DBMS BASICS

SUPRAJA ARTHI S
BE (CSE)

Your Account

Account
Orders
Recommendations
Browsing History
Watchlist
Video Purchases & Rentals
Kindle Unlimited
Content & Devices
Subscribe & Save Items
Memberships & Subscriptions
Music Library
Switch Accounts
Sign Out

Database

- A **database** is a collection of information that is organized so that it can be easily accessed, managed and updated.
- Computer **databases** typically contain aggregations of data records or files, containing information about sales transactions or interactions with specific customers.

SQL

- SQL - Structured Query Language
- SQL can create, delete, update records from the DB
- SQL can create new tables, storage procedures & views

Definition

DBMS :

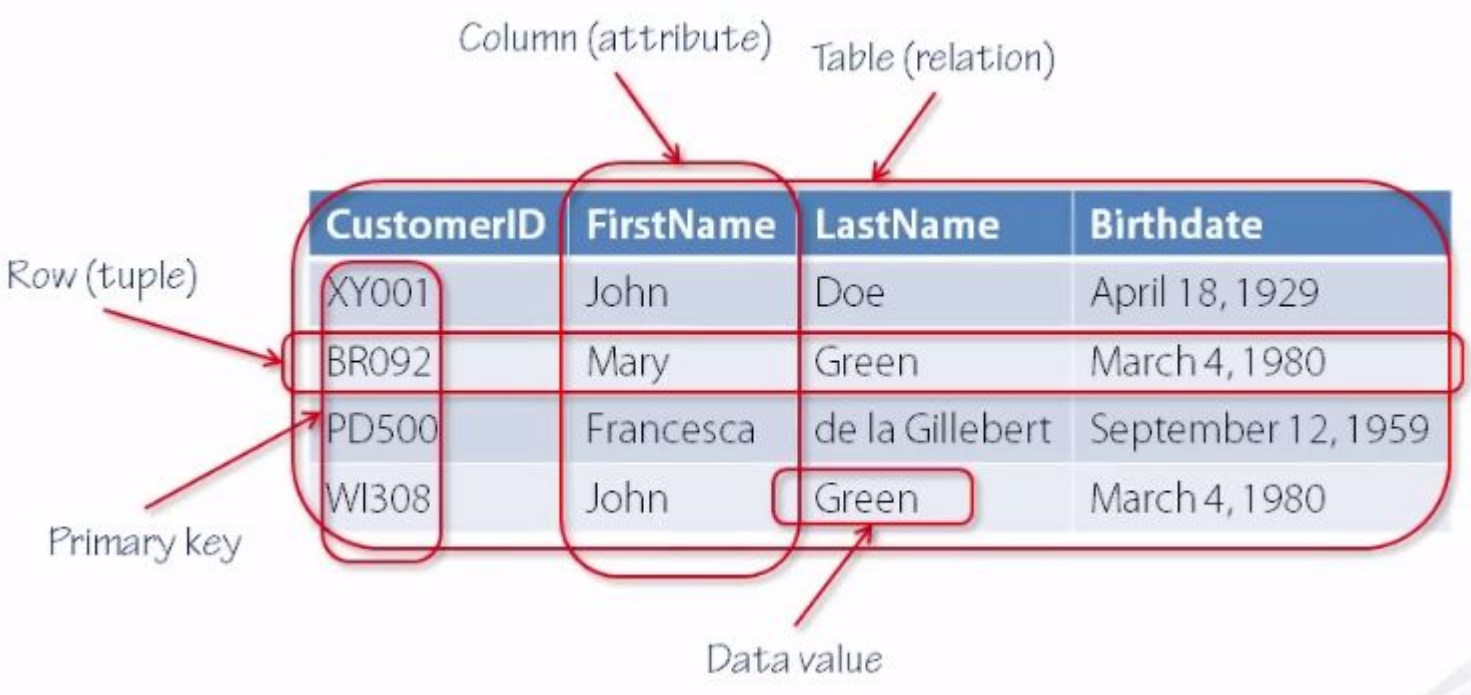
- It controls creation and maintenance of DB
- Saves DB in file systems
- Eg : MongoDB

RDBMS

- Relational Database Management System
- Stores data in tables
- Eg : SQL

DBMS VISUALISATION

RDBMS VISUALISATION



CustomerID	FirstName	LastName	Birthdate
XY001	John	Doe	April 18, 1929
BR092	Mary	Green	March 4, 1980
PD500	Francesca	de la Gillebert	September 12, 1959
WI308	John	Green	March 4, 1980

Difference b/w DBMS and RDBMS

DBMS	RDBMS
DBMS applications store **data as file**.	RDBMS applications store **data as table**
Normalization is not present in DBMS.	**Normalization is** present in RDBMS.
Handles **small amount of data**(Single user)	Handles large **amount of data**(Multiple users)
Does not support distributed database	**Supports** distributed database
Example : XML	Example : Oracle, Sql

TABLES

- A table is a set of data that are organized in a model with Columns and Rows
- Columns => Fields
- Rows => Records

Example

Table: Student

Field: Stu ID, StuName, Date of Birth,Salutation

Data: 100,Nancy,12/03/1993,Ms.

