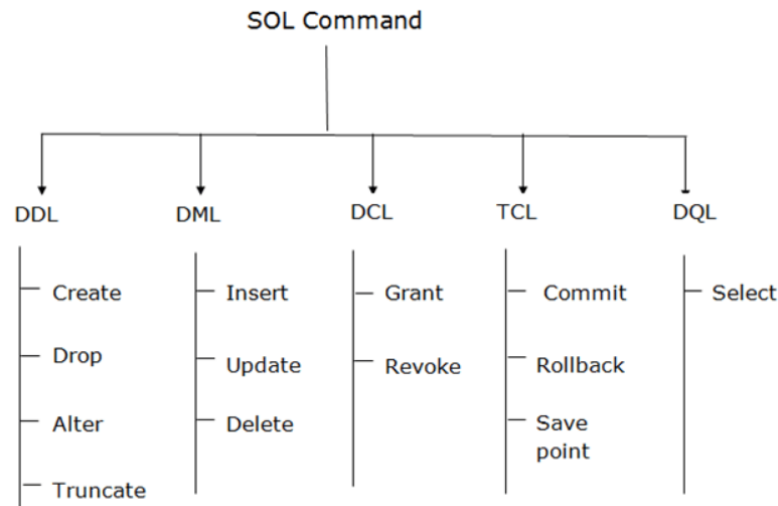


SQL Commands

SQL commands are instructions. It is used to communicate with the database. It is also used to perform specific tasks, functions, and queries of data.

Types of SQL Commands:-

There are five types of SQL commands: DDL, DML, DCL, TCL, and DQL.



Data Definition Language (DDL)

- DDL changes the structure of the table like creating a table, deleting a table, altering a table, etc.
- All the command of DDL are auto-committed that means it permanently save all the changes in the database.

Here are some commands that come under DDL:

- CREATE
- ALTER
- DROP
- TRUNCATE

a. CREATE It is used to create a new table in the database.

b. DROP: It is used to delete both the structure and record stored in the table. **c. ALTER:** It is used to alter the structure of the database. This change could be either to modify the characteristics of an existing attribute or probably to add a new attribute.

d. TRUNCATE: It is used to delete all the rows from the table and free the space containing the table.

2. Data Manipulation Language

- DML commands are used to modify the database. It is responsible for all form of changes in the database.

- The command of DML is not auto-committed that means it can't permanently save all the changes in the database. They can be rollback.

Here are some commands that come under DML:

- INSERT
- UPDATE
- DELETE

a. INSERT: The INSERT statement is a SQL query. It is used to insert data into the row of a table.

b. UPDATE: This command is used to update or modify the value of a column in the table.

c. DELETE: It is used to remove one or more row from a table.

3. Data Control Language

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

Here are some commands that come under DCL:

- Grant
- Revoke

a. Grant: It is used to give user access privileges to a database.

b. Revoke: It is used to take back permissions from the user.

4. Transaction Control Language

TCL commands can only use with DML commands like INSERT, DELETE and UPDATE only.

These operations are automatically committed in the database that's why they cannot be used while creating tables or dropping them.

Here are some commands that come under TCL:

- COMMIT
- ROLLBACK
- SAVEPOINT

a. Commit: Commit command is used to save all the transactions to the database.

b. Rollback: Rollback command is used to undo transactions that have not already been saved to the database.

c. SAVEPOINT: It is used to roll the transaction back to a certain point without rolling back the entire transaction.

5. Data Query Language

DQL is used to fetch the data from the database.

It uses only one command:

- **SELECT**

a. SELECT: This is the same as the projection operation of relational algebra. It is used to select the attribute based on the condition described by WHERE clause.

SQL - Expressions

An expression is a combination of one or more values, operators and SQL functions that evaluate to a value. These SQL EXPRESSIONs are like formulae and they are written in query language. You can also use them to query the database for a specific set of data.

