Sample Answers to Discussion Questions

Chapter 2: Database Concepts and Applications in HRIS

1. Explain the differences between data, information, and knowledge.

- Data represent the **"facts"** of transactions that occur on a daily basis. A transaction can be thought of as an event of consequence, such as hiring a new employee for a particular position for a specified salary.
- Information, on the other hand, is the **interpretation** of these data. An interpretation of data always has some goal and context, such as making a hiring decision for a particular department or understanding of the performance of the company to make an improvement.
- Knowledge is different from data and information. While information refers to data that have been given structure, knowledge is information that has been given **meaning** (Whitehill, 1997). For example, in HRIS, facts about age, gender, and education are the data. When these data are transformed into average age, gender ratio, and number and types of graduates at the unit level, they become information. More than what and why, knowledge is about how. It is procedural and mostly hidden in the minds of individuals and groups in the organization.

2. What are the main functions of a database management system, and how is it different from a database?

DBMS and their associated databases electronically allow organizations to effectively manage data. DBMS turn data into an organizational resource. A database is a component of a DBMS. A database management system is a set of software applications (i.e., programs) combined with a database. The main functions of a DBMS are to create the database; insert, read, update, and delete database data; maintain data integrity (i.e., making sure that the data are correct) and security (i.e., making sure that only the right people have access to the data); and prevent data from being lost by providing backup and recovery capabilities.

3. What were the shortcomings of early file-oriented database structures?

Early DBMS were simply data-processing systems that performed recordkeeping functions that mimicked existing manual procedures. These traditional file-oriented data structures had a number of shortcomings, including (1) data redundancy—an employee's name and address could be stored in many different files; (2) poor data control—if you had access to the file you had access to all the data in the file, which may not be desirable because you may want to restrict the data viewed by a particular user; (3) inadequate data manipulation capabilities—it was very difficult to combine the data across files and to easily update and to add new data; and (4) excessive programming effort—any change in the data required extensive changes in the programming that accessed the data.

4. What are the three types of data sharing?

- The three types of data sharing are (1) data sharing between functional units, (2) data sharing between management levels, and (3) data sharing across geographically dispersed locations.

5. Define the key terms in a relational database.

- **Entities** are things such as employees, jobs, promotion transactions, positions in company, and so on. They include both physical things such as desks and conceptual things such as bank accounts. A company must analyze its business operations and identify all of the entities that it believes are important.
- Each of these entities is made up of *attributes*. An **attribute** is a characteristic of the entity. For example, an employee has a name, address, phone number, education, and so on.
- **Tables** are used to store information about entities. Each table in a database contains rows. Rows are also referred to as records and represent an *instance* of the entity.
- A **query** is a question that you ask about the data stored in a database. Queries retrieve specific data in a particular order, but it is important to note that queries **do not** store data! All data are stored in tables. Queries only report on data currently in the table.
- A **form** is an object in a database that you can use to maintain, view, and print records in a database in a more "structured" manner. Although you can perform these same functions with tables and queries, forms can present data in many customized and useful ways.

- A **report** is a formatted presentation of data from a table, multiple tables, or queries that is created as a printout or to be viewed on screen.

6. What is the difference between a primary key and a foreign key?

A primary key is the attribute of an entity that uniquely identifies a specific instance of the data (e.g., the specific employee). In a relational DBMS, relationships are created by having the same attribute in each table with the value of the attribute being the same in each table. Most often this is done by taking the primary key of one table and including it in the related table. When a primary key from one table is stored as an attribute of another table, that attribute is called a foreign key.

7. What are the three types of queries?

- A select query allows you to ask a question based on one or more tables in a database. This is the most commonly used query.
  - An action query performs an action on the table on which it is based. Actions include updating data in the table (e.g., increasing the base salary of all employees who were rated above average in the latest performance rating), deleting records from the table (e.g., removing employees from the employees table if they no longer work at the company), or inserting records (e.g., the query may add a new set of benefits to the benefits table).
  - A cross-tab query performs calculations on the values in a field and displays the results in a datasheet. The reason it is called *cross-tab* is that it tabulates the data for a set of descriptor attributes, contrasting them or crossing them in a table format.
  - Select queries and cross-tab queries provide the information that managers and executives expect from IT. These queries can serve as the foundation for MRS and DSS information and decision making. Action queries, on the other hand, improve the operational efficiency of managing and maintaining the database. These tasks are important to the operational staff but of less interest to HR managers and executives.

8. How are forms and reports similar, and how are they different?

Forms and reports are similar in that they are both components of a relational database and can be customized to the needs of the user. Forms and reports differ in that a form is an object in a database

while a report is a formatted presentation of data. You can print data that appear in forms, but reports provide you with the greatest flexibility for formatting printed output.

9. Take the list of HR database common fields, and group them into tables.

This could be a good project by having students work in teams of two to three students to develop the tables and then present their rationale to the class.

