DATABASE MANAGEMENT SYSTEMS

UNIT 4

SQL

WHAT IS SQL?

❖ SQL is the standard language for database management.

❖ SQL is the database language which can be used to perform certain operations on the existing database and also we can use this language to create a database.

❖ SQL is a database language designed for the retrieval and management of data in a relational database.

❖ All the RDBMS systems like MySQL, MS Access, Oracle, Sybase, Postgres, and SQL Server use SQL as their standard database language.

❖ SQL programming language uses various commands for different operations.

❖ We will learn about the DCL, TCL, DQL, DDL and DML commands in SQL.

WHY USE SQL?

- ❖ It allows you to define the data in a database and manipulate that specific data.

- ❖ It helps users to access data in the RDBMS system.

- ❖ It helps you to describe the data.

- ❖ With the help of SQL commands in DBMS, you can create and drop databases and tables.

- ❖ SQL offers you to use the function in a database, create a view, and stored procedure.

- ❖ You can set permissions on tables, procedures, and views.

BRIEF HISTORY OF SQL

❖ Here, are important landmarks from the history of SQL:

❖ 1970 - Dr. Edgar F. "Ted" Codd described a relational model for databases.

❖ 1974 - Structured Query Language appeared.

❖ 1978 - IBM released a product called System/R.

❖ 1986 - IBM developed the prototype of a relational database, which is standardized by ANSI.

❖ 1989- First ever version launched of SQL

❖ 1999 - SQL 3 launched with features like triggers, object-orientation, etc.

❖ SQL2003- window functions, XML-related features, etc.

❖ SQL2006- Support for XML Query Language

❖ SQL2011-improved support for temporal databases

TYPES OF SQL COMMANDS

❖ **SQL commands are instructions.**

  ❖ Used to communicate with the database.

  ❖ Also used to perform specific tasks - like create a table, add data to tables, drop the table, modify the table, set permission for users etc. and querying of data.

❖ These SQL commands are mainly categorized into five categories as:

