DCl & TCl Commands (Authorization in SQl)

SQL language is divided into four types of primary language statements: DML, DDL, DCL and TCL. Using these statements, we can define the structure of a database by creating and altering database objects, and we can manipulate data in a table through updates or deletions. We also can control which user can read/write data or manage transactions to create a single unit of work.

DML (Data Manipulation Language)

- DML statements affect records in a table. These are basic operations we perform on data such as selecting a few records from a table, inserting new records, deleting unnecessary records, and updating/modifying existing records.
- DML statements include the following:
- **SELECT** – select records from a table
  INSERT – insert new records
  UPDATE – update/Modify existing records
  DELETE – delete existing records

- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain
- MERGE - UPSERT operation (insert or update)
- CALL - call a PL/SQL or Java subprogram
- EXPLAIN PLAN - explain access path to data
- LOCK TABLE - control concurrency

DDL (Data Definition Language)

- DDL statements are used to alter/modify a database or table structure and schema. These statements handle the design and storage of database objects.
- **CREATE** – create a new Table, database, schema
  ALTER – alter existing table, column description
  DROP – delete existing objects from database

- CREATE - to create objects in the database
- ALTER - alters the structure of the database
- DROP - delete objects from the database
- TRUNCATE - remove all records from a table, including all spaces allocated for the records are removed
- COMMENT - add comments to the data dictionary
- RENAME - rename an object

DCL (Data Control Language)

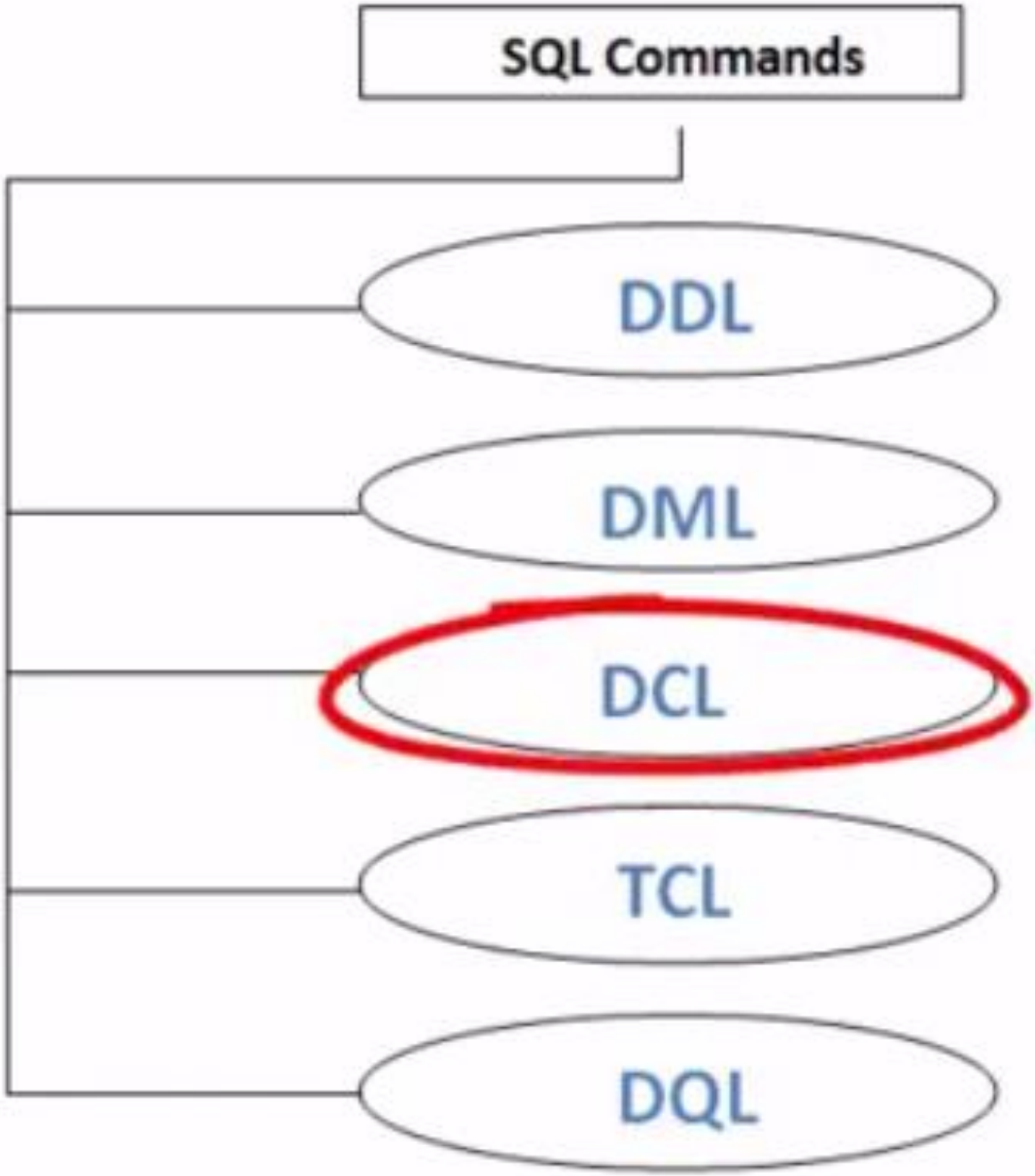
- DCL statements control the level of access that users have on database objects.

