Department of Management Studies

MBA – I Semester

**BA4106 Information Management**

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UNIT –III
Database Management Systems

Relational Database management

System – RDBMS

RDBMS...

- Most popular database system.

- Simple and sound theoretical basis.

- Developed by E F Codd in the early 1970's.

- The model is based on tables, rows and columns and the manipulation of data stored within.

- Relational database is a collection of these tables.

- First commercial system: MULTICS in 1978.

- Has overtaken Hierarchical and Network models.

- Main feature: Single database can be spread across several tables.

- Examples include: Oracle, IBM's DB2, Sybase, MySQL & Microsoft Access.
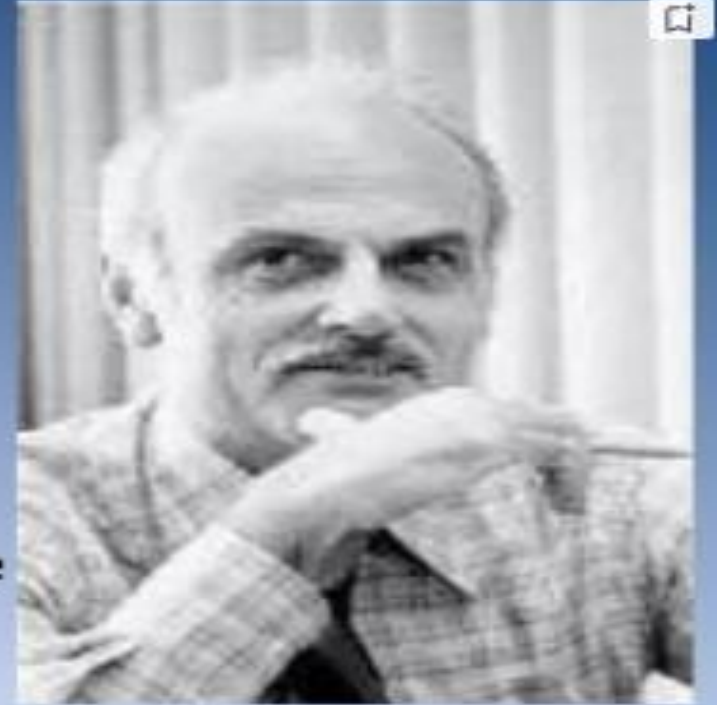
RDBMS Advantages

- Increases the sharing of data and faster development of new applications
- Support a simple data structure, namely tables or relations
- Limit redundancy or replication of data
- Better integrity as data inconsistencies are avoided by storing data in one place
- Provide physical data independence so users do not have to be aware of underlying objects
- Offer logical database independence - data can be viewed in different ways by different users.
- Expandability is relatively easy to achieve by adding new views of the data as they are required.
- Support one off queries using SQL or other appropriate language.
- Better backup and recovery procedures
- Provides multiple interfaces
- Solves many problems created by other data models
- The ability to handle efficiently simple data types
- Multiple users can access which is not possible in DBMS

RDBMS Disadvantages

- Software is expensive
- Complex software means expensive hardware
- Requires skilled knowledge to implement
- Certain applications are slower processing
- Increased vulnerability
- More difficult to recover if data is lost
- Seen as a poor representation of the real world
- Difficult to represent hierarchies
- Difficult to represent complex data type.

Schema:

- Logical structure of the database.
- Doesn't show the data in database.
- Classification:

