Apply Your Knowledge

This section contains four mini-cases. Each case describes a situation, explains your role, and requires you to apply what you learned in the chapter.

1 CM Builders

CM Builders is a regional building contractor specializing in multifamily residential buildings, including condominiums, townhomes, and apartments. Charles Manville, the owner, hired you as an IT consultant to design a new relational database system for his business. As a small business owner, Charles is very involved in the operation of his business and wants to know more about the new computer system. How would you respond to Charles when he asks the following questions? Try to use terms that most business owners would understand clearly.

Tasks

1. Charles asks you, "What is an entity, a table, a field, and a record?" He also wants to know the difference between primary key, candidate keys, foreign keys, secondary keys, and combination keys.
2. After looking at the ERD you developed, Charles asks you to explain the crow's foot notation symbols he sees on the diagram.
3. Charles says that he has heard of data normalization, but does not understand it. He wants you to explain it to him.
4. Charles also wants to know what kind of codes you plan to use. How would you answer him? Before you make a final decision about codes, are there any questions that you might want to ask Charles? Explain your answer.

2 Parrot Palace

Parrot Palace works with TV and movie producers who need birds that can perform special tricks, such as playing dead, reciting poetry, ladder climbs, and various other tricks. Parrot Palace has about 50 birds and a list of 20 tricks from which to choose. Each bird can perform one or more tricks, and many tricks can be performed by more than one bird. When a bird learns a new trick, the trainer assigns a skill level. Some customers insist on using birds that score a 10, which is the highest skill level. As an IT consultant, you have been asked to suggest 3NF table designs. You are fairly certain that a M:N relationship exists between birds and tricks.

Tasks

1. Draw an ERD for the Parrot Palace information system.
2. Indicate cardinality.
3. Identify all fields you plan to include in the birds and tricks tables. For example, in the bird table, you might want species, size, age, name, and so on. In the tricks table, you might want the trick name and description. You will need to assign a primary key in each table. *Hint*: Before you begin, review some database design samples in this chapter. You might spot a similar situation that requires an associative entity that you can use as a pattern. In addition, remember that numeric values work well in primary key fields.
4. Create 3NF table designs.

3 Winfield Public Transit Authority

Winfield is a small city with a population of 22,000. Until now, Winfield was served by a bus route from a nearby city. The Winfield City Council has held a bond sale to fund the purchase of several buses to serve three routes in Winfield and neighboring areas. As the city's IT director, you have been asked to set up an information system for the new Transportation Authority. Assume that multiple buses will run on each route.

Tasks

1. Draw an ERD for the Winfield Public Transit Authority system.
2. Indicate cardinality.
3. Identify all fields you plan to include in the tables.
4. Create 3NF table designs.

4 Working Shoes

Working Shoes is a multistate shoe store that offers an extensive selection of casual and dress shoes designed for men and women who work on their feet. Working Shoes plans to launch a new Web site, and the company wants to develop a new set of product codes. Currently, 250 different products exist, with the possibility of adding more in the future. Shoes and many accessories come in various sizes, styles, and colors. The marketing manager asked you to develop an individualized product code that can identify a specific item and its characteristics. Your initial reaction is that it can be done, but the code might be fairly complex. Back in your office, you give the matter some thought.

Tasks

1. Design a code scheme that will meet the marketing manager's stated requirements.
2. Write a brief memo to the marketing manager suggesting at least one alternative to the code she proposed, and state your reasons.
3. Suggest a code scheme that will identify each Working Shoes customer.
4. Suggest a code scheme that will identify each specific order.

Case Studies

Each chapter includes a Chapter Case, a Continuing Case, a Capstone Case, and an Online Case Simulation. You can learn more about the Online Case Simulation in the MIS CourseMate Features section.

Chapter Case: Scenic Routes

Scenic Routes operates a bus company that specializes in travelling on secondary roads, rather than Interstate highways. Their slogan is: "It Takes a Little Longer, But It's Scenic." The firm needs to update its passenger reservation system.

Background

Data items must include reservation number, Route Number, Date, Origin, Destinations, Departure Time, Arrival Time, Passenger Name, and Seat Number. For example, Route 97 leaves Monroe, VA, daily at 8:00 A.M. and arrives in Spencer, VA, 100 miles away, at 11:00 A.M. Scenic wants to use an alphabetic reservation code, similar to the codes that airlines use.