10. What are the differences between data warehouses, BI, and data mining?

- A data warehouse is a special type of database that is optimized for reporting and analysis and is the raw material for management's decision support system.
- BI is a broad category of business applications and technologies for creating data warehouses and for analyzing and providing access to these specialized data to help enterprise users make better business decisions.
- Patterns in large data sets are identified through data mining, which involves statistically analyzing large data sets to identify recurring relationships.

Lecture Outline

Chapter 2: Database Concepts and Applications in HRIS

CHAPTER OBJECTIVES

After completing this chapter, you should be able to do the following:

- Discuss the differences between data, information, and knowledge
- Identify problems with early database structures
- Understand what a relational database is and why it is better than older database structures
- Discuss three types of data sharing and why they are important
- Know where data in a database are stored
- Know the different ways in which data can be delivered to the end user
- Know what a query is and discuss three different types of queries
- Discuss how queries are used to support decision making
- Discuss the key steps involved in designing a simple database in Microsoft (MS) Access

INTRODUCTION

- Data are produced, stored, updated, and used by HR employees and managers on a daily basis.
- Effective collection, storage, and use of data are essential for any business, and the most successful organizations are masters of this process! Many believe that managing data and turning data into information is a competency necessary to succeed in today's marketplace.
- Today's HRIS consist of business applications that work in conjunction with an electronic database. Together, these software programs transform data into information that is essential for business operations and for decision making.
- **Relational database** terminology is described, how a database is structured, and how to develop a basic database using MS Access, a basic database management system (DBMS), as an example.
- A DBMS provides the capability to integrate HR data and to link these data with other data essential to the operations of a business.

Data, Information, and Knowledge

- Data represent the **"facts"** of transactions that occur on a daily basis. A transaction can be thought of as an event of consequence, such as hiring a new employee for a particular position for a specified salary.
- Information, on the other hand, is the **interpretation** of these data. An interpretation of data always has some goal and context, such as making a hiring decision for a particular department or understanding the performance of the company to make an improvement.
- Knowledge is different from data and information. While information refers to data that have been given structure, knowledge is information that has been given **meaning** (Whitehill, 1997). For example, in HRIS, facts about age, gender, and education are the data. When these data are transformed into average age, gender ratio, and number and types of graduates at the unit level, they become information.
- More than what and why, knowledge is about how. It is procedural and mostly hidden in the minds of individuals and groups in the organization.
- In the HR function, *data* about employees and jobs are the foundation of most of the *information* that is critical to analyzing and making HR decisions. *Knowledge* constitutes knowing what information is needed from a database and how to use it to achieve HR objectives.

Database Management Systems

- A database management system (DBMS) is a set of software applications (i.e., computer programs) combined with a database. These systems allow organizations to effectively manage data electronically. DBMS turn data into an organizational resource. The main functions of a DBMS are to create the database; insert, read, update, and delete database data; maintain data integrity (i.e., making sure that the data are correct) and security (i.e., making sure that only the right people have access to the data); and prevent data from being lost by providing backup and recovery capabilities.
- As a central repository of data, a database is a valuable organizational asset and therefore needs to be managed appropriately.
- DBMS and databases work in conjunction with business applications, such as transaction processing systems, to make organizations run smoothly. As shown in Figure 2.1, these business applications consist of a set of one or more computer programs that serve as an intermediary between the user and the DBMS while providing the "functions" or "tasks" that the user wants performed (e.g., store data about the new hire) (Kroenke, 2003). The business application must communicate in an easy-to-use manner with the user sitting at a computer terminal while maintaining efficient database processing.
- Early DBMS were simply data-processing systems that performed record-keeping functions that mimicked existing manual procedures. The main objective of these file-processing systems was to process transactions such as updating payroll records and the

production of payroll checks as efficiently as possible.

- These traditional file-oriented data structures had a number of shortcomings, however, including (1) data redundancy—an employee's name and address could be stored in many different files; (2) poor data control—if you had access to the file you had access to all the data in the file, which may not be desirable if the organization wanted to restrict the data viewed by a particular user; (3) inadequate data manipulation capabilities—it was very difficult to combine the data across files and to update and add new data easily; and (4) excessive programming effort—any change in the data required extensive changes in the programming that accessed the data.
- To overcome the shortcoming of file-oriented structures, hierarchical and network database systems evolved in the mid-1960s and early 1970s. The key to these systems were that **relationships** between different records were explicitly maintained. Only the very knowledgeable technical staff were able to interact with the database effectively.

