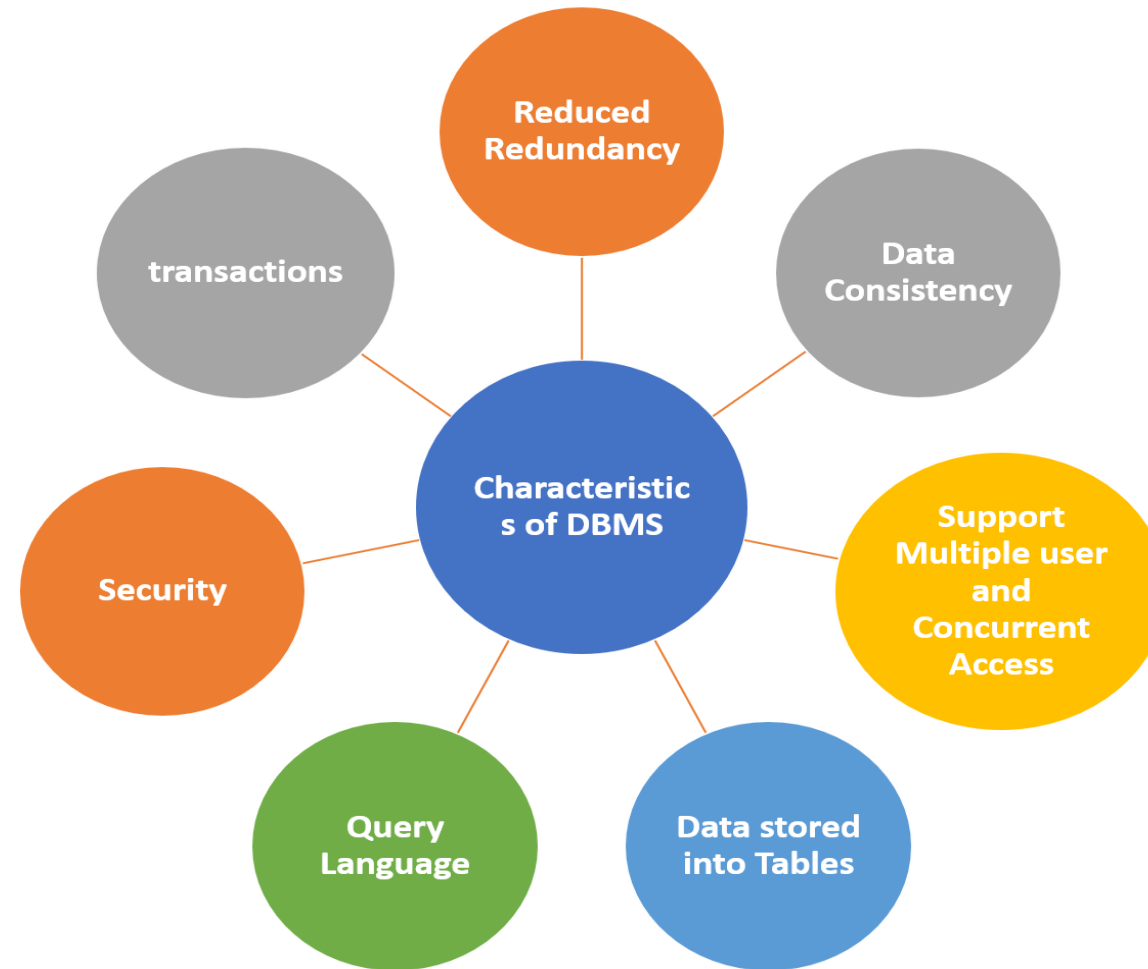


Today we are going to discuss

- **Modern Database Management System**
- **Database System Architecture**
- **Data Model**

A Modern Database Management System



A Modern Database Management System

Now DBMS has the following characteristics –

Real-world entity – A modern DBMS is more realistic and uses real-world entities to design its architecture. It uses the behavior and attributes too.

For example, a school database may use students as an entity and their age as an attribute.

Relation-based tables – DBMS allows entities and relations among them to form tables. A user can understand the architecture of a database just by looking at the table names.

A Modern Database Management System

Isolation of data and application – A database system is entirely different than its data. A database is an active entity, whereas data is said to be passive, on which the database works and organizes.

