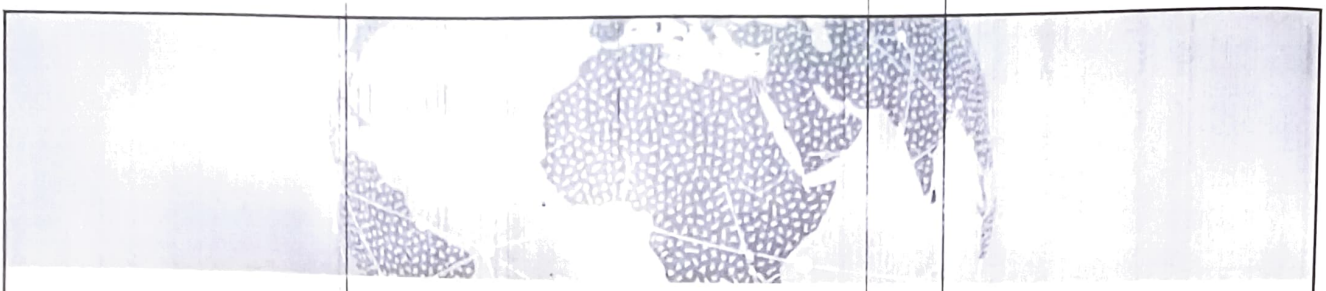


Conclusion: The Enduring Role of DBMS

- ***Essential Foundation:*** *DBMS is critical for modern data management and business operations.*
- ***Structured Efficiency:*** *Provides secure, structured, and efficient handling of vast datasets.*
- ***Diverse Applications:*** *Powers everything from banking systems to social media platforms.*
- ***Continuous Evolution:*** *Adapts with new models and technologies to meet future data demands.*

PURPOSE & ADVANTAGES OF DBMS

Data Management

Eliminates redundancy and inconsistency, centralizing data for better control.

Security & Integrity

Ensures data accuracy, consistency, and protection through robust security features.

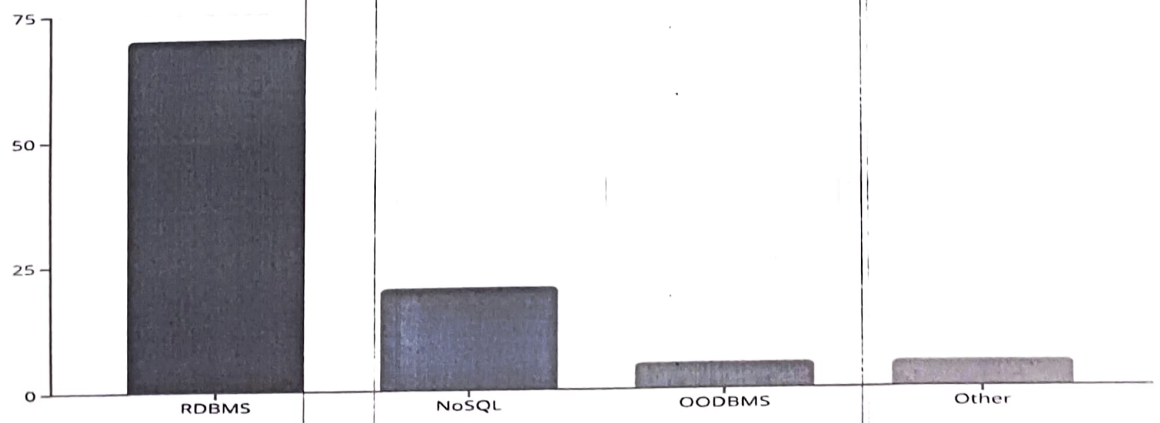
Concurrent Access

Manages simultaneous access for multiple users without compromising data.

Faster Development

Reduces application development time and simplifies maintenance, boosting productivity.

MOST USED DBMS



TYPES OF DBMS

Relational DBMS (RDBMS)

Uses tables with rows and columns, primarily SQL-based, like MySQL and Oracle.

NoSQL DBMS

Features flexible schemas and handles unstructured data, such as MongoDB and Cassandra.

Object-Oriented DBMS

Stores data as objects and supports complex data types, for example, ObjectDB.

Other Types

Includes Hierarchical, Network, Columnar, and Distributed DBMS for specialized needs.

