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**IT5507 – Fundamentals of Data Science – Lab 2.1**

**Review Questions:**

1. **Difference Between Data and Information:**
   * Explain the distinction between data and information. Provide examples to illustrate your points.
2. **Types and Importance of Databases:**
   * Describe the various types of databases based on users, location, and data types. Why are databases considered valuable assets for decision-making?
3. **Importance of Database Design:**
   * Elaborate on the significance of well-designed databases. How does a good database design contribute to efficient data management and decision-making?
4. **Evolution of Databases from File Systems:**
   * Discuss how modern databases evolved from file systems. What were the flaws in file system data management that necessitated the development of databases?
5. **Components and Functions of Database Management System (DBMS):**
   * Outline the main components of a database system and describe the primary functions of a Database Management System (DBMS).

**Mini Case 1: Improving Efficiency with Multiuser Databases**

*Scenario:* A small company currently uses a single-user database for managing customer information. The business is growing, and they are considering transitioning to a multiuser database.

*Questions:*

1. What are the advantages of transitioning from a single-user to a multiuser database for the company's customer information management?
2. How can a multiuser database system improve efficiency and support the company's growth?

**Mini Case 2: Choosing Between Centralized and Distributed Databases**

*Scenario:* A multinational corporation is evaluating its database infrastructure. Currently, they use a centralized database system, but they are contemplating the switch to a distributed database due to global operations.

*Questions:*

1. Compare the characteristics of centralized and distributed databases.
2. Discuss the factors the corporation should consider when deciding between centralized and distributed databases.

**Mini Case 3: Enhancing Decision Support with Analytical Databases**

*Scenario:* A retail company wants to enhance its decision-making processes. Currently, they use an operational database, but they are considering implementing an analytical database for strategic decision support.

*Questions:*

1. Explain the differences between operational and analytical databases.
2. How can the implementation of an analytical database contribute to better strategic decision-making in the retail industry?

*Illustrative Explanation:*

1. **Differences between Operational and Analytical Databases:**
   * *Operational Database:* Primarily designed for day-to-day transactional activities, operational databases support routine business operations. They excel in handling frequent and rapid transactions, ensuring real-time data processing. These databases are optimized for data retrieval, insertion, and updating.
   * *Analytical Database:* Geared towards strategic decision support, analytical databases store large volumes of historical data and business metrics. They are designed for complex queries and aggregations, enabling in-depth analysis, trend identification, and data-driven decision-making.
2. **Contribution of Analytical Database to Strategic Decision-Making:**
   * *Enhanced Data Analysis:* Analytical databases allow for in-depth analysis of historical data, enabling the identification of trends, patterns, and correlations crucial for strategic decision-making.
   * *Improved Reporting and Visualization:* Analytical databases facilitate the creation of comprehensive reports and visualizations, providing a clear overview of key performance indicators (KPIs) and supporting informed decision-making.
   * *Strategic Planning Support:* With the ability to process and analyze vast amounts of data, analytical databases empower retail companies to develop and refine strategic plans based on comprehensive insights.
   * *Competitive Advantage:* By leveraging analytical databases, the retail company can gain a competitive edge through data-driven decision-making, optimized operations, and a deeper understanding of customer behavior and market trends.

This case encourages exploring the distinct roles of operational and analytical databases in supporting different aspects of business operations and decision-making, fostering a discussion on the strategic advantages of implementing analytical databases in a retail setting.