DATABASE SYSTEMS

OBJECTIVES

In this chapter, you will learn:

- What a database is, the various types of databases, and why they are valuable assets for decision making
- The difference between data and information
- The importance of database design
- Database System Environment

WHY DATABASES?

- Databases solve many of the problems encountered in data management
  - Used in almost all modern settings involving data management:
    - Business
    - Research
    - Administration
- Important to understand how databases work and interact with other applications

DATA VS. INFORMATION

- **Data** are raw facts
- **Information** is the result of processing raw data to reveal meaning
- Information requires context to reveal meaning
- Raw data must be formatted for storage, processing, and presentation
- Data are the foundation of information, which is the bedrock of **knowledge**

DATA VS. INFORMATION (CONT'D.)

- **Data**: building blocks of information
- Information produced by processing data
- Information used to reveal meaning in data
- Accurate, relevant, timely information is the key to good decision making
- Good decision making is the key to organizational survival

WHY DATABASE DESIGN IS IMPORTANT

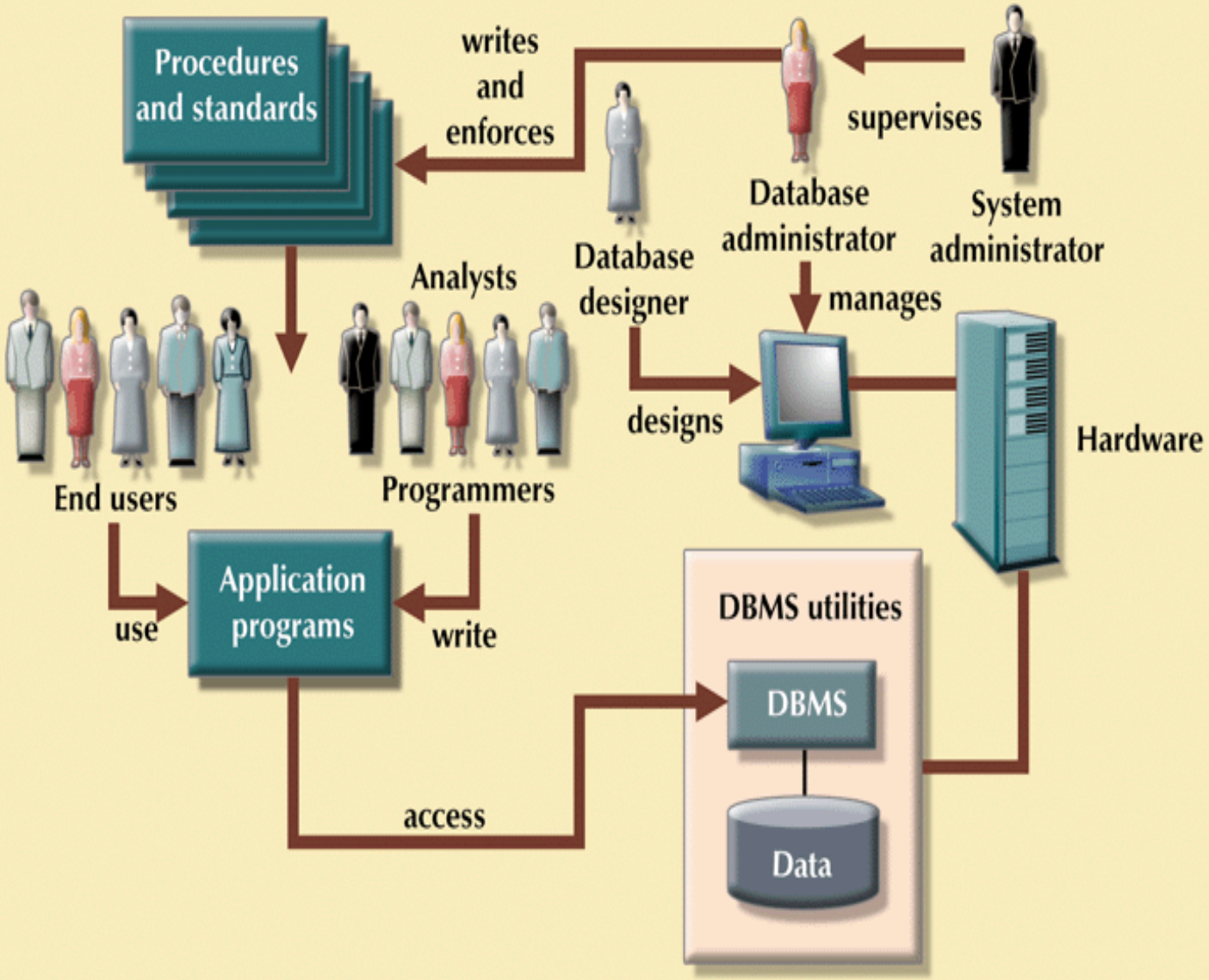
- **Database design** focuses on design of database structure used for end-user data
  - Designer must identify database's expected use
- Well-designed database:
  - Facilitates data management
  - Generates accurate and valuable information
- Poorly designed database:
  - Causes difficult-to-trace errors

THE DATABASE SYSTEM ENVIRONMENT

- **Database system**: defines and regulates the collection, storage, management, use of data
- Five major parts of a database system:
  - Hardware
  - Software
  - People
  - Procedures
  - Data

FIGURE 1.7

The database system environment



SUMMARY

- Data are raw facts
- Information is the result of processing data to reveal its meaning
- Accurate, relevant, and timely information is the key to good decision making
- Data are usually stored in a database
- DBMS implements a database and manages its contents

SUMMARY (CONT'D.)

- Metadata is data about data
- Database design defines the database structure
  - Well-designed database facilitates data management and generates valuable information
  - Poorly designed database leads to bad decision making and organizational failure
- Databases evolved from manual and computerized file systems

SUMMARY (CONT'D.)

- In a file system, data stored in independent files
  - Each requires its own management program
- Some limitations of file system data management:
  - Requires extensive programming
  - System administration is complex and difficult
  - Changing existing structures is difficult
  - Security features are likely inadequate
  - Independent files tend to contain redundant data
    - Structural and data dependency problems

SUMMARY (CONT'D.)

- Database management systems were developed to address file system's inherent weaknesses
- DBMS present database to end user as single repository
  - Promotes data sharing
  - Eliminates islands of information
- DBMS enforces data integrity, eliminates redundancy, and promotes security