GRANT - gives user's access privileges to database

GRANT – allows users to read/write on certain database objects

REVOKE - withdraw access privileges given with the GRANT command

REVOKE – keeps users from read/write permission on database objects


SQL Commands
DDL
DML
DCL
TCL
DQL

DCL (DATA CONTROL LANGUAGE):-

DCL stands for Data Control Language

With the help of DCL Command we can provide the Access of database to User and we can also take back the provided Access from User

- **GRANT**
- **REVOKE**

GRANT: - Gives user access privileges to database

REVOKE: - Take back permissions from user

Types of Privileges:-

1. **SYSTEM :-** Creating SESSION,TABLE,VIEW etc. are all types of system privilege

2. **OBJECT :-** SELECT , UPDATE , INSERT , DELETE , INDEX , REFERENCES

- ***Privilege_name*** is the level of access given to the users. Some of the access rights are ALL, DELETE, UPDATE, INSERT, EXECUTE and SELECT.
- ***Object_name*** is the name of a database object like TABLE, VIEW, PROCEDURE, FUNCTION, PACKAGE and SEQUENCE.
- ***User_name*** is the name of the user to whom an access is being granted.
- ***WITH GRANT OPTION*** - allows a user to grant access rights to other users. i.e.; usually grants are given by the user who has created the database objects. But with this option, the users who have got the access rights can also provide the grants and access other tables/views.

```
GRANT privilege_name ON object_name TO user_name
WITH GRANT OPTION];
```

```
GRANT SELECT, INSERT ON STUDENT TO Amrita;
```

GRANT Syntax:-

```
GRANT <privilege list>
ON <relation name/view name>
TO <User/role list>
```

Example: - Grant the 'select' privelage to user U1,U2,U3 on Employee relation

```
GRANT Select
ON Employee
TO U1,U2,U3
```

