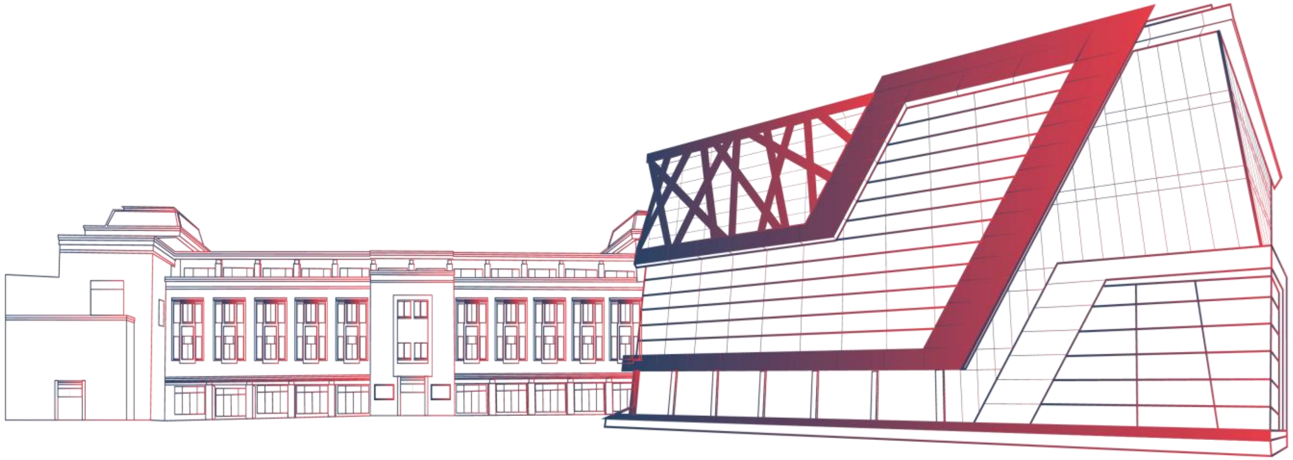
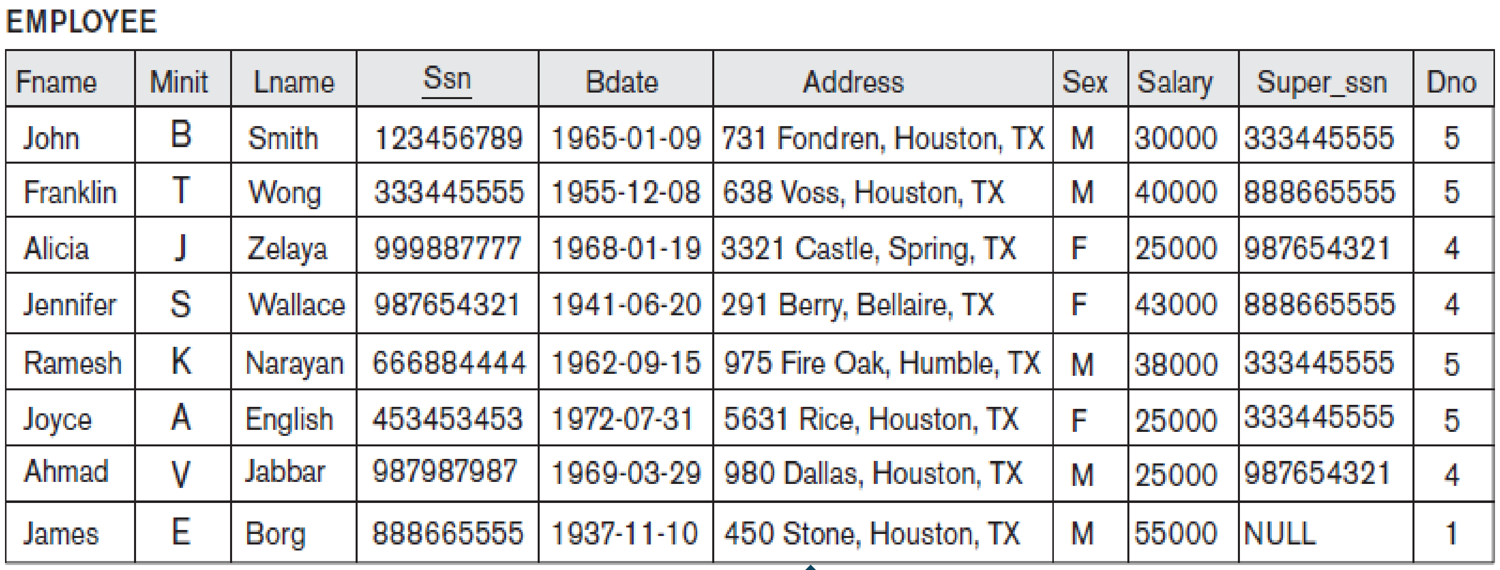
Lecture-2
RDBMS



