manage information related to products, inventory, and transactions.

Q8. How might Walmart use a graph data model to optimize its supply chain management system?

Ans: A graph data model could represent relationships between suppliers, distribution centers, and stores, aiding Walmart in optimizing routes and ensuring efficient supply chain logistics.

Q9. Can you describe a database system implemented by TCS for a client, highlighting the challenges faced and the technologies employed?

Ans: TCS might discuss a project where they addressed a client's business needs by implementing a database system, showcasing their expertise in utilizing technologies like Oracle, SQL Server, or others.

Q10. How does TCS implement data abstraction through stored procedures, and what advantages does this approach offer?

Ans: TCS uses stored procedures to encapsulate complex database operations, providing a layer of abstraction that enhances security, promotes modularity, and simplifies database interactions.

Q11. What is SQL?

Ans: SQL, or Structured Query Language, is a versatile language used for managing relational databases.

Q12. Differentiate between SQL vs MySQL?

Ans:

SQL	MySQL
SQL is a query programming language that manages RDBMS.	MySQL is a relational database management system that uses SQL.
SQL is primarily used to query and operate database systems.	MySQL allows you to handle, store, modify and delete data and store data in an organized way.
SQL does not support any connector.	MySQL comes with an in-built tool known as MySQL Workbench that facilitates creating, designing, and building databases.
SQL follows a simple standard format without many or regular updates.	MySQL has numerous variants and gets frequent updates.
SQL supports only a single storage engine.	MySQL offers support for multiple storage engines along with plug-in storage, making it more flexible.
SQL does not allow other processors or even its own binaries to manipulate data during execution.	MySQL is less secure than SQL, as it allows third-party processors to manipulate data files during execution.

Q13. What is a Query?

Ans: A query is a request for data or information from a database table or combination of tables. A database query can be either a select query or an action query.

Example:

```
SELECT fname, lname    /* select query */
```

```
FROM students
WHERE student_id = 1;
```

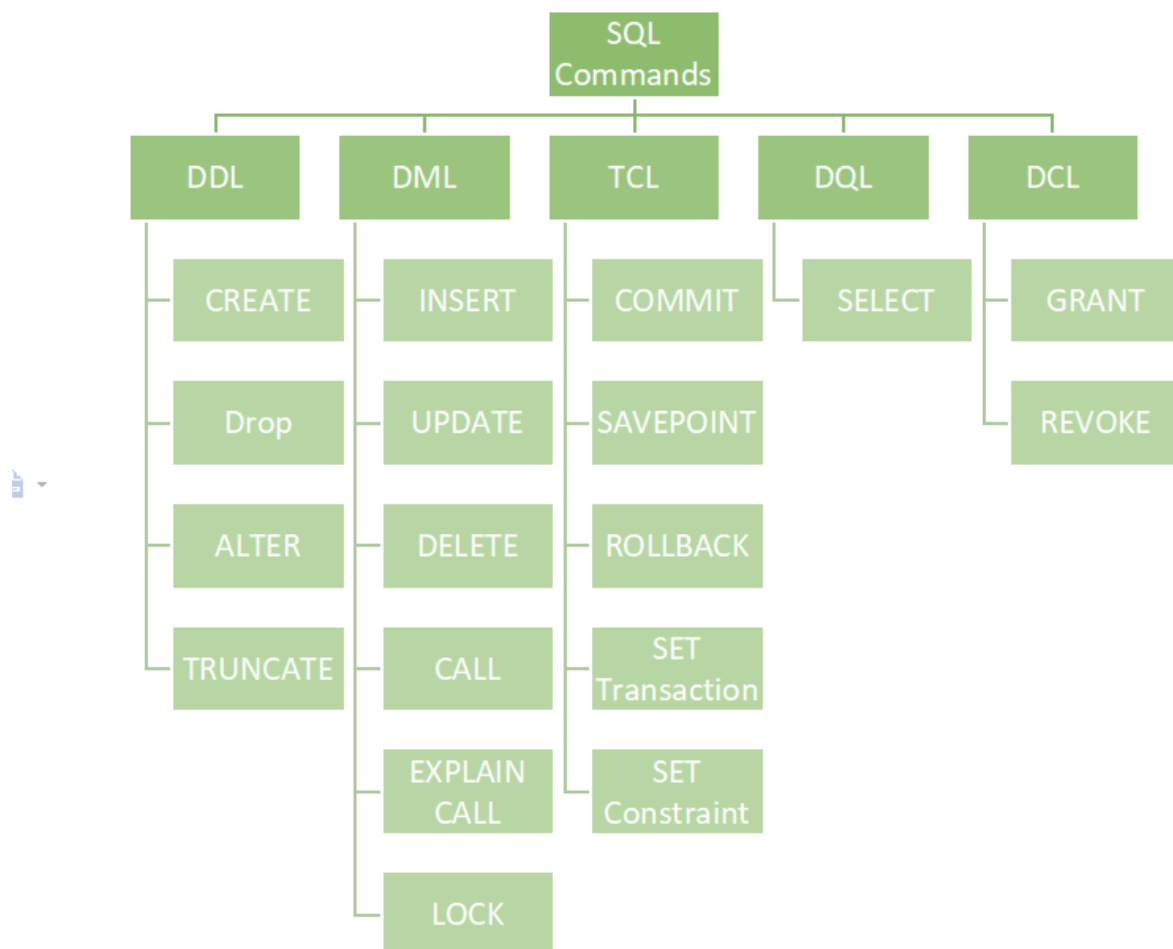
```
UPDATE students      /* action query */
SET fname = 'Captain', lname = 'America'
WHERE student_id = 1;
```