REVOKE Syntax:-

REVOKE <privilege list>

ON <relation name >

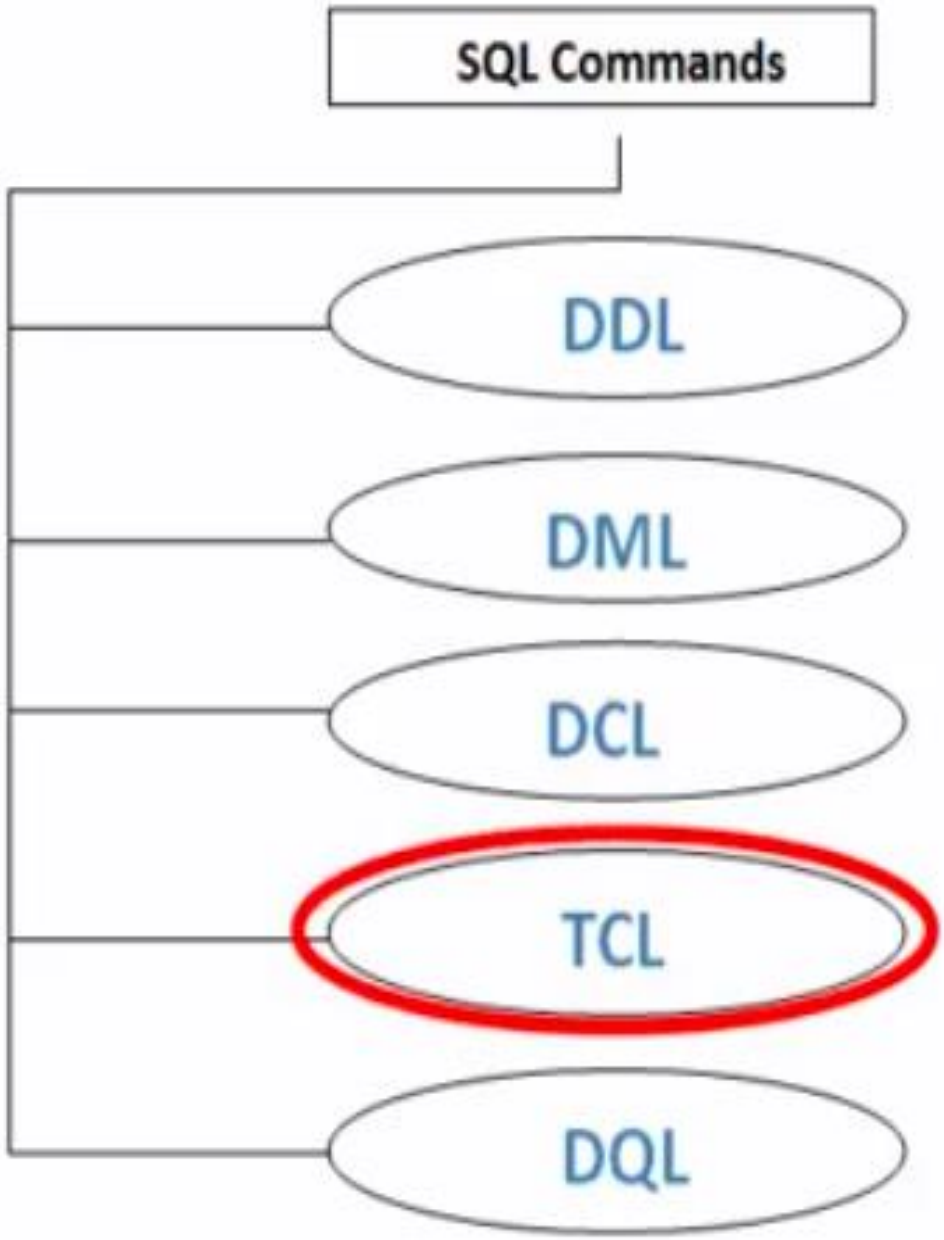
FROM <User > [restrict/cascade]

REVOKE Syntax:-

```
REVOKE <privilege list>
ON <relation name >
FROM <User > [restrict/cascade]
```

Example:-

```
REVOKE Select
ON Employee
FROM User1 restrict
```


SQL Commands
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TCL (Transaction Control Language)

- TCL statements allow you to control and manage transactions to maintain the integrity of data within SQL statements.
- **BEGIN Transaction** – opens a transaction
  COMMIT Transaction – commits a transaction
  ROLLBACK Transaction – ROLLBACK a transaction in case of any error

- COMMIT - save work done
- SAVEPOINT - identify a point in a transaction to which you can later roll back
- ROLLBACK - restore database to original since the last COMMIT
- SET TRANSACTION - Change transaction options like isolation level and what rollback segment to use

TCL command

- Transaction Control Language(TCL) commands are used to manage transactions in database.These are used to manage the changes made by DML statements. It also allows statements to be grouped together into logical transactions.

TCL (Transaction Control Language):-

Transaction Control Language(TCL) commands are used to manage transactions in the **database.**

- Commit
- Rollback
- Savepoint

COMMIT Command:-

COMMIT command is used to permanently save any transaction into the database.

Syntax:-

```
COMMIT;
```

- **Rollback command**
- This command restores the database to last commited state. It is also use with savepoint command to jump to a savepoint in a transaction.

ROLLBACK Command:-

The ROLLBACK command is the transactional command used to undo transactions that have not already been saved to the database. This command can only be used to undo transactions since the last COMMIT or ROLLBACK command was issued

Syntax:-

```
ROLLBACK;
```

```
INSERT INTO Student (Name, Class)
VALUES (Ravi, 8th);


Rollback;
```

Select * from Student;