Relational DBMS

- Integrity Constraints of RDBMS → Tabular Form



EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

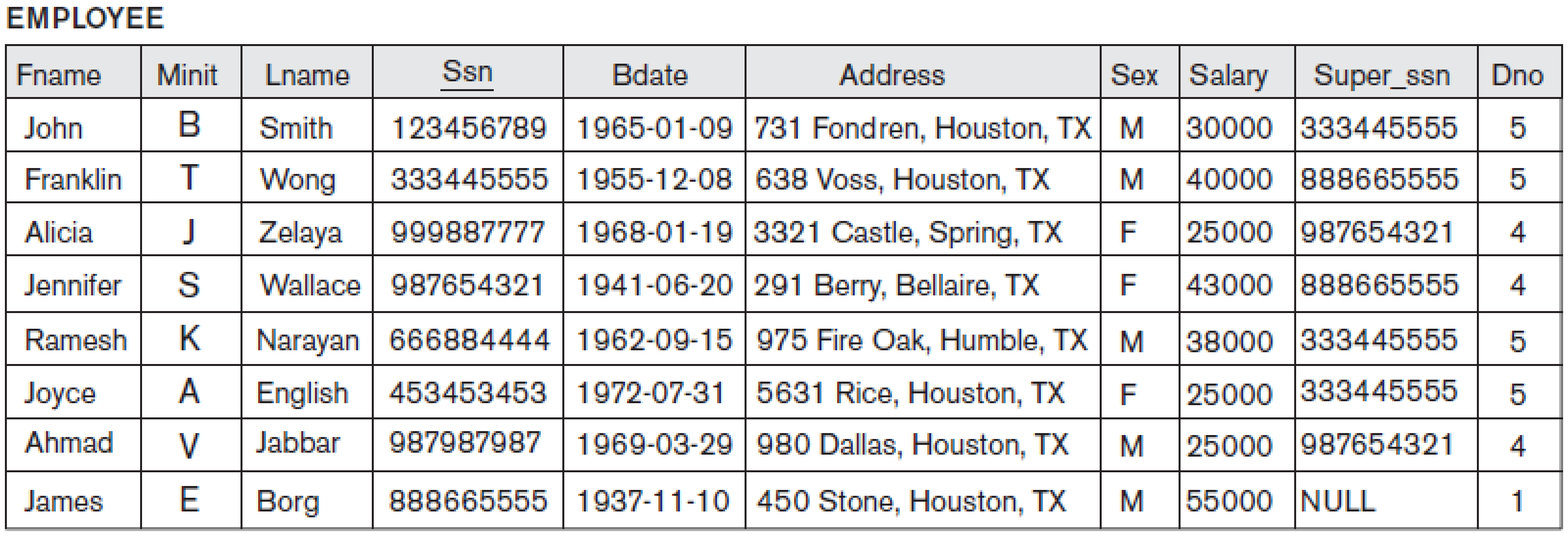
Record/ Tuple

Attribute/Field

No. of Records = Cardinality

No. of Attributes = Arity

Relational Schema v/s Instance



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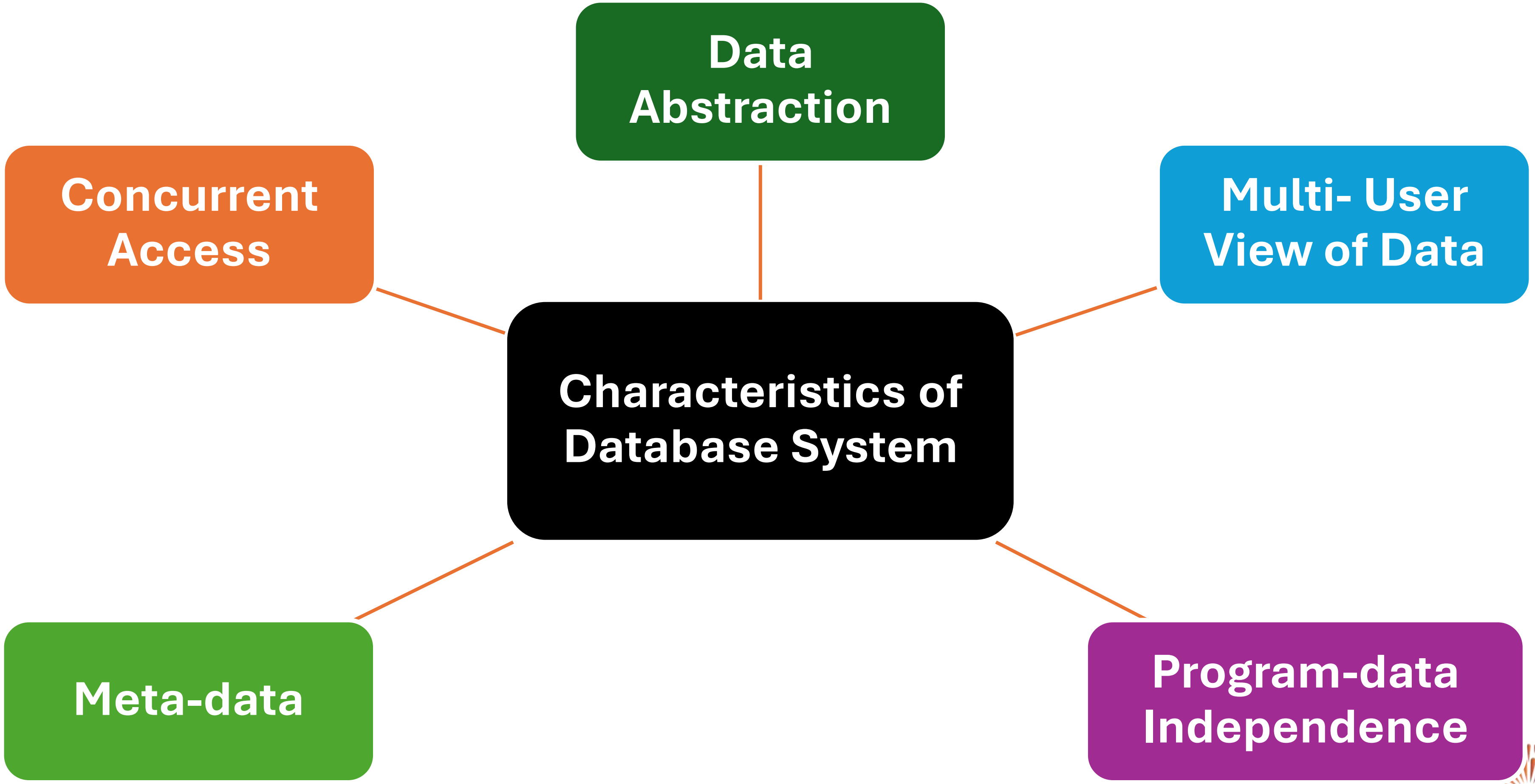
- **Relational Schema:** definition/structure of DB Table

  Example:

  EMPLOYEE (Fname, Minit, Lname, Ssn, Bdate, Address, Sex, Salary, Super_ssn, Dno)

