Database Course Documentation

1. Flat File Systems vs. Relational Databases

Feature	Flat File System	Relational Database
Structure	Stores data in plain text files	Tables with schema
Data Redundancy	High, data often repeated	Low, normalized
Relationships	None	Primary/Foreign keys
Example Usage	Excel, CSV logs	Banking, Inventory
Drawbacks	Prone to errors, not scalable	More complex setup

2. DBMS Advantages - Mind Map

The mind map includes advantages like:

- Security: Controls access to data

- Integrity: Ensures data accuracy

- Backup: Prevents data loss

- Redundancy: Avoids repeated data

- Concurrency: Supports multi-user access

- Data Sharing: Enables collaboration

[Insert mind map image here: dbms_mindmap.png]

3. Roles in a Database System

- System Analyst: Understands business needs and plans systems.

- Database Designer: Designs data structure and schema.

- Database Developer: Implements database logic, queries.

- Database Administrator (DBA): Manages and secures databases.

- Application Developer: Builds applications that use the database.

- BI Developer: Creates reports and dashboards from data.

4. Types of Databases

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Relational vs. Non-Relational:

- Relational Databases (RDBMS): Store data in structured tables. Examples: MySQL, PostgreSQL.

- Non-Relational Databases (NoSQL): Flexible formats like documents, key-value pairs. Examples: MongoDB, Cassandra.

Centralized vs. Distributed vs. Cloud Databases:

- Centralized: All data stored in one location. Easier to manage, but risk of single point of failure.

- Distributed: Data spread across multiple locations/servers. Improves speed, fault tolerance.

- Cloud: Hosted on cloud platforms (e.g., AWS, Azure). Scalable and accessible globally.

Use Case Examples:

- Relational: Banking systems (strict structure).

- Non-Relational: Social media (unstructured, flexible data).

- Distributed: E-commerce platforms (fast response globally).

- Cloud: Startups and scalable apps using Amazon RDS or Google Firestore.

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5. Cloud Storage and Databases

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What is Cloud Storage?

- Cloud storage refers to saving data on remote servers accessed via the internet. It supports

  database hosting by allowing on-demand access to storage, backup, and scalability.

Advantages of Cloud-Based Databases:

- Easy to scale resources up or down.

- Accessible from anywhere with an internet connection.

- Automatic updates, security patches, and maintenance.

- Examples: Amazon RDS, Azure SQL, Google Cloud Spanner.

Disadvantages or Challenges:

- Requires stable internet connection.

- Can get expensive as data grows.

- Security concerns if not properly managed.

- Potential vendor lock-in (hard to switch providers).