# **Concepts of Database Management, Eighth 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 Eighth Edition, this document includes detailed tips on integrating the Eighth Edition with the following books, also published by Cengage: *Microsoft Office Access 2013: Introductory*, *Microsoft Office Access 2013: Complete*, *Microsoft Office Access 2013: Comprehensive*, by 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 also include PowerPoint Presentations, Test Banks, Solutions to Exercises, and other supplements to aid in your teaching experience. You can access Instructor Resources via the Web at [login.cengage.com](file:///C:\Concepts%208e%20IM\IM%207e\login.cengage.com).

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# **Chapter Objectives**

The learning objectives for Chapter One are:

* Introduce TAL Distributors, 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 Colonial Adventure Tours, the company that is used in a case that appears throughout the text
* Introduce Solmaris Condominium Group, the company that is used in another case that appears throughout the text

**1: TAL Distributors Background**

LECTURE NOTES

* Describe the TAL Distributors 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 TAL Distributors 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 TAL Distributors 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.

If you want to personalize the database, you have students add their name as a customer or you can have them rename the database using their own name rather than TAL.

CLASSROOM ACTIVITIES

1. Group Activities: Place students in groups and distribute order forms from local companies and/or retail stores. 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 TAL Distributors would need to maintain.

3. Critical Thinking: TAL Distributors needs to maintain data on the suppliers that supply the wooden items. Should TAL Distributors 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 TAL Distributors database
  + Rep, Customer, Orders, OrderLine, Item
* Point out the Note on page 8
* Use Figure 1-6 to illustrate the problems with storing orders in the alternative table structure
* Review the embedded Q & As on pages 8 through 10
* 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 TAL Distributors 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 TAL Distributors 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 item can be found on many orders and one order can include many items, there is a many-to-many relationship between the Item and the Orders table. The OrderLine table relates the Item and Orders table by including both the OrderNum field and the ItemNum field. The OrderNum field is the common field between the Orders and the OrderLine tables. The ItemNum field is the common field between the Item 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 TAL Distributors 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)

**10: 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 or the database feature of *Excel*. 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

**13: 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 medical records data (such as a hospital database) has incorrect data?

4. Critical Thinking: One of the advantages of database processing is: getting more information for the same amount of data. Using a medical records database, provide some specific examples of this advantage.

**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 learning management system (for example, *Blackboard* or *LMS*) at your university is unavailable, how does that affect you? How does it affect your instructors?

**16: Introduction to the Colonial Adventure Tours Database Case**

* Use Figures 1-15 through 1-19 to describe the Colonial Adventure Tours database case
* Use Figure 1-20 to illustrate the E-R diagram for Colonial Adventure Tours
* Use the embedded Q & As on pages 19, 20,and 21 to test students’ understanding of Colonial Adventure Tours

FIGURES: 1-15, 1-16, 1-17, 1-18, 1-19, 1-20

TEACHER TIPS

The Colonial Adventure Tours database has five entities: Guide, Trip, Customer, Reservation, and TripGuides. There is a one-to-many relationship (one customer can have many reservations) between the Customer table and the Reservation table. The common field between the two tables is CustomerNum. There is a one to many relationship (one trip can be on many reservations) between the Trip table and the Reservation table. The common field between the two tables is the TripID field. Because one guide can guide many trips and one trip can be guided by many guides, there is a many-to-many relationship between guides and trips. The TripGuides table relates guides and trips by including the GuideNum field and the TripID field. The GuideNum field is the common field between the TripGuides and Guide tables. The TripID field is the common field between the TripGuides and Trip tables.

CLASSROOM ACTIVITIES

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

2. Critical Thinking: What other attributes could you use to uniquely identify each trip?

3. Critical Thinking: Why is the price of a trip in the Reservation table and not in the Trip table?

**21: Introduction to the Solmaris Condominium Group Database Case**

* Use Figures 1-21 through 1-25 to describe the Solmaris Condominium Group database case
* Use Figure 1-26 to illustrate the E-R diagram for Solmaris Condominium Group database
* Use the embedded Q & As on pages 22 and 24 to test students’ understanding of Solmaris Condominium Group

FIGURES: 1-21, 1-22, 1-23, 1-24, 1-25, 1-26

TEACHER TIPS

The Solmaris Condominium Group database has five entities: Location, Owner, CondoUnit, ServiceCategory, and ServiceRequest. There is a one-to-many relationship between the Owner table and the CondoUnit table. The common field between the two tables is OwnerNum. There is a one-to-many relationship between locations and condo units. The common field between the Location and CondoUnit tables is LocationNum. There is a one-to-many relationship between the ServiceCategory and the ServiceRequest tables. There is a many-to-many relationship between condo units and service requests. The ServiceRequest table relates condo units and services by including the CondoID field and the CategoryNum field. The CondoID field is the common field between the CondoUnit 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 TAL Distributors, Colonial Adventure Tours, and Solmaris Condominium 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
* forms
* 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 2013 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 Bavant Publishing and make sure students understand the purpose of the database and the type of data needed by the textbook publishing company. (AC 2)
* Use the database shown in Figure 1-1 to point out the entities, attributes, and relationships. Identify the common field (Book Rep Number) between the Customer table and the Book Rep table. (AC 3)
* Ask students what type of relationship exists between the Book Rep table and the Customer table (one-to-many). (AC 4)
* Discuss the Database Design section. Use Figures 1-81 and 1-82 to review the problems associated with redundancy. (AC 60 - AC 62)

SUGGESTED EXERCISES

* Use the Mums Landscaping database in Consider This: Your Turn as a homework assignment. Ask students to list the entities (Customers and Supervisors), the attributes for each table, the common field (Supervisor Number), and the type of relationship that exists between the tables (one Supervisor is related to many Customers). Ask them to identify an additional attribute that could be added to the Supervisor table (telephone number or e-mail address are two choices). (AC 72)
* Use the Research and Collaboration exercise 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 are very similar in design to the TAL Distributors and Solmaris Condominium Group databases.
* Review the Henry Books database used in this book.
* 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 are very similar in design to the TAL Distributors and Solmaris Condominium Group databases.
* Review the Henry Books database used in this book.
* 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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