**Module 1**

**Introduction to Database Management**

**Solutions**

Review Questions

1. \_\_\_\_\_ is the duplication of data or the storing of the same data in more than one place.

a. Data security

b. Data inconsistency

c. Data independence

d. Data redundancy

1. Which of the following is *not* a problem associated with redundancy?

a. prevents orphan records

b. makes updating data more cumbersome and time-consuming

c. can lead to inconsistencies

d. results in more frequent data errors

1. A(n) \_\_\_\_\_ is a person, place, object, event, or idea for which you want to store and process data.

a. attribute

b. entity

c. relationship

d. flat file

1. A(n) \_\_\_\_\_ is a characteristic or property of an entity.

a. metadata

b. database

c. flat file

d. attribute

1. A(n) \_\_\_\_\_ is an association between entities. A(n) \_\_\_\_\_ 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.

a. record

b. one-to-many relationship (for second blank)

c. relationship (for first blank)

d. attribute

1. A(n) \_\_\_\_\_ is a structure that contains data about many categories of information as well as the relationships between those categories.

a. table

b. data file

c. relational database

d. software stack

1. Which of the following describes how to create a one-to-many relationship in a database system?

a. Insert a new table between two existing tables.

b. Use a common field in the two tables to tie the related records from each table together.

c. Create an entity-relationship (E-R) diagram.

d. Include multiple entries in a single field.

1. In a(n) \_\_\_\_\_, rectangles represent entities and display their attributes; lines represent relationships between connected entities.

a. entity-relationship (E-R) diagram

b. unstructured data file

c. spreadsheet

d. software stack

1. Which of the following defines a DBMS?

a. a collection of data that corresponds to one record

b. a file used to store data about a single entity

c. the person or group in charge of a database

d. a program through which users interact with the data stored in a database

1. Which of the following describes database design?

a. collecting the large volume of data produced by digital processes and devices

b. creating a file used to store data about a single entity

c. creating the entities, attributes, and relationships between tables of data

d. Converting the data in a database to a format indecipherable to normal programs

1. Which of the following allows you to get more information from the same amount of data?

a. creating a healthy relational database

b. entering the same information more than once

c. using a flat file system

d. encrypting the data

e. designing professional forms

1. A(n) \_\_\_\_\_ is the person in charge of an organization’s database.

a. database management server (DBMS)

b. database administrator (DBA)

c. organization administrator (OBA)

d. big data administrator (BDA)

Critical Thinking

1. Explain how redundant data often leads to poorer decision making.

If a student’s name was repeated for each course he/she took, any data entry errors at input could potentially create a second student rather than give the same student credit for all of the courses he or she took. Even if the name change was intentional which commonly follows a marriage, a second person would be created if that person’s name was entered into the system for every class he or she took. Redundancy in class names would create inconsistencies between students and confusion about the specific class that was taken.

2. An attribute is a characteristic or property of an entity. If *person* is an entity, would the same attributes be used to describe a person in different databases that store medical, student, and fitness club data? Why or why not?

Perhaps. It depends on what information is needed. Some attributes about a person would be the same regardless of what type of application was being used, such as first and last name, address, and other contact information. Other attributes are specific to the application and would require new entities. A medical database would have entities with attributes to describe appointments, lab results, and medications to name a few. A student database would have entities and attributes to describe courses taken, credits, grades, and academic major. A fitness database would have entities and attributes to describe membership level, athletic ability, fitness classes, fees, and liability waivers.

JC Consulting Exercises

Answer each of the following questions using the JCC data shown in Figure 1-5. No computer work is required.