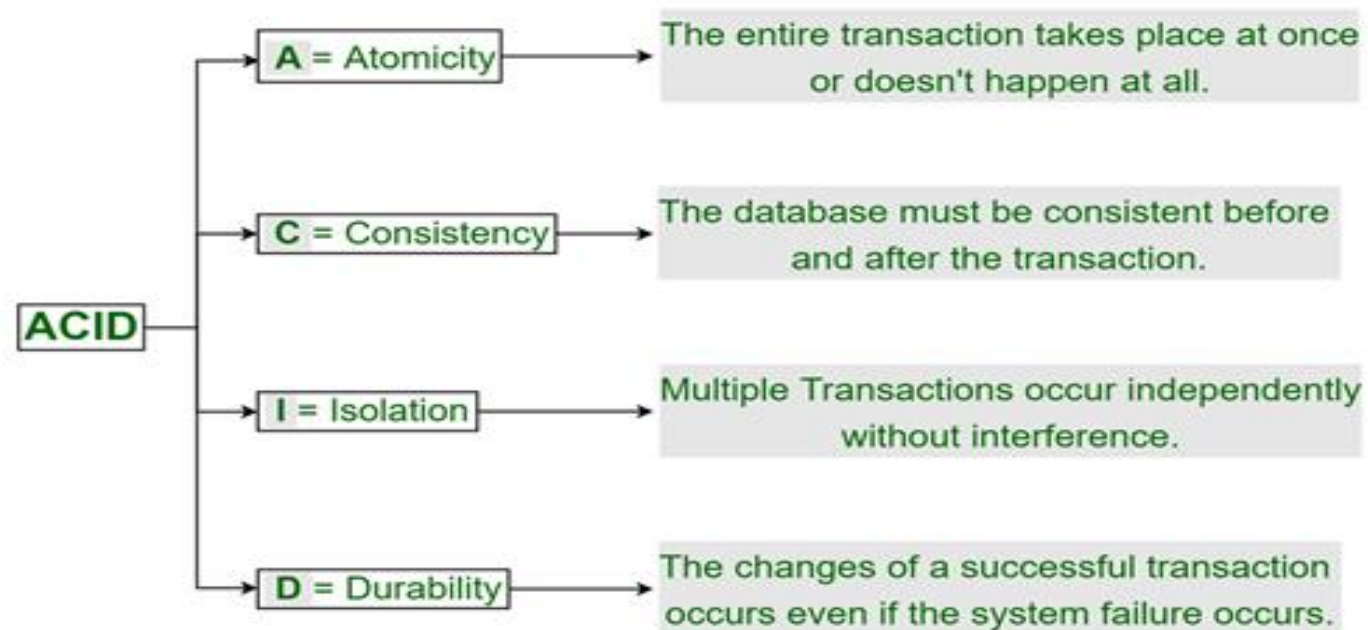
DBMS also stores metadata, which is data about data, to ease its own process.

Less redundancy – DBMS follows the rules of normalization, which splits a relation when any of its attributes is having redundancy in values.

Consistency – Consistency is a state where every relation in a database remains consistent. There exist methods and techniques, which can detect attempt of leaving database in inconsistent state.

A Modern Database Management System

ACID Properties – DBMS follows the concepts of **A**tomicity, **C**onsistency, **I**solation, and **D**urability (normally shortened as ACID). These concepts are applied on transactions, which manipulate data in a database



A Modern Database Management System

Multiuser and Concurrent Access – DBMS supports multi-user environment and allows them to access and manipulate data in parallel.

Multiple views – DBMS offers multiple views for different users. This feature enables the users to have a concentrate view of the database according to their requirements.

Security – Security to some extent where users are unable to access data of other users and departments. DBMS offers methods to impose constraints while entering data into the database and retrieving the same at a later stage.

