SQL

I. SQL Overview.

→ What is SQL?

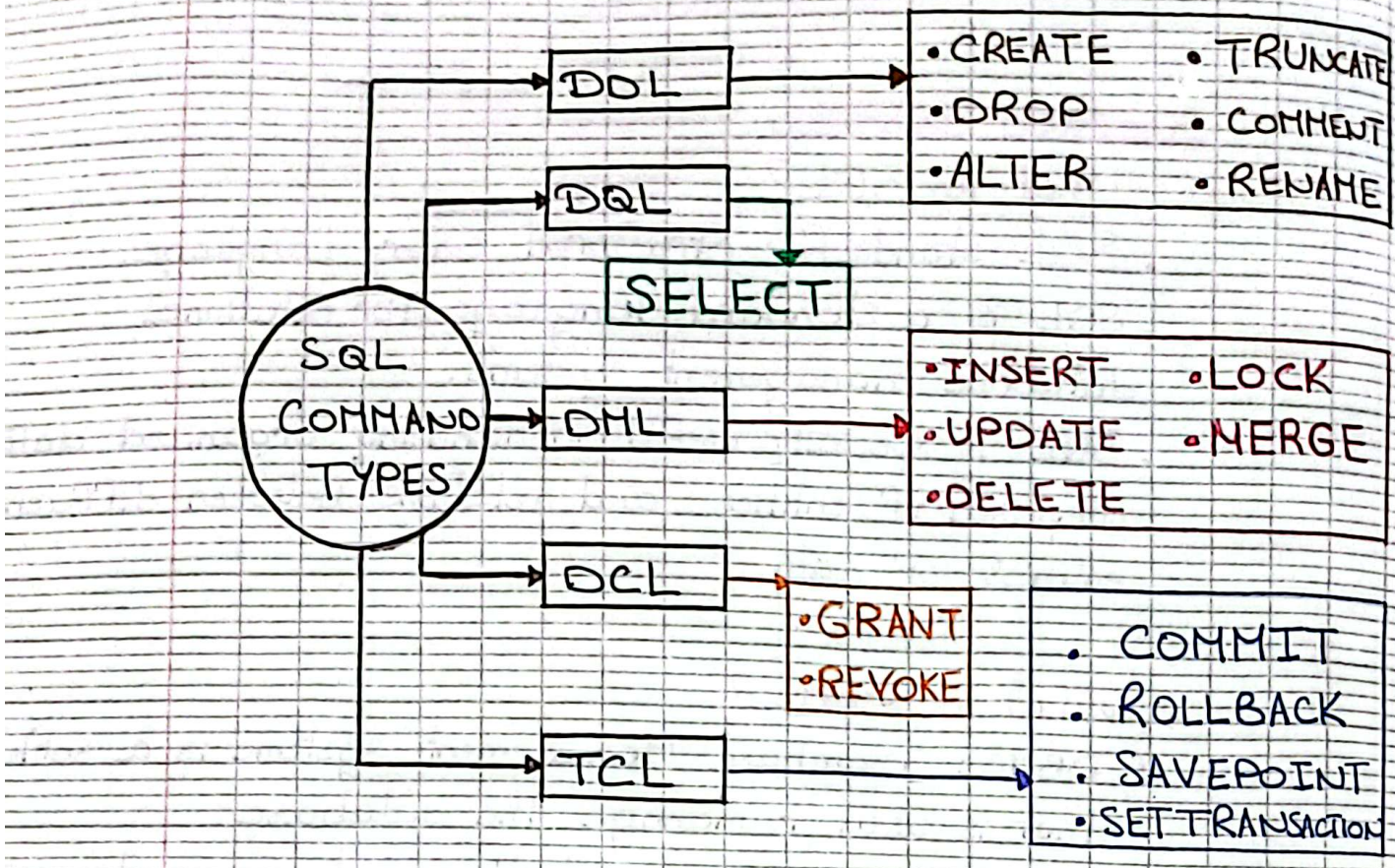
- SQL stands for Structured Query Language.
- SQL is a standard language for relational database management systems.
- SQL is specially useful in handling organized data comprised of entities and relations between different entities of data.