- **Relational Instance:** set of records of relation at the point of time

Characteristics of Database Systems



Characteristics of Database System

Data Abstraction

Multi- User View of Data

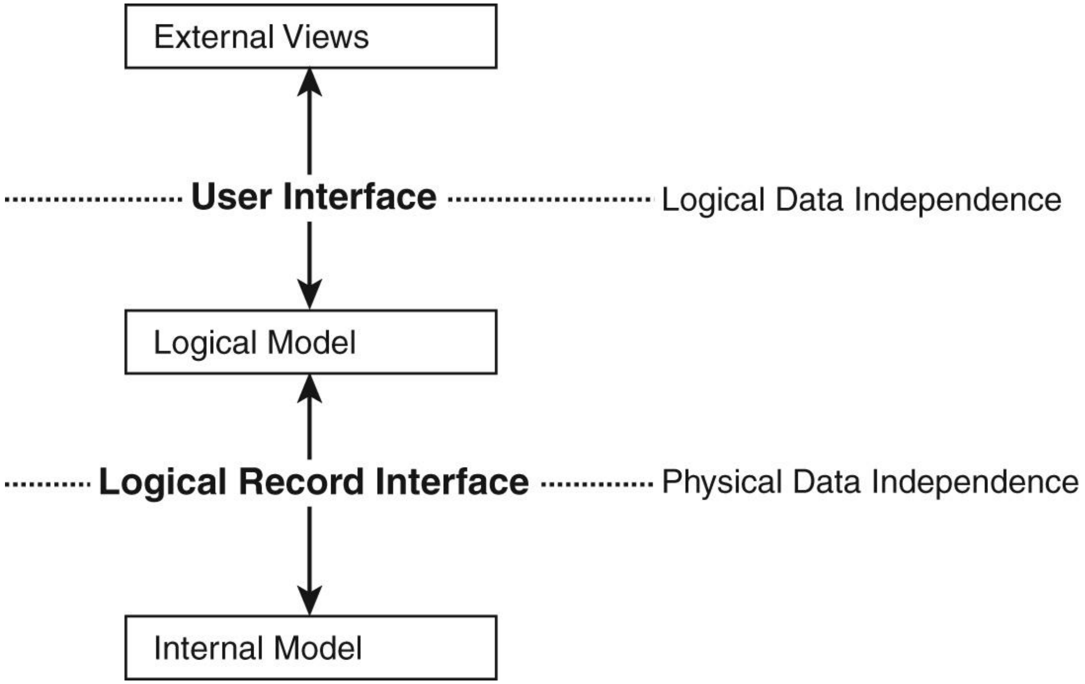
Program-data Independence

Meta-data

Concurrent Access

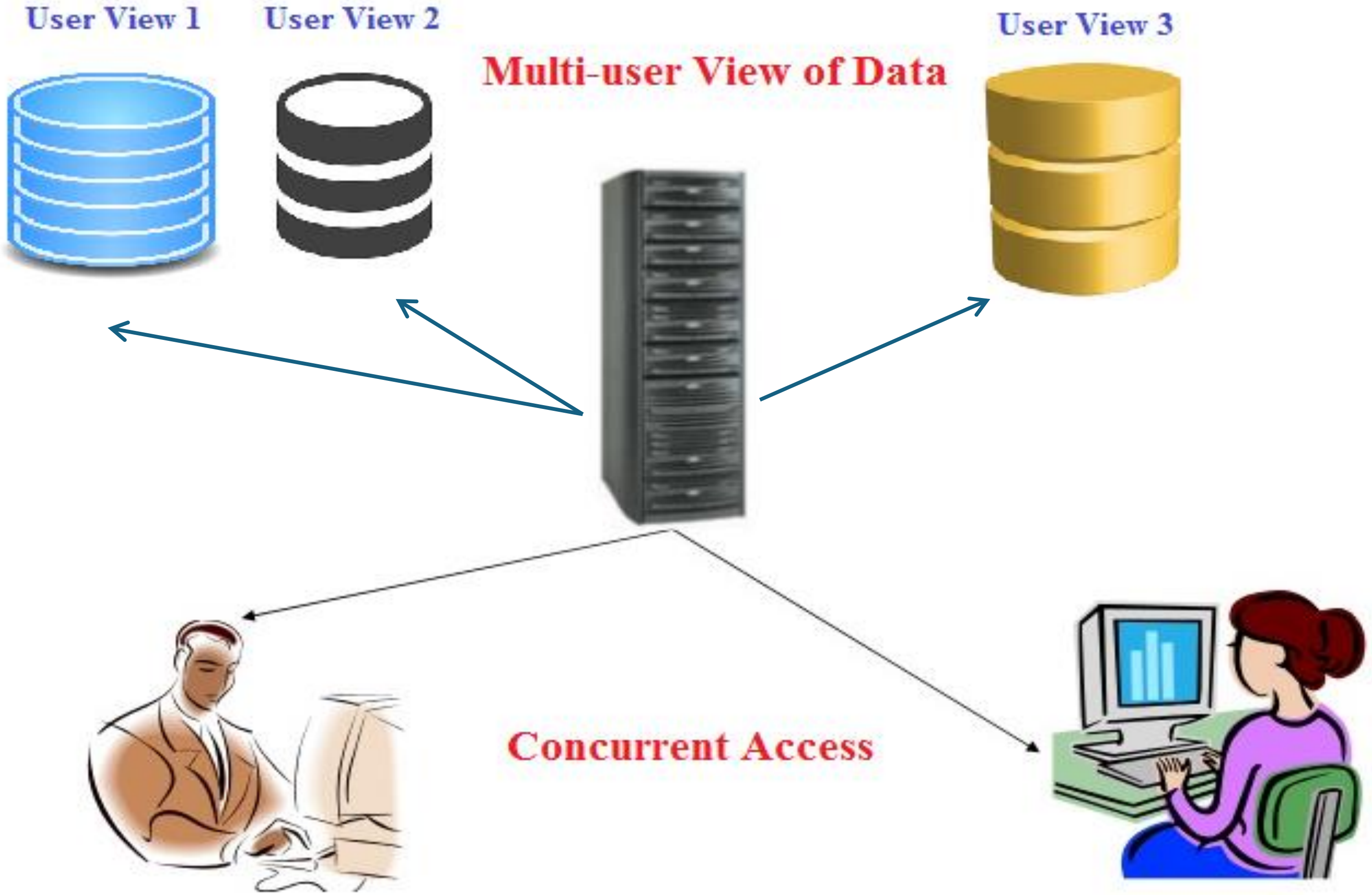
Data Abstraction & Program-Data Independence

- **Data Abstraction:** A **data model** is used to hide storage details and present the users with a *conceptual view* of the database.



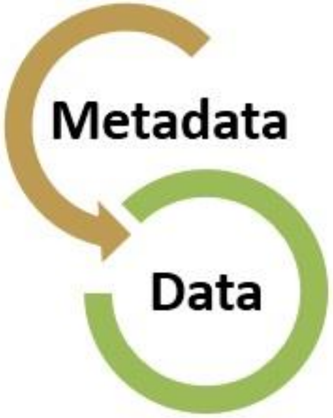
- **Program-data Independence**: Allows changing data storage structures and operations without having to change the DBMS access programs.

Concurrent Access & Multi-user View of Data



Meta-data

- **Meta-data:** A DBMS **catalog** stores the *description* of the database. This description is called meta-data. This allows the DBMS software to work with different databases.



