



Database system concepts and architecture

Unit – 12

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In this unit, you will learn:

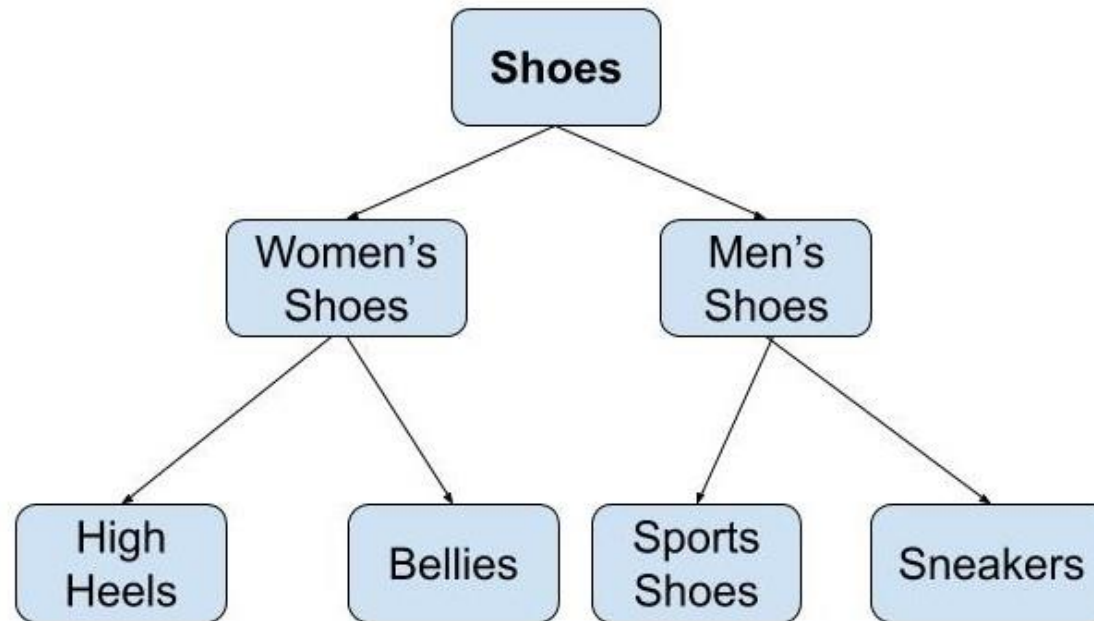
- Data Model
- Three-Level Architecture
- Different Database Languages

Data Models

- **Data Model:** A set of concepts to describe the *structure* of a database, and certain *constraints* that the database should obey.

Data Models in DBMS are:

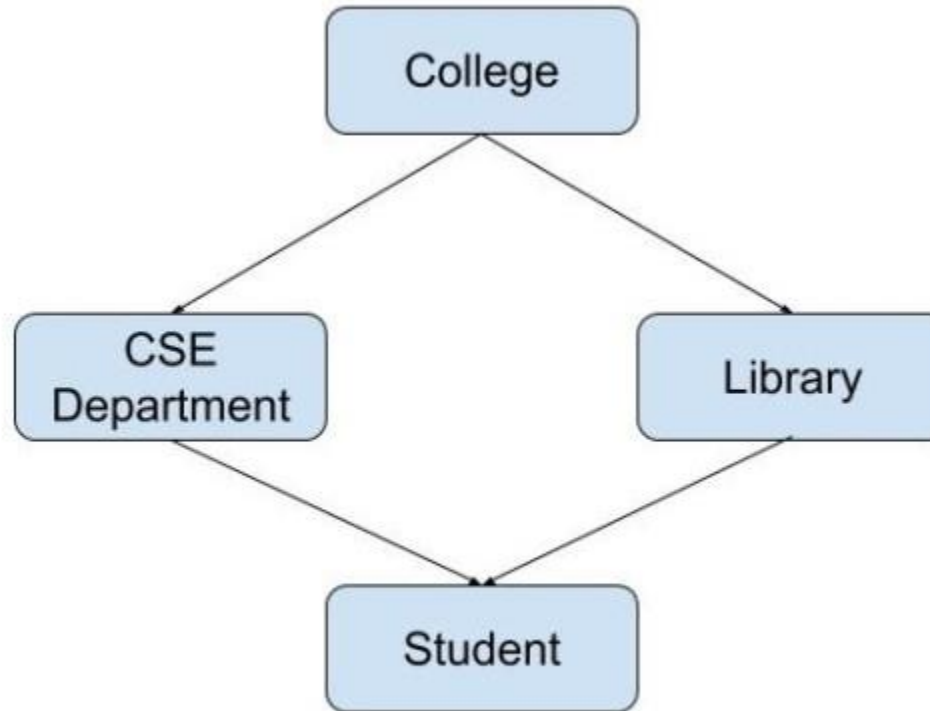
Hierarchical Model:



Hierarchical Model

Data Models in DBMS are:

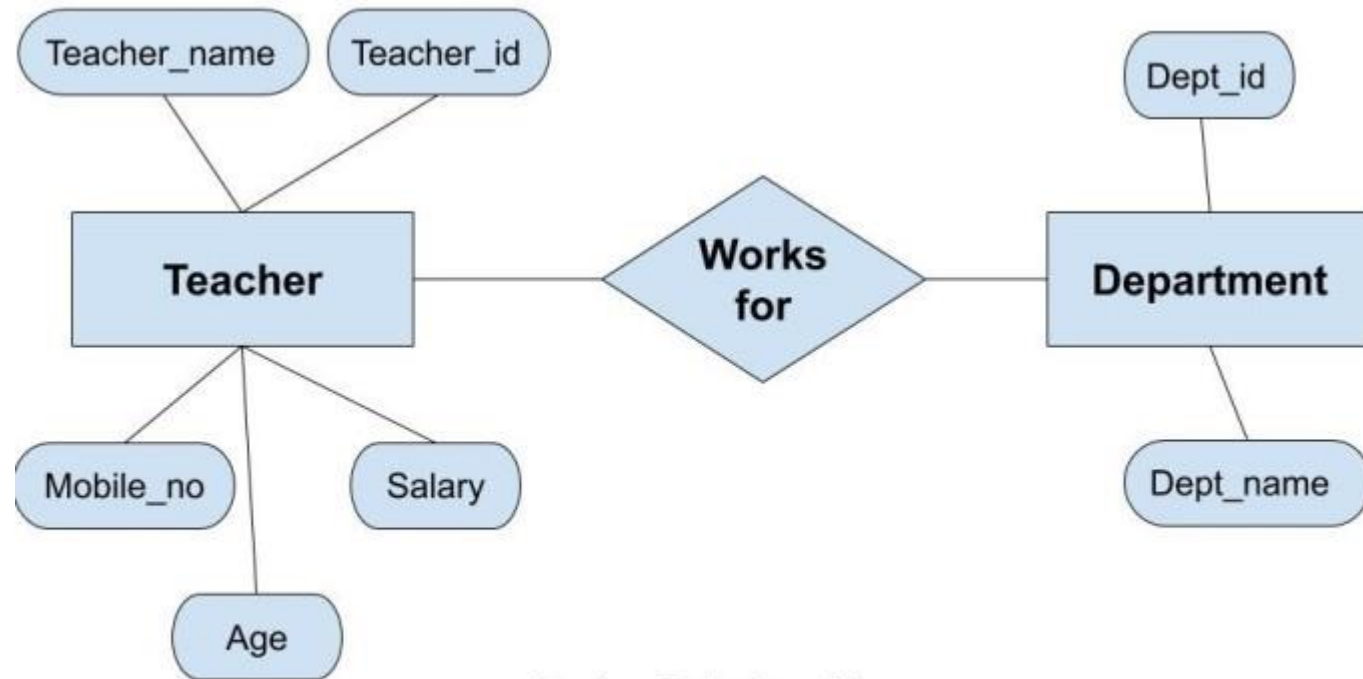
Network Model:



Network Model

Data Models in DBMS are:

Entity-Relationship Model



Entity-Relationship
Model

Data Models in DBMS are:

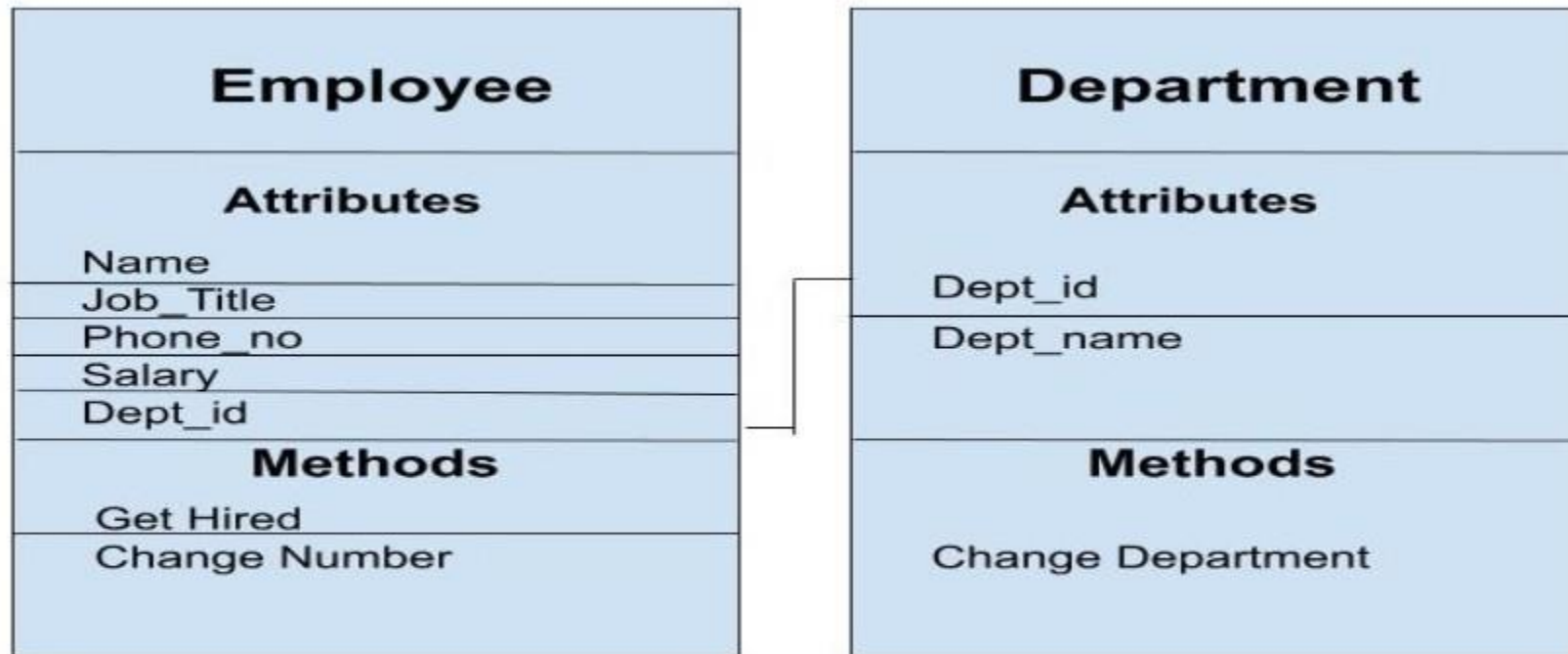
Relational Model

Emp_id	Emp_name	Job_name	Salary	Mobile_no	Dep_id	Project_id
AfterA001	John	Engineer	100000	9111037890	2	99
AfterA002	Adam	Analyst	50000	9587569214	3	100
AfterA003	Kande	Manager	890000	7895212355	2	65