1. Which employee has a salary value of $8,100?
   1. Nathan Geller
   2. Nigel Horvat
   3. Hector Garcia
   4. Nada Prohm
2. What client is *not* a government entity?
   1. Project Lead The Way
   2. Aspire Associates
   3. The HELPCard
   4. All are government entities
3. Which projects had an estimated start date prior to 1/1/2020?
   1. ProjectIDs 1, 2, 3, and 7
   2. ProjectIDs 8, 16, and 24
   3. ProjectIDs 8–30
   4. ProjectID 1, 9, and 17
4. List ProjectLineItemID values that are related to ProjectID 3.
   1. ProjectLineItemIDs 1 and 2
   2. ProjectLineItemIDs 8 and 9
   3. ProjectLineItemIDs 39, 40, and 41
   4. ProjectLineItemID 4
5. List the name of the client related to ProjectID 3.
   1. SecureCom Wireless
   2. Loren Group
   3. Midstates Auto Auction
   4. Project Lead The Way
6. Which of the following tasks is *not* priced by the project?
   1. TaskID DB01 Design relational database
   2. Task ID DB04 Install SQL Server database
   3. Task ID MEET00 Initial customer meeting
   4. Task ID CODE04 Code SQL
7. For the record with a ProjectLineItemID value of 7, why does the Quantity field contain 20?
   1. It represents an estimate of 20 hours.
   2. It represents an estimate of 20 minutes.
   3. It represents an estimate of 20 projects.
   4. It represents the project ID.
8. For the record with a ProjectLineItemID value of 7, why does the Factor field contain 1.3?
   1. It represents an estimated increase of 1.3% due to risk or complexity for that task.
   2. It represents an estimated increase of 30% due to risk or complexity for that task.
   3. It represents an estimate of 1.3 hours for that task.
   4. It represents an additional 1.3 hours to add to the task.
9. What is the cost for an initial meeting with a client, TaskID MEET00?
   1. $100
   2. $150
   3. $0 (no charge)
   4. $1
10. What is the cost for creating a shopping cart, TaskID CODE15?
    1. $150/hour
    2. $125/project
    3. $100/month
    4. $125/hour

Critical Thinking

1. JCC needs to be able to contact clients when problems arise concerning an estimate. What other attributes could JCC include in the Clients table to assist in contacting clients?

Potential Answer: JCC may want to store other contact information such as email addresses or phone numbers for various contacts at each company.

1. JCC wants the database to include data on all its employees, not just those who may be involved in projects. What additional entities would the DBA need to include in the database to store this data? What attributes?

Potential Answer: JCC may want to store employee titles, departments, supervisor names, telephone numbers, email addresses or other contact information for each employee.

1. What kinds of unstructured data or big data might JCC want to gather in the future?

Potential Answer: JCC may want to store information on blog postings, web site analytics, photos, or social media posts.

Pitt Fitness Case

Answer each of the following questions using the Pitt Fitness data shown in Figures 1-15 through 1-19. No computer work is required.

1. Which instructor lives on Webster Avenue?
   1. Vicki Pegues
   2. Neda Tahan
   3. Memo Said
   4. Luke Lane
2. Who is the oldest customer?
   1. Glenn Spencer
   2. Jess Hill
   3. Gene Shaffer
   4. Nour Aboud
3. What class did Terrance Feldman reserve?
   1. Barre
   2. Barbell Power
   3. Yoga Balance
   4. Yogalates
4. In what location and room is ClassID 9, Barre, held?
   1. Shadyside, 159B
   2. Oakland, Main
   3. Shadyside, Main
   4. Oakland, 159B
5. What time does ClassID 24, Intense Cycle, begin?
   1. 2 pm
   2. 1 pm
   3. 12 pm
   4. 10 am
6. How long is the ClassID 15, Bootcamp?
   1. 60 minutes
   2. 45 minutes
   3. 30 minutes
   4. 90 minutes
7. Who teaches ClassID 21, Combination?
   1. Maria D’Angelo
   2. Robert Sisto
   3. Michael Nguyen
   4. Megan Kobinski
8. What customer has reservation 2100014?
   1. Debbie Thorn
   2. Tamara Lara
   3. Sylvia Devito
   4. Margo Patterson
9. When was customer Ramiro Sanchez born?
   1. 10/21/2000
   2. 4/20/1984
   3. 2/16/1957
   4. 4/1/1953
10. How many classes are offered on Mondays?
    1. 2
    2. 3
    3. 0
    4. 5
11. Which facility does *not* have the three senior classes: Maturity, Endurance, and Strength, Maturity Classics, and Agility for Seniors?
    1. Shadyside
    2. Downtown
    3. Oakland
    4. All of the facilities have the three senior classes.
12. How many classes are offered at the Downtown location at 6:00 pm?
    1. 1
    2. 2
    3. 3
    4. 4
13. What two classes did Charles Hatcher sign up for?
    1. Aquasize, Aqua Strength and Cardio
    2. Barre, Barre Limited
    3. Cycle, Cycle and Strength
    4. HIIT, Bootcamp
14. Where does Juan Varlano teach his classes?
    1. Oakland and Downtown
    2. Oakland only
    3. Oakland and Shadyside
    4. Shadyside and Downtown
15. Which class holds the largest number of participants?
    1. Yoga
    2. Cycle
    3. Barbell Power
    4. Combination