Syntax

Consider the basic syntax of the SELECT statement as follows –

**SELECT column1, column2, columnN FROM table_name WHERE [CONDITION
[EXPRESSION];**

There are different types of SQL expressions, which are mentioned below –

- Boolean
- Numeric
- Date

DBMS Functions

There are several functions that a DBMS performs to ensure data integrity and consistency of data in the database. The ten functions in the DBMS are: data dictionary management, data storage management, data transformation and presentation, security management, multiuser access control, backup and recovery management, data integrity management, database access languages and application programming interfaces, database communication interfaces, and transaction management.

1. Data Dictionary Management

Data Dictionary is where the DBMS stores definitions of the data elements and their relationships (metadata). The DBMS uses this function to look up the required data component structures and relationships. When programs access data in a database they are basically going through the DBMS. This function removes structural and data dependency and provides the user with data abstraction. In turn, this makes things a lot easier on the end user. The Data Dictionary is often hidden from the user and is used by Database Administrators and Programmers.

2. Data Storage Management

This particular function is used for the storage of data and any related data entry forms or screen definitions, report definitions, data validation rules, procedural code, and structures that can handle video and picture formats. Users do not need to know how data is stored or manipulated. Also involved with this structure is a term called performance tuning that relates to a database's efficiency in relation to storage and access speed.

3. Security Management

This is one of the most important functions in the DBMS. Security management sets rules that determine specific users that are allowed to access the database. Users are given a username and password or sometimes through biometric authentication (such as a fingerprint or retina scan) but these types of authentication tend to be more costly. This function also sets restraints on what specific data any user can see or manage.

4. Backup and Recovery Management

Backup and recovery is brought to mind whenever there is potential outside threats to a database. For example if there is a power outage, recovery management is how long it takes to recover the database after the outage. Backup management refers to the data safety and integrity; for example backing up all your mp3 files on a disk.

7. Data Integrity Management

The DBMS enforces these rules to reduce things such as data redundancy, which is when data is stored in more than one place unnecessarily, and maximizing data consistency, making sure database is returning correct/same answer each time for same question asked.

SORTING AND INDEXING OF DATABASE FILES:-

Indexing is a method that is used to improve the data retrieval speed in a table of a database. An index could be created using a single or more columns in a table and the index is stored in a separate file. Indices can be created as unique indices or non-unique indices. Sorting is the process of arranging items in a set in a specific order. Sorting a table would create a copy of the table in which the rows may have a different order than the original.

What is Indexing?

Indexing is a method that is used to improve the data retrieval speed in a table of a database. An index could be created using a single or more columns in a table and the index is stored in a separate file. This file contains the logical order of rows along with their physical position in the table. The space required by an index file is typically less than the space required to store the table. Unique indices will prevent the table from containing duplicate values of the index. Indexing would make the data retrieval more efficient. Consider the following SQL statement.

SELECT first_name, last_name FROM people WHERE city = 'New York'

If the above query was executed in a table that does not have an index created using the *city* column, it has to scan the whole table and look at the *city* column of each row to find all the entries with *city* = "New York". But if the table had an index, it will simply follow using a B-tree data structure until the entries with the "New York" is found. This would make the search more efficient.

What is Sorting?

Sorting is the process of arranging items in a set in a specific order. Sorting a table would create a copy of the table in which the rows may have a different order than the original. Storing the new table would require an amount of space similar to that of the original table. Due to this reason sorting is used less frequently; only used when a new copy of the sorted table is required. Sorting is allowed using multiple fields, such as sorting addresses using the states and then sort using the cities inside the states.

What is the difference between Indexing and Sorting?

Indexing and sorting are two methods that can be used to create an order in a data table. Indexing would create an index file that contains only the logical order of rows along with their physical position in the table whereas with sorting, a copy of the sorted table has to be stored. Usually, the index file requires lesser space than storing a sorted table. Furthermore, some operations like running queries and searching would be faster with a table with indexes. In addition, indexing would not change the original order in the table, while sorting would change the order of rows. Also, operation such as linking tables would require having an index.