EMPLOYEE TABLE

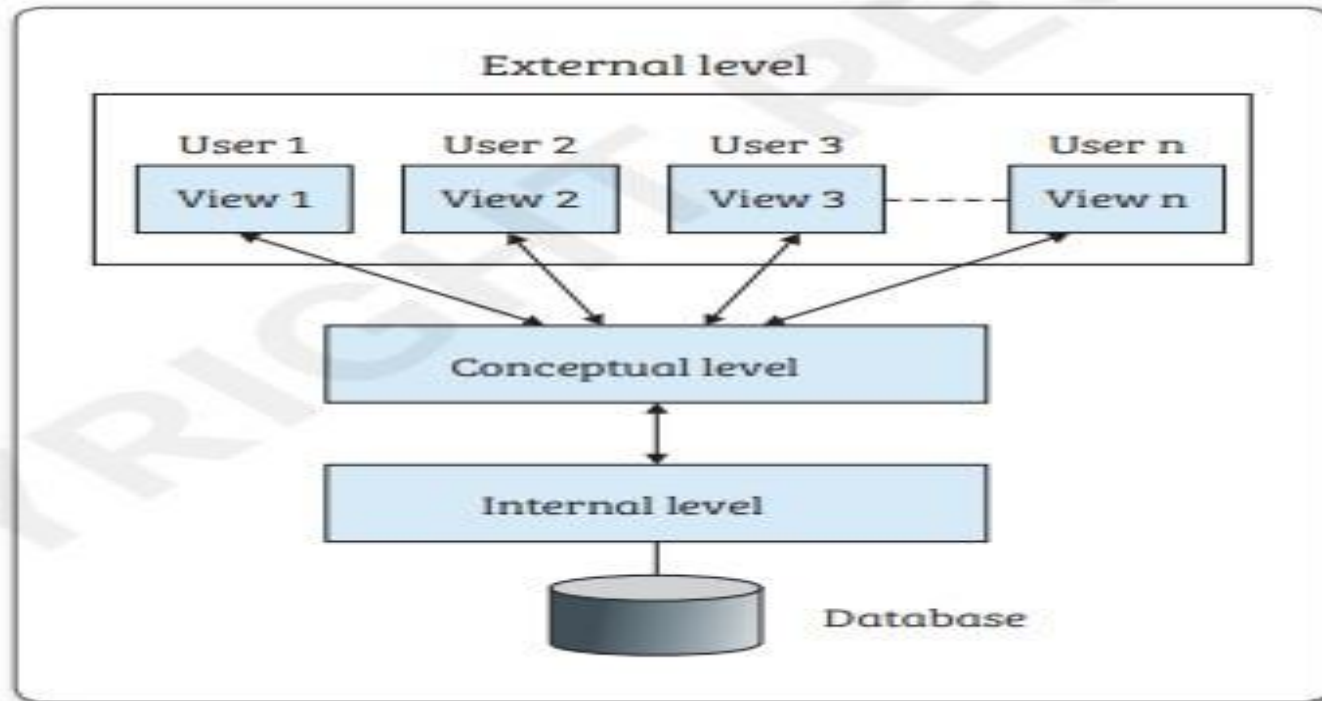
Data Models in DBMS are:

Object-Oriented Data Model



Object_Oriented_Model

Three-Schema Architecture



Three-Schema Architecture

- Defines DBMS schemas at *three levels*:
 - **Internal schema** at the internal level to describe physical storage structures and access paths. Typically uses a *physical* data model.
 - **Conceptual schema** at the conceptual level to describe the structure and constraints for the *whole* database for a community of users. Uses a *conceptual* or an *implementation* data model.
 - **External schemas** at the external level to describe the various user views. Usually uses the same data model as the conceptual level.

Three-Schema Architecture

- Proposed to support DBMS characteristics of:
 - **Program-data independence.**
 - Support of **multiple views** of the data.