Relational DBMS

- The advent of relational database management systems addressed the many problems associated with these older DBMS and database structures. In 1970, E. F. Codd introduced the notion that rather than programming relationships between data based on physical location, the information needed to integrate data should reside within the data (Hansen & Hansen, 1996).
- In relational database systems, retrieval of data was based on logical relationships built into the table structures, which made feasible the creation of a query capability that was much more accessible to end users, who generally had limited programming experience.
- Perhaps, the most significant difference between a file-based system and a relational database system is that data are easily shared.
- There are three types of data sharing: (1) data sharing between functional units, (2) data sharing between management levels, and (3) data sharing across geographically dispersed locations.
- Data sharing requires a major change in end-user thinking. Fundamentally, sharing data means sharing power because both data and information are power. Sharing data also means being a good citizen and making certain that the data you enter are correct.

Data Sharing Between Different Functions

- Relational DBMS facilitate data integration across different functions. As a result, relational database technology increased the feasibility and popularity of integrated business applications. These integrated applications used in large organizations are referred to as **enterprise resource planning (ERP)** business applications.

Data Sharing Between Different Levels

- Operational employees, managers, and executives also share data but have different objectives and, thus, different information needs. These three different levels of use correspond to three different types of software systems that have evolved over the past three decades: transaction processing systems (TPS), management reporting systems (MRS), and decision support systems (DSS) (Hansen & Hansen, 1996). Note the similarity between the categorization of software systems and the classification of information systems into electronic data processing (EDP), management information systems (MIS), and decision support systems (DSS), which were discussed in Chapter 1 (Sprague & Carlson, 1982). These terms correspond to TPS, MRS, and DSS in this chapter. The HRDSS could be classified as a special instance of an MRS or MIS system but focused specifically on information used in decision making—a central theme of this book.
- In addition to TPS capabilities, relational databases can also provide MRS capability. DSS assist senior managers and business professionals in making business decisions.
- Data mining, data analytics, and business intelligence (BI) are examples of information derived from a DSS, which relies on data warehouses. Data warehouses represent aggregated data collected from various databases available to a business.

Data Sharing Across Locations

- In today's global environment, access to data from any physical location in the world is increasingly important. Computer networks are created that provide instant access to these operational data, allowing real-time managerial decision capability regardless of physical location.
- A centralized database allows a company to confine its data to a single location and therefore more easily control data integrity, updating, backup, query, and control access to the database. A company with many locations and telecommuters, however, must develop a communications infrastructure to facilitate data sharing over a wide geographical area. The advent of the Internet and a standardized communication protocol made the centralized database structures and geographically dispersed data sharing feasible.

Key Relational Database Terminology

Entities and Attributes

- Entities are things such as employees, jobs, promotion transactions, positions in the company, and so on. It includes both physical things, such as desks, and conceptual things, such as bank accounts. A company must analyze its business operations and identify all of the entities that it believes are important.
- Each of these entities is made up of *attributes*. An attribute is a characteristic of the entity. For example, an employee has a name, address, phone number, education, and so on.
- In addition to the entities and attributes, the relationships among the entities must be

identified and defined.

Tables

- Tables are used to store information about entities. Each table in a database contains rows. Rows are also referred to as records and represent an "instance" of the entity.

Relationships, Primary Keys, and Foreign Keys

- In a relational DBMS, relationships are created by having the same attribute in each table with the value of the attribute being the same in each table. Most often this is done by taking the *primary key* of one table and including it in the related table. When a primary key from one table is stored as an attribute of another table, that attribute is called a *foreign key*.

Queries

- A query is a question that you ask about the data stored in a database. Queries retrieve specific data in a particular order, but it is important to note that queries **do not** store data! All data are stored in tables. Queries only report on data currently in the table.
- There are three different kinds of queries: select queries, action queries, and cross-tab queries.
- A select query allows you to ask a question based on one or more tables in a database. This is the most commonly used query.
- An action query performs an action on the table on which it is based. Actions include updating data in the table (e.g., increasing the base salary of all employees who were rated above average in the latest performance rating), deleting records from the table (e.g., removing employees from the employees table if they no longer work at the company), or inserting records (e.g., adding a new set of benefits to the benefits table).
- A cross-tab query performs calculations on the values in a field and displays the results in a datasheet. The reason it is called *cross-tab* is that it tabulates the data for a set of descriptor attributes, contrasting them or crossing them in a table format.
- Select queries and cross-tab queries provide the information that managers and executives expect from IT. These queries can serve as the foundation for MRS and DSS information and decision making. Action queries, on the other hand, improve the operational efficiency of managing and maintaining a database. These tasks are important to the operational staff but of less interest to HR managers and executives.
- Queries are also used as the basis for forms and reports. In addition to retrieving data, they can add, update, and delete records in tables. You can define fields in a query that perform calculations, such as sums and averages. The following list summarizes the typical capabilities of queries:
  - Display selected fields and records from a table
  - Sort records on one or multiple fields
  - Perform calculations
  - Generate data for forms, reports, and other queries

- Update data in the tables of a database
- Find and display data from two or more tables
- Create new tables
- Delete records in a table based on one or more criteria

Forms

- A form is an object in a database that you can use to maintain, view, and print records in a database in a more "structured" manner. Although you can perform these same functions with tables and queries, forms can present data in many customized and useful ways.
- A report is a formatted presentation of data from a table, multiple tables, or queries that is created as a printout or to be viewed on screen.
- Although you can print data appearing in tables, queries, and forms, reports provide you with the greatest flexibility for formatting printed output.

