Concepts of Database Management 9th edition Starks Solutions Manual

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Chapter 1

Introduction to Database Management

Solutions

Answers to Review Questions

1. Redundancy is the duplication of data or the storing of the same data in more than one place. Redundancy wastes space, makes the updating of data more cumbersome and time-consuming, and can lead to inconsistencies.

2. The problems, other than redundancy, associated with the nondatabase approach to processing data include difficulties accessing related data, limited security features to protect data from access by unauthorized users, limited ability for multiple users to update the same data at the same time, and size limitations.

3. An entity is a person, place, object, event, or idea for which you want to store and process data. An attribute, which also is called a field or column in many database systems, is a characteristic or property of an entity.

4. A relationship is an association between entities. A one-to-many relationship exists between two entities when each row in the first entity matches many rows in the second entity and each row in the second entity matches only one row in the first entity.

5. A database is a structure that can store information about multiple types of entities, the attributes of those entities, and the relationships among the entities.

6. In a database system, you create a one-to-many relationship by using common columns in the two tables.

7. An E-R diagram represents a database in a visual way by using a rectangle for each entity, using a line to connect two entities that have a relationship, and placing a dot at the end of a line to indicate the “many” part of a one-to-many relationship.

8. A database management system (DBMS) is a program, or a collection of programs, through which users interact with a database.

9. Database design is the process of determining the table structure of the desired database.

10. A form is a screen object used to maintain, view, and print data from a database.

11. It is possible to get more information from the same amount of data by using a database approach as opposed to a nondatabase approach because all data is stored in a single database, instead of being stored in dozens of separate files, making the process of obtaining information quicker, easier, and even possible in certain situations.

12. Sharing data means that several users can have access to the same piece of data and use it in a variety of ways.

13. The DBA (database administrator or database administration) is the central person or group in an organization in charge of the database and the DBMS that runs the database. The DBA attempts to balance the needs of individuals and the overall needs of the organization.

14. Multiple copies of the same data in an organization leads to inconsistency because each piece of data can have different values. Controlling redundancy is the result of eliminating, or at least reducing, the multiple copies. Improved consistency is the result of this controlled redundancy.

15. An integrity constraint is a rule that the data in a database must follow. A database has integrity when the data in it satisfies all established integrity constraints. A good DBMS should provide an opportunity for users to incorporate these integrity constraints when they design the database. The DBMS then should ensure that these constraints are not violated.

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16. Security is the prevention of access to the database by unauthorized users. A DBMS provides security features such as passwords. As additional security, the DBA can assign users to groups and restrict each group to certain data and to certain types of access.

17. Data independence is the property that lets you change the structure of a database without requiring you to change the programs that access the database. With data independence, you easily can change the structure of the database when the need arises.

18. In a database environment, file size is a disadvantage because the DBMS is a large program that occupies a great amount of disk space and internal memory. In addition, because all the data that the database manages for you is stored in one file, the database file itself requires a large amount of disk space and internal memory.

19. The more complex a product is in general (and a DBMS, in particular, is complex), the more difficult it is to understand and correctly apply its features. Because of this complexity, serious problems may result from mistakes made by users and designers of the DBMS.

20. Some specific inputs which result in big data are mobile devices, digital processes, and even social media exchanges.

21. In a nondatabase environment, each user has a completely separate system; the failure of any single user's system does not necessarily affect any other user. On the other hand, if several users are sharing the same database, a failure on the part of any one user that damages the database in some way might affect all the other users.

22. The great complexity of a database structure makes recovery more difficult. In addition, many users update the data at the same time, which means that recovering the database involves not only restoring it to the last state in which it was known to be correct, but also performing the complex task of redoing all the updates made since that time.

23. [Critical Thinking] Answers will differ, but students should have reasons for their responses. Any error to a student transcript/record, such as incorrect grade, courses not listed correctly; incorrect contact information could be an error that may cause a student to lose a job opportunity, a scholarship, or a loan. It also could affect whether they graduate.

24. [Critical Thinking] No. The only attributes that would be the same would be contact and demographic information such as, name, address, phone number, age, and gender. Other attributes are specific to the database context. A medical database would have attributes to describe, for example, health conditions, previous appointments, lab results, and medications. A student database would have attributes to describe, for example, courses taken, advisor, GPA, number of credits, and academic major. A fitness database would have attributes to describe for example, membership level, athletic ability, fitness classes, fees, and liability waivers.

Answers to BITS Corporation Exercises

Note: Data and solution files are available at www.cengagebrain.com. Data files consist of copies of the BITS Corporation, Colonial Adventure Tours, and Sports Physical Therapy databases that are usable in Access 2010, Access 2013, and Access 2016; and script files to create the tables and data in these databases in other systems, such as Oracle.

1. The names of all clients that have a credit limit less than $10,000 are: Hershey, Jarrod; Goduto, Sean; Salazar, Jason; Fisherman's Spot Shop; Seymour, Lindsey; Bonnie's Beautiful Boutique; Yates, Nick; Howler, Laura; MarketPoint Sales.

2. The descriptions of all items in the Tasks table that have the category DRM are Data Recovery Major and Data Recovery Minor.

