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CASE 3

THE PERSONAL TRAINER DATABASE

Designing a Relational Database to Create Tables, Forms, Queries, and Reports

PREVIEW

In this case, you will design a relational database for a personal trainer who tracks fitness information about his clients. After your design is complete and correct, you will create database tables and populate them with data. Then you will produce two forms with subforms, six queries, and one report. The queries will show which clients are over 60 years old, list today's appointments for the trainer, list the top 5 percent of clients who can do the most push-ups, display clients' training hours, and display clients' weight loss. You will also produce a report that tracks the fitness assessments of clients.

PREPARATION

- Before attempting this case, you should have some experience in database design and in using Microsoft Access.
- Complete any part of Tutorial A that your instructor assigns.
- Complete any part of Tutorial B that your instructor assigns, or refer to the tutorial as necessary.
- Refer to Tutorial F as necessary.

BACKGROUND

Your high school friend, Sheldon, is a personal trainer. You ran into Sheldon at a Fourth of July fireworks celebration in your hometown and began talking about his personal training business. He has become so popular that he can't keep up with all the paperwork needed to track his clients. Because you are studying database design and Access, you know that the software is a perfect fit for the small database system Sheldon needs to keep his records straight. You offer to help him in exchange for some free personal training sessions.

You agree to meet for lunch the next day to discuss the business. Sheldon explains that he has a large number of clients. Client information is recorded on index cards and includes their name, address, email address, telephone number, birth date, and height. On the back of each card, Sheldon has written the date of the client's first training session and noted the baseline data collected on that day.

To assess a client's fitness, Sheldon uses a classic set of exercises. To measure strength and endurance, he uses push-ups and crunches. To measure aerobic fitness, he uses a step test and a walking test. On the first day of training, Sheldon weighs the client, puts him or her through the battery of exercises, and records all the results. He measures how many push-ups and crunches the client can do in one minute. The step test measures the client's heartbeat after three minutes of stepping up and down. Finally, the walk test times how long it takes the client to walk one mile.

For some clients, Sheldon has provided assessments on a bimonthly basis and recorded their weights each time as well as the results of the four fitness tests, which enables him to track progress and then tweak clients' fitness routines to improve results. Sheldon has this assessment information saved on his computer in an Excel spreadsheet. Each client has a coded number so he doesn't have to enter their names.

In addition, Sheldon has a large calendar on his wall in which he records his daily appointments for personal training sessions. He would love to be able to transfer this information into electronic form for ease of making additions and deletions.

Once the database tables are created and populated, you suggest some forms to help Sheldon streamline his operations. A form for recording clients' baseline fitness data would be helpful as he interacts with new clients, and a form for recording the bimonthly appointments and assessments of his clients would be useful as well.

Sheldon has some requests for organizing information that he has not been able to accomplish with a paper-based system. First, he would like to be able to identify his clients who are over 60 years old so he can encourage them to remain active and schedule appointments with him. He would also like an easy way to view his daily appointments. You assure him that both tasks can be easily accomplished using queries.

The world of fitness can be quite competitive, and Sheldon likes to challenge some of his clients to improve by competing against each other. You suggest creating a list of the top 5 percent of clients who can do the most push-ups. Sheldon thinks that is a great idea and adds a request to be able to list all clients' training hours for other competitive incentives. Both of these requests fit nicely into Access queries.

Sheldon also requests that the database be able to calculate weight changes in his clients from a series of training sessions. After discussions with him, you realize that you can create a series of two queries that can calculate weight changes.

Finally, Sheldon would like a report that summarizes the bimonthly fitness assessments of his clients. This report will give him a "snapshot" of how clients are responding to his tailored training regime.

