# **Concepts of Database Management, Seventh Edition**

# **Chapter One: Introduction to Database Management**

# **A Guide to this Instructor’s Manual:**

We have designed this Instructor’s Manual to supplement and enhance your teaching experience through classroom activities and a cohesive chapter summary.

This document is organized chronologically, using the same heading in **red** that you see in the textbook. Under each heading, you will find (in order): Lecture Notes that summarize the section, Figures and Boxes found in the section, if any, Teacher Tips, Classroom Activities, and Lab Activities. Pay special attention to Teacher Tips and activities geared towards quizzing your students, enhancing their critical thinking skills, and encouraging experimentation within the software.

For instructors who want to use an Access or SQL text as a companion to the Seventh Edition, this document includes detailed tips on integrating the Seventh Edition with the following books, also published by Course Technology: *New Perspectives on Microsoft Office Access 2010 – Brief,* *New Perspectives on Microsoft Office Access 2010 – Introductory,* and *New Perspectives on Microsoft Office Access 2010 – Comprehensive,* by Adamski and Finnegan; *Microsoft Office Access 2010: Introductory*, *Microsoft Office Access 2010: Complete*, *Microsoft Office Access 2010: Comprehensive*, by Shelly, Pratt, and Last; *A Guide to SQL*, *Eighth Edition*, by Pratt and Last; and *A Guide to MySQL*, by Pratt and Last. These tips are found at the end of this document under the heading, **Applying Database Concepts**.

In addition to this Instructor’s Manual, our Instructor’s Resources CD also contains PowerPoint Presentations, Test Banks, Solutions to Exercises, and other supplements to aid in your teaching experience. You also can access Instructor Resources via the Web at <login.cengage.com>.

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# **Chapter Objectives**

The learning objectives for Chapter One are:

* Introduce Premiere Products, the company that is used as the basis for many of the examples throughout the text
* Introduce basic database terminology
* Describe database management systems (DBMSs)
* Explain the advantages and disadvantages of database processing
* Introduce Henry Books, the company that is used in a case that appears throughout the text
* Introduce Alexamara Marina Group, the company that is used in another case that appears throughout the text

**1: Premiere Products Background**

LECTURE NOTES

* Describe the Premiere Products company
* Use Figure 1-1 to illustrate the problems associated with using spreadsheets to maintain this data
  + Redundancy
  + Difficulty accessing related data
  + Limited security features
  + Multiple updates
  + Size limitations
* Define redundancy
  + Duplication of data or the storing of the same data in more than one place
* Use the embedded Q & A on page 2 to discuss the problems redundancy causes
  + Wastes space
  + Makes changes more cumbersome
  + Can lead to inconsistencies
* Use Figure 1-2 to introduce the type of data that Premiere Products must be able to store and retrieve
  + Point out that the amounts in the Total column in Figure 1-2 are not stored in the database but are calculated

FIGURES: 1-1, 1-2

TEACHER TIPS

Students will work with Premiere Products in every chapter. They should become familiar with this fictitious company and the type of data it needs to maintain. The same type of data needs to be stored by distributors of electronics products, food, sporting goods, and clothing.

CLASSROOM ACTIVITIES

1. Group Activities: Place students in groups and distribute order forms from other companies. Ask the groups to determine the data the company must store and the data that is calculated.

2. Class Discussion: Ask students what other type of data a distributor such as Premiere Products would need to maintain.

3. Critical Thinking: Premiere Products needs to maintain data on the suppliers that supply the parts. Should Premiere Products store this data in a spreadsheet? Why or why not?