NORMALISATION

The process of organizing data to avoid any duplication of data and redundancy is known as Normalization

- **First Normal Form (1NF)** – No repeating groups within rows
- **Second Normal Form (2NF)** – Every non-key (supporting) column value is dependent on the whole primary key.
- **Third Normal Form (3NF)** – Dependent solely on the primary key and no other non-key (supporting) column value.

Students Table

Student	Address	Books Issued	Salutation
Sara	Amanora Park Town 94	Until the Day I Die (Emily Carpenter), Inception (Christopher Nolan)	Ms.
Ansh	62nd Sector A-10	The Alchemist (Paulo Coelho), Inferno (Dan Brown)	Mr.
Sara	24th Street Park Avenue	Beautiful Bad (Annie Ward), Woman 99 (Greer Macallister)	Mrs.
Ansh	Windsor Street 777	Dracula (Bram Stoker)	Mr.

Students Table (1st Normal Form)

Student	Address	Books Issued	Salutation
Sara	Amanora Park Town 94	Until the Day I Die (Emily Carpenter)	Ms.
Sara	Amanora Park Town 94	Inception (Christopher Nolan)	Ms.
Ansh	62nd Sector A-10	The Alchemist (Paulo Coelho)	Mr.
Ansh	62nd Sector A-10	Inferno (Dan Brown)	Mr.
Sara	24th Street Park Avenue	Beautiful Bad (Annie Ward)	Mrs.
Sara	24th Street Park Avenue	Woman 99 (Greer Macallister)	Mrs.
Ansh	Windsor Street 777	Dracula (Bram Stoker)	Mr.

Students Table (2nd Normal Form)

Student_ID	Student	Address	Salutation
1	Sara	Amanora Park Town 94	Ms.
2	Ansh	62nd Sector A-10	Mr.
3	Sara	24th Street Park Avenue	Mrs.
4	Ansh	Windsor Street 777	Mr.

Books Table (2nd Normal Form)

Student_ID	Book Issued
1	Until the Day I Die (Emily Carpenter)
1	Inception (Christopher Nolan)
2	The Alchemist (Paulo Coelho)
2	Inferno (Dan Brown)
3	Beautiful Bad (Annie Ward)
3	Woman 99 (Greer Macallister)
4	Dracula (Bram Stoker)

Students Table (3rd Normal Form)

Student_ID	Student	Address	Salutation_ID
1	Sara	Amanora Park Town 94	1
2	Ansh	62nd Sector A-10	2
3	Sara	24th Street Park Avenue	3
4	Ansh	Windsor Street 777	1

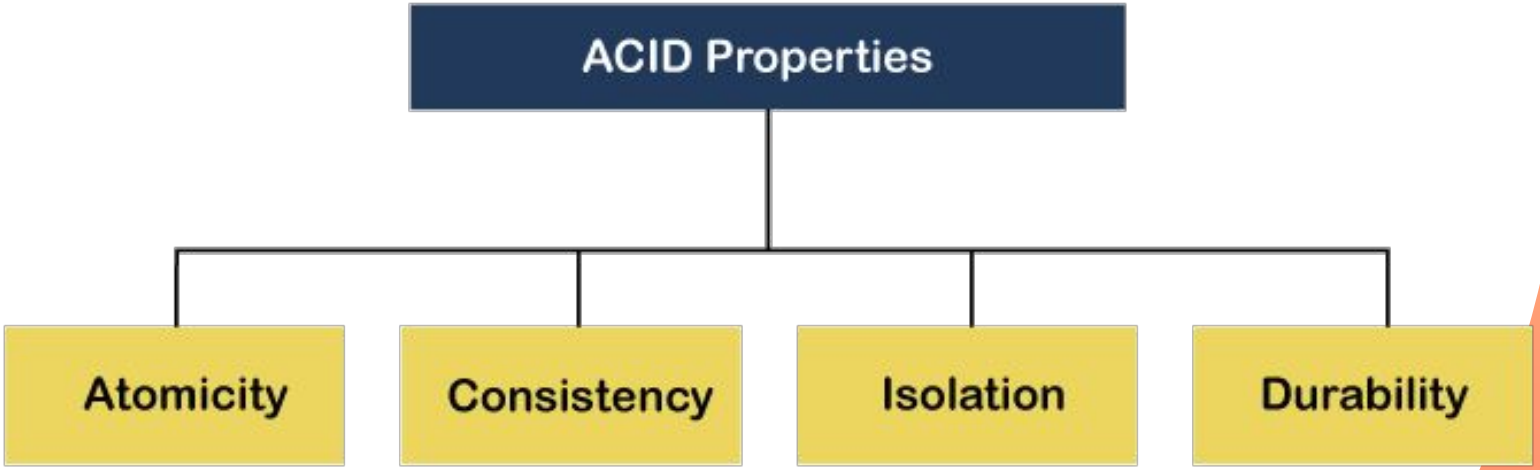
Books Table (3rd Normal Form)

