

CASE 3

THE ROOM AND BOARD DATABASE

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

PREVIEW

In this case, you will design a relational database for a senior home that provides free room and board for select local university students who volunteer to work with the senior residents. After your design is completed and correct, you will create database tables and populate them with data. Then you will produce one form with a subform, six queries, and two reports. The queries will show which students work one-on-one with the seniors, the amount of time students have worked with a particular senior, which students play music for the seniors, the amount of time each student has worked with seniors, and which volunteer jobs are the most popular at the home. You will produce two reports: One lists students' room assignments and their home addresses, and the other is based on a query that displays the volunteer job summary.

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

It is well known that university tuition and rooming expenses are increasing; these days, students are looking to save money on their educational costs. One solution is a concept first used in Europe: Senior nursing homes offer university students free room and board in exchange for volunteering to work a certain number of hours with the resident seniors each month. Experience in Europe has shown that seniors thrive when living with young people, and the young people often enjoy the arrangement as well, associating the senior residents with their grandparents. The local senior home in your university town is starting a small program based on the European model, and needs your help in setting up a database to track the students and their volunteer hours. Because you are studying database design and Access, you know that the software is a perfect fit for the small database system the senior home needs.

Your first task is to meet with Terrence Brown, the director of the senior home, to figure out how the business works and how to support it with the database. He explains to you how the students live at the home and integrate with the residents. To begin, students move into private rooms on different floors of the home on a trial basis. For example, Terrence explains, students must be quiet at certain times and not entertain a lot of visitors, so the trial period helps ensure that the students are a good fit. After the trial period, students are considered permanent residents for the academic year.

You realize that the database you create must record student information, such as their name, home address, phone number, email address, and credit card number in case of damages or extra expenses. Currently, Terrence keeps a list of rooms and writes the student's ID number next to the appropriate room number to keep track of where the students are staying. He also uses this list to note the date the student moved in. After the 30-day trial period, Terrence marks the record with a big "P" for "permanent." You realize that you will need a better way to indicate whether room assignments are approved or not.

In addition to keeping the student information himself, Terrence relies on the students to manually record details of the volunteer jobs they do at the senior home, including the date and the start and end times of each job.

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Each job has a code to help students record the hours. The volunteer jobs are categorized as music, exercise, art, bingo, reading one on one, coffee chat one on one, dance, and flower arranging. Students choose jobs based on their own preference. For example, one student might be a music major and play some of his new music for the residents, while another student might be an exercise science major and work with the seniors on their physical fitness. Jobs such as reading to the seniors and chatting over coffee help them pass the time and keep alert.

After you set up the database, you would like to include several useful features that help Terrence keep track of important information. First, you think that a form and subform would be an efficient way of recording students' activities in various jobs.

Terrence explains how important it is for students to make contact with the senior residents. He would like to see a listing of which students work with the residents one on one. He would also like to know how much time each resident spends with students in one-on-one visits. Depending on the results, he might need to encourage more residents to meet students over coffee or be read to by students. You tell Terrence that the tasks he describes can be accomplished by queries.

Terrence also requests the ability to update the database records and approve students as permanent residents when they have lived at the home for at least 30 days. Again, an update query can handle this request. Next, Terrence tells you that the residents love to listen to music. He would like a listing of students who volunteer to play music so he can post it on the bulletin board for residents to see.

To be eligible to live at the home for free, students must volunteer for at least 12 hours per month. Terrence would like a way to calculate hours worked and quickly identify any students who need to increase their volunteer hours. In addition, he's curious to know which volunteer jobs are the most popular among students. Both of these requests fit nicely into Access queries.

Finally, Terrence would like you to create two reports for the office staff. The first one should be a listing of each student's home address and room assignment. This report is important in case an emergency occurs and a parent needs to be contacted. The second report should display