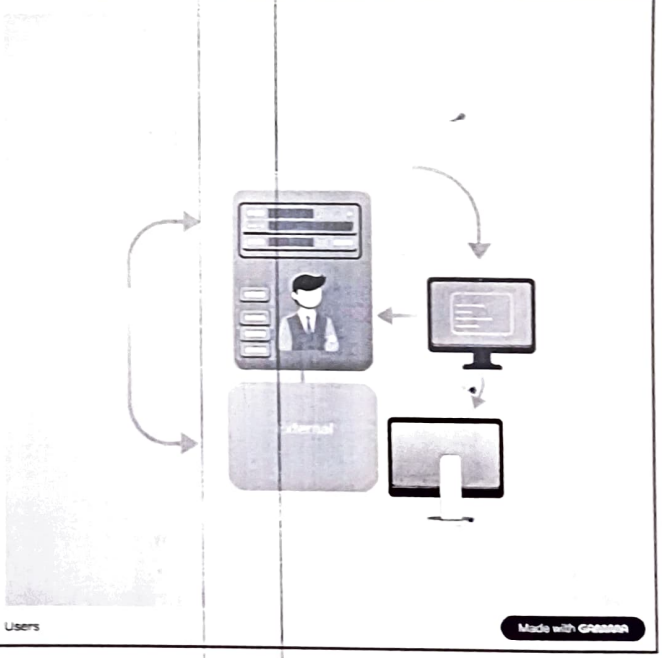
DATABSE ARCHITECTURE AND COMPONENTS

Three-Tier Architecture

- *Physical Level: How data is stored.*
- *Logical Level: Data structure & relationships.*
- *View Level: User-specific data views.*

Key Components

- *User Interface*
- *Data Manager*
- *File Manager*
- *Disk Manager*



CORE FUNCTIONS OF A DBMS

Data Definition

Creating and modifying database schemas using DDL.

Data Manipulation

Inserting, updating, and deleting data with DML.

Data Retrieval

Querying data efficiently using SELECT statements.

Access Control

Managing user permissions and ensuring data security.

Backup & Recovery

Protecting data from loss and ensuring quick restoration.

Concurrency Control

Handling simultaneous user transactions smoothly.

DATABSE LANGUAGES

Data Definition Language (DDL)

*Defines and modifies the database schema. Commands include **CREATE**, **ALTER**, and **DROP**.*

Data Manipulation Language (DML)

*Used for querying and modifying data. Key commands are **SELECT**, **INSERT**, **UPDATE**, and **DELETE**.*

Data Control Language (DCL)

*Manages user permissions and access control. Includes **GRANT** and **REVOKE** commands.*

Transaction Control Language (TCL)

*Manages transactions within the database. Commands like **COMMIT**, **ROLLBACK**, and **SAVEPOINT**.*

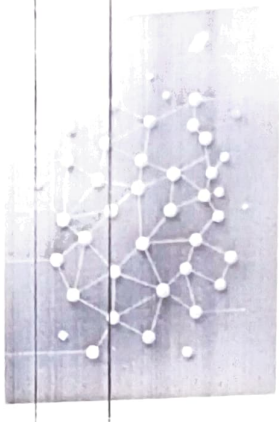
DBMS VS TRADITIONAL FILE SYSTEMS

Traditional File Systems

- *Data Redundancy: Duplicated information across files, leading to inconsistencies.*
- *Limited Sharing: Difficult for multiple users to access and modify data concurrently.*
- *Weak Security: Basic OS-level security, lacking granular access controls.*
- *No Data Integrity: No built-in rules to ensure data accuracy and validity.*

Database Management Systems (DBMS)

- *Reduced Redundancy: Centralized storage minimizes data duplication.*
- *Enhanced Sharing: Supports simultaneous access for multiple users and applications.*
- *Robust Security: Granular access control, encryption, and audit trails.*
- *Data Integrity: Enforces rules and constraints for consistent and accurate data.*



KEY COMPONENTS OF DBMS

- ***Hardware:*** *Physical storage devices (disks, servers).*
- ***Software:*** *DBMS programs and utilities for management.*
- ***Data:*** *Actual stored information plus metadata (data about data).*
- ***Procedures:*** *Rules and instructions for database use.*
- ***Query Languages:*** *SQL, DDL, DML, DCL, TCL for data operations.*
- ***Users:*** *DBAs, developers, and analysts with varied access levels.*

WHAT IS A DBMS AND ITS PURPOSE

System for Data Management

A DBMS is a software system designed to create, define, and manipulate databases.