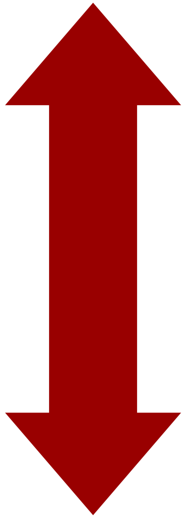
Self-describing nature of a database system

Client/Server Architectures

- Two-tier Architecture

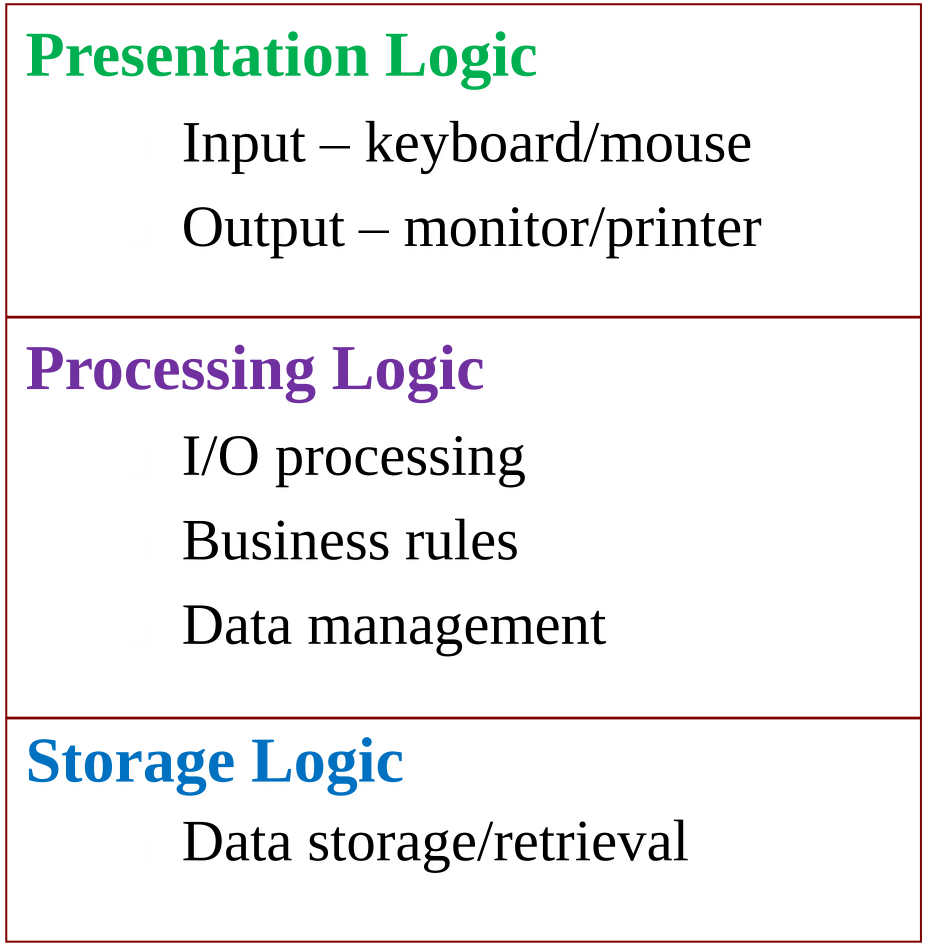
- Three-tier Architecture

Client does extensive processing



Client does little processing

APPLICATION LOGIC IN C/S SYSTEMS



Presentation Logic

- Input – keyboard/mouse
- Output – monitor/printer

Processing Logic

- I/O processing
- Business rules