Critical Thinking

1. A few of the classes have data in a field called “OtherFees.” These are rentals of bicycle shoes for the cycle classes. Should that fee be combined with the ClassPrice field? What if a participant has their own bike shoes?

Answer: The OtherFees should not be included in the ClassPrice field because someone who does a lot of cycling might have his or her own bike shoes. Yet those who are new to the class or don’t want to bother, might like to rent them.

1. Currently, the class price and other fees reside in the Registration table. If Pitt Fitness practices dynamic pricing (the management changes the prices as the classes fill up like the airlines do), should they put the class price in the Classes table? Why or why not?

Answer: Pitt Fitness should leave the class price in the Registration table. That gives them maximum flexibility in terms of changing prices of classes as they fill up. If they put the class price in the Classes table, it would remain a constant price and not be changing as the class enrollment changes.

Sports Physical Therapy Case

Answer each of the following questions using the Sports Physical Therapy data shown in Figures 1-21 through 1-24. No computer work is required.

1. What therapist lives in Palm Rivers?
   1. Steven Wilder
   2. Bridgette McClain
   3. Saritha Nair
   4. Jonathan Risk
2. What patient lives in Palm Rivers?
   1. Tierra Falls
   2. Ben Odepaul
   3. Susan Houghland
   4. Andre Marino
3. Which patient has the highest balance?
   1. Joseph King
   2. Robbie Koehler
   3. Latisha Culling
   4. Tammy Wilson
4. Which therapy takes the longest time?
   1. Massage
   2. Education and training for patient self-management
   3. Ultrasound
   4. Electrical stimulation
5. What treatment is Ben Odepaul having?
   1. Paraffin bath
   2. Knee strapping
   3. Electrical stimulation
   4. Hot or cold pack application
6. Who is having self-care/home management therapy?
   1. Tammy Wilson
   2. Tobey Short
   3. Brianna Waggoner
   4. Isaiah Venable
7. What therapist is performing unlisted modality on 10/17/2021?
   1. Steven Wilder
   2. Bridgette McClain
   3. Saritha Nair
   4. No therapist has that session
8. Which patient is undergoing aquatic therapy with therapeutic exercises? What is the length of the session? Who is the therapist in charge?
   1. Tierra Falls, 15 minutes, Bridgette McClain
   2. Tierra Falls, 30 minutes, Jonathan Risk
   3. Tierra Falls, 30 minutes, Bridgette McClain
   4. Robbie Koehler, 30 minutes, Steven Wilder
9. What patient is therapist Saritha Nair seeing on 10/18/2021?
   1. Susan Houghland
   2. Isaiah Venable
   3. Tierra Falls
   4. Latisha Culling

Critical Thinking

1. The Sports Physical Therapy database does not include a field for the hours that the therapist is working. For example, doing any sort of treatment requires set up and break down of equipment, reading patients’ charts, etc. In which table would you put the hours worked? What might be a better way to record when therapists begin their work and end their work?

Answer: There should be an additional table that records each therapist’s ID, the date, when he or she clocked in and when he or she clocked out.

1. What table might the database need to help determine the balance field in the Patient table? Would you want to record when a bill is paid and the amount? How would the insurance part of the bill be recorded?

Answer: You should have an additional table that records each Patient Number, the date and the amount paid for the outstanding bill. That amount would then be subtracted from the Patient’s balance. When the Patient’s bill is generated, and that most likely would be in an additional table, the portion that the insurance company is billed should be included as a field.