DATABASE
REPORT

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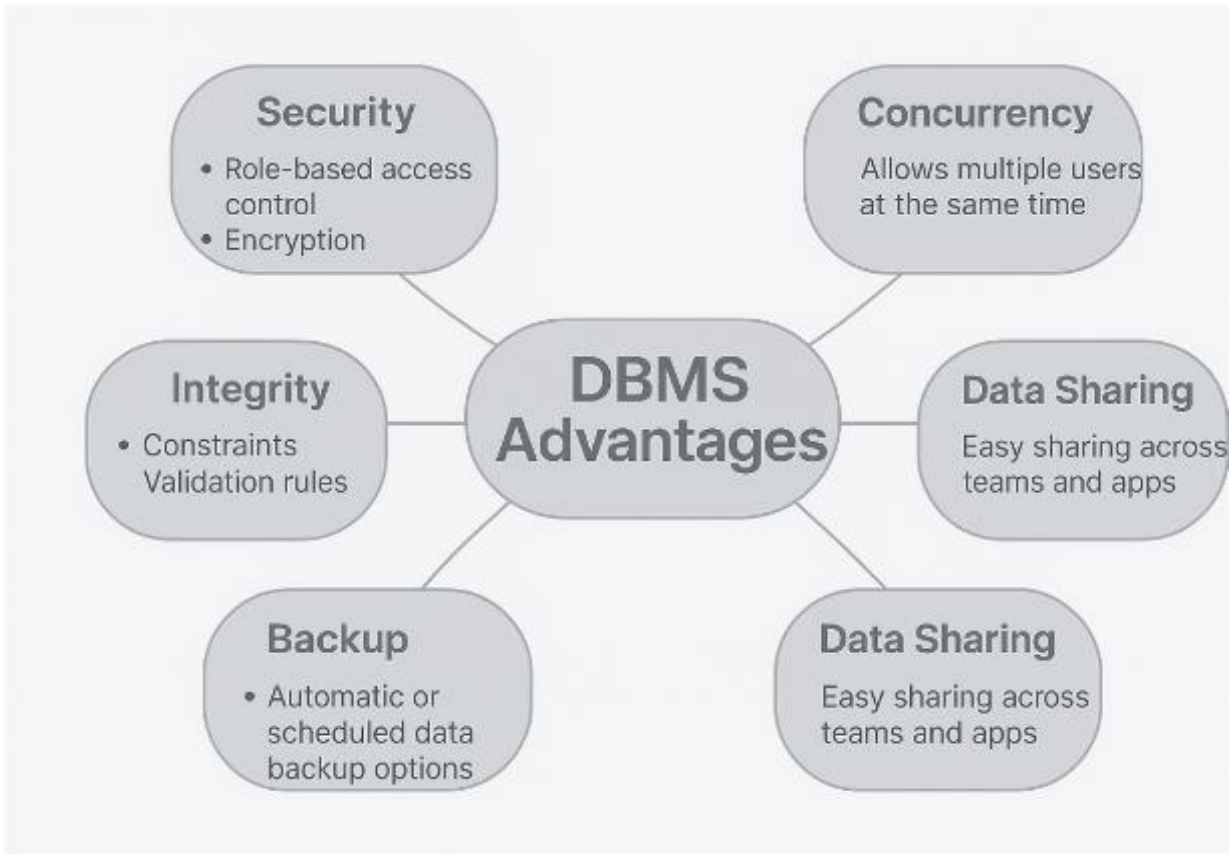**DATE**

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Flat file system vs relational database system

FEATURE	Flat File System	Relational Database System
Structure	stores data in plain file text or binary CSV, TSV with a basic structure and no relationship	Organized into multiple structured tables (relations) with Columns, rows, types, and keys and SQL is used for querying .
Data Redundancy	High redundancy— same data (e.g. names, addresses) often repeated in each record. No normalization .	Low redundancy separate tables connected by keys (PK/FK), eliminating duplication and anomalies .
Relationships	No relationships, any new linking must be manually coded	Strong relationship – primary keys link to foreign keys to relate tables.
Example Usage	small personal datasets, logs, data interchange— simple scenarios	business applications (e.g. e-commerce, banking, school records), multi-user systems, analytics dashboards
Drawbacks	- Slow searches on large files - Duplicated data - Hard to back up - Multiuser modification is not possible	Requires DBMS setup (installation, schema design, SQL knowledge, transactions)

2. DBMS ADVANTAGES – MIND MAP

Security
- Role-based access control
- Encryption

Concurrency
Allows multiple users at the same time

Integrity
- Constraints Validation rules

DBMS Advantages

Data Sharing
Easy sharing across teams and apps

Backup
- Automatic or scheduled data backup options

Data Sharing
Easy sharing across teams and apps

3. ROLES IN A DATABASE SYSTEM

☐ System Analyst: Analyzes business requirements and defines data needs. Acts as a bridge between business users and technical teams.

☐ Database Designer: Designs database schemas, sets normalization rules, defines tables, relationships, constraints, and indexes.

☐ Database Developer: Writes SQL queries, stored procedures, and functions. Implements database design using code.

☐ Database Administrator (DBA): Manages database installation, security, backup, performance, and recovery.

☐ Application Developer: Builds front-end and back-end apps that interact with the database through APIs or direct queries.

☐ BI Developer: Creates dashboards, reports, and analytics tools. Extracts insights from data using visualization platforms.

4. TYPES OF DATABASE:

Relational vs. Non-Relational (NoSQL) Databases

Relational Database:
- Store data in fixed-schema tables (relations) with uniform rows and columns, enforcing structure and consistency
- Support robust querying (SQL), normalization, and ACID transactions

Non-Relational:
Schema-free, flexible data models: key-value, document, graph

- Example: MongoDB and Cassandra are document and column-store types, respectively.

Examples of non-relational database:

MongoDB: Stores hierarchical data in JSON-like documents; ideal when schema varies greatly
Cassandra: Designed for distributed, high-write workloads, offering eventual consistency via LSM-tree storage

5. Cloud Storage and Databases
Cloud storage refers to storing data on remote servers accessed via the internet. It supports database functionality by providing scalable, accessible, and secure infrastructure for hosting databases. Instead of maintaining physical servers, organizations can store and manage databases on cloud platforms, which offer automatic backups, high availability, and flexible resource management.

Advantages of using cloud-based databases:
Easy scalability to handle growing data volumes
High availability and disaster recovery options
Reduced infrastructure and maintenance costs

Disadvantages or challenges with cloud-based databases:
Dependence on internet connectivity
Potential latency issues
Security and data privacy concerns