Reports

- A report is a formatted presentation of data from a table, multiple tables, or queries that is created as a printout or to be viewed on screen. Data displayed in a report are dynamic, reflecting the latest data from the tables on which the report is based.
- Unlike forms, however, you cannot change the data or add a new record in a report. You can only view the data in a report.
- Although you can print data appearing in tables, queries, and forms, reports provide you with the greatest flexibility for formatting printed output. As with forms, you can design your own reports or use a Report Wizard to create reports automatically.

Introduction to MS Access

- MS Access differs from other commercial database management software such as Oracle, DB2, or MYSQL in that it integrates both database application and DBMS software into one. MS Access is a relational DBMS in which data are organized as a collection of tables.
- MS Access is designed for relatively small databases and assumes limited knowledge of database programming.
- The design process for an MS Access Database begins with an analysis of the data and information that the users of the database will need to have stored and retrieved in order to accomplish their work.
- In general, the database design process can be broken down into several steps that are somewhat sequential but oftentimes have to be repeated until the database meets the users' needs. (Refer to the text for a list of steps.)

HR Database Application Using MS Access

- For small companies, generally with less than 1,000 employees, there are commercially available HR database applications based on MS Access. One such system, popular in the

United States, is HRSource™ from Auxillium West (www.auxillium.com).

- Other HR databases
- A few decades ago, database application programs were often written by companies for their particular use; in today's business environment, customized application programs, termed legacy systems, are being replaced by commercially developed database application programs (e.g., PeopleSoft Enterprise HCM, mySAP ERP HCM, Lawson HCM, Epicor HCM, SuccessFactors Employee Central, UltiPro HR, and Workday).
- Although the list in Table 2.1 appears to be comprehensive, in fact, it is quite sparse when compared with listings of HR fields within more complex database applications. More complex database applications will also have fields that relate to business processes other than HR.

Data Integration: Data Warehouse, Business Intelligence, and Data Mining

- An organization's ability to generate meaningful information to make good decisions is only as good as its underlying database.
- Metrics are various measures of organizational performance that are derived from organizational data.
- The overarching objective of HR metrics is to improve organizational efficiency and effectiveness.
- Much of the data now available to create HR metrics come from an organization's data warehouse. A data warehouse is a special type of database that is optimized for reporting and analysis and is the raw material for management's decision support system.
- Business intelligence (BI) is a broad category of business applications and technologies for creating data warehouses and for analyzing and providing access to these specialized data to help enterprise users make better business decisions. Essentially, BI systems retrieve specified data from multiple databases, including old legacy file database systems, and store these data in a new database, which becomes that data warehouse. The data in the data warehouse can then be accessed via queries and used to uncover patterns and diagnose problems.
- Patterns in large data sets are identified through data mining, which involves statistically analyzing large data sets to identify recurring relationships.
- BI systems also provide reporting tools and interfaces (e.g., forms) that distribute the information to Excel spreadsheets, Internet-based portals, PDF files, or hard copies. These results can also be distributed to key executives in specialized formats known as executive dashboards, which are becoming a popular executive-decision support tool.
- A major reason for a DBMS is to provide information from various parts of the organization in an "ad hoc" manner.
- Data warehouses and BI software enable managers to create information from an even

greater store of data.

Big Data and NOSQL

- Big Data is a term that illustrates the challenges faced by organizations. It is described using four dimensions: volume, variety, velocity and veracity.
    - **Volume** refers to the amount of data, often measured in terabytes that organizations collect today.
    - **Variety** refers to the different forms of data.
    - **Velocity** refers to the speed at which data is coming into the organization.
    - **Veracity** refers to the quality of the data collected by the organizations.
- NOSQL are databases where data are stored and retrieved using different methods than SQL.

CHAPTER SUMMARY

In this chapter, we have described the key aspects of current DBMS technologies and how these systems work to create, store, and manage critical data about an organization. Data are transformed into information by relational DBMS and business applications that work together. The underlying data in a database are collected from business transactions and stored in tables that are related to each other through shared fields called primary and foreign keys. Queries represent questions asked of the data and are used to access specific data stored in tables. The results of queries can be viewed in forms or reports that are customized so that the end user can better interpret the data that are retrieved from the database. More sophisticated data analyses and reports, such as executive dashboards, are produced from specialized databases called data warehouses and using business application software called BI software.

Most HRIS rely on an underlying database. Understanding how database systems work, therefore, is relevant to HR decision makers because knowledge about how to create, store, and access data can be a key differentiator in a competitive environment. Small HR databases can be created using MS Access, or more sophisticated ones can be purchased from software vendors. There are literally hundreds of HR database business applications that create process and analyze HR data. The challenge is to find one that can most cost-effectively collect and share data from which meaningful information can be extracted to support making good decisions.

