

Task 1

Database Search and Reporting

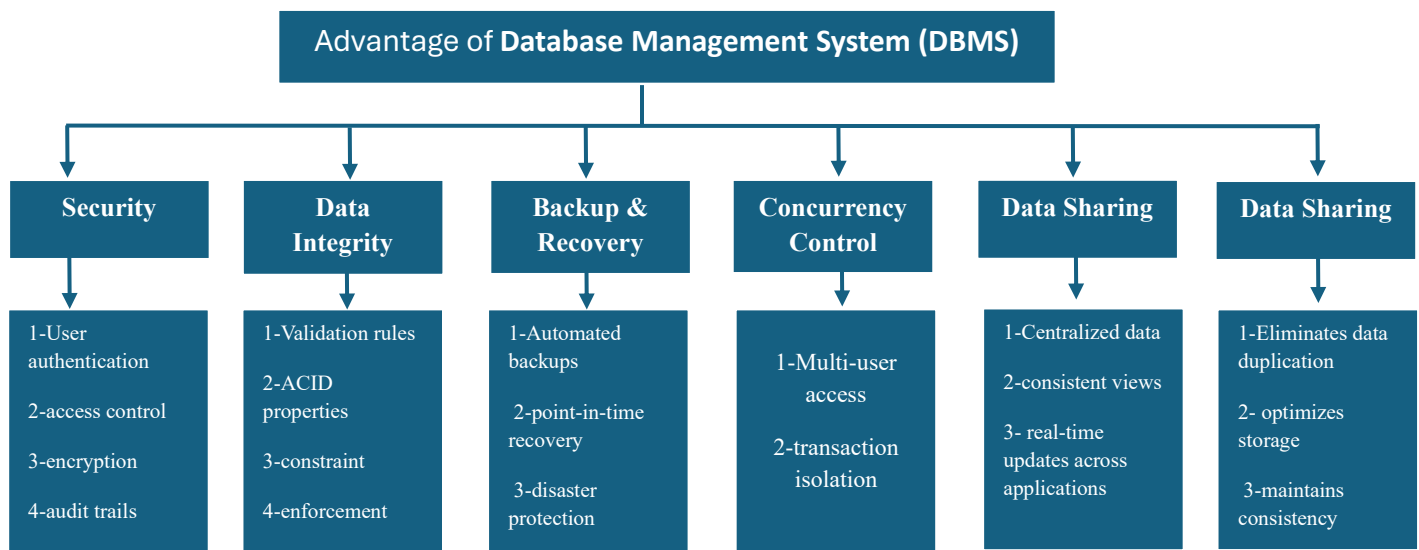
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Database Course Documentation Report

1. Flat File Systems vs. Relational Databases

Aspect	Flat File Systems	Relational Databases
Structure	Single table, plain text files	Multiple interconnected tables
Data Redundancy	High - data repeated	Low - normalized structure
Relationships	No built-in relationships	Primary/foreign key relationships
Example Usage	Contact lists, logs	Banking systems, e-commerce
Drawbacks	Data inconsistency, hard to maintain	Complex setup requires expertise

2. DBMS Advantages



3. Database System Roles

System Analyst – Gathers business requirements and designs system workflows.

Database Designer – Plans how data will be structured and connected.

Database Developer – Builds the database using SQL and implements complex logic.

Database Administrator (DBA) – Maintains, secures, and optimizes the database.

Application Developer – Creates the apps users interact with, connecting to the database.

BI Developer – Builds reports and dashboards to help businesses make sense of their data.

4. Types of Databases

1- Relational vs. Non-Relational Databases

- **Relational Databases** use structured tables with rows and columns. They rely on SQL and are great for data with clear relationships.
Examples: MySQL, PostgreSQL
Use Case: Banking systems, HR databases, inventory tracking.
- **Non-Relational Databases (NoSQL)** store data in flexible formats like documents or key-value pairs.

MongoDB: Document-based, ideal for dynamic or semi-structured data.

Cassandra: Wide-column store, built for high scalability and fault tolerance

Use Case: Real-time analytics, IoT platforms, content delivery networks.

2- Centralized vs. Distributed vs. Cloud Databases

- **Centralized Database:** All data is stored in one location.
Use Case: Small businesses, internal tools with limited access needs.
- **Distributed Database:** Data is spread across multiple locations but appears unified.
Use Case: Global applications, e-commerce platforms, systems needing high availability.
- **Cloud Database:** Hosted on cloud platforms like AWS, Azure, or Google Cloud. Offers scalability, remote access, and managed services.
Use Case: SaaS apps, mobile backends, modern web services.

5. Cloud Storage and Databases

- What is Cloud Storage and how does it support database functionality?

Cloud storage is a service that stores data on remote servers accessible via the internet. It supports database functionality by:

- Hosting backups and snapshots of databases
- Storing large unstructured data (e.g., images, logs) referenced by databases
- Acting as a data lake for analytics and machine learning

-Advantages of Cloud-Based Databases

Examples: *Azure SQL, Amazon RDS, Google Cloud Spanner*

- **Scalability** – Easily adjust resources based on demand
- **High Availability** – Built-in redundancy and failover support
- **Cost Efficiency** – Pay-as-you-go pricing reduces upfront costs
- **Automatic Maintenance** – Providers handle updates, backups, and patches
- **Global Access** – Accessible from anywhere with internet
- **Security** – Encryption, access control, and compliance features

- Disadvantages or Challenges

- **Security Concerns** – Sensitive data stored offsite may raise compliance issues
- **Downtime Risks** – Internet or provider outages can affect access
- **Vendor Lock-In** – Switching providers can be complex and costly
- **Cost Surprises** – Usage-based billing may lead to unexpected charges
- **Limited Customization** – Less control over low-level configurations