    1. Physical
    2. Conceptual
    3. External
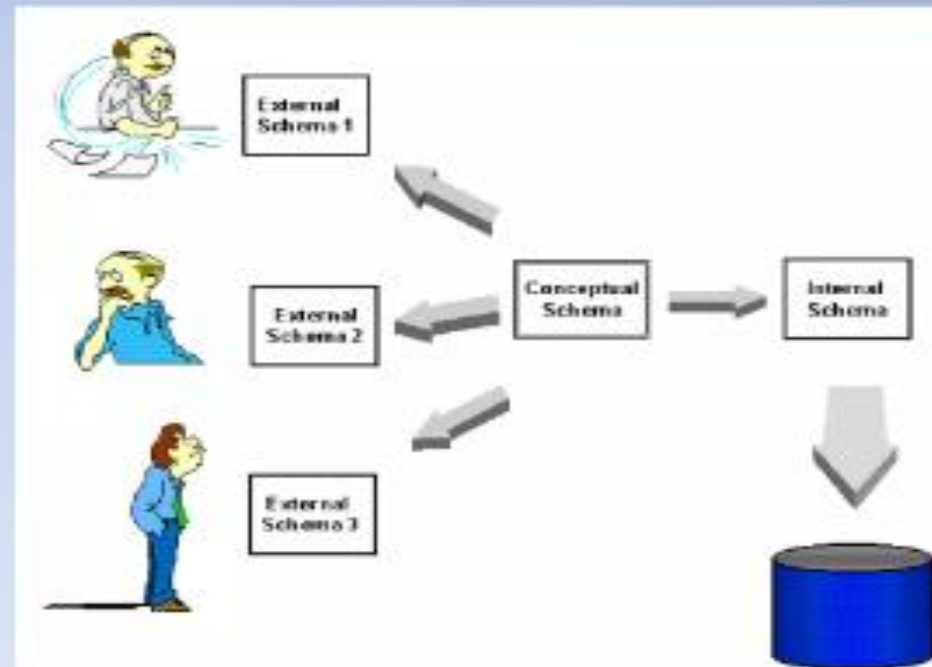
Cont…

1. Physical Schema:

-Describes the physical storage of database.

-Not in terms of blocks or devices, but describes organization of files, access path etc.

2. Conceptual Schema:

-Describes structure of whole database.

-Describes entities their relationships and constraints.

3. External Schema:

-Provides a user's view of data.

-Shows relevant info particular to user, hides rest of the info.

-one or more levels.

➤ **Instances:** Actual data contained in database at a particular point of time.
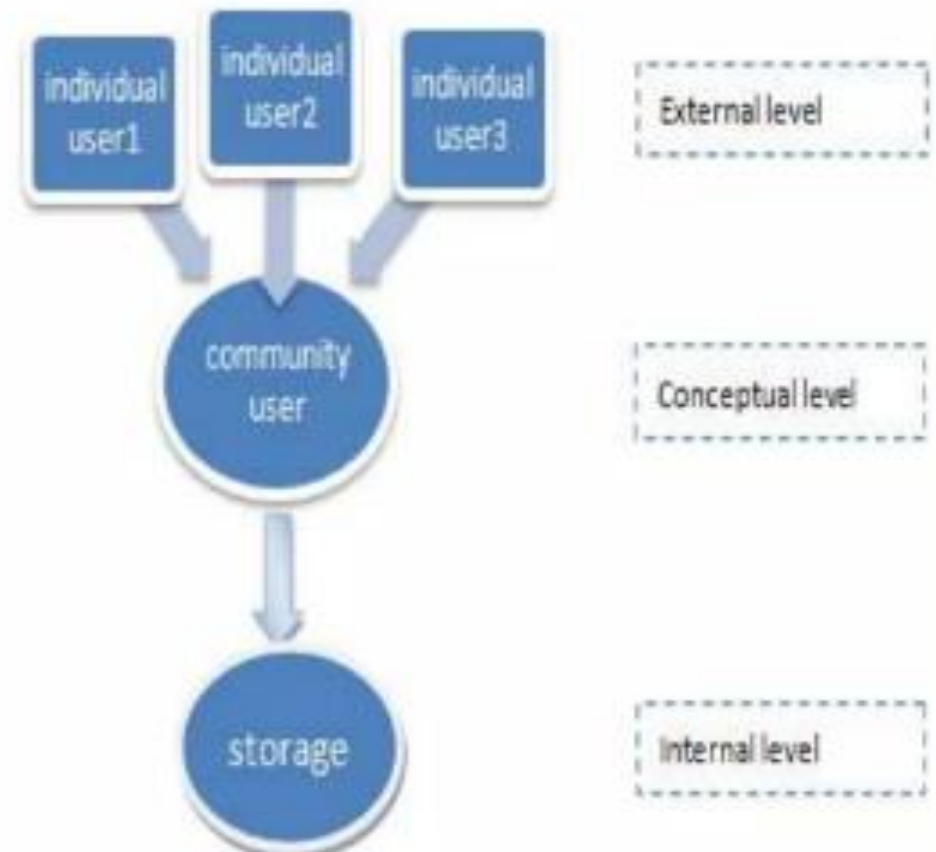
Differences betwen DBMS and RDBMS

DBMS

- Data is stored in a single large table
- Single record modification affects the whole database

RDBMS (Codd 1980)

- Database is 'broken down' into smaller pieces
- The changes will not affect the entire database

Features of RDBMS

1.Tabular Structure:

1. Data is organized into tables, also known as relations.

2. Each table consists of rows (tuples) and columns (attributes).

2.Data Integrity:

1. RDBMS enforces data integrity through constraints such as primary keys, foreign keys, unique constraints, and check constraints.

2. Primary keys uniquely identify each record in a table, and foreign keys establish relationships between tables.

Features of RDBMS

3 . Normalization:

    1. Normalization is the process of organizing data to reduce redundancy and

       dependency.