Q14: What are the different types of SQL commands?

Ans: SQL commands are like instructions to a table. It is used to interact with the database with some operations. It is also used to perform specific tasks, functions, and queries of data. SQL can perform various tasks like creating a table, adding data to tables, dropping the table, modifying the table, set permission for users.

These SQL commands are mainly categorized into five categories:

- DDL – Data Definition Language
- DQL – Data Query Language
- DML – Data Manipulation Language
- DCL – Data Control Language
- TCL – Transaction Control Language



Q15. What is DDL?

Ans: DDL, or Data Definition Language, is a subset of SQL used to define and manage the structure of database objects. DDL commands are typically executed once to set up the database schema. DDL Commands: CREATE TABLE, ALTER TABLE, DROP TABLE.

Q16. What is DML?

Ans: DML, or Data Manipulation Language, is a subset of SQL used to retrieve, insert, update, and delete data in a database. DML commands are fundamental for working with the data stored in tables. DML Commands: SELECT, INSERT, UPDATE, DELETE.

Q17. What is DCL?

Ans: DCL, or Data Control Language, is a subset of SQL used to manage database security and access control. DCL commands determine who can access the database and what actions they can perform. DCL Commands: GRANT, REVOKE.

Q18. What is TCL?

Ans: TCL, or Transaction Control Language, is a subset of SQL used to manage database transactions. TCL commands ensure data integrity by allowing you to control when changes to the database are saved permanently or rolled back. TCL Commands: COMMIT, ROLLBACK, SAVEPOINT.

Q19. What is DQL?

Ans: Data Query Language (DQL) is a critical subset of SQL (Structured Query Language) used primarily for querying and retrieving data from a database. DQL commands are focused exclusively on data retrieval. Data Query Language (DQL) forms the foundation of SQL and is indispensable for retrieving and analyzing data from relational databases. DQL Commands: SELECT.

Q20. What is the SELECT statement?

Ans: SELECT operator in SQL is used to select data from a database. The data returned is stored in a result table, called the result-set.

SELECT * FROM students;

Q21. What are some common clauses used with SELECT query in SQL?

Ans: Some common SQL clauses used in conjunction with a SELECT query are as follows:

- WHERE clause in SQL is used to filter records that are necessary, based on specific conditions.
- ORDER BY clause in SQL is used to sort the records based on some field(s) in ascending (ASC) or descending order (DESC).
- GROUP BY clause in SQL is used to group records with identical data and can be used in conjunction with some aggregation functions to produce summarized results from the database.

- HAVING clause in SQL is used to filter records in combination with the GROUP BY clause. It is different from WHERE, since the WHERE clause cannot filter aggregated records.

Q22. What is the difference between Drop, Delete and Truncate statements?

Ans:

- Delete is a logged operation, which means deleted rows are written to the transaction log. The DELETE command deletes only the rows from the table based on the condition given in the where clause or deletes all the rows from the table if no condition is specified. But it does not free the space containing the table.
- Truncate is not a logged operation, which means deleted rows are not written to the transaction log. Hence, truncate is a little faster than Delete. You can have a where clause in Delete statement whereas Truncate statement cannot have a where clause. Truncate will delete all the rows in a table and free the space containing the table, but the structure of the table remains. If a table is truncated, the table retains its original structure.
- Drop would delete all the rows including the structure of the Table. If a table is dropped, all things associated with the tables are dropped as well. This includes - the relationships defined on the table with other tables, the integrity checks and constraints, access privileges and other grants that the table has. To create and use the table again in its original form, all these relations, checks, constraints, privileges and relationships need to be redefined.