Student_ID	Book Issued
1	Until the Day I Die (Emily Carpenter)
1	Inception (Christopher Nolan)
2	The Alchemist (Paulo Coelho)
2	Inferno (Dan Brown)
3	Beautiful Bad (Annie Ward)
3	Woman 99 (Greer Macallister)
4	Dracula (Bram Stoker)

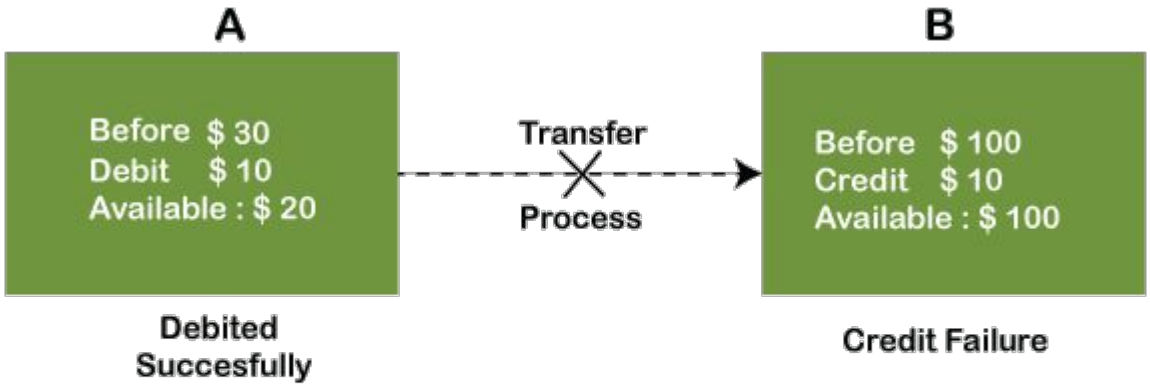
Salutations Table (3rd Normal Form)

Salutation_ID	Salutation
1	Ms.
2	Mr.
3	Mrs.