Three-Schema Architecture

- **Mappings** among schema levels are needed to transform requests and data. Programs refer to an external schema, and are mapped by the DBMS to the internal schema for execution

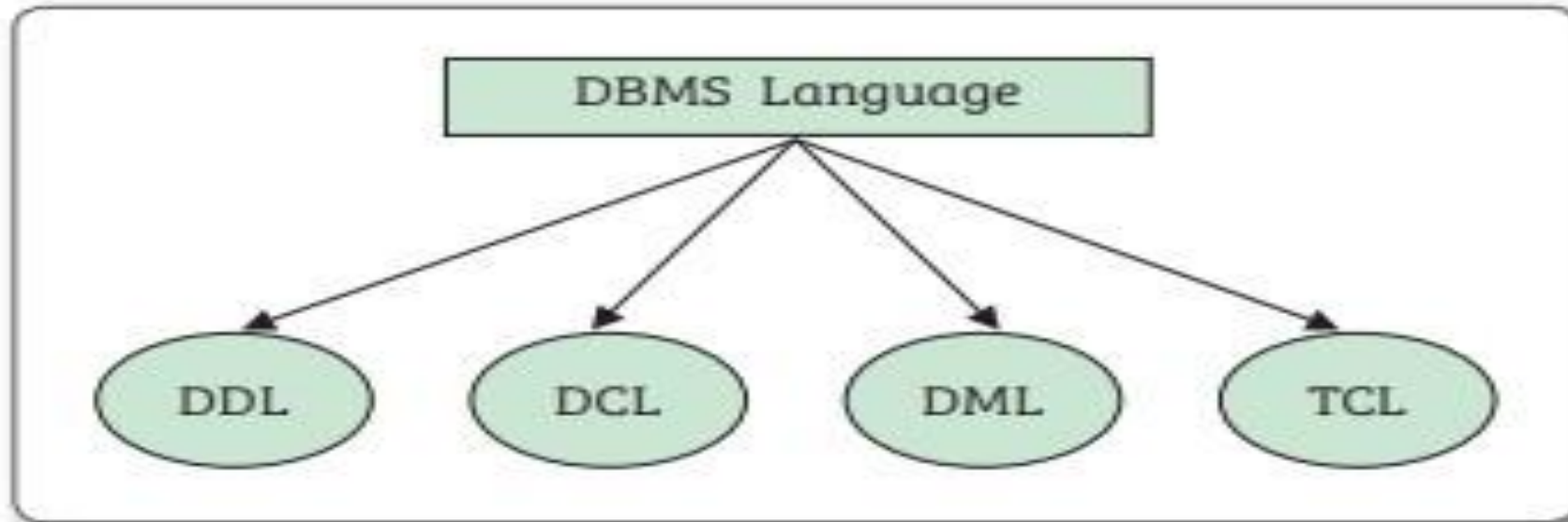
Data Independence

- When a schema at a lower level is changed, only the **mappings** between this schema and higher-level schemas need to be changed in a DBMS that fully supports data independence. The higher-level schemas themselves are *unchanged*. Hence, the application programs need not be changed since they refer to the external schemas.

Data Independence

- **Logical Data Independence:** The capacity to change the conceptual schema without having to change the external schemas and their application programs.
- **Physical Data Independence:** The capacity to change the internal schema without having to change the conceptual schema.

DBMS Languages



Data Definition Language

- DDL stands for Data Definition Language. It is used to define database structure or pattern.
- It is used to create schema, tables, indexes, constraints, etc. in the database.
- Using the DDL statements, you can create the skeleton of the database.
- Data definition language is used to store the information of metadata like the number of tables and schemas, their names, indexes, columns in each table, constraints, etc.

Data Definition Language

Create: It is used to create objects in the database.

Alter: It is used to alter the structure of the database.

Drop: It is used to delete objects from the database.

Data Manipulation Language

- **DML** stands for **Data Manipulation Language**. It is used for accessing and manipulating data in a database. It handles user requests.

Data Manipulation Language

Select: It is used to retrieve data from a database.

Insert: It is used to insert data into a table.

Update: It is used to update existing data within a table.

Delete: It is used to delete all records from a table.

Data Control Language

- **DCL** stands for **Data Control Language**. It is used to retrieve the stored or saved data.

The DCL execution is transactional. It also has rollback parameters.

(But in Oracle database, the execution of data control language does not have the feature of rolling back.)