Case Notes

Chapter 2: Database Concepts and Applications in HRIS

Applicant Database

Case Summary

The students are asked to create an applicant database for a small recruiting firm that specializes in recruiting HR professionals for small to medium firms using Microsoft (MS) Access. This activity should include a reflection on how to describe the process that would be used when creating the specified database and how it would be presented to a manager.

Case Analysis

Most HRIS rely on an underlying database. Understanding how database systems work, therefore, is relevant to HR decision makers because knowledge about how to create, store, and access data can be a key differentiator in a competitive environment. Small HR databases can be created using MS Access, or more sophisticated ones can be purchased from software vendors. There are literally hundreds of HR database business applications that create process and analyze HR data. The challenge is to find one that can most cost-effectively collect and share data from which meaningful information can be extracted to support making good decisions

Sample Answers to Case Questions

1. You have been asked to create an applicant database for a small recruiting firm that specializes in recruiting HR professionals for small to medium firms. Describe the process that you would use to design this database. Use MS Access to develop a prototype of the database that you could show your manager.

In general, the database design process can be broken down into several steps that are somewhat sequential but oftentimes have to be repeated until the database meets the users' needs.

- Determine what the users want from the database: what questions need to be answered, what information needs to be tracked, what reports are produced, and what data are needed to provide the basis for those results.
- Identify the data fields needed to produce the required information; in doing so, identity rules that define the integrity of the data.
- Group related fields into tables (entities).
- Determine each table's primary key.
- Normalize the data: Make sure the data for an entity are really associated with only

that entity.

- Determine how the tables are related to one another and include common keys.
- Create the relationships among the different entities.
- Create queries to define data needs that are not handled by only looking at individual tables.
- Create reports to provide a structured view of the data.
- Create forms, and in doing so, identify a common design for the forms.
- Enter test data to verify the quality/accuracy of the system design.
- Test the system.
- Enter or populate the database.

A good project might be to have students work in teams of two to three students to develop the prototype of the database. Then, have each group report on what their experience was in using MS Access.

Class Activities

Chapter 2: Database Concepts and Applications in HRIS

On Ground

Have students interview different users of an HRIS. If a local organization, profit or nonprofit, with an HRIS is willing to participate with this project, then have students use this organization. Using the university/college as the target organization is OK, assuming you can obtain permission. If this project seems too difficult by requiring students to set up interviews, have different users of the HRIS come to class and be interviewed by the students. The students should develop the interview questions prior to the users coming to class. The university/college might be the easiest to organization to use for this exercise.

Have students break out into groups of four. Give the class 15 minutes to discuss among themselves what type of information they would expect to be in a HRIS database. Have each group give their top-five database items they gathered as a group.

Online

Have each student post in the class discussion forum the top-five pieces of information that they expect to be included in a HRIS database.

There are a number of HRIS software programs that are used to gather, maintain, and analyze employee information for databases. Have students conduct an online search to identify some of the most common software programs that are used for maintaining HRIS data.

Chapter 2

Database Concepts and Applications in HRIS

DATA, INFORMATION, AND KNOWLEDGE

- **Data** are the "facts"
- **Information** is the interpretation of data
- **Knowledge** is information that has been given meaning (Whitehill, 1997)
- HR professionals use the data and information about employees and jobs to make strategic HR recommendations and decisions