→ What is DBMS?

- DBMS: Database Management systeme is a software that is used to manage the database.
- A DBMS serves as an interface between end-user and database, allowing users to create, read, and delete data in the database.
- Most widely used types of DBMS software are relationnal, distributed, hierarchical, object-oriented, and network.

→ What is RDBMS?

- RDBMS stands for Relational Database Management systeme.
- RDBMS store data in the form of tables with relations between these tables
- RDBMS provides a dependable methode of storing and retrieving large amount of data.
- RDBMS uses SQL queries to access the data in database.



II - SQL Data Types

→ String Types :

- Char( ) : Storing fixed_length string
- Varchar( ) : Storing variable_length string
  (~ 64 KB)
- MediumText (16 MB)
- LongText (4 GB)
- TinyText (255 B)

→ Varchar (50) : short string (username, password)

→ Varchar (255) : medium_lenght string (address)

We can also use String Type to store numeric values like zip code and phone numbers because we don't use these value in mathematical operations.

→ Integer Types

- Store exact numbers with a predefined precision and scale of zero (don't have a decimal point.)

. Tinyint	1 b	[-128 , 127]
. UNSIGNED Tinyint	1 b	[0 , 255]
. Smallint	2 b	[-32K , 32K]
. Meditumint	3 b	[-8M , 8M]
. Int	4 b	[-2B , 2B]
. Bigint	8 b	[-9z , 9z]

useful for age →

- When defining a new numeric column we can specify the display size:

  int (4) : Always have 4 digits
  (This only affect how my Sql displays these values not how it stores them)

- For the best performance, its better to use the smallest data type thats suits our needs.

→ Rationals Types

Store exact numbers with a defined precision and scale.

. Decimal (p, s) : For storing fixed-point numbers
- p: max nb of digit before the decimal point (1 – 65)
- s: nb of digits after the decimal point

. Float / Double : Used in scientific calculation (don't have exact values)

→ Boolean Types

Boolean : Stores truth value: TRUE, FALSE, or UNKNOWN

→ Date and Time Types

. Date : store date without time

. Time : store time without date

. DateTime / TimeStamp: store date/hour data type
- DateTime: 8b
- TimeStamp: 4b (up to 2038)

→ Blob Type

To store large amount of binary data (images, videos, PDF ...)

. TinyBlob (255 b)

. Blob (65 KB)

. MediumBlob (16 MB)

. LongBlob (4 GB)

III- SQL Constraints

→ Not Null

- prohibits a database value from being null.
- Is defined at the columns-constraint level

ex: Emp_Name Varchar(25) NOT NULL

→ Unique

- prohibits multiple rows from having the same value in the same column or combination of columns but allows some values to be null
- Is defined at either the table or column constraint level.

→ Check

- Requires a value in the database to comply with a specified condition.
- Is defined at either the table or column-constraint level

syntax:

column level: Attribute_Name Datatype CONSTRAINT constraint_name check (condition)

table level: ...,
CONSTRAINT constraint_name check (condition)

→ Primary Key

- A primary Key constraint combine NOT NULL constraint and a UNIQUE constraint in a single declaration.
- It prohibits multiple rows from having the same value in the same column and prohibits values from being null.
- Is defined at either the table or column constraint level.

→ Foreign Key

- A foreign Key is a way to enforce referential integrity within your database.
- A foreign Key constraint requires values in one table to match values in another table.
- Is defined at either the table or column constraint level.

Syntaxe:

```
Attribute_Name Datatype [CONSTRAINT constraint_name]
foreign Key REFERENCES table_Name
(refattribute_Name)
[ON DELETE CASCADE |ON DELET SET NULL|
 SET DEFAULT
 ON UPDATE CASCADE]
```