- Data management

Storage Logic

- Data storage/retrieval

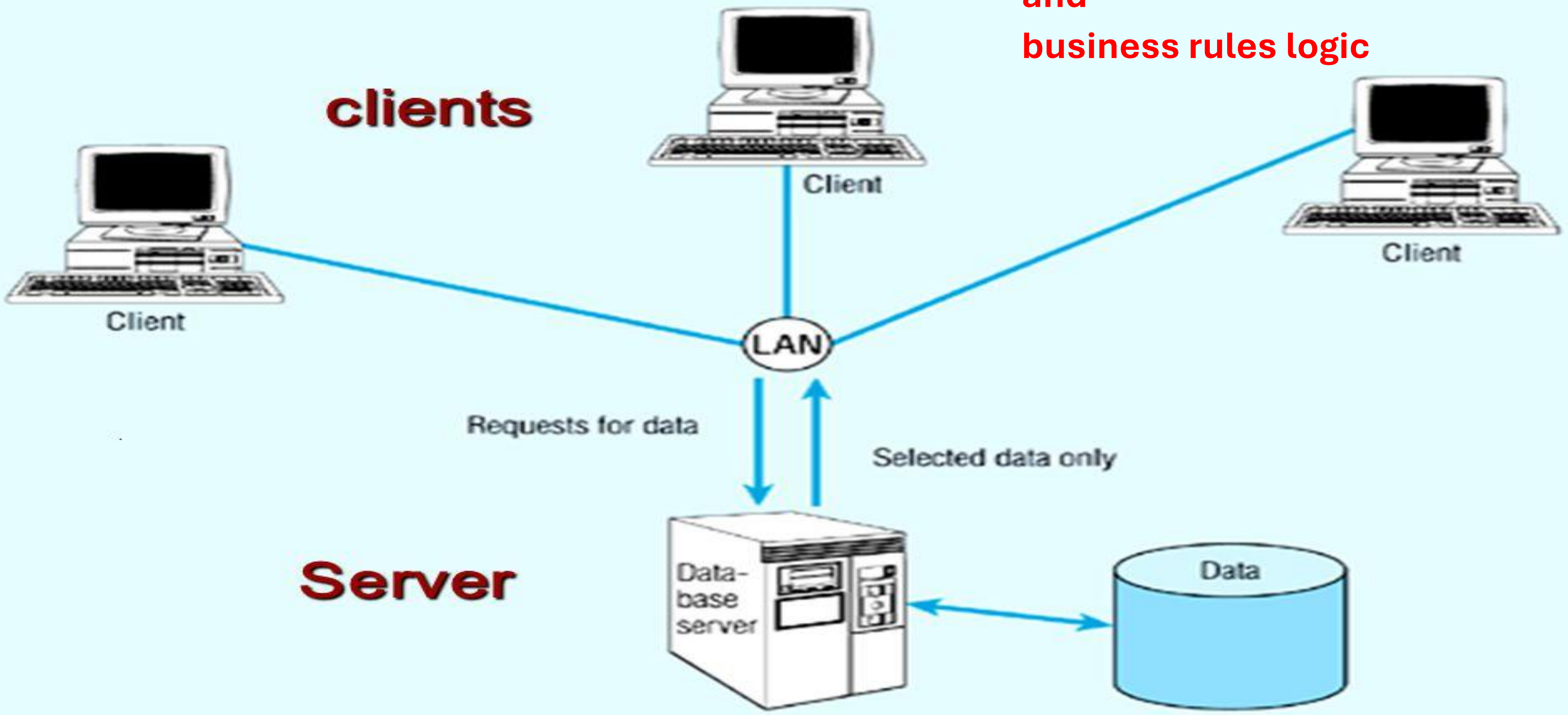
GUI Interface

Procedures, functions, programs

DBMS Activities

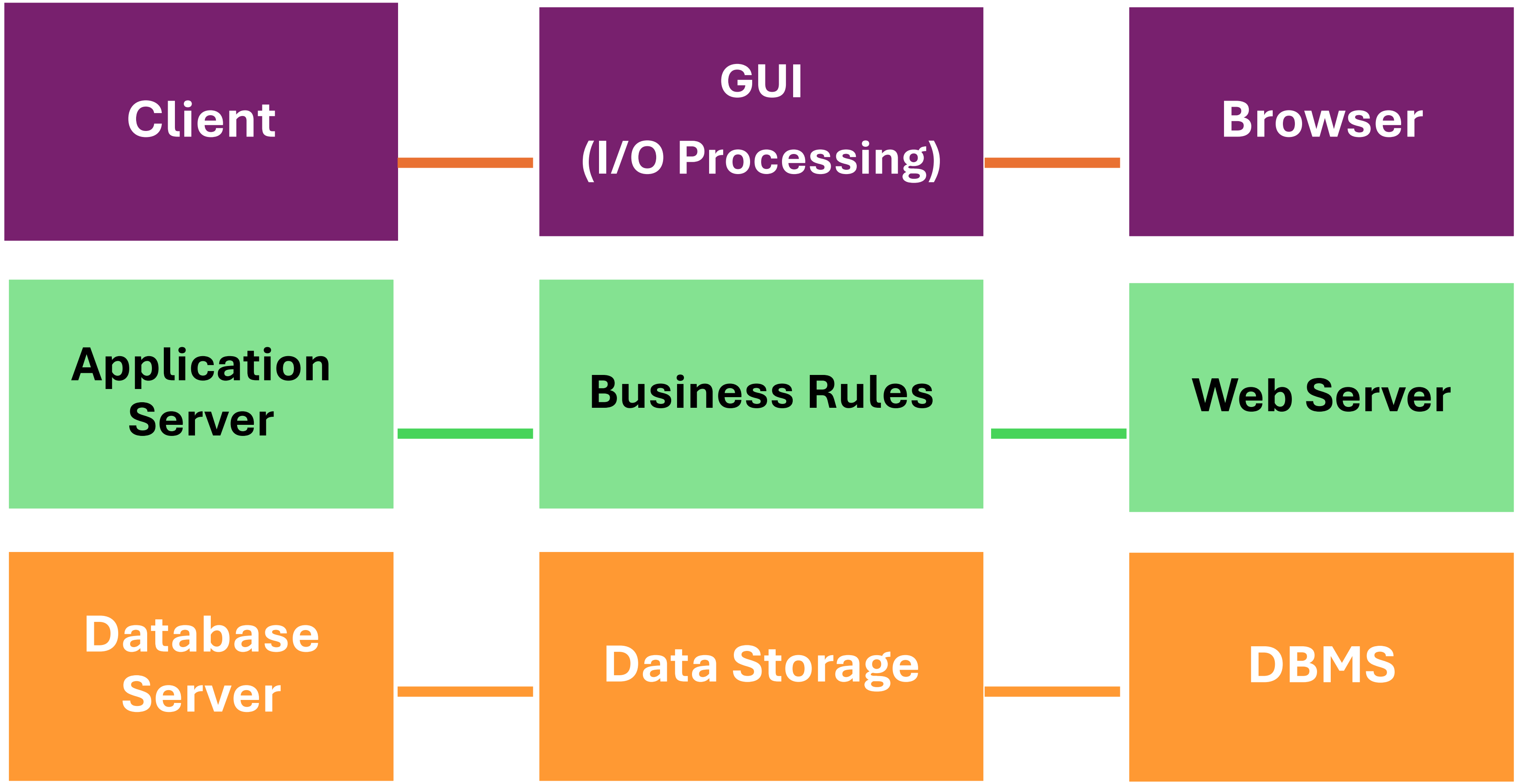
Two-tier Architecture

Responsible for I/O processing and
business rules logic



Server performs all data storage and access processing →DBMS is only on server

Three-tier Architecture



Client

GUI

(I/O Processing)