Tasks

1. Identify the entities and their relationships. Then create an ERD for the reservations system.
2. Create 3NF table designs for the system.
3. For each of the entities identified, design tables and identify the possible candidate keys, the primary key, a probable foreign key, and potential secondary keys.
4. Use sample data to populate the fields for three records.

Continuing Case: Personal Trainer, Inc.

Personal Trainer, Inc. owns and operates fitness centers in a dozen Midwestern cities. The centers have done well, and the company is planning an international expansion by opening a new "supercenter" in the Toronto area. Personal Trainer's president, Cassia Umi, hired an IT consultant, Susan Park, to help develop an information system for the new facility. During the project, Susan will work closely with Gray Lewis, who will manage the new operation.

Background

After evaluating various development strategies, Susan prepared a system requirements document and submitted her recommendations to Cassia Umi, Personal Trainer's president. During her presentation, Susan discussed in-house development and outsourcing options. She did not feel that a commercial software package would meet Personal Trainer's needs.

Based on her research, Susan felt it would be premature to select a development strategy at this time. Instead, she recommended to Cassia that an in-house team should develop a design prototype, using a relational database as a model. Susan said that the prototype would have two main objectives: It would represent a user-approved model of the new system, and it would identify all systems entities and the relationships among them. Susan explained that it would be better to design the basic system first, and then address other issues, including Web enhancements and implementation options. She proposed a three-step plan: data design, user interface design, and application architecture. She explained that systems analysts refer to this as the systems design phase of a development project.

Cassia agreed with Susan's recommendation, and asked her to go forward with the plan.

(continues)

Continuing Case: Personal Trainer, Inc.

Tasks

1. In your discussion of the systems design phase, you mentioned normalization to Cassia. She would like you to explain the basics of normalization in plain English to help her understand the data design tasks.
2. Review the Personal Trainer fact-finding summary in Chapter 4 and draw an ERD with cardinality notation. Assume that system entities include members, classes, merchandise, and fitness instructors.
3. Design tables in 3NF. As you create the database, include various codes for at least three of the fields.
4. Use sample data to populate the fields for at least three records in each table.

Capstone Case: New Century Wellness Group

New Century Wellness Group offers a holistic approach to healthcare with an emphasis on preventive medicine as well as traditional medical care. In your role as an IT consultant, you will help New Century develop a new information system.

Background

After completing the user interface, input, and output design for the new information system, you will now focus on the data design of the DBMS that will support the system. Begin by reviewing the DFDs that you prepared in Chapter 5 and the object models that you created in Chapter 6.

Tasks

1. Create an initial ERD for the new system that contains at least eight entities.
2. Analyze each relationship to determine if it is 1:1, 1:M, or M:N.
3. Normalize your designs for all tables to ensure they are 3NF, and verify that all primary, secondary, and foreign keys are identified properly. Update your ERD to reflect any changes.
4. Review the Data Dictionary you created in Chapter 5 and double-check all data dictionary entries. Make sure that the entries for data stores, records, and data elements are documented completely and correctly. Determine what codes, if any, will be used and be sure they are documented in the data dictionary.

CASE Tool Workshop

Systems analysts use CASE tools to help them plan, build, and maintain information systems. To learn more about CASE tools, turn to Part B of the Toolkit that follows Chapter 12. You can complete these tasks with the Visible Analyst® CASE tool, which is available with this textbook, or a similar tool.

Background

At your school, your capstone systems analysis project is due very soon. Your instructor assigned student teams to develop an information system proposal for Danica's Auto Shop, which is shown in Figure 9-4 on page 349. The Microsoft Access screen in Figure 9-4 shows two tables: one for MECHANICS and the other for JOBS. The two tables represent entities, and are linked by a common field called Mechanic No.

You are a member of a three-person team, and your job is to prepare an ERD and design a relational database for Danica with all tables in third normal form (3NF). Based on what you learned in this chapter, you have a feeling that an associative entity will be needed in the ERD.

Tasks

1. Before you start on the capstone project, you decide to hone your ERD skills by drawing your own version of the ERD shown in Figure 9-21 on page 364. You don't have to be precise — it's just a practice task.
2. Now, using Visible Analyst®, or another CASE tool, create an ERD that shows the two main entities in Danica's shop, and the relationship between them. Add an associative entity if necessary, similar to the examples shown on page xxx.