ACID PROPERTIES IN DBMS



ATOMICITY

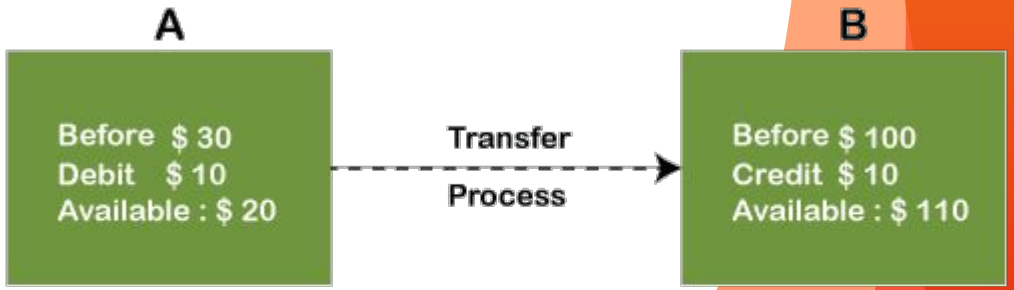


Debited Succesfully

Credit Failure

Partial Execution
No Atomicity
Excution termination

CONSISTENCY

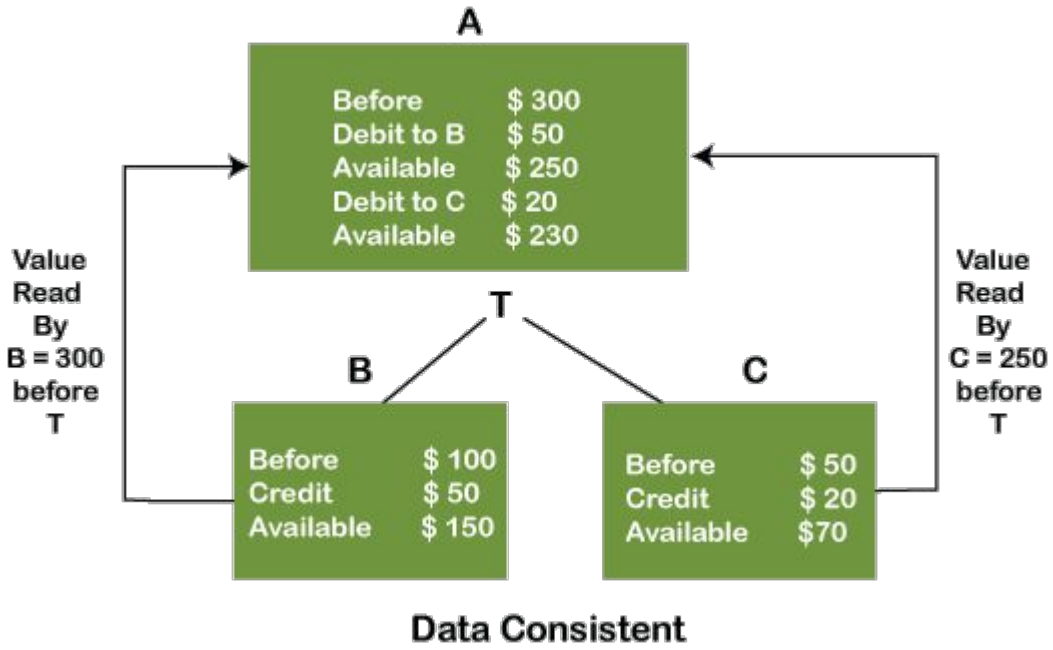


Debited Successfully

Credited Successfully

Complete Execution
Atomicity
Execution Successfull

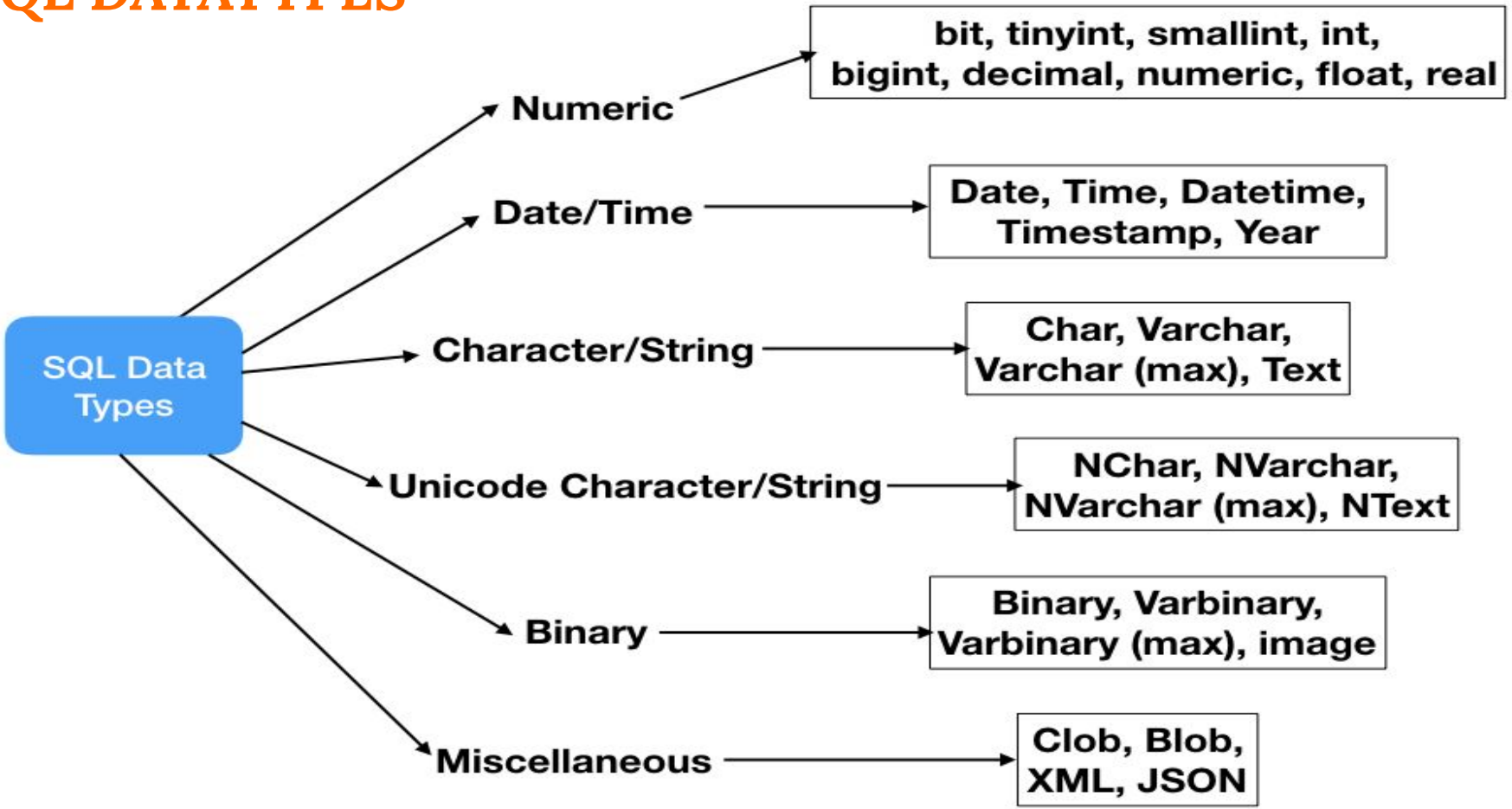
ISOLATION



DURABILITY

Changes that have been committed to the database should remain even in the case of software and system failure. For instance, if Bob's account contains $120, this information should not disappear upon system or software failure.

