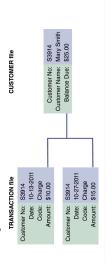
## Chapter 9 – Data Design

## Data Design Concepts

- Data Structures
- Each file or table contains data about people, places, things or events that interact with the information system
- File-oriented system
- Database management system (DBMS)

### Data Design Concepts

- Overview of File Processing
- File processing can be efficient and cost-effective in certain situations
- Potential problems
- Data redundancy
- Data integrity
- Rigid data structure

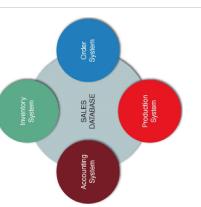


### Data Design Concepts

- Overview of File Processing
- Various types of files
- Master file
  - Table file
- Transaction file
- Work file
- Security file
- History file

### Data Design Concepts

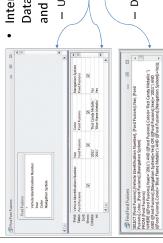
- The Evolution from File Systems to Database Systems
- A database management system (DBMS) is a collection of tools, features, and interfaces that enables users to add, update, manage, access, and analyze the contents of a database
  - The main advantage of a DBMS is that it offers timely, interactive, and flexible data access



### Data Design Concepts

- The Evolution from File Systems to Database Systems
- Some Advantages
- Scalability
- Better support for client/server systems
  - Economy of scale
- Flexible data sharing
- Enterprise-wide application database administrator
  - (DBA)
    - Stronger standards
- Controlled redundancy
- Better security
- Increased programmer productivity
  - Data Independence

#### **DBMS Components**



- Interfaces for Users, Database Administrators, and Related Systems
- Users
- Query language
- Query by example (QBE)SQL (structured query language)
- Database Administrators
  - A DBA is responsible for DBMS management and support

#### **DBMS** Components

- Interfaces for Users, Database Administrators, and Related Systems
- Related information systems
- A DBMS can support several related information systems that provide input to, and require specific data from, the DBMS
- No human intervention is required for two-way communication

#### **DBMS** Components

- · Data Manipulation Language
- A data manipulation language (DML) controls database operations, including storing, retrieving, updating, and deleting data
- Schema
- The complete definition of a database, including descriptions of all fields, tables, and relationships, is called a schema
- You also can define one or more subschemas

#### **DBMS** Components

- Physical Data Repository
- The data dictionary is transformed into a physical data repository, which also contains the schema and subschemas
- The physical repository might be centralized, or distributed at several locations
- ODBC open database connectivity
- JDBC Java database connectivity
- jdbc:uCanAccess connection in Swing

# Web-Based Database Design

Characteristics of Web-Based Design

Web-Based Database Design Characteristics

CHARACTERISTIC	EXPLANATION
Global access	The Internet enables worldwide access, using existing infrastructure and standard telecommunications protocols.
Ease of use	Web browsers provide a familiar interface that is user-friendly and easily learned.
Multiple platforms	Web-based design is not dependent on a specific combination of hardware or software. All that is required is a browser and an Internet conrection.
Cost effectiveness	Initial investment is relatively low because the Internet serves as the communication network. Users require only a browser, and Web-based systems do not require powerful workstations. Flexibility is high because numerous outsourcing options exist for development, hosting, maintenance, and system support.
Security issues	Security is a universal issue, but Internet connectivity raises special concerns. These can be addressed with a combination of good design, software that can protect the system and detect intrusion, stringent rule for passwords and user identification, and vigilant users and managers.
Adaptability issues	The Internet offers many advantages in terms of access, connectivity, and resultiny. Migrating a traditional database design to the Web. however, can require design modification, additional software, and some added expense.

# Web-Based Database Design

- Internet Terminology
- Web browser
- Web page
- HTML (Hypertext Markup Language)
- Tags
- Web server
- Web site

# Web-Based Database Design

- Internet Terminology
- Intranet
- Extranet
- Protocols
- Web-centric
- Clients
- Servers

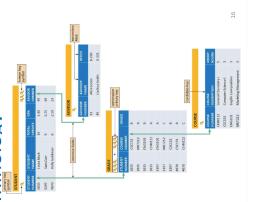
# Web-Based Database Design

- Connecting a Database to the Web
- Database must be connected to the Internet or intranet
- Middleware
- Adobe ColdFusion
- PHP and MySQL commands
  - Data Security
- Well-designed systems provide security at three levels: the database itself, the Web server, and the telecommunication links that connect the components of the system

14

# Data Design Terminologv

- Definitions
  - Entity
- Table or file
- Field
- Record
- Tuple



## Data Design Terminology

- Key Fields
- Primary key
- Composite key
- Candidate key
- Foreign key

## Data Design Terminology

- Referential Integrity
- Validity checks can help avoid data input errors
- In a relational database, referential integrity means that a foreign key value cannot be entered in one table unless it matches an existing primary key in another table
- Deletes Cascade
- Deletes Restricted



7.