Database Management System- Overview

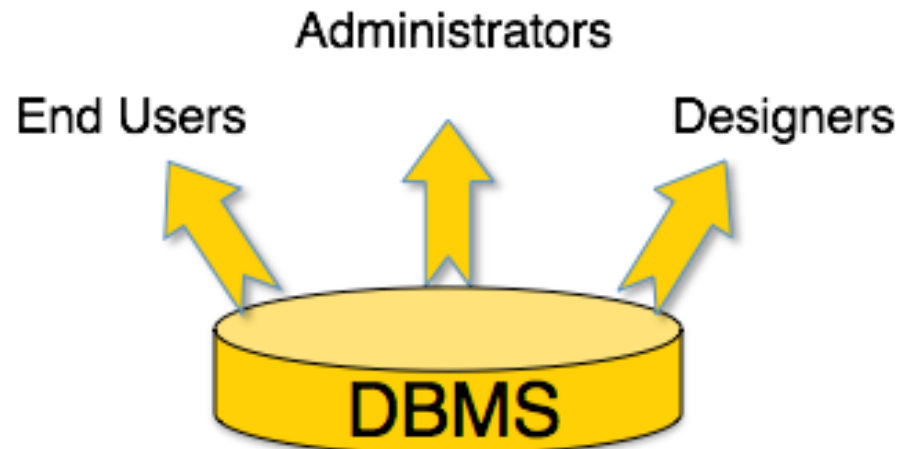
Security – Features like multiple views offer security to some extent where users are unable to access data of other users and departments. DBMS offers methods to impose constraints while entering data into the database and retrieving the same at a later stage. DBMS offers many different levels of security features, which enables multiple users to have different views with different features.

- For example, a user in the Sales department cannot see the data that belongs to the Purchase department. Additionally, it can also be managed how much data of the Sales department should be displayed to the user. Since a DBMS is not saved on the disk as traditional file systems, it is very hard for miscreants to break the code.

Database System Users

- A typical DBMS has users with different rights and permissions who use it for different purposes.
- Some users retrieve data and some back it up.

The users of a DBMS can be broadly categorized as follows –



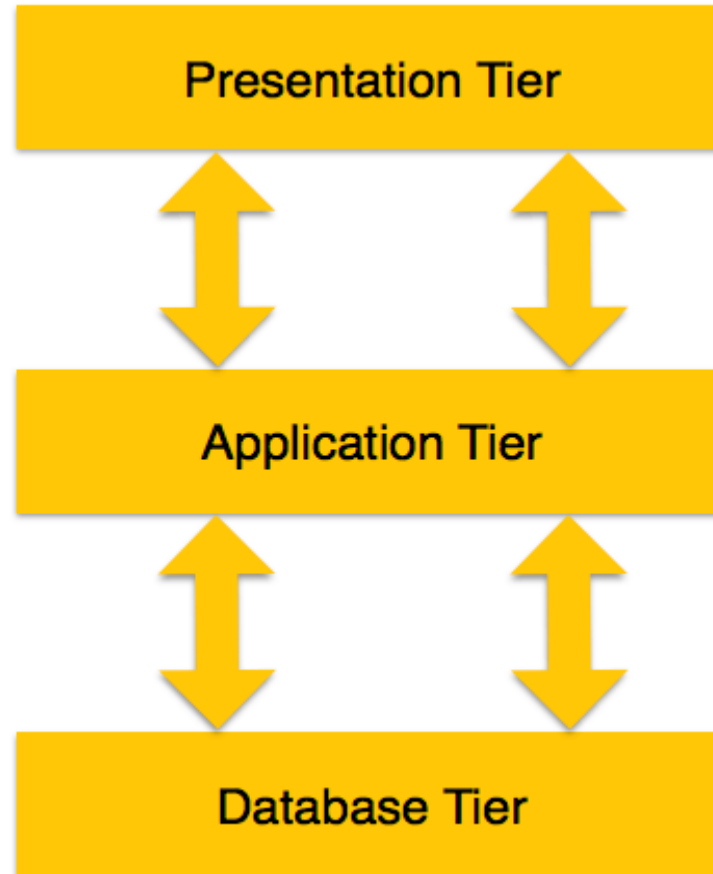
Database System Users

- **Administrators** – Administrators are responsible for administering the database. They are responsible to look after its usage and by whom it should be used.
- **Designers** – Designers are actually work on the designing part of the database. They keep a close watch on what data should be kept and in what format.
- **End Users** – End users are those who actually reap the benefits of having a DBMS.

Database System Architecture

- The design of a DBMS depends on its architecture.
- It can be centralized or decentralized or hierarchical.
- A 3-tier architecture separates its tiers from each other based on the complexity of the users and how they use the data present in the database.