SQL DATATYPES



OPERATORS IN SQL

Generally there are three types of operators in SQL:

1. SQL Arithmetic Operators

   (+ - * / %)

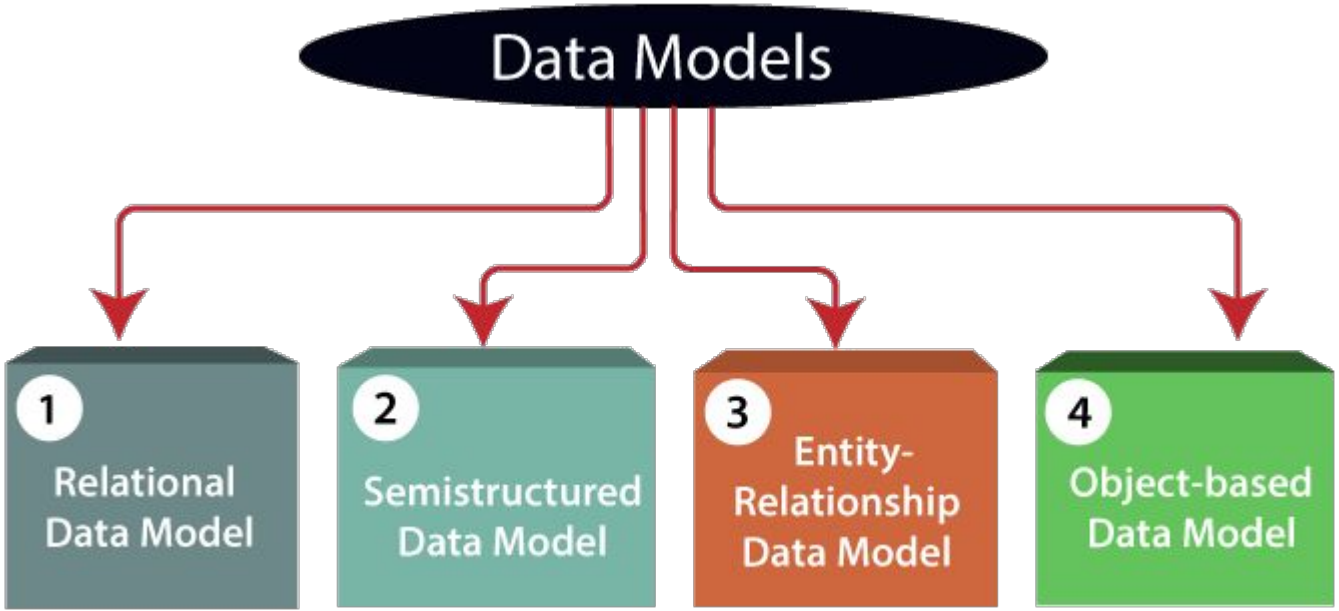
2. SQL Comparison Operators

   (= > < >= != <= !< !>)

3. SQL Logical Operators

   (ALL, AND,OR, IN, BETWEEN, LIKE, NOT)