Ensures Data Integrity

It minimizes data redundancy and enforces data integrity and security rules.

Supports Multi-User Access

The system supports concurrent access for multiple users while maintaining data consistency.

Real-World Application

For instance, a university database uses a DBMS to manage students, faculty, and course information.

WHY USE A DBMS?

A DBMS offers significant advantages over traditional file systems, ensuring efficient, secure, and reliable data management for modern applications.

Enhanced Security

Robust features to protect data from unauthorized access and ensure privacy.

Improved Data Sharing

Facilitates easy and concurrent access for multiple users and applications.

Data Integrity & Consistency

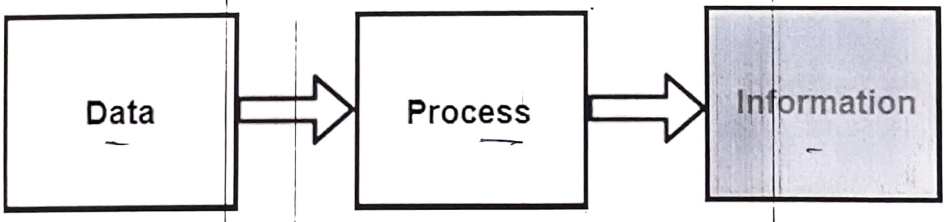
Minimizes redundancy and ensures data accuracy and reliability.

Understanding Database Management Systems (DBMS)

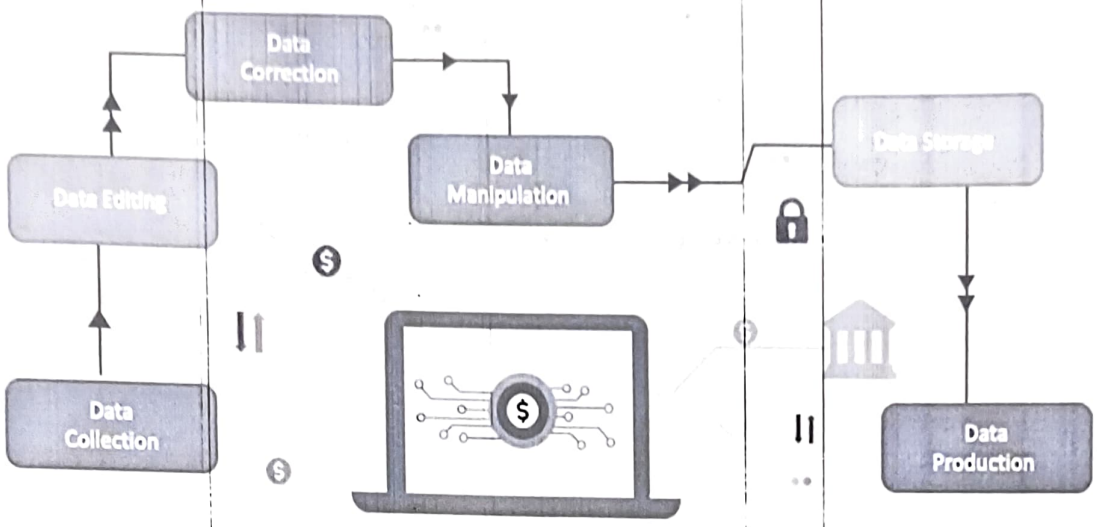
A Database is a collection of related data of information that is stored in a computer system

DATA

- What is data?
  A set of character collected for a specific purpose.
- Binary digit
- Datum
- Data Processing
- Processed Data
  - Accuracy
  - Completeness



DATA TRANSACTION PROCESSING SYSTEM



DATABASE

- **What is Database?**
  A database is an organized collection of data stored electronically, designed for efficient management, retrieval, and manipulation to meet specific needs and applications.

- **Ex Facebook, Banking, ATM, Online Ticket Resv.**

- **Software (Ex MS Excel)**

- **As the group of Data becomes Information, in the same way group of information becomes Database.**