NAME	CLASS
Ravi	8th

SAVEPOINT Command:-

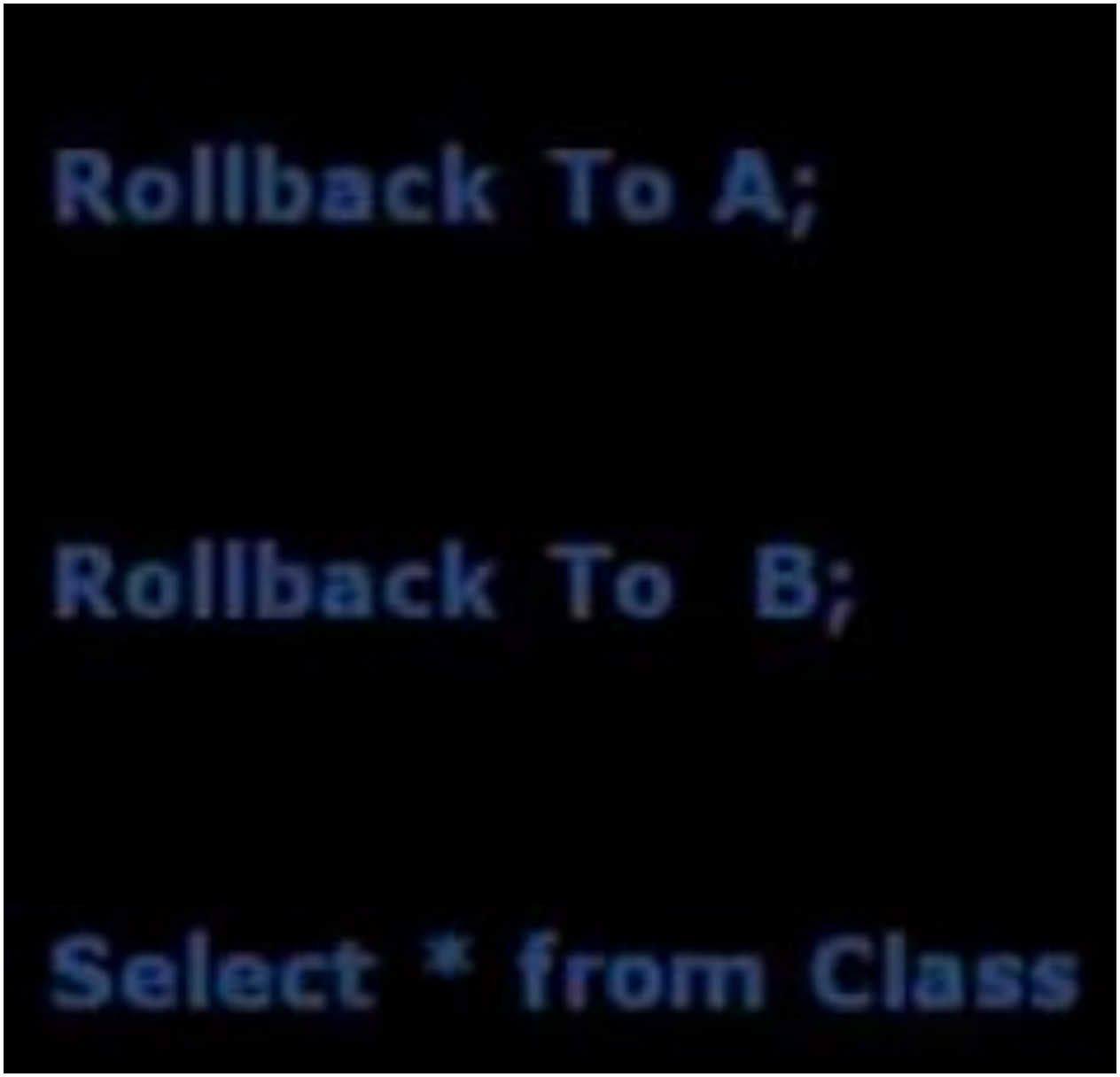
SAVEPOINT command is used to temporarily save a transaction so that you can rollback to that point whenever required.

Syntax:-

```
SAVEPOINT savepoint_name;
```

```
INSERT INTO class VALUES(2, 'Rahul');

COMMIT;

UPDATE class SET name = 'Abhijit' WHERE id = '2';

SAVEPOINT A;

INSERT INTO class VALUES(3, 'Rahul');

SAVEPOINT B;

INSERT INTO class VALUES(4, 'Mohan');

SAVEPOINT C;

SELECT * FROM class;
```

ID	NAME
1	Rakesh
2	Abhijit
3	Rahul
4	Mohan


Rollback To A;
Rollback To B;
Select * from Class

ID	NAME
1	Rakesh
2	Rahul
4	Mohan

DRL/DQL

- DQL: Data Query Language OR
  DRL: Data Retrieval Language
- DRL means Data Retrieval Language. This will be used for the retrieval of the data from the database.
  In order to see the data present in the database, we will use DRL statement. We have only one DRL statement.
- SELECT is the only DRL statement in SQL
- Select is DRL/DQL i.e. data retrieval Language