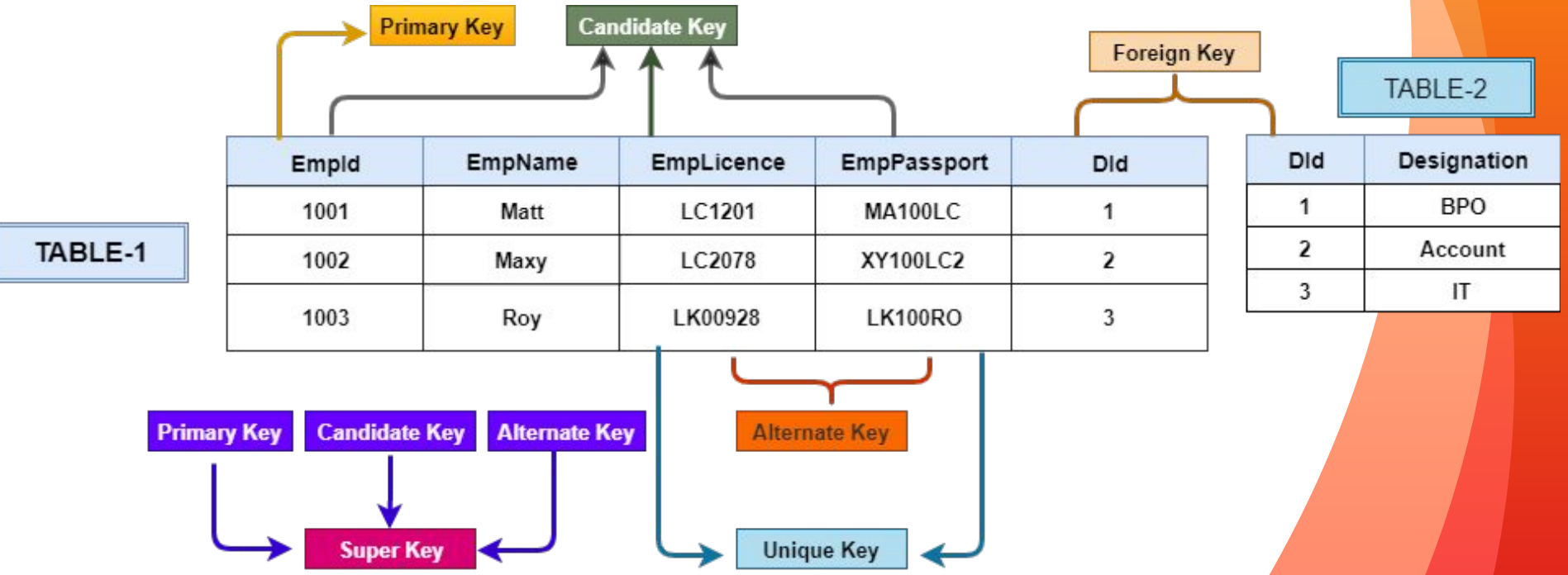
DATA MODELS



Rows-Columns ER models ER+Encapsulation+Obj identity XML

KEYS in SQL

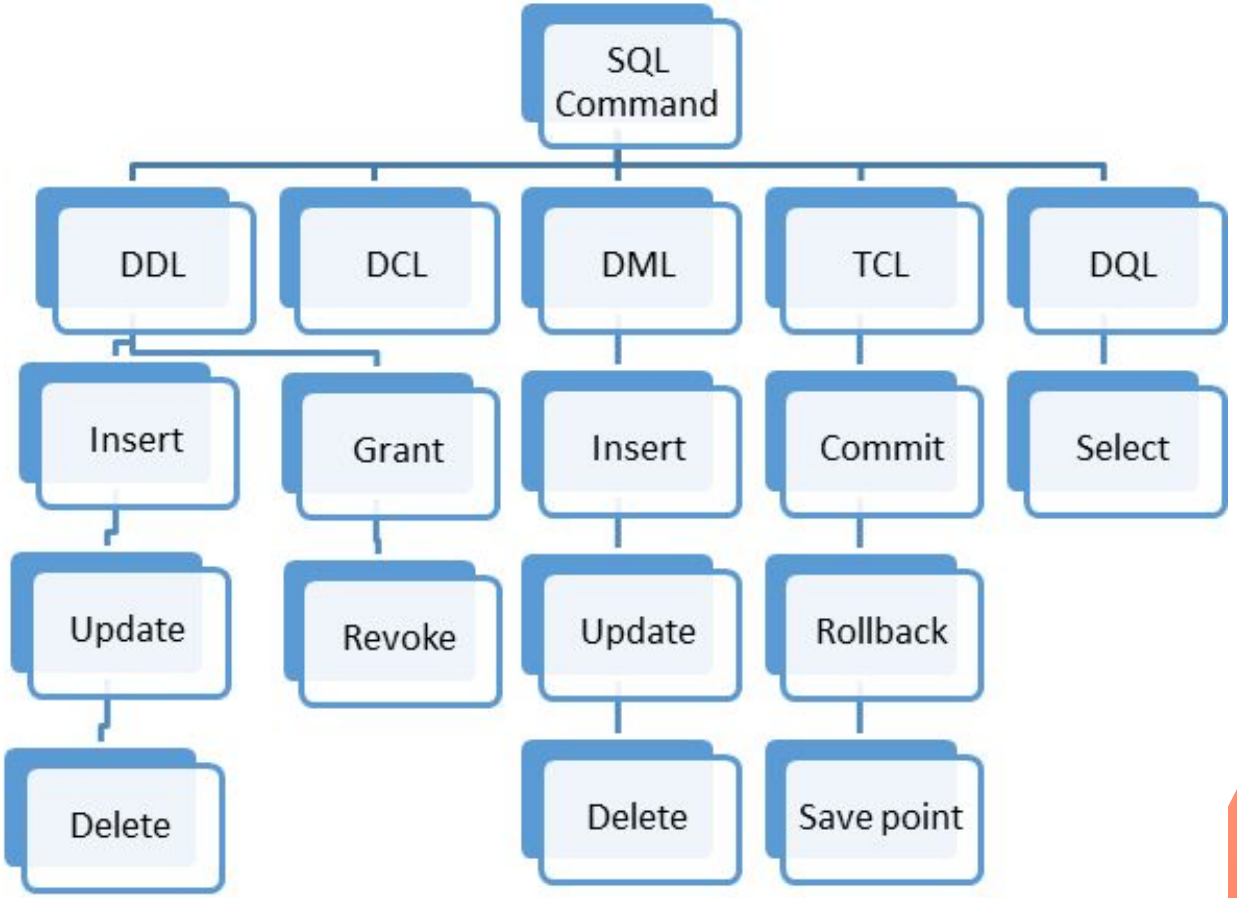
A **key in DBMS** is an attribute or a set of attributes that help to uniquely identify a tuple (or row) in a relation (or table). **Keys** are also used to establish relationships between the different tables and columns of a relational **database**.



