Databases

Chapter 12
Databases

Competencies (Page 1 of 2)

- Distinguish between the physical and logical views of data.
- Describe how data is organized: characters, fields, records, tables, and databases.
- Define key fields and how they are used to integrate data in a database.
- Define and compare batch processing and real-time processing.
Describe the five common database models: hierarchical, network, relational, multidimensional, and object-oriented.

Distinguish among individual, company, distributed, and commercial databases.

Discuss strategic database uses and security concerns.
Introduction

- Like a library, secondary storage is designed to store information
- End users need to understand
  - How information is organized in fields, records, tables and databases
  - The different types of databases and structures
- Competent end users need to be able to find information that is stored in databases
Examples of data include:

- Facts or observations about people, places, things, and events
- Audio, music, photographs, and video

Two ways to view data:

- Physical view
- Logical view
Data Organization

- Character
- Field
- Record
- Table
- Database
Key Field

- Unique identifier also known as **primary key**
- Common examples
  - Social Security Number
  - Student Identification Numbers
  - Employee Identification Numbers
  - Part Numbers
  - Inventory Numbers
Batch processing

Data is collected over a period of time and the processing happens later all at one time.
Real-Time Processing

- Real-time processing
  - Also known as online processing because it happens immediately during the transaction
Databases

- Collection of integrated data
  - Logically related files and records
- Databases address data redundancy and data integrity
Need for Databases

- Sharing
- Security
- Less data redundancy
- Data integrity
- DBMS engine
- Data definition subsystem
  - Data dictionary / schema
Database Management (Page 2 of 2)

- Data manipulation subsystem
  - Query-by-example
  - Structured query language (SQL)
- Application generation subsystem
- Data administration subsystem
  - Database Administrators (DBAs)
  - Processing rights
DBMS Structure

- Database model
  - DBMS programs work with data that is logically structured or arranged
  - Model defined rules and standards for data in a database
- Five common data models
  - Hierarchical database
  - Network database
  - Relational database
  - Multidimensional database
  - Object-oriented database
Types of Databases

- Individual
- Company or shared
- Distributed
- Commercial

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Integrated files used by just one person</td>
</tr>
<tr>
<td>Company</td>
<td>Common operational or commonly used files shared in an organization</td>
</tr>
<tr>
<td>Distributed</td>
<td>Database spread geographically and accessed using database server</td>
</tr>
<tr>
<td>Commercial</td>
<td>Information utilities or data banks available to users on a wide range of topics</td>
</tr>
</tbody>
</table>
Database Uses and Issues

- **Strategic uses**
  - Special type of database called **data warehouse**
  - **Data mining** is used to search databases for information and patterns

- **Security**
  - Databases are valuable
  - Protection necessary

Security: electronic fingerprint scanner
Database administrators
- Determine the most efficient ways to organize and access a company’s data
- Responsible for database security and backing up the system

Employers look for
- Bachelors degree in Computer Science
- Technical experience

Database administrators can expect to earn $48,500 to $85,000 annually
A Look to the Future

- Every Book Ever Written ... at Your Fingertips
  - Massive amounts of digital storage are now available and affordable
  - Google Book Search contains millions of book
Open-Ended Questions (Page 1 of 2)

- Describe the five logical data groups or categories.
- What is the difference between batch processing and real-time processing?
- Identify and define the five parts of DBMS programs.
Open-Ended Questions (Page 2 of 2)

- Describe each of the five common database models.

- What are some of the benefits and limitations of databases? Why is security a concern?