  ❖ **Data Definition Language (DDL)**

  ❖ **Data Manipulation Language (DML)**

  ❖ **Data Control Language(DCL)**

  ❖ **Transaction Control Language(TCL)**

  ❖ **Data Query Language (DQL)**

TYPES OF SQL COMMANDS
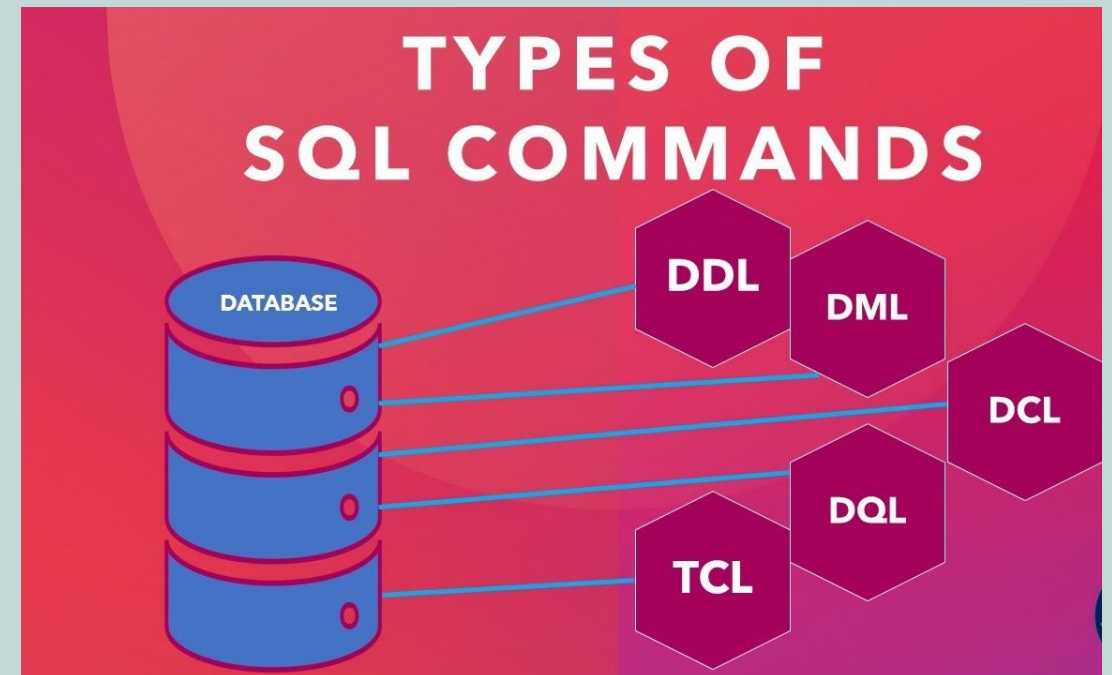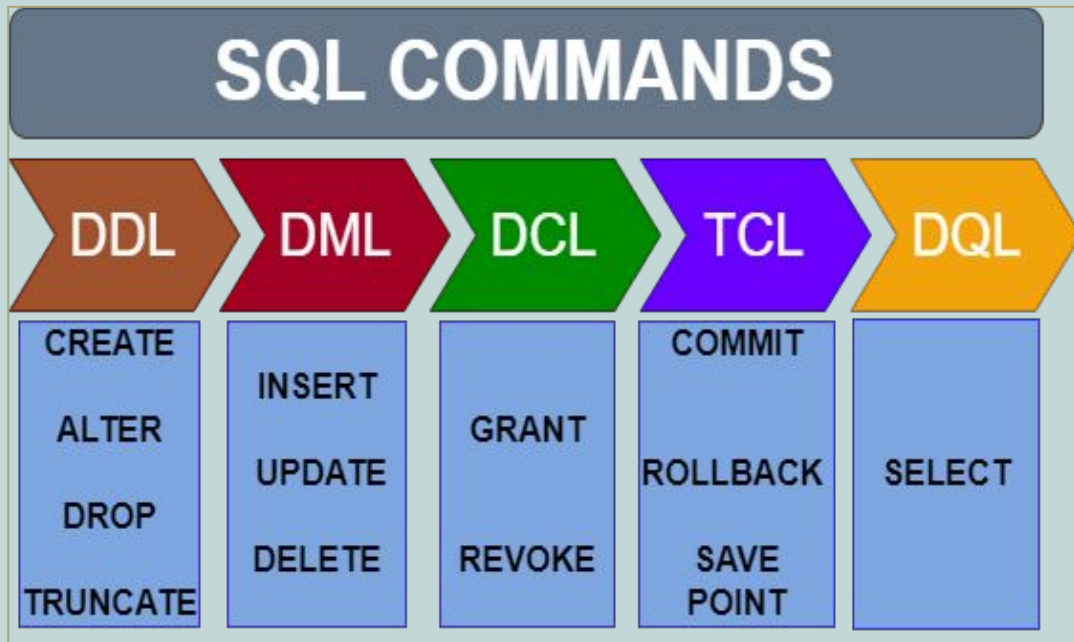
DDL COMMANDS

❖ Data Definition Language helps you to define/change the database structure or schema/table.

❖ **All the command of DDL are auto-committed** that means it permanently save all the changes in the database.

❖ FOUR types of DDL commands in SQL are:

  ❖ **CREATE** - CREATE statements is used to define the database structure schema

  ❖ **DROP** - Drops commands remove tables and databases from RDBMS.

  ❖ **ALTER** - Alters command allows you to alter the structure of the database.

  ❖ **TRUNCATE** - This command used to delete all the rows from the table and free the space containing the table.

DML COMMANDS

❖ DML commands are used to modify the database - are responsible for all form of data modification in a database.

❖ DML allows you to modify the database instance by inserting, modifying, and deleting its data.

❖ DML command are not auto-committed - these statements do not implicitly commit the current transaction.