KEYS

- **Primary key** - unique value , not null , uniquely identify a table
- **Candidate key** - combination of unique keys to uniquely identify a table
- **Alternate keys** - are those candidate keys which are not the Primary key
- **Unique key** - is a constraint that is used to uniquely identify a tuple in a table.
- **Super key** - Combination of primary key , alternate key and candidate key

Types of Languages



There are four types of database languages:

- **Data Definition Language (DDL)**
  - CREATE, ALTER, DROP, TRUNCATE, RENAME
  - All these commands are used for updating the data
- **Data Manipulation Language (DML)**
  - SELECT, UPDATE, INSERT, DELETE, etc.
  - These commands are used for the manipulation of already updated data

❖ DATA Control Language (DCL)

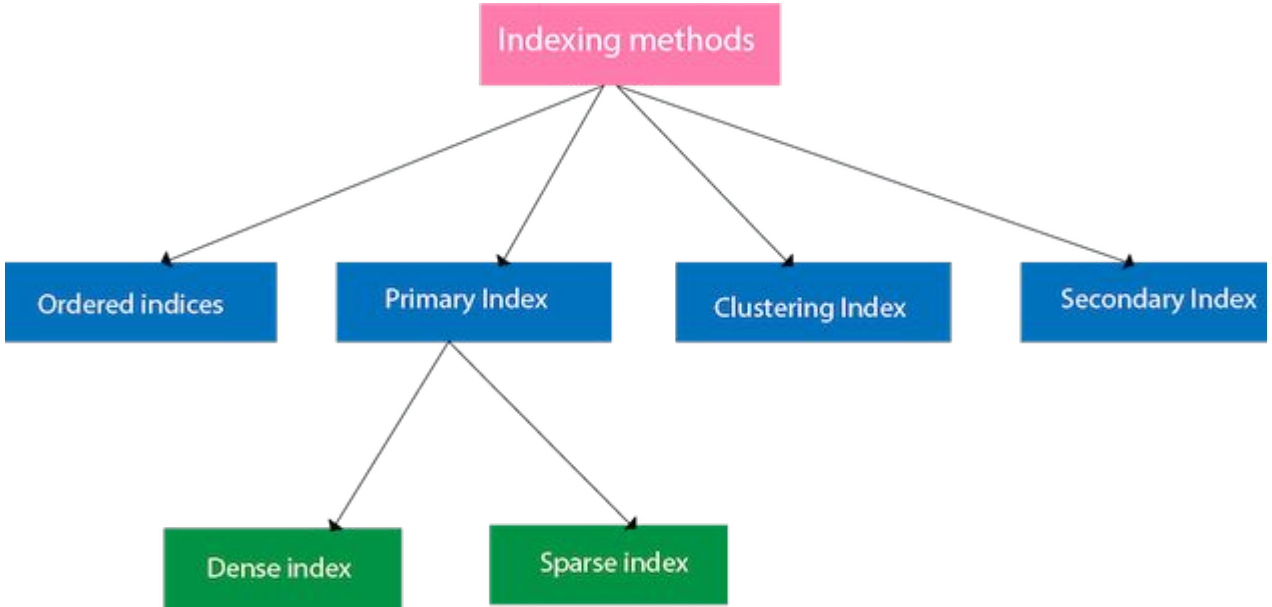
- ➢ GRANT and REVOKE.
- ➢ These commands are used for giving and removing the user access on the database.

❖ Transaction Control Language (TCL)

- ➢ COMMIT, ROLLBACK, and SAVEPOINT.
- ➢ These are the commands used for managing transactions in the database.
- ➢ TCL is used for managing the changes made by DML.

Indexing

- **Indexing** is used to optimize the performance of a database by minimizing the number of disk accesses required when a query is processed.
- The **index** is a type of data structure. It is used to locate and access the data in a database table quickly.