3. The order numbers are 67424 and 67949.

4. The order date is 09/14/2018 and the scheduled date is 09/24/2018.

5. The names of the clients are Pritchard's Pizza & Pasta and Harpersburg Bank.

6. The names of the clients are Seymour, Lindsey and Howler, Laura.

7. The sum of the balances is 18,746.05.

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8.

Order Number	Order Date	Client Number	Client Name
67101	9/6/2018	733	Howler, Laura
67313	9/7/2018	458	Bonnie's Beautiful Boutique
67424	9/10/2018	322	Prichard's Pizza & Pasta
67838	9/10/2018	867	MarketPoint Sales
67949	9/10/2018	322	Prichard's Pizza & Pasta
68252	9/12/2018	363	Salazar, Jason
68868	9/14/2018	867	MarketPoint Sales
68979	9/17/2018	826	Harpersburg Bank

9.

Order Number	Order Date	Client Number	Client Name
67424	9/10/2018	322	Prichard's Pizza & Pasta
67838	9/10/2018	867	MarketPoint Sales
67949	9/10/2018	322	Prichard's Pizza & Pasta

10. 68979, Harpersburg Bank, Christopher Turner

11. The other attributes that might be in the client table are email and phone number. Answers will vary.

12. BITS should include job title, job number, and supervisor number. Answers will vary.

13. BITS might want to track how many times clients check the website, or survey data. They would use web-enabled devices to track this information and would store it in another database. Answers will vary.

Answers to Colonial Adventure Tours Case

Note: Data and solution files are available at www.cengagebrain.com. Data files consist of copies of the BITS Corporation, Colonial Adventure Tours, and Sports Physical Therapy databases that are usable in Access 2010, Access 2013, and Access 2016; and script files to create the tables and data in these databases in other systems, such as Oracle.

1. Abrams, Devon, Marston, Rowan, Stevens, Unser

2. Bloomfield - Maidstone, Chocorua Lake Tour, Mason's Farm, Lake Mephremagog Tour, Long Pond Tour, Lower Pond Tour, Missisquoi River - VT, Northern Forest Canoe Trail, Pontook Reservoir Tour

3. Mt Ascutney - North Peak, Baldpate Mountain, Bloomfield – Maidstone, Cadillac Mountain, Mason's Farm, Lake Mephremagog Tour, Lower Pond Tour, Metacomet-Monadnock Trail Hike, Park Loop Ride, Pontook Reservoir Tour, Pondicherry Trail Ride, Westfield River Loop

4. Bradbury Mountain Ride, Park Loop Ride

5. Mt Ascutney - North Peak, Mt Ascutney - West Peak, Cadillac Mountain Ride, Cherry Pond, Lake Mephremagog Tour, Mount Cardigan Hike, McLennan Reservation Hike, Missisquoi River – VT, Pondicherry Trail Ride, Seal Beach Harbor, Sawyer River Ride

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6. Mt Ascutney - West Peak, Bradbury Mountain Ride, Blueberry Mountain, Cadillac Mountain Ride, Cannon Mtn, Huguenot Head Hike, Low Bald Spot Hike, Mount Battie Ride, Mount Cardigan Hike, Mount Garfield Hike, Sawyer River Ride

7. 6 (2 for CT and 4 for VT)

8. Mt Ascutney - North Peak, Long Pond, McLennan Reservation Hike

9. Bradbury Mountain Ride, Cadillac Mountain Ride, Mount Battie Ride, Westfield River Loop

10. Gernowski, Mt. Cardigan - Firescrew, Orange

    Bretton-Borak, Chocorua Lake Tour, Tamworth

11. 13

12. Arethusa Falls, Hiking, Zach Gregory, Hal Rowan; Mt Ascutney - North Peak, Hiking, Miles Abrams, Lori Stevens; Bradbury Mountain Ride, Biking, Rita Boyers, Zach Gregory; Baldpate Mountain, Hiking, Susan Kiley, Glory Unser; Chocorua Lake Tour, Paddling, Harley Devon, Susan Kiley, Glory Unser

13. Siam Bretton-Borak, Sawyer River Ride, Biking, Chocorua Lake Tour, Paddling;

    Brianne Brown, Sawyer River Ride, Biking, Cadillac Mountain Ride, Hiking;

    Karen Busa, Mount Garfield Hike, Hiking, Mount Battie Ride, Biking;

    Clement Chau, Long Pond, Hiking, Cadillac Mountain Ride, Biking;

    Sadie Gernowski, Bradbury Mountain Ride, Biking, Mt. Cardigan - Firescrew, Hiking;

    Ryan Goff, Mount Cardigan Hike, Hiking, Crawford Path Presidentials Hike, Hiking;

    Liam Northfold, Wachusett Mountain, Hiking, Long Pond, Hiking;

    Arnold Ocean, Mt Ascutney - West Peak, Hiking, Mt Ascutney - North Peak, Hiking

14. Busa, Mount Battie Ride, Biking; Gernowski, Bradbury Mountain Ride, Biking

15. Gernowski, Chau, Brown, Marchand, Busa

16. [Critical Thinking] No. You can calculate the total price by adding the trip price and the other fees and then multiplying by the number of people.