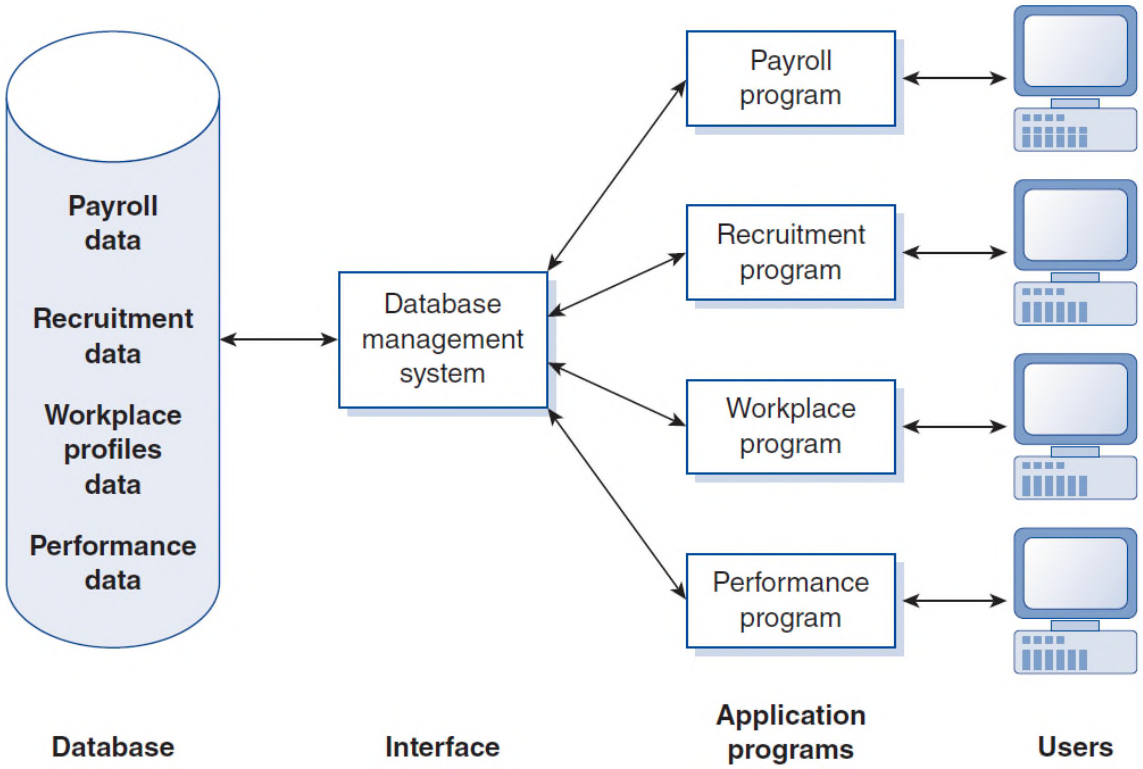
Data ⟶ Information ⟶ Knowledge

DATABASE MANAGEMENT SYSTEMS (DBMS)

- Set of software applications combined with a database
- Enables effective management of data electronically
  - Identifying the data necessary to make HR decisions
  - Defining the characteristics of those data (e.g., number data vs. character data),
  - Organizing those data
  - Restricting access to the data

DATABASE, DBMS, AND BUSINESS APPLICATIONS (Figure 2.1)

FIGURE 2.1 ■ Database, Database Management System, and Business Applications



Kavanagh, Human Resource Information Systems 4e.
SAGE Publications, 2018.

EARLY FILE STRUCTURES

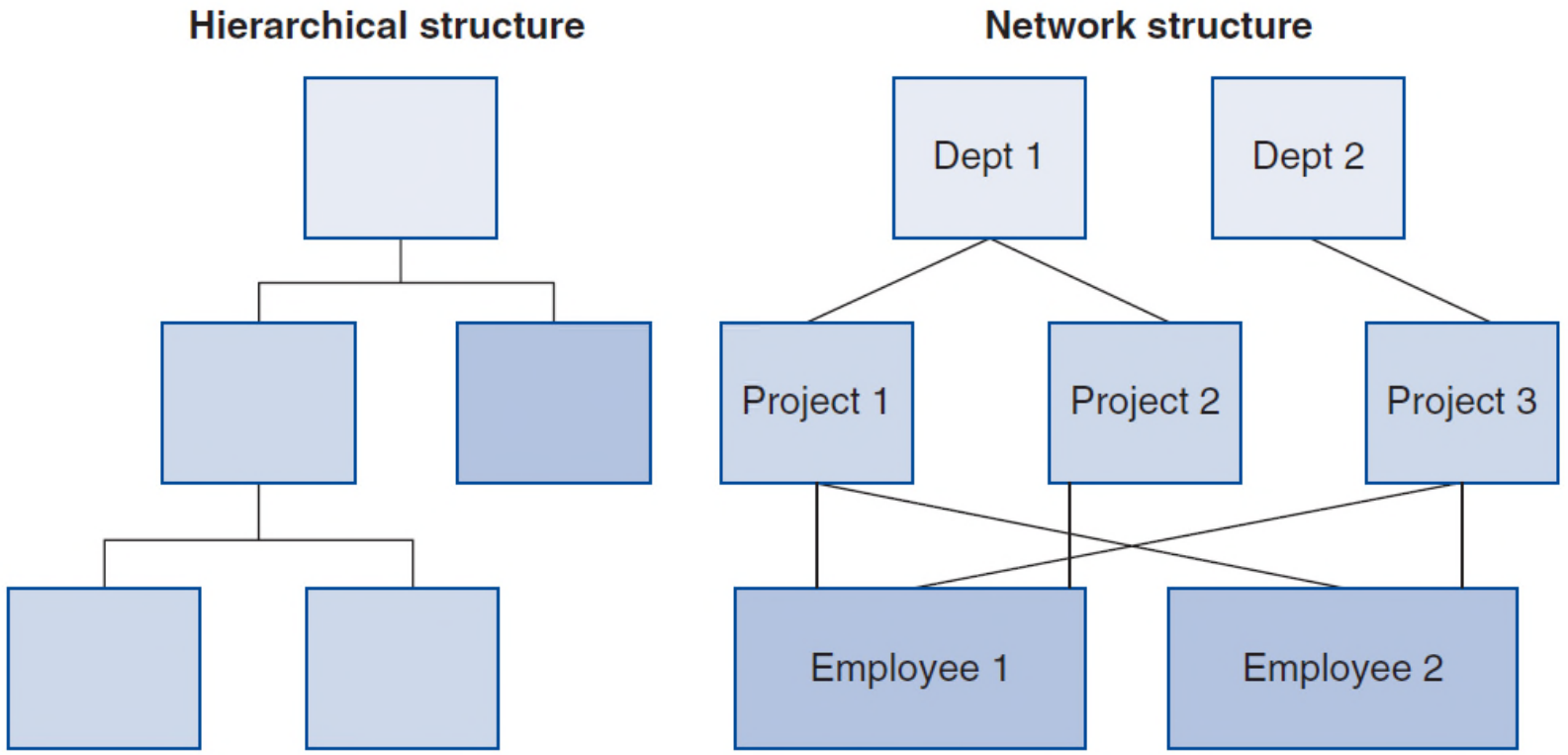
- File-oriented data structures
  - Record structure matches manual forms and procedures
  - Separate files are created, stored, and maintained for each particular problem or application
- Problems with file-oriented data structures
  - Multiple files result in data redundancy and inconsistency
  - Poor data control: Access to file gives a person access to all data in the file
  - Inadequate data manipulation
  - Excessive programming effort

EARLY DBMS

- Hierarchical database model
  - A database model in which the data is organized in a top-down or inverted tree-like structure
- Network database model
  - An extension of the hierarchical model or tree model. Instead of having only levels of one to many relationships, the network model is an owner–member relationship in which a member may have many owners.

HIERARCHICAL AND NETWORK DBMS (Figure 2.2)

FIGURE 2.2 ■ Hierarchical and Network Database Structures



RELATIONAL DATABASE MODEL

- Relational model – The overall purpose of the relational model is to describe data using a standard tabular format
- All data elements are placed in two-dimensional tables, called relations

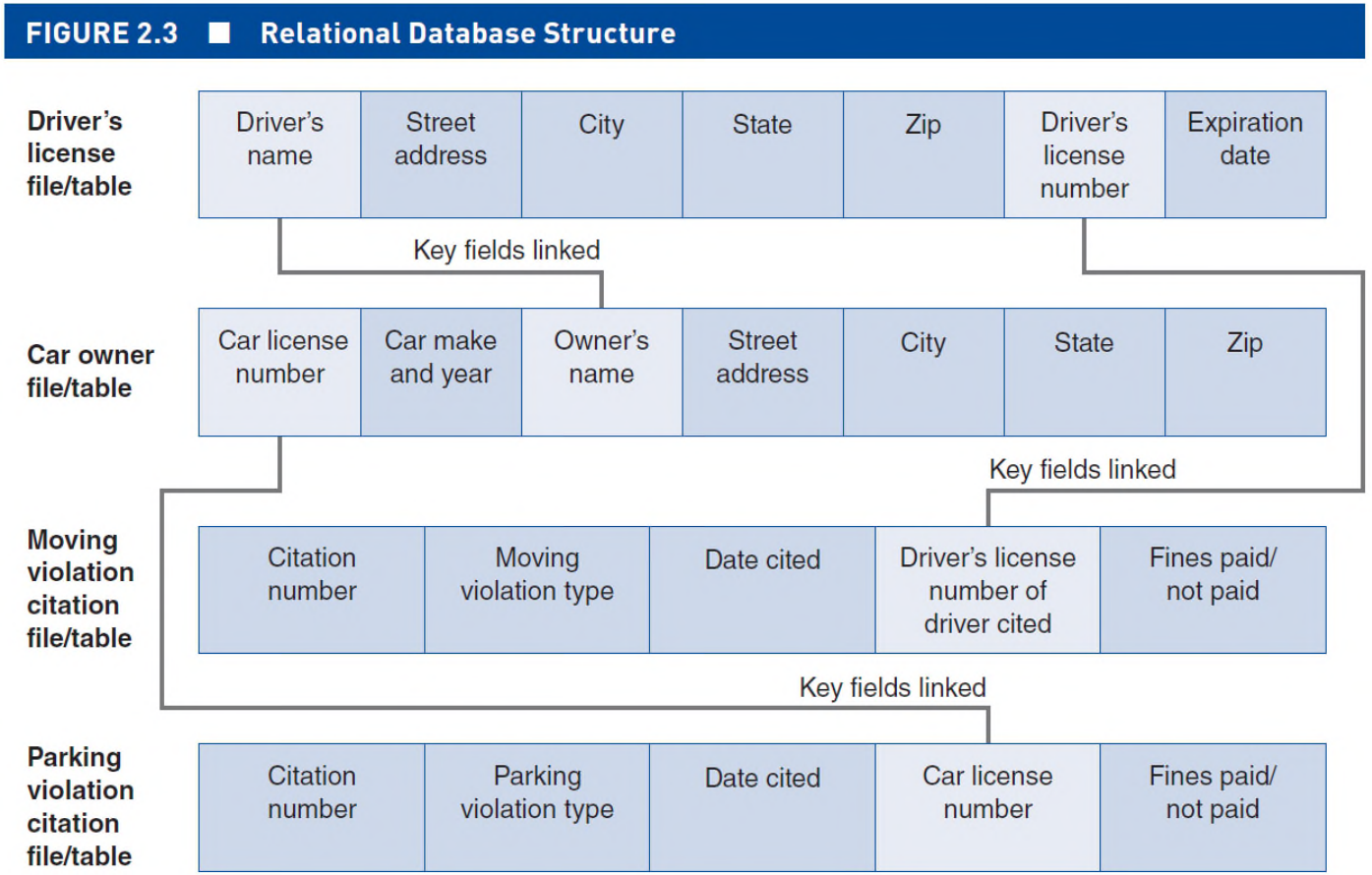
RELATIONAL DBMS: DATA SHARING

- Data sharing between different functions
  - Increased use of integrated business applications (e.g., enterprise resource planning)
- Data sharing between different levels
  - Three levels: operational employees, managers, and executives
  - Three types of software systems: transaction processing, management reporting, and decision support systems

RELATIONAL DBMS: DATA SHARING

- Data sharing between different locations
  - Manage time/day of transaction
  - Determine where to store components

RELATIONAL DATABASE STRUCTURE (Figure 2.3)



KEY RELATIONAL DATABASE TERMINOLOGY

- **Entities** are things such as employees, jobs, promotion transactions, positions in a company, and so on.
- An **attribute** is a characteristic of an entity.
- **Tables** are used to store information about entities. One table is created for each entity. Attributes are stored as the columns (also called fields) in the table. Each table in a database contains rows.
- A row in a table is referred to as a **record** and represents an instance of the entity.

KEY RELATIONAL DATABASE TERMINOLOGY

- **Relationships** are created by having same attribute in each table with the value of the attribute being the same in each table.
- A **primary key** uniquely identifies the record.
- A **foreign key** is a primary key from one table stored as an attribute of another table.

KEY RELATIONAL DATABASE TERMINOLOGY

- **Query** – A question you ask about the data stored in a database
  - A **select query** allows you to ask a question based on one or more tables in a database.
  - An **action query** performs an action on the table on which it is based.
  - A **cross-tab query** performs calculations on the values in a field and displays the results in a datasheet.

KEY RELATIONAL DATABASE TERMINOLOGY