Browser

Application Server

Business Rules

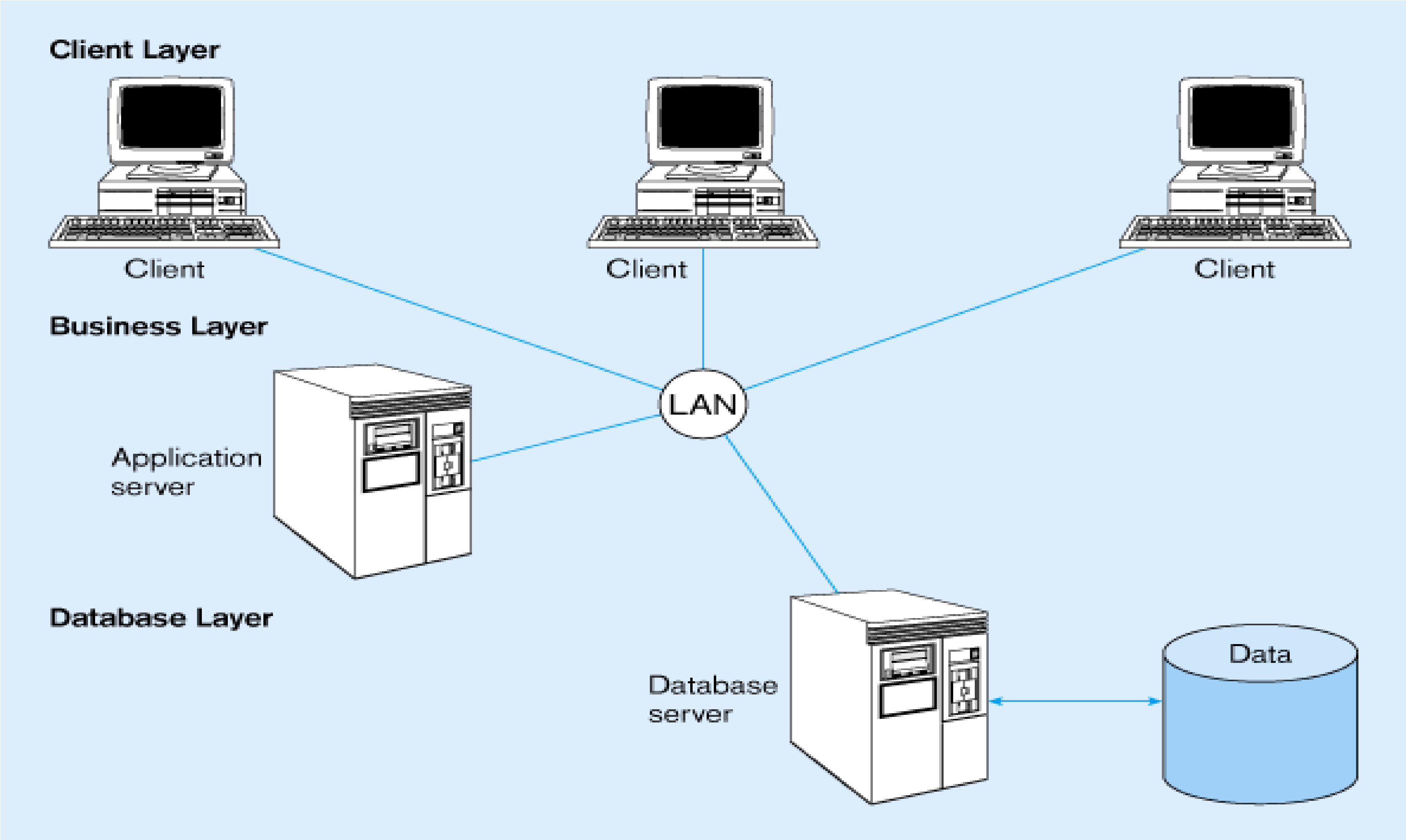
Web Server

Database Server

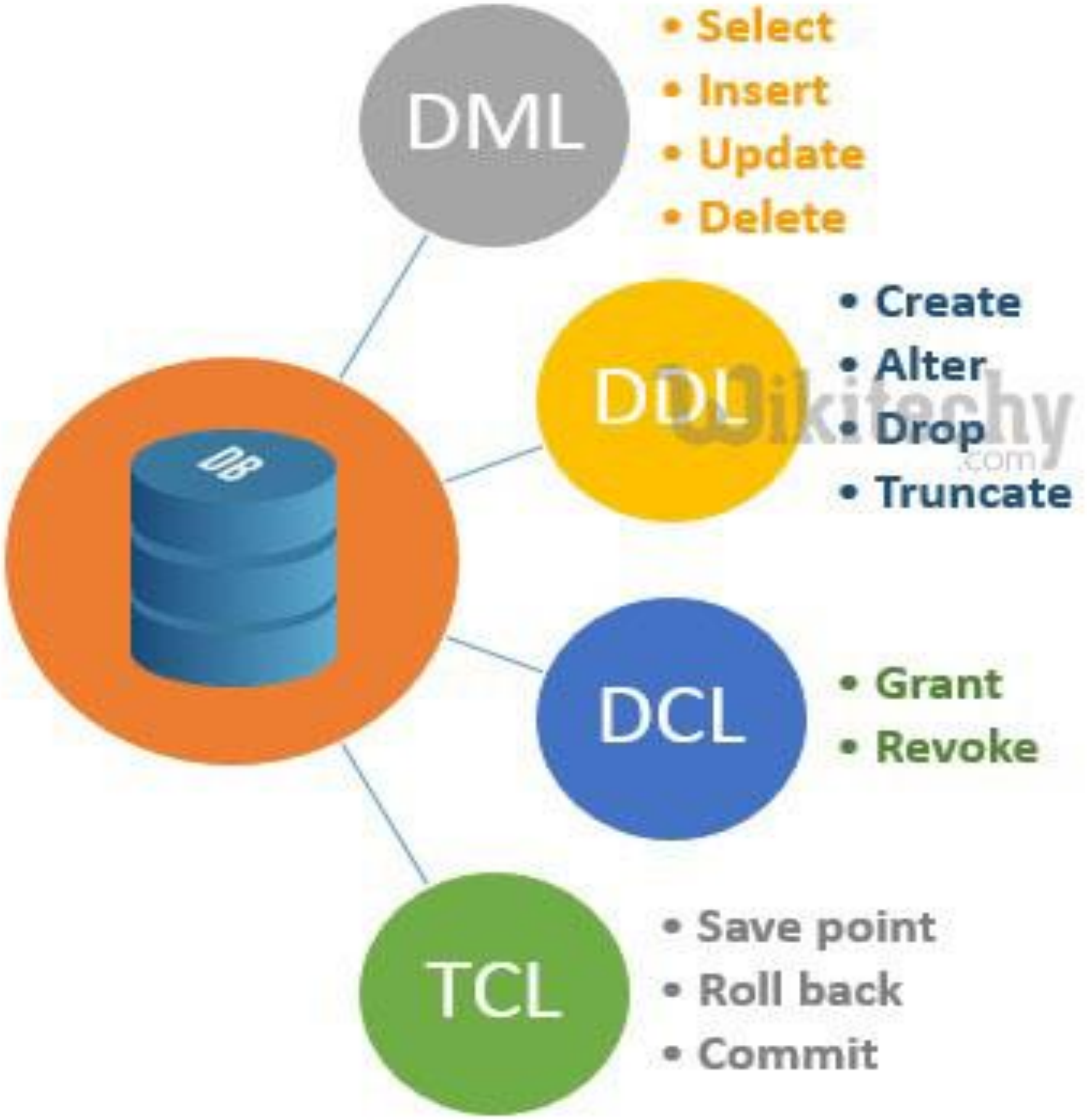
Data Storage

DBMS

Three-tier Architecture



Database Query Languages



Data Definition language (DDL)

DDL - define the database structure or schema

CREATE - to create objects in the database

ALTER - alters the structure of the database

DROP - delete objects from the database

Data Manipulation language (DML)

DML –

manages data within schema objects

SELECT - retrieve data from the a database

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

Data Control language (DCL)

DCL - used to control data access

GRANT - gives user's access privileges to database

REVOKE - withdraw access privileges given with the GRANT command

"Okay, she's got her card in, now shut it down."

Transaction Control Language (TCL)

TCL - used to manage the changes made by DML. It allows statements to be grouped together into logical transactions.

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 rollback segment to use

Thanks