❖ **Important DDL commands in SQL are:**

  ❖ **INSERT** - This is a statement is a SQL query. This command is used to insert data into the row of a table.

  ❖ **UPDATE** - This command is used to update or modify the value of a column in the table.

  ❖ **DELETE** - This command is used to remove one or more rows from a table.

DCL COMMANDS

❖ DCL commands mainly deal with the rights, permissions and other controls of the database system.

❖ DCL commands are used to grant and take back authority from any database user.

❖ DCL (Data Control Language) includes commands like GRANT and REVOKE, which are useful to give "rights & permissions" of the database system.

❖ Commands that come under DCL:

  ❖ **Grant -** This command is use to give user access privileges to a database.

  ❖ **Revoke** - It is useful to take back permissions from the user.

TCL COMMANDS

❖ Transaction control language or TCL commands deal with the transaction within the database.

❖ TCL commands manage changes made by DML statements - can only be used with DML commands like INSERT, DELETE and UPDATE only.

❖ These operations are automatically committed in the database.

❖ Here are some commands that come under TCL:

  ❖ **COMMIT** - Used to save all the transactions to the database.

  ❖ **ROLLBACK** - Used to undo transactions that have not already been saved to the database.

  ❖ **SAVEPOINT** - Helps you to sets a savepoint within a transaction.

DQL COMMANDS

❖ Data Query Language (DQL) is used to fetch the data from the database. It uses only one command:

❖ SELECT:

  ❖ This command helps you to select the attribute based on the condition described by the WHERE clause.

SUMMARY

❖ SQL is a database language designed for the retrieval and management of data in a relational database.

❖ It helps users to access data in the RDBMS system.

❖ In the year 1974, the term Structured Query Language appeared.

❖ Five types of SQL queries are:

  ❖ **Data Definition Language(DDL)** helps you to define the database structure or schema.

  ❖ **Data Manipulation Language (DML**) allows you to modify the database instance by inserting, modifying, and deleting its data.

  ❖ **DCL (Data Control Language**) includes commands like GRANT and REVOKE, which are useful to give "rights & permissions."

  ❖ **Transaction control language (TCL)** commands deal with the transaction within the database.

  ❖ **Data Query Language (DQL)** is used to fetch the data from the database.

DATA TYPES IN SQL

SQL General Data Types

Data type	Description
CHARACTER(n)	Character string. Fixed-length n
VARCHAR(n) or CHARACTER VARYING(n)	Character string. Variable length. Maximum length n
BINARY(n)	Binary string. Fixed-length n
BOOLEAN	Stores TRUE or FALSE values
VARBINARY(n) or BINARY VARYING(n)	Binary string. Variable length. Maximum length n
INTEGER(p)	Integer numerical (no decimal). Precision p
SMALLINT	Integer numerical (no decimal). Precision 5
INTEGER	Integer numerical (no decimal). Precision 10
BIGINT	Integer numerical (no decimal). Precision 19

Data type	Description
DECIMAL(p,s)	Exact numerical, precision p, scale s. Example: decimal(5,2) is a number that has 3 digits before the decimal and 2 digits after the decimal
NUMERIC(p,s)	Exact numerical, precision p, scale s. (Same as DECIMAL)
FLOAT(p)	Approximate numerical, mantissa precision p. A floating number in base 10 exponential notation. The size argument for this type consists of a single number specifying the minimum precision
REAL	Approximate numerical, mantissa precision 7
FLOAT	Approximate numerical, mantissa precision 16
DOUBLE PRECISION	Approximate numerical, mantissa precision 16
DATE	Stores year, month, and day values
TIME	Stores hour, minute, and second values
TIMESTAMP	Stores year, month, day, hour, minute, and second values
INTERVAL	Composed of a number of integer fields, representing a period of time, depending on the type of interval
ARRAY	A set-length and ordered collection of elements
MULTISET	A variable-length and unordered collection of elements
XML	Stores XML data