    2. It helps in maintaining data consistency and reduces the chances of anomalies.

4. ACID Properties:

    1. RDBMS systems adhere to the ACID properties: Atomicity, Consistency, Isolation,

       and Durability, to ensure the reliability of transactions.

5. SQL (Structured Query Language):

    1. RDBMS uses SQL as the standard language for defining and manipulating data.

    2. SQL allows users to query, insert, update, and delete data in the database.

Features of RDBMS

6. **Data Independence:**

    1. RDBMS provides a high level of data abstraction, allowing changes to the database structure (schema) without affecting the application programs.

7. Data Relationships:

    1. The relationships between tables are established using foreign keys, allowing for the representation of complex data associations.

8. **Transaction Management:**

    1. RDBMS ensures the integrity of transactions by providing features such as commit and rollback.

    2. Transactions are units of work that are either completed in their entirety or not at all.

Steps for designing RDBMS

❑ Define the Purpose and Scope:

❑ Gather Requirements:

❑ Conceptual Design:

❑ Normalize Data:

❑ Define Entities and Relationships:

❑ Attribute Definition:

❑ Create the Logical Data Model

❑ Refinement and Iteration:

❑ Normalization Refinement:

❑ Define Views and Indexes:

❑ Define Security and Access Controls:

❑ Physical Design

❑ Implementation:

❑ Data Loading:

❑ Testing

Example: 1

In the given table, CustomerID is a key attribute of Customer Table. It is most likely to have a single key for one customer, CustomerID =1 is only for the CustomerName =" Google".

Example: 2
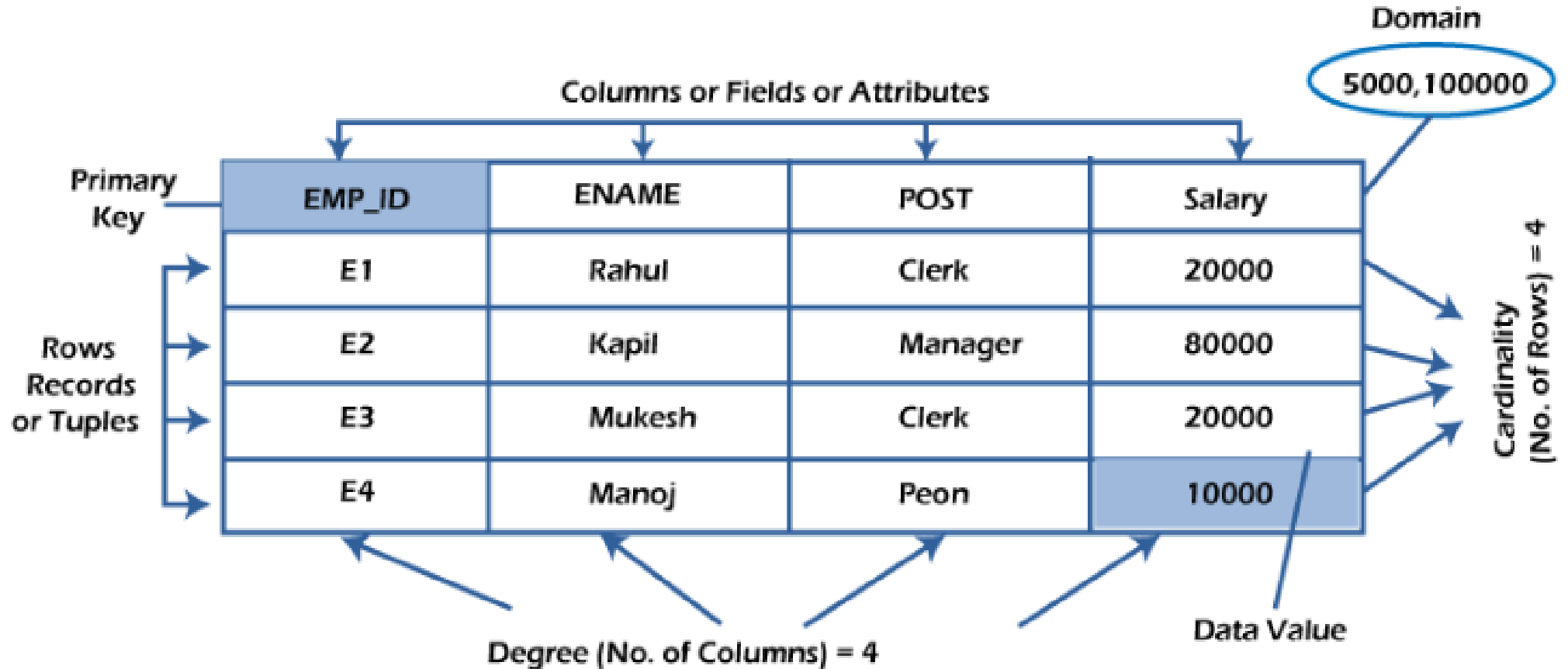
- Each relation has a unique name by which it is identified in the database.
- Relation does not contain duplicate tuples.