ASSIGNMENT 1: CREATING THE DATABASE DESIGN

In this assignment, you design your database tables using a word-processing program. Pay close attention to the logic and structure of the tables. Do not start developing your Access database in Assignment 2 before getting feedback from your instructor on Assignment 1. Keep in mind that you need to examine the requirements in Assignment 2 to design your fields and tables properly. It is good programming practice to look at the required outputs before beginning your design. When designing the database, observe the following guidelines:

- First, determine the tables you will need by listing the name of each table and the fields it should contain. Avoid data redundancy. Do not create a field if it can be created by a calculated field in a query.
- You will need some transaction tables. Think about the business events that occur when clients book their training sessions. Also, think about how Sheldon records his bimonthly assessment figures. Avoid duplicating data.
- Document your tables using the table feature of your word processor. Your tables should resemble the format shown in Figure 3-1.
- You must mark the appropriate key field(s) by entering an asterisk (*) next to the field name. Keep in mind that some tables might need a compound primary key to uniquely identify a record within a table.
- Print the database design, if required.

Table Name	
Field Name	Data Type (text, numeric, currency, etc.)
...	...
...	...

FIGURE 3-1 Table design

NOTE

Have your design approved before beginning Assignment 2; otherwise, you may need to redo Assignment 2.

ASSIGNMENT 2: CREATING THE DATABASE, QUERIES, AND REPORTS

In this assignment, you first create database tables in Access and populate them with data. Next, you create two forms, six queries, and a report.

Assignment 2A: Creating Tables in Access

In this part of the assignment, you create your tables in Access. Use the following guidelines:

- Enter data for at least 10 clients, as outlined in the Background section of this case. Use your name as one of the clients. Enter home addresses, telephone numbers, email addresses, birthdates, and heights. Create initial baseline health data for clients, such as their weights, and how they score on the four fitness tests.
- Create at least two bookings for personal training sessions for each client. Create at least two bimonthly health assessments for each client.
- Appropriately limit the size of the text fields; for example, a phone number does not need the default length of 255 characters.
- Print all tables if your instructor requires it.

Assignment 2B: Creating Forms, Queries, and Reports

You will generate two forms with subforms, six queries, and a report, as outlined in the Background section of this case.

Form 1

Create a form and subform based on your Clients table and the Baseline table (or whatever you named the tables). Save the form as Baseline. Your form should resemble the one in Figure 3-2.

Client ID	Date	Weight	Pushup	Crunch	Step	Walk
101	1/15/2018	195	6	37	69	18

FIGURE 3-2 Baseline form and subform

Form 2

Create a form and subform based on your Clients table and your Appointments table (or whatever you named the tables). Save the form as Appointments. Your form should resemble the one in Figure 3-3.

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Appointments

Clients

Client ID: 101

First Name: Emily

Last Name: McCarty

Street Address: 4908 Oak Ridge Drive

City: Minneapolis

State: MN

Zip: 55401

Email Address: EmilyHMcCarty@einrot.com

Birthday: 9/17/1943

Telephone Number: 573-567-0344

Appointments subform

Client ID	Appt Date	Start Time	End Time
101	4/1/2018	6:00:00 AM	7:00:00 AM
101	4/3/2018	6:00:00 AM	6:30:00 AM
* 101			

FIGURE 3-3 Appointments form and subform

Query 1

Create a select query called Clients over 60 that lists all clients who are over 60 years of age. The query should display columns for the clients' First Name, Last Name, and Email Address. Your output should resemble that shown in Figure 3-4, although your data will be different.