Search key	Data Reference

Fig: Structure of Index

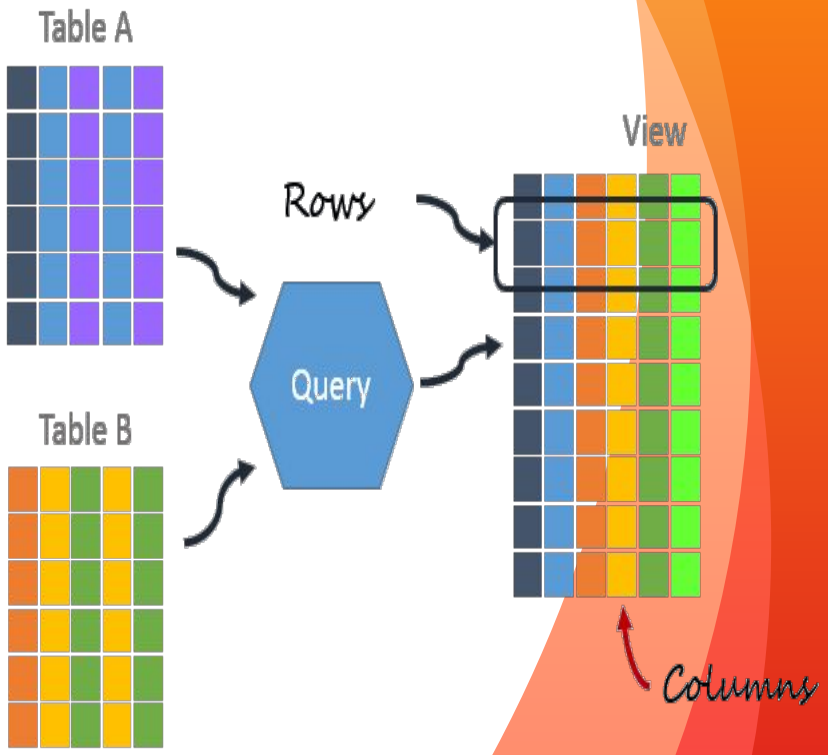
VIEWS

Definition

- It is considered as a virtual table
- Also contains rows and columns , but not a physical table
- All DML operations can be performed in SQL

Advantages

- They do not occupy space in systems
- It simplifies complex queries



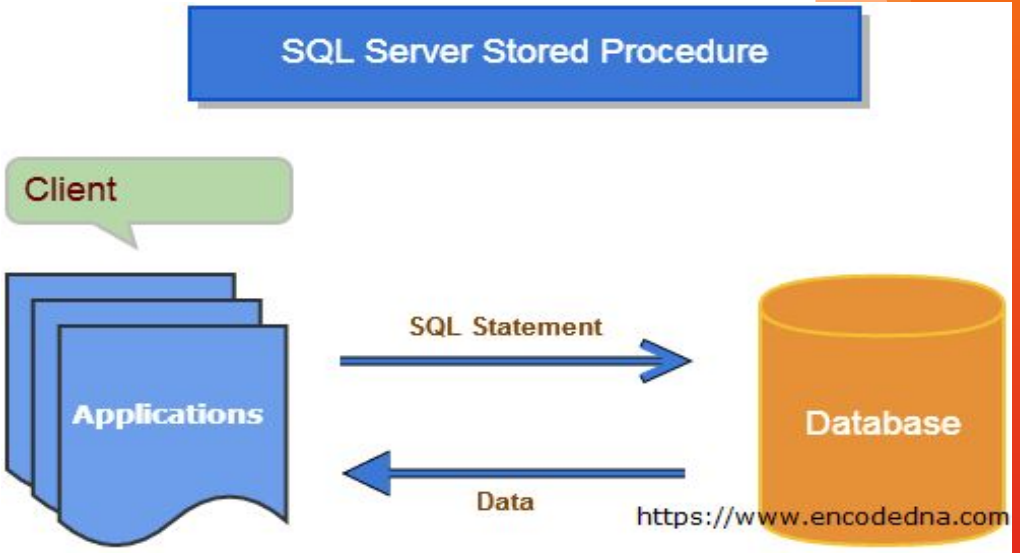
STORED PROCEDURE

- ➔ Prepared SQL code that you can save, so the code can be reused over and over again
- ➔ Call the prepared SQL code and execute it

Syntax

```
CREATE PROCEDURE procedure_name

AS Sql_statement
```



DIFFERENCE b/w Drop, Delete, Truncate

DELETE	TRUNCATE	DROP
DELETE statement is used to delete rows from a table. (DML)	**TRUNCATE** command is used to delete all the rows from the table (DDL)	**DROP** command is used to remove an object from the database. (DDL)
`DELETE FROM Candidates WHERE CandidateId > 1000;`	`TRUNCATE TABLE Candidate;`	`DROP TABLE Candidates;`

TRIGGERS

- A **trigger** is a stored procedure in database which automatically invokes whenever a special event in the database occurs.
- For **example**:
  - A **trigger** can be invoked when a row is inserted into a specified table or when certain table columns are being updated.

“

THANKYOU