- A **form** is an object in a database that you can use to maintain, view, and print records in a database in a more structured manner.
- A **report** is a formatted presentation of data from a table, multiple tables, or queries that is created as a printout or to be viewed on screen.

REVIEW – COMPARISON OF DATABASE MODELS

- Hierarchical model
  - Primary advantage: processing efficiency
- Network model
  - More flexible than hierarchical models in terms of organizing data
- Relational database model
  - Easier to control, more flexible, and more intuitive
  - By far the most widely used

MS ACCESS

- Integrates both database application and DBMS into one
- Relational DBMS
- Handles substantially more data than spreadsheet software programs
- Can model relationships

DESIGNING AN MS ACCESS DATABASE

- Determine user needs
- Identify data fields
- Group related fields into tables
- Determine each table's primary key
- Normalize the data
- Determine relationships
- Create relationships
- Create forms
- Create queries
- Create reports
- Enter test data
- Test the system
- Enter or populate the database

HR APPLICATIONS USING DB

- HR software using MS Access
  - e.g., HRSource™ from Auxillium West, HR Vantage from Spectrum HR Systems Corporation
    - Focus is on small companies
    - Goal is breadth of functionality
    - Ability to create ad hoc queries and reports
- Other HR Databases
  - Built upon large-scale databases such as Oracle, DB2, and SQL server
  - Can be leased or purchased
    - ex., PeopleSoft Enterprise HCM, mySAP ERP HCM, Lawson HCM, Epicor HCM, Ultipro, SuccessFactors (SAP), Workday

DATA INTEGRATION: DATA WAREHOUSES, BUSINESS INTELLIGENCE, AND DATA MINING

- An organization's ability to generate meaningful information to make good decisions is only as good as its underlying database.
  - HR metrics are derived from the organization's data warehouse
  - Business intelligence aids in the creation of data warehouses
  - Data mining identifies underlying relationships

Big Data and NOSQL

- Big Data is a term that illustrates the challenges faced by organizations.
  - **Volume** refers to the amount of data, often measured in terabytes that organizations collect today.
  - **Variety** refers to the different forms of data.
  - **Velocity** refers to the speed at which data is coming into the organization.
  - **Veracity** refers to the quality of the data collected by the organizations.
- NOSQL are databases where data are stored and retrieved using different methods than SQL.