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Clients over 60

First Name	Last Name	Email Address
Emily	McCarty	EmilyHMcCarty@einrot.com
Donald	Woodruff	DonaldCWoodruff@cuvox.de
Mary	Heiman	MaryJHeiman@jourrapide.com
Tyrone	Mendoza	TyroneFMendoza@superrito.com
Joanie	Slater	JoanieJSlater@dayrep.com
Mary	Wilson	MarySWilson@teleworm.us
James	Moses	JamesEMoses@rhyta.com
Patricia	Palermo	PatriciaEPalermo@jourrapide.com
Elizabeth	Woodward	ElizabethJWoodward@armyspy.com
Eric	Davidson	EricSDavidson@rhyta.com
Henry	Brantley	HenryPBrantley@rhyta.com
Megan	Ott	MeganAOtt@superrito.com
Clyde	Buckman	ClydeNBuckman@jourrapide.com
Larry	Beale	LarryABeale@jourrapide.com
Joseph	Lloyd	JosephLLloyd@dayrep.com
Hannah	Ritter	HannahMRitter@jourrapide.com
Stephanie	Williams	StephaniePWilliams@fleckens.hu
Victoria	Snow	VictoriaNSnow@rhyta.com
Andrew	Sharp	AndrewASharp@rhyta.com
Roxanne	Courtney	RoxanneWCourtney@einrot.com
Donald	Petersen	DonaldNPetersen@einrot.com
Susan	Rivera	SusanHRivera@dayrep.com
Donna	Caines	DonnaRCaines@dayrep.com
*		

FIGURE 3-4 Clients over 60 query

Query 2

Create a parameter query called Today's Appointments that shows the appointments Sheldon has scheduled for a specified date. The query prompts the user to enter a date and then displays headings for Appt (appointment) Date, First Name, Last Name, Start Time, and End Time. When you enter the date April 1, 2018, the output should resemble that shown in Figure 3-5, although your data will be different.

Appt Date	First Name	Last Name	Start Time	End Time
4/1/2018	Emily	McCarty	6:00:00 AM	7:00:00 AM
4/1/2018	Kathy	Johnson	7:00:00 AM	8:00:00 AM
4/1/2018	Tina	Bangs	8:00:00 AM	9:00:00 AM
4/1/2018	Kevin	Prater	10:00:00 AM	11:00:00 AM
4/1/2018	Pat	Pearce	12:00:00 PM	1:00:00 PM
4/1/2018	Albert	Downey	4:00:00 PM	5:00:00 PM
4/1/2018	Marietta	Dolloff	5:00:00 PM	6:00:00 PM
4/1/2018	Sonya	Clark	6:00:00 PM	7:00:00 PM
4/1/2018	Lela	Decker	7:00:00 PM	8:00:00 PM
4/1/2018	Ray	Moody	8:00:00 PM	9:00:00 PM

FIGURE 3-5 Today's Appointments query

Query 3

Create a query that lists the top 5 percent of clients who did the most push-ups in one minute during their baseline assessment. Display columns for each client's Last Name, First Name, and number of push-ups. Sort the output so that clients who did the most push-ups are shown at the top of the list. (Hint: Under the Design tab, in the Query Setup group, enter "5%" in the Return field.) Save the query as Top 5 Percent. Your data will differ, but the output should look similar to that shown in Figure 3-6.

Last Name	First Name	Pushup
Calton	Esmeralda	40
Brown	Jeffrey	40
Lee	Raul	40
Perkins	Christopher	40
Sweeney	Danny	40
Willis	Robert	40
Hatton	Robert	40
Coleman	Tiffany	40
Sowers	Mack	39
Mitchell	Jessica	39
Ritter	Hannah	39
Forney	Robert	39
Williamson	Arnulfo	38
Cook	Lorie	38
Smith	Helen	38
Condrey	Loretta	38
Johnson	Claudia	38

FIGURE 3-6 Top 5 Percent query

Query 4

Create a query called Training Hours that lists the number of hours each client has trained within a specific range of dates. Display columns for the Client ID, First Name, and Last Name, and calculate values for the Training Hours column. Make sure your output is formatted correctly, as shown in Figure 3-7. Your output should resemble the format shown in Figure 3-7, but the data will be different.

