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1. Chapter 1
   1. Compare and contrast *data*, *databases*, *database (management) systems* and *information systems*.
      * + Data is known facts that can be recorded and that have implicit meaning.
        + Databases are collections of data which is designed for a specific purpose for an intended group.
        + DBMS is a computerized system that enables users create and maintain a database.
        + An information system (IS) is any organized system for the collection, organization, storage and communication of information.
   2. Compare and contrast database systems with the following, using the main characteristics of the database approach in your discussion.
      * data structures and algorithms
      * traditional file system
        + Database systems contains not only the database but also a complete definition or description of the database structure and constraints. This definition, stored in the DBMS catalog, contains information such as the structure of each file, the type and storage format of each data item.
        + Data Structures may be designed to store data for the purpose of working on it by using different algorithms for searching or sorting data
        + Traditional file systems act locally whereas DBMS saves directly in a database. Dada in databases are more secure compared to data in traditional file systems.
   3. Identify the stakeholders of database systems.
      * + Database Administrators
        + Database Designers
        + End Users

Chapter 2

1. Explain the significance of the categories of data models. Which type of model is displayed in Figure 2.1?
   * + - High-level models provide concepts that are close to the way many users perceive data.
       - Low-level models provide concepts that describe the details of how data is stored on the computer storage media.
       - Representational or implementation data model provides concepts that may be easily understood by end users but that are not too far removed from the way the data is organized in computer storage. This data model gives more details but is understood by non-technical end users.
       - Figure 2.1 displays a schema diagram.
2. Explain the structure and significance of the three-schema architecture.
   * + - The goal of the three-schema architecture is to separate the user applications from the physical database.
       - The internal level describes the physical storage structure of the database. The conceptual level describes the structure of the whole database for a community of users. The external level includes a number of external schemas or user views. Each external schema describes the past of the database that a particular user group is interested in and hides the rest of the database from that user group.
3. Explain the tiers used in a typical web-based information system.
   * + - The bottom layer includes all data management services.
       - The middle layer can also act as a web server. It plays an intermediary role by running application programs and storing business rules that are used to access data form the database server.
       - The top layer which is the client layer or the presentation layer displays information to the user and allows data entry.