17. [Critical Thinking] You would place the trip cost field in the Trip table.

Answers to Sports Physical Therapy Case

Note: Data and solution files are available at www.cengagebrain.com. Data files consist of copies of the BITS Corporation, Colonial Adventure Tours, and Sports Physical Therapy databases that are usable in Access 2010, Access 2013, and Access 2016; and script files to create the tables and data in these databases in other systems, such as Oracle.

1.

Patient Number	Last name	First Name
1010	Koehler	Robbie
1011	King	Joseph
1012	Houghland	Susan
1013	Falls	Tierra
1014	Odepaul	Ben
1015	Venable	Isaiah

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1016	Waggoner	Brianna
1017	Short	Tobey
1018	Baptist	Joseph
1019	Culling	Latisha
1020	Marino	Andre
1021	Wilson	Tammy

2. The session numbers are: 29, 31 ,33, 36, and 38.

3.

Last Name	First Name	Street Address
Shields	Anthony	5222 Eagle Court
Risk	Jonathan	1010 650 North

4. Stephen Wilder does electrical stimulation and Aquatic therapy with therapeutic exercises.

5.

Last Name	First Name	City
Koehler	Robbie	San Vista
Houghland	Susan	Munster
Falls	Tierra	Palm Rivers
Baptist	Joseph	Waterville
Culling	Latisha	San Vista
Wilson	Tammy	Waterville

6. Steven Wilder.

7. The codes are: 92507, 97032, 97033, 97035, 97039, 97110, 97112, 97113, 97116, 97124, 97140, 97150, 97530, 097535, 97750, and 98960

8. Joseph Baptist had ultrasound.

9.

Last Name	First Name	Street	City	State	Zip Code
Culling	Latisha	4238 East 71st St.	San Vista	TX	74071
Koehler	Robbie	119 West Bay Dr.	San Vista	TX	72510

10. Add rate of pay to the therapists table along with any information needed for tax purposes in order to have complete information on each person. Answers will vary.

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11. The relationship between the two is the unit of time by which the therapy is billed and the number of minutes by which the therapy was performed. Therapies that have no billable time may be performed by the service. The company may bill by LengthOfSession and the UnitOfTime fields. Answers will vary.

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Concepts of Database Management, Ninth 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.

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.

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Chapter Objectives

The learning objectives for Chapter One are:

- Introduce Burk IT Solutions (BITS), 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 at the end of each chapter
- Introduce Sports Physical Therapy, the company that is used in another case that appears at the end of each chapter

1: BITS Company Background

LECTURE NOTES

- Describe the BITS company
- Use Figure 1-1 to illustrate the problems associated with using spreadsheets to maintain this data

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  - 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 BITS 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 BITS 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 other consulting companies or service providers.

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 BITS.

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 service provider such as BITS would need to maintain.

3. Critical Thinking: BITS needs to maintain data on the consultants and what each one specializes in. Should BITS store this data in a spreadsheet? Why or why not?

4: Database Solution

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 Consultant and Client 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 consultants and clients
- Define data file

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  - 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 BITS database
  - Consultant, Client, Tasks, OrderLine, Work Orders
- 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 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 BITS 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 BITS 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. Encourage students to use the embedded Q & As to test their understanding of the concepts as well as the design of the BITS 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

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- 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
  - Referential integrity
  - Expanding security
  - Increasing productivity
  - Providing data independence
- Define database administrator or database administration (DBA)
  - Person or group in charge of the database
- Define referential integrity
  - A relational database concept stating that table relationships must be consistent and follow integrity constraints
- Define integrity constraint

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  - 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.

15: Disadvantages of Database Processing

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

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?

15: Big Data

- Define big data

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  - the large volume of data produced by every digital process, system, sensor, mobile device, and social media exchange
- Define structured data
  - traditional in its retrieval and storage DBMS
- Define unstructured data
  - data that is not organized or easily interpreted by traditional databases or data models
- Define metadata
  - descriptive data stored with input sources
- Point out that big data is a source for ongoing discovery and analysis. The demand for information from big data will require new approaches to database management, architecture, tools, and practices.

CLASSROOM ACTIVITIES

1. Classroom Discussion: Big data is often seen as a controversial issue today. Everyone seems to be collecting it, analyzing it, making money from it and praising it. Have students discuss whether they feel there are potential problems with collecting, storing, and distributing big data.

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 and 20 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 Sports Physical Therapy Database Case

- Use Figures 1-21 through 1-24 to describe the Sports Physical Therapy database case
- Use Figure 1-25 to illustrate the E-R diagram for Sports Physical Therapy database
- Use the embedded Q & As on pages 22 through 24 to test students' understanding of Sports Physical Therapy

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

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 Bits Corporation, Colonial Adventure Tours, and Sports Physical Therapy exercises test students' knowledge of the chapter material.

Glossary of Key Terms

- attribute
- big data
- 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
- metadata
- one-to-many relationship
- redundancy
- referential integrity
- relationship
- reports
- rows
- security
- structured data
- table
- unstructured data

Top of Document

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