Database Search and Reporting

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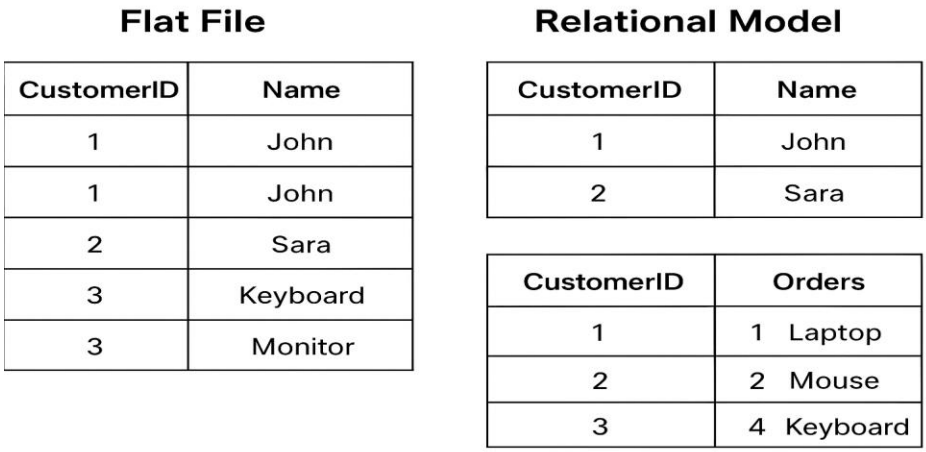
1. Comparison Assignment: Flat File Systems vs. Relational Databases

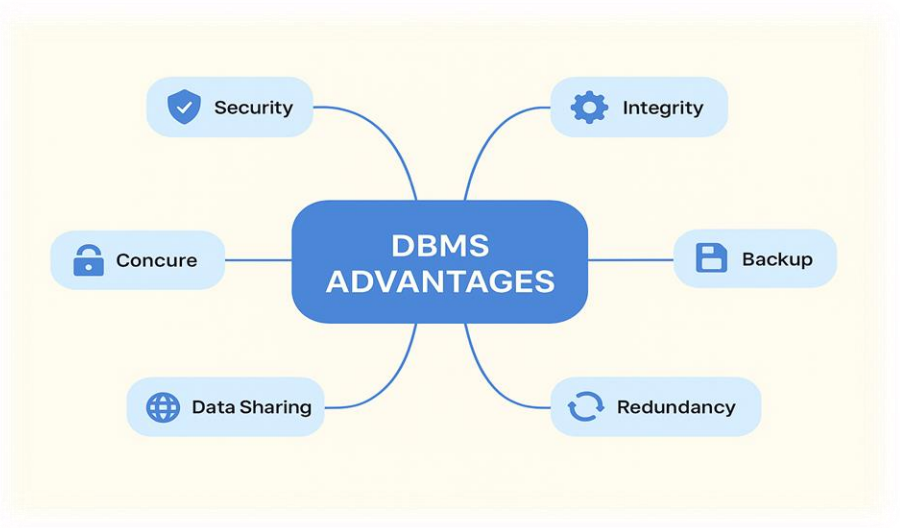
Feature	Flat File System	Relational Database
Structure	Stores data in plain text files with no defined schema.	Organized into tables with rows and columns.
Data Redundancy	High; duplication across multiple files.	Low; normalization reduces redundancy.
Relationships	None; files are independent.	Supports relationships using primary and foreign keys.
Example Usage	Configuration files, small address books.	Banking, e-commerce, enterprise systems.
Drawbacks	Hard to maintain, lacks integrity and querying.	Setup complexity requires DBMS management.



2. DBMS Advantages – Mind Map

A Database Management System (DBMS) offers multiple advantages that make data handling efficient, secure, and reliable.

The mind map below illustrates the key benefits:



- **Security:** Controlled access through authentication and authorization.
- **Integrity:** Ensures accurate and consistent data.
- **Backup:** Automated and regular data backups.
- **Redundancy:** Minimizes duplication of data.
- **Concurrency:** Multiple users can access the database simultaneously.
- **Data Sharing:** Easy sharing across departments or users.

3. Roles in a Database System

Role	Description
System Analyst	Analyzes business requirements and defines what the database must accomplish.
Database Designer	Designs logical and physical database models (schemas, ER diagrams).
Database Developer	Implements the database/ creates tables, queries, and stored procedures.
Database Administrator (DBA)	Maintains, secures, and optimizes the database system.
Application Developer	Builds applications that interact with the database.
BI (Business Intelligence) Developer	Creates dashboards, reports, and data visualizations for decision-making.

4. Types of Databases

Relational vs. Non-Relational Databases

Type	Description	Examples	Use Case
Relational (SQL)	Structured tables and predefined schemas.	MySQL, PostgreSQL	Finance systems, CRMs
Non-Relational (NoSQL)	Schema-less and flexible (documents, key-value pairs).	MongoDB, Cassandra	IoT, social media apps

Centralized vs. Distributed vs. Cloud Databases

Type	Description	Examples	Use Case
Centralized	All data stored on one server.	IBM Db2	Small business systems
Distributed	Data split across multiple locations or servers.	Google Bigtable	Large-scale analytics
Cloud	Hosted online; scalable and managed by providers.	Amazon RDS, Azure SQL, Google Cloud Spanner	Web apps, SaaS platforms

5. Cloud Storage and Databases

What is Cloud Storage?

Cloud storage allows users to store and access data over the internet instead of local servers. It supports database functionality by providing scalable, reliable, and managed hosting environments.

Advantages of Cloud Databases:

- **Scalability:** Easily adjust capacity and resources.
- **Automatic Backups:** Simplified disaster recovery.
- **Global Accessibility:** Data available from anywhere.
- **Cost Efficiency:** Pay-as-you-go pricing models.
- **Integration:** Connects easily with AI, analytics, and other cloud tools.

Disadvantages / Challenges:

- **Data Security Risks:** Reliance on third-party providers.
- **Downtime Dependency:** Internet or service outages affect access.
- **Limited Control:** Provider manages infrastructure and updates.
- **Long-term Costs:** Costs can increase with large-scale data or long usage.

Popular Cloud Database Services

Provider	Service	Description
Microsoft Azure	Azure SQL Database	Managed relational database with AI optimization.
Amazon Web Services (AWS)	Amazon RDS	Multi-engine support (MySQL, PostgreSQL, Oracle).
Google Cloud	Cloud Spanner	Global-scale relational database with horizontal scalability.