Here are some tasks that come under DCL:

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

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

Transaction Control Language

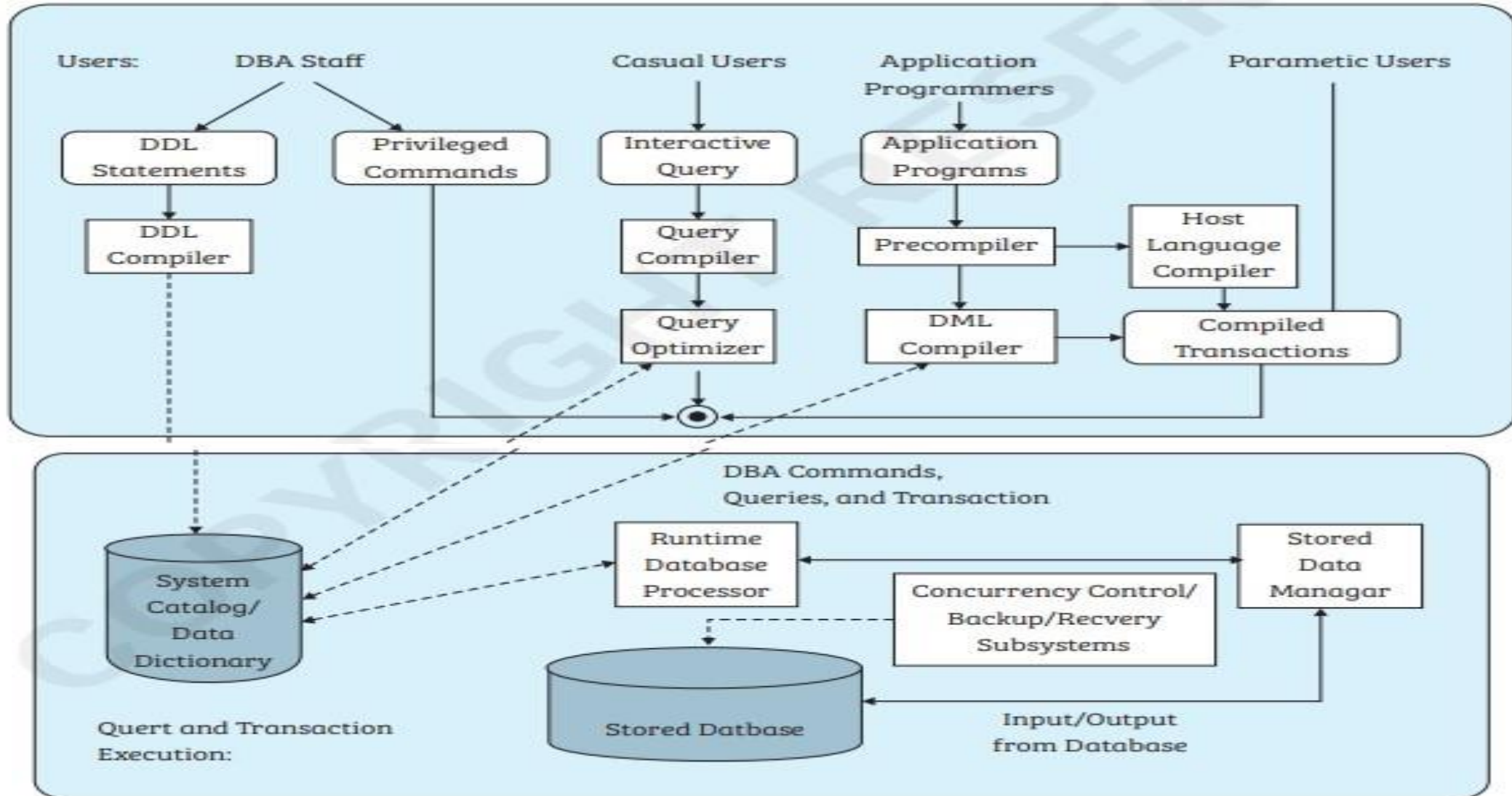
- **TCL** is used to run the changes made by the DML statement. TCL can be grouped into a logical transaction. The DCL execution is transactional. It also has rollback parameters.

Here are some tasks that come under TCL:

Commit: It is used to save the transaction on the database.

Rollback: It is used to restore the database to original since the last Commit.

Database System environment



Q & A





THANK YOU