**4: Database Background**

LECTURE NOTES

* Define entity
  + Person, place, object, event, or idea for which you want to store and process data
* Define attribute
  + Characteristic or property of an entity
  + Also called a field or column in many database systems
* Use Figure 1-3 to point out the Rep and Customer entity and the attributes for each entity
* Define relationship
  + An association between entities
* Define one-to-many relationship
  + Each rep is associated with many customers, but each customer is associated with only one rep
* Use Figure 1-4 to explain the one-to-many relationship between sales reps and customers
* Define data file
  + File used to store data, such as a spreadsheet or word-processed document
* Define database
  + A structure that can store information about multiple types of entities, the attributes of those entities, and the relationships among the entities
* Point out the differences between a data file and a database
* Use Figure 1-5 to review the tables (entities) that make up the Premiere Products database
  + Rep, Customer, Orders, OrderLine, Part
* Point out the Note on page 7
* Use Figure 1-6 to illustrate the problems with storing orders in the alternative table structure
* Review the embedded Q & As on pages 7 through 9
* Define entity-relationship (E-R) diagram
  + Visual way to represent a database
* Use Figure 1-7 to illustrate an E-R diagram and review the entities, attributes, and relationships in the Premiere Products database

FIGURES: 1-3, 1-4, 1-5, 1-6, 1-7

TEACHER TIPS

Database concepts such as entity, attribute, and relationship are often difficult for students to grasp. Use examples that students can relate to, for example, a school database or a database maintained by the state department of public safety (driver’s licenses). A good analogy to use is an employment application form. The items that we complete on the form are attributes, and the completed application (entity example) describes the person who completed it.

Figure 1-5 lists the five tables that make up the Premiere Products database. Each table represents an entity. The data in the tables are related through common fields. It is these relationships that allow the user to access data from more than one table and produce reports, queries, and forms. Because the same part can be found on many orders and one order can include many parts, there is a many-to-many relationship between the Part and the Orders table. The OrderLine table relates the Part and Orders table by including both the OrderNum field and the PartNum field. The OrderNum field is the common field between the Orders and the OrderLine tables. The PartNum field is the common field between the Part and OrderLine tables. Encourage students to use the embedded Q & As to test their understanding of the concepts as well as the design of the Premiere Products database.

CLASSROOM ACTIVITIES

1. Class Discussion: Pick up any object in the classroom, such as a coffee mug, a book, or a pen, and ask students to list the attributes to describe the object as an entity.

2. Critical Thinking: What attributes would you use to describe yourself in a database of students? What attributes would you use to describe yourself in a database of employees?

3. Quick Quiz

1. What is an entity? (Answer: A person, place, object, event, or idea for which you want to store and process data)
2. In the database environment, what is a relationship? (Answer: An association between entities)
3. What is a database? (A structure that can store information about multiple types of entities, the attributes of those entities, and the relationships among the entities)

**9: Database Management Systems**

LECTURE NOTES

* Define database management system (DBMS)
  + A program or collection of programs, through which users interact with a database
* Use Figure 1-8 to illustrate using a DBMS directly
* Use Figure 1-9 to illustrate using a DBMS through another program
* Discuss the popular DBMSs
  + Access, Oracle, DB2, MySQL, SQL Server
* Define database design
  + Determining the structure of a desired database
* Define forms
  + Screen objects used to maintain, view, and print data from a database
* Use Figures 1-10 and 1-11 to illustrate forms used in a database
* Use Figure 1-12 to illustrate reports created from a database

FIGURES: 1-8, 1-9, 1-10, 1-11, 1-12

TEACHER TIPS

Most students have very little experience with a true database management system. A database management system (DBMS) is different from file management software such as *Professional File* or the database feature of *Excel* or *MS Works*. In a typical file management system, each department within an organization has its own set of files, often designed specifically for particular applications. In a database management system, many programs and users share the data in a database. With file management software, data only can be retrieved from one file. With a DBMS, data can be retrieved by joining tables that have a common field.

Microsoft Access currently is the most popular DBMS for use with personal computers. There are versions of Oracle, DB2, MySQL, and SQL Server that run under several different operating systems. MySQL is open-source software that is available at no cost. Both Oracle and SQL Server provide Express versions that can be downloaded at no cost. These Express versions are subsets of the complete versions.

