Database-Course-Documentation

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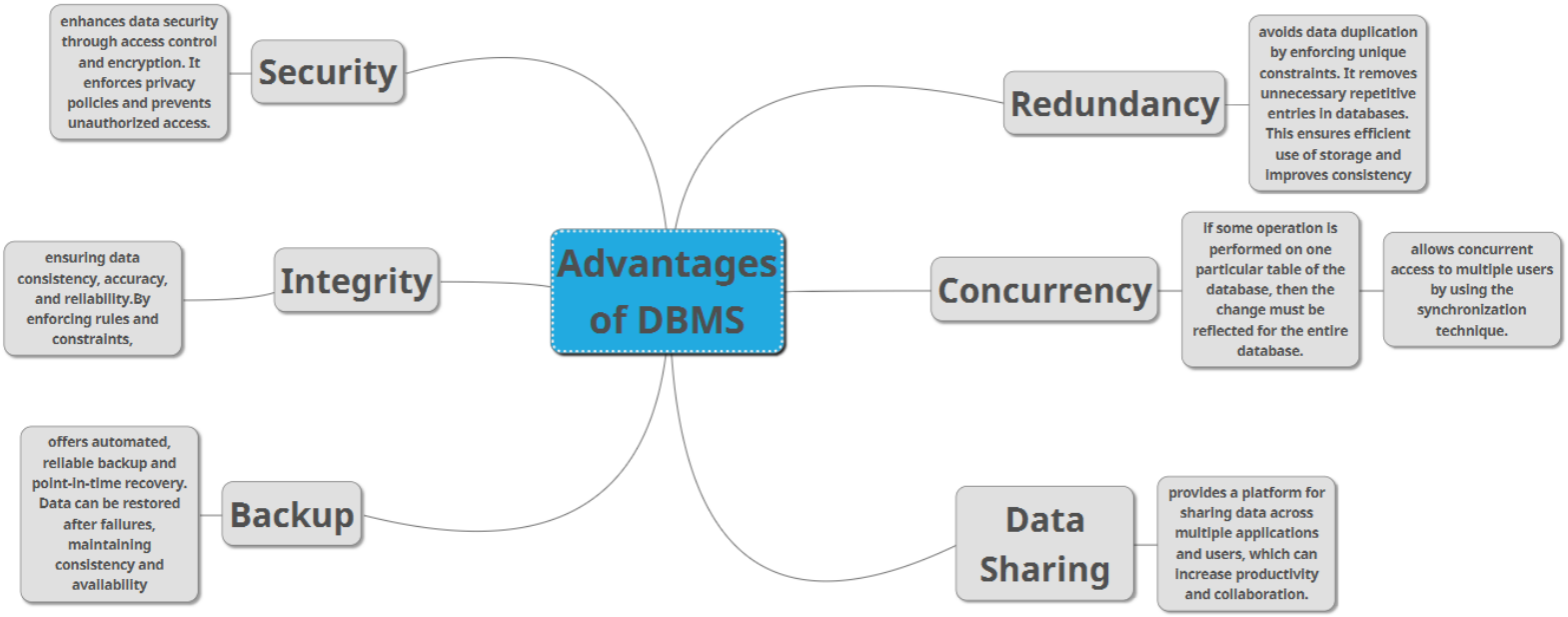
Flat File Systems vs. Relational Databases

Feature	Flat File Systems	Relational Databases
Structure	A spreadsheet with rows and columns, where each row represents a record and each column represents a field. Is an example of data kept in plain text, where all information is contained within a single file.	type of database that stores and provides access to data points that are related to one another. Data stored in structured tables with rows, columns,
Data Redundancy	High – because of the duplication of the same data across multiple records or files	Low – due to Normalization that involves organizing tables and columns to minimize data redundancy
Relationships	Non-existent – because the data are limited meaning it has only rows and columns and the data relationship between them does not exist.	Exist – tables can be connected with other tables. There are multiple forms of connection (one-to-one , one-to-many and many-to-many).
Example Usage	Spreadsheets	Banks, Airports , Hospitals
Drawbacks	Hard to scale, vulnerable to error	Must know SQL for query , require great knowledge of design a database.

Advantages of DBMS



Roles in a Database System:

1. **System Analyst**:
    - Understanding User Needs and Business Requirements
    - Implementing Solutions
    - Ensuring System Quality
2. **database designer**:
    - responsible for defining the detailed database design,
    - including tables, indexes, views, constraints, triggers, stored procedures
    - database-specific constructs needed to store, retrieve, and delete persistent objects
3. **Database Developer:**
    - designs, builds, tests and maintains databases.
    - Database developers create relational database management systems (RDBMS), which store and manage data.
    - They also develop methods of keeping data secure and up-to-date as well as identify trends within the database to help improve it.
4. **Database Administrator (DBA):**
    - responsible for database security, backups, recovery plans and optimization.
    - monitor database performance and troubleshoot errors.
    - maintain database systems by administering patches, updates and upgrades.
    - They plan database capacity and storage requirements.
5. **Application Developer:**
    - Database Application Design and Development
    - Database Structure Design
    - SQL Code Development
    - Application Tuning and Optimization
    - Collaboration with DBAs
6. **BI (Business Intelligence) Developer**:
    - Designing and Developing BI Solutions
    - Data Extraction and Transformation
    - Collaboration
    - Data Visualization

References:

- https://www.geeksforgeeks.org/dbms/advantages-of-database-management-system/
- Gemini
- ChatGPT
- https://home.iscte-iul.pt/~hro/RUPSmallProjects/core.base_rup/roles/rup_database_designer_524DC34F.html#:~:text=The%20database%20designer%20is%20responsible,in%20the%20Artifact:%20Data%20Model.
- https://www.revelo.com/blog/database-developer