Client ID	First Name	Last Name	Training Hours
101	Emily	McCarty	1.50
102	Kathy	Johnson	1.75
103	Tina	Bangs	2.00
104	Kevin	Prater	1.50
105	Pat	Pearce	1.75
201	Albert	Downey	1.00
202	Marietta	Dolloff	2.00
203	Sonya	Clark	1.00
204	Lela	Decker	1.00
205	Ray	Moody	1.00

FIGURE 3-7 Training Hours query

Query 5

Create a query called Weight Loss that displays columns for each client’s Last Name, First Name, Street Address, and Height and calculates values in the Weight Loss column. To calculate weight loss, you must first create a query that lists each client’s most recent weight from the bimonthly assessment. Using that query, calculate the difference in weight in a new query. Ensure that your calculated field is properly formatted. Your output should resemble the format shown in Figure 3-8, but the data will be different.

Last Name	First Name	Street Address	Height	Weight Loss
Pearce	Pat	1203 Green Avenue	5' 10"	9
Downey	Albert	1565 Fleming Street	6' 0"	8
Prater	Kevin	1514 Irving Road	5' 10"	8
Johnson	Kathy	176 Walkers Ridge Way	5' 7"	8
Bangs	Tina	2688 Private Lane	5' 3"	5
Moody	Ray	1394 Quiet Valley Lane	5' 11"	4
Clark	Sonya	2548 University Street	5' 3"	3
Dolloff	Marietta	985 Ridenour Street	5' 1"	3
Decker	Lela	2833 Fincham Road	5' 2"	2
McCarty	Emily	4908 Oak Ridge Drive	5' 5"	1

FIGURE 3-8 Weight Loss query

Report

Create a report called Assessment Summary that helps clients track their bimonthly assessment details. First, you need to create a query to amass the required data. The report should include headings for First Name, Last Name, Street Address, Email Address, the date of the assessment, and its fitness results. Make sure all headings are visible and that the data is formatted correctly, as shown. Depending on your data, the output should resemble that shown in Figure 3-9.

First Name	Last Name	Street Address	Email Address	Assessment Date	Pushup	Crunch	Step	Walk
Albert	Downey	1565 Fleming Street	AlbertMDowney@fleckers.hu	3/1/2018	34	47	104	12
				6/12/2018	32	48	106	12
				4/30/2018	26	54	112	12
Emily	McCarty	4908 Oak Ridge Drive	EmilyHMcCarty@eirrol.com	4/30/2018	6	40	89	16
				6/12/2018	7	45	88	16
				3/1/2018	10	41	85	16
Kathy	Johnson	176 Walkers Ridge Way	KathyJJohnson@fleckers.hu	6/12/2018	21	23	59	16
				3/1/2018	19	25	61	16
				4/30/2018	16	25	64	16

FIGURE 3-9 Assessment Summary report

ASSIGNMENT 3: ANALYZING THE DATA AND MAKING A PRESENTATION

Sheldon can track each client's fitness progression, but he doesn't know how his clients stack up to existing fitness standards. Are Sheldon's clients seeing adequate improvements in their fitness? Explore standards of fitness tests on the Internet and compare the data from your database with the data online. Consider organizing the clients into various age groups and comparing their results with published survey results of fit people in those age brackets. Write a brief memo to Sheldon explaining your results. Include details from your queries' outputs and consider including some graphs from Excel to further explain your results. For details on writing a memo, see Tutorial E.

Create a presentation that explains the database to Sheldon and demonstrates how it is used. Discuss future improvements to the database, such as moving the system online or to Sheldon's mobile device. Your presentation should take less than 10 minutes, including a question-and-answer period.

DELIVERABLES

Assemble the following deliverables for your instructor, either electronically or in printed form:

1. Word-processed design of tables
2. Tables created in Access
3. Form and subform: Baseline
4. Form and subform: Appointments
5. Query 1: Clients over 60
6. Query 2: Today's Appointments
7. Query 3: Top 5 Percent
8. Query 4: Training Hours
9. Query 5: Weight Loss
10. Subquery for Weight Loss query (latest weight)
11. Query for report
12. Report: Assessment Summary
13. Data analytics memo
14. Presentation materials
15. Any other required printouts or electronic media

Staple all the pages together. Include your name and class number at the top of each page. Make sure that your electronic media are labeled, if required.