- The tuples of a relation have no specific order.
- All attributes in a relation are atomic, i.e., each cell of a relation contains exactly one value.
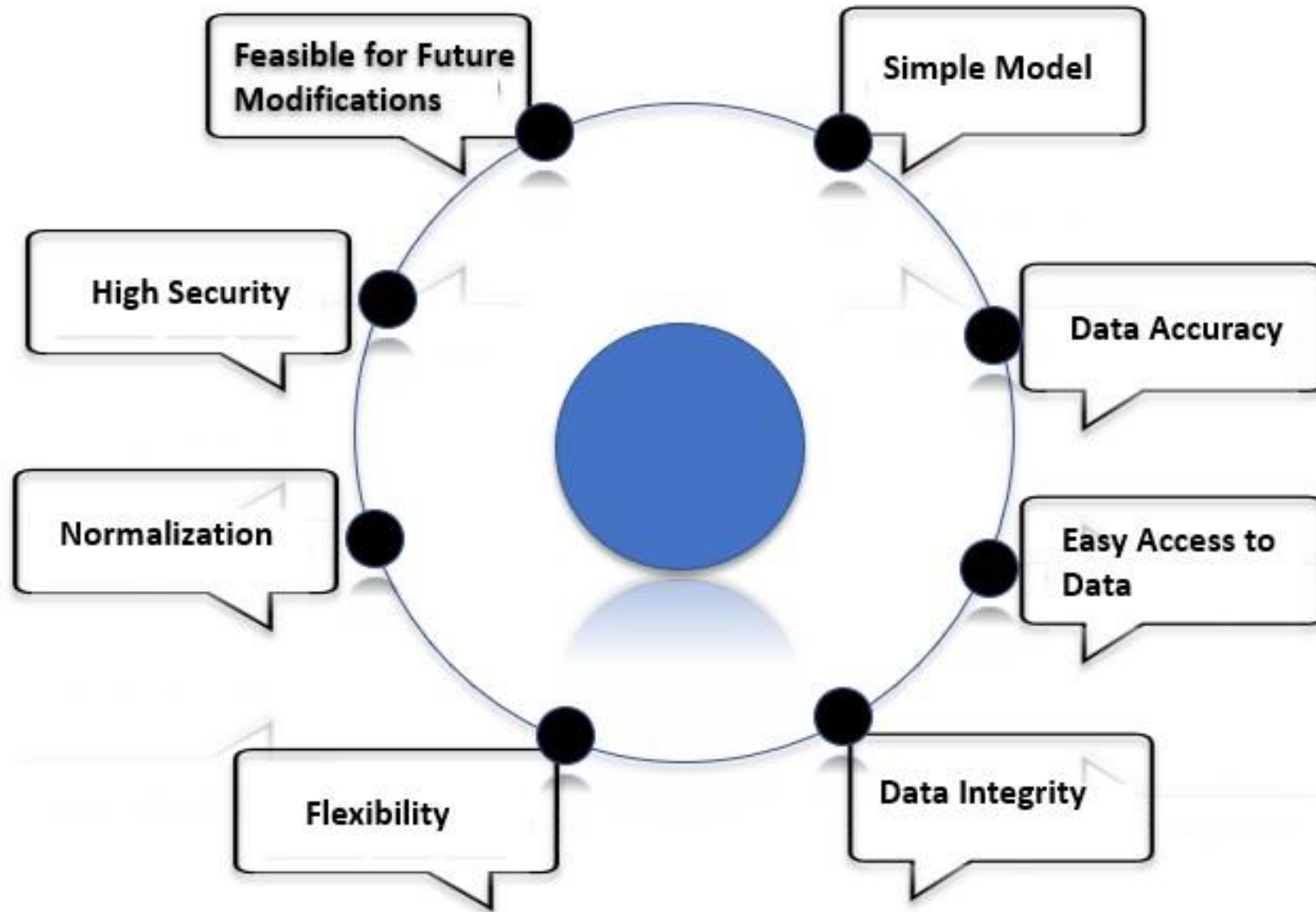
DBMS	RDBMS
• DBMS stands for "Database Management System".	• RDBMS stands for "Relational Database Management System".
• DBMS technology stores the data in the form of files.	• RDBMS stores the data in the form of tables.
• DBMS is designed to handle small amounts of data.	• RDBMS is designed to deal with vast amount of data.
• DBMS provides support only for a single user at a time.	• RDBMS provides support for multiple users at a time.

Advantages of RDBMS

Thank You