

Database Course Documentation

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AI – Operations

Database Course Documentation

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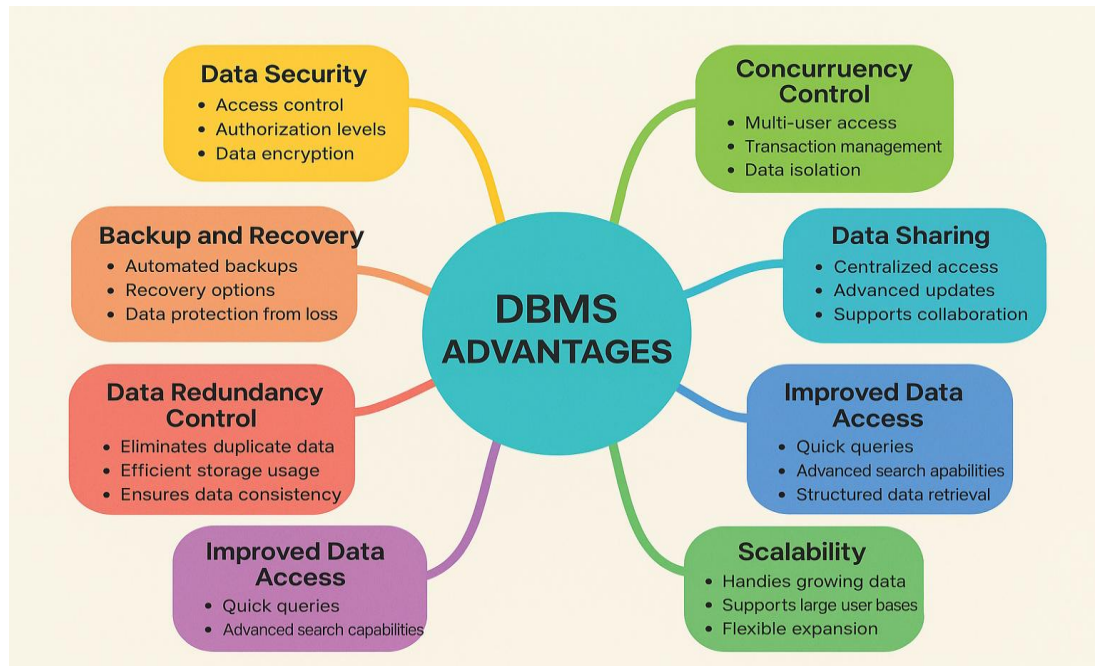
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1. Comparison:

Flat File Systems vs. Relational Databases

Feature	Flat File Systems	Relational Databases
Structure	Simple files like CSV, Excel	Tables with rows and columns
Data Redundancy	High redundancy	Low redundancy
Relationships	No support for relationships	Supports complex relationships
Example Usage	Text files, spreadsheets	MySQL, Oracle, SQL Server
Drawbacks	Hard to manage, not scalable	More complex setup, requires DBMS

2. DBMS Advantages Mind Map



3. Roles in a Database System

System Analyst

- Understands user needs and converts them into system requirements.

Database Designer

- Designs the database structure and relationships.

Database Developer

- Builds the database using SQL or other programming languages.

Database Administrator (DBA)

- Manages, secures, and maintains the database.

Application Developer

- Develops applications that interact with the database.

BI (Business Intelligence) Developer

- Creates dashboards and reports using database data for business insights.

4. Types of Databases

Relational vs. Non-Relational Databases

- **Relational Databases**
 - Example: MySQL, Oracle
 - Structure: Tables with rows and columns
 - Use Case: Banking, Inventory Management
- **Non-Relational Databases**
 - Example: MongoDB, Cassandra
 - Structure: Document-based, key-value pairs, or wide-column stores
 - Use Case: Big data, Real-time analytics, Content management systems

Centralized vs. Distributed vs. Cloud Databases

- **Centralized Database**
 - Example: Traditional single-server setup
 - Use Case: Small organizations with localized data access
- **Distributed Database**
 - Example: Cassandra, Google Spanner
 - Use Case: Multi-location companies needing fast access
- **Cloud Database**
 - Example: Google Cloud Spanner, Amazon RDS, Azure SQL
 - Use Case: Scalable, global applications, SaaS platforms

5. Cloud Storage and Databases

What is Cloud Storage?

- Cloud storage is a service that allows data to be stored and accessed over the internet instead of on local servers.

How Cloud Supports Databases

- Cloud storage provides scalable, remote data storage for cloud-based databases, making them accessible from anywhere with an internet connection.

Advantages of Cloud Databases

- Easy scalability
- High availability
- Automatic backups
- Reduced infrastructure costs
- Easy maintenance

Disadvantages of Cloud Databases

- Potential security risks
- Internet dependency
- Possible higher costs over time

Examples

- Azure SQL
- Amazon RDS
- Google Cloud Spanner