CLASSROOM ACTIVITIES

1. Class Discussion: Ask students if they have ever used file management software or other DBMS packages.

2. Group Activities: Divide the class into small groups. Ask each group to determine the fields that could be used to describe a student in one of the following situations:

1. A database that stores information about students in a student organization
2. A database that stores information about students in a course
3. A database that stores information about students on an athletic team
4. A database that stores information about student health records

**12: Advantages of Database Processing**

* Use Figure 1-13 to discuss the advantages of database processing
  + Getting more information from the same amount of data
  + Sharing data
  + Balancing conflicting requirements
  + Controlling redundancy
  + Facilitating consistency
  + Improving integrity
  + Expanding security
  + Increasing productivity
  + Providing data independence
* Define database administrator or database administration (DBA)
  + Person or group in charge of the database
* Define integrity constraint
  + Rule that data must follow in the database
* Define security
  + Prevention of unauthorized access to the database
* Define data independence
  + Property that lets you change the structure of the database without requiring you to change the programs that access the database

FIGURE: 1-13

CLASSROOM ACTIVITIES

1. Group Activities: Divide the class into nine small groups. Assign each group a different advantage. Ask them to give a practical example of the advantage using a university database.

2. Class Discussion: Ask each student to list one place (for example, doctor’s office, dentist’s office, employer, school) where data about them is stored. Write the list on the board. Ask students what happens when data that is stored about them is incorrect.

3. Critical Thinking: If a database is not maintained or if incorrect data is entered into the database, serious problems can occur. What problems could occur if a student database is not maintained? What problems could occur if a database that maintains financial data (such as a credit card database) has incorrect data?

4. Critical Thinking: One of the disadvantages of database processing is the greater impact of failure. If the student database or the course management system (for example, Blackboard) at your university is unavailable, how does that affect you? How does it affect your instructors?

**14: Disadvantages of Database Processing**

* Use Figure 1-14 to discuss the disadvantages of database processing
  + Larger file size
  + Increased complexity
  + Greater impact of failure
  + More difficult recovery

FIGURE: 1-14

CLASSROOM ACTIVITIES

1. Group Activities: Divide the class into four groups. Assign each group a different disadvantage. Ask them to give a practical example of the disadvantage using a university database.

2. Critical Thinking: When a database approach is used, a failure on the part of one user that damages the database can affect other users. What are some specific examples of database failures?

3. Critical Thinking: One of the disadvantages of database processing is the greater impact of failure. If the student database or the course management system (for example, Blackboard) at your university is unavailable, how does that affect you? How does it affect your instructors?

**14: Introduction to the Henry Books Database Case**

* Use Figures 1-15 through 1-18 to describe the Henry Books database case
* Use Figure 1-19 to illustrate the E-R diagram for Henry Books
* Use the embedded Q & As on pages 18, 21,and 22 to test students’ understanding of Henry Books

FIGURES: 1-15, 1-16, 1-17, 1-18, 1-19

TEACHER TIPS

The Henry Books database is slightly different than the database used in previous editions. The case has been updated, and the bookstore chain now sells used books and remainders. There are minor changes to the attributes in the Branch table, Book table, and Copy table (formerly Inventory table). There is no change in the relationships among the tables.

The Henry Books database has six entities: Publisher, Author, Wrote, Branch, Book, and Copy. There is a one-to-many relationship (one publisher can publish many books) between the Publisher table and the Book table. The common field between the two tables is Publisher Code. Because one author can write many books and one book can be written by many authors, there is a many-to-many relationship between books and authors. The Wrote table relates books and authors by including the BookCode field and the AuthorNum field. The BookCode field is the common field between the Wrote and Book tables. The AuthorNum field is the common field between the Wrote and Author tables. Because the same book can be found at many bookstore branches and one bookstore branch has many books, there is a many-to-many relationship between the Branch and Book table. The BookCode field is the common field between the Copy and Book tables. The BranchNum field is the common field between the Copy and Branch tables.

CLASSROOM ACTIVITIES

1. Class Discussion: Ask students if there are any other attributes they would add to the Author table and the Publisher table.

2. Critical Thinking: What other attribute could you use to uniquely identify each book?

3. Critical Thinking: Why is the price of a book in the Copy table and not in the Book table?

4. Critical Thinking: Why are there different prices for the same book in the Copy table?

**22: Introduction to the Alexamara Marina Group Database Case**

* Use Figures 1-20 through 1-24 to describe the Alexamara Marina Group database case
* Use Figure 1-25 to illustrate the E-R diagram for Alexamara Marina Group database
* Use the embedded Q & As on pages 24 and 26 to test students’ understanding of Alexamara Marina Group

FIGURES: 1-20, 1-21, 1-22, 1-23, 1-24, 1-25

TEACHER TIPS

The Alexamara Marina Group database has five entities: Marina, Owner, MarinaSlip, ServiceCategory, and ServiceRequest. There is a one-to-many relationship between the Owner table and the MarinaSlip table. The common field between the two tables is OwnerNum. There is a one-to-many relationship between marinas and marina slips. The common field between the Marina and MarinaSlip tables is MarinaNum. There is a one-to-many relationship between the ServiceCategory and the ServiceRequest tables. There is a many-to-many relationship between boats and service requests. The ServiceRequest table relates boats and services by including the SlipID field and the CategoryNum field. The SlipID field is the common field between the MarinaSlip and the ServiceRequest tables. The CategoryNum field is the common field between the ServiceCategory and the ServiceRequest tables.

CLASSROOM ACTIVITIES

1. Class Discussion: Ask students if there are any other attributes they would add to the Owner table.

2. Assign a Project: Have students visit a local business to find out how the business uses a database.

**End of Chapter Material**

* Review questions require students to recall and apply the important material in the chapter.
* The Premiere Products, Henry Books, and Alexamara Marina Group exercises test students’ knowledge of the chapter material.

**Glossary of Key Terms**

* attribute
* column
* data file
* data independence
* database
* database administration (DBA)
* database administrator
* database design
* database management system (DBMS)
* entity
* entity-relationship (E-R) diagram
* field
* form
* integrity
* integrity constraint
* one-to-many relationship
* redundancy
* relationship
* security

**Applying Database Concepts**

**Note:** Each of the textbooks listed below has its own Instructor’s Manual that provides lecture notes, teaching tips, and solutions. The integration tips are designed to help you integrate and reinforce material in the Concepts book with the specific DBMS application text. Page numbers for these textbooks are shown in parentheses. The suggested exercises complement and enhance the exercises in the Concepts book. You also will want to assign exercises that cover the material presented in the specific application text.

**Microsoft Access 2010 New Perspectives (Brief, Introductory, Comprehensive)**

INTEGRATION TIPS

Tutorial 1 introduces students to Microsoft Access 2010. Session 1.1 identifies the same database concepts that are discussed in Chapter 1 of the Concepts book. Session 2.1 in Tutorial 2 presents basic guidelines for designing databases.

* Introduce Belmont Landscapes and make sure students understand the purpose of the database and the type of data needed by Oren Belmont. (AC 4)
* Use the database shown in Figure 1-2 to point out the entities (records), attributes (fields), and relationships. Identify the common field (CustomerID) between the Customer table and the Contract table. (AC 5)
* Ask students what type of relationship exists between the Customer table and the Contract table (one-to-many). (AC 5)
* Use Figure 1-3 to explain relational database management systems. (AC 6)
* Use Quick Check questions 1 through 3 as review. (AC 21)
* Point out the guidelines for designing databases in Session 2.1 (AC 52). Use Figure 2.3 to show inconsistent data and data redundancy. (AC 53)