3-tier architecture of DBMS



3-tier architecture of DBMS

Database (Data) Tier

- At this tier, the database resides along with its query processing languages.

Application (Middle) Tier

- At this tier reside the application server and the programs that access the database.
- For a user, this application tier presents an abstracted view of the database.
- End-users are unaware of any existence of the database beyond the application.
- At the other end, the database tier is not aware of any other user beyond the application tier.
- The application layer sits in the middle and acts as a mediator between the end-user and the database.

3-tier architecture of DBMS

User (Presentation) Tier

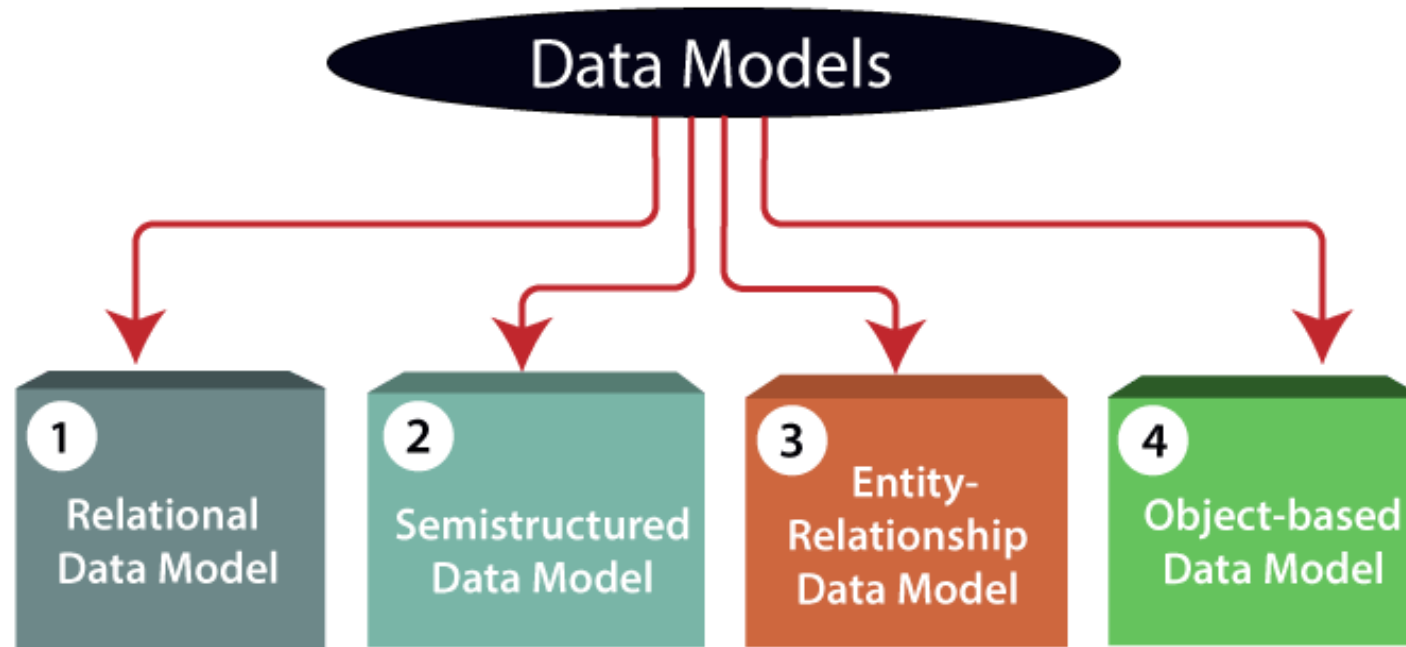
- End-users operate on this tier
- User know nothing about any existence of the database beyond this layer.
- At this layer, multiple views of the database can be provided by the application.
- All views are generated by applications that reside in the application tier.

Data Model

- A major purpose of a database system is to provide users with an abstract view of the data.
- That is, the system hides certain details of how the data are stored and maintained.
- A model is a representation of reality, ‘real world’ objects and events, and their associations.
- Data model is a collection of conceptual tools for describing data, data relationships, data semantics, and consistency constraints.

Data Model

The data models can be classified into four different categories,



Thanks