SUGGESTED EXERCISES

* Assign Case Problem 2 in Tutorial 1 and Tutorial 2. These assignments demonstrate the essential concepts of file and database management systems. (AC 44, AC 102)
* Use Case Problem 4 in Tutorial 2, GEM Ultimate Vacations to ask students about other entities and attributes to include in the database. (E-mail address is one choice for the Guest table.) Obtain some trip brochures (or use the WWW to find information on luxury rentals), and ask students to determine the design of the database. You also can have students create a simple E-R diagram of the database. This can be an individual or a group exercise. It can be a homework assignment or an in-class assignment. (AC 107)

**Microsoft Access 2010 Shelly Cashman Series (Introductory, Complete, Comprehensive)**

INTEGRATION TIPS

Chapter 1 introduces students to Microsoft Access and identifies the same database concepts that are discussed in Chapter 1 of the Concepts book. Data redundancy also is discussed.

* Introduce Camashaly Design Group and make sure students understand the purpose of the database and the type of data needed by the marketing company. (AC 2)
* Use the database shown in Figure 1-1 to point out the entities, attributes, and relationships. Identify the common field (Business Analyst Number) between the Client table and the Business Analyst table. (AC 3)
* Ask students what type of relationship exists between the Business Analyst table and the Client table (one-to-many). (AC 3)
* Discuss the database design guidelines and Designing a Database. Use Figures 1-3 and 1-4 to review the problems associated with redundancy. (AC 5, AC 11)

SUGGESTED EXERCISES

* Use the Philamar Training database in In the Lab 3 as a homework assignment. Ask students to list the entities (Clients and Trainers), the attributes for each table, the common field (Trainer Number), and the type of relationship that exists between the tables (one Trainer is related to many Clients). Ask them to identify an additional attribute that could be added to the Trainer table (telephone number or e-mail address are two choices). (AC 70)
* Use Cases and Places 3 to ask students about the entities and attributes to include in the database. This can be an individual or a group exercise. It can be a homework assignment or an in-class assignment. You also can have students create a simple E-R diagram of the database. (AC 72)

**A Guide to SQL, Eighth Edition**

INTEGRATION TIPS

Chapter 1 describes the Premiere Products database, the Henry Books database, and the Alexamara Marina Group database.

* Point out that the Premiere Products and Alexamara databases used in this book have the same database design. The actual data also is the same except for the dates.
* Point out the minor differences between the Henry Books databases used in each book. Only attributes have been changed as well as one table name (Inventory versus Copy). Relationships are the same.
* Use the Henry Books database to point out the entities, attributes, and relationships. (8)
* Identify the common field (Publisher Code) between the Publisher table and the Book table. (9, 11)
* Ask students what type of relationship exists between the Publisher table and the Book table (one-to-many). (9, 11)

SUGGESTED EXERCISES

* Assign Premiere Products exercises 4, 5, 6, and 9 as complements to the exercises in the Concepts book. (20)
* Assign Henry Books exercises 2, 6, 7, 8, 10, and 11 as complements to the exercises in the Concepts book. (21, 22)
* Assign Alexamara Marina Group exercises 4, 5, 6, 7, 8, 9, and 10. (21)

**A Guide to MySQL**

INTEGRATION TIPS

Chapter 1 describes the Premiere Products database, the Henry Books database, and the Alexamara Marina Group database.

* Point out that the Premiere Products and Alexamara databases used in this book have the same database design. The actual data also is the same except for the dates.
* Point out the minor differences between the Henry Books databases used in each book. Only attributes have been changed as well as one table name (Inventory versus Copy). Relationships are the same.
* Use the Henry Books database to point out the entities, attributes, and relationships. (8)
* Identify the common field (Publisher Code) between the Publisher table and the Book table. (9, 11)
* Ask students what type of relationship exists between the Publisher table and the Book table (one-to-many). (9, 11)

SUGGESTED EXERCISES

* Assign Premiere Products exercises 4, 5, 6, and 9 as complements to the exercises in the Concepts book. (21)
* Assign Henry Books exercises 2, 6, 7, 8, 10, and 11 as complements to the exercises in the Concepts book. (22)
* Assign Alexamara Marina Group exercises 4, 5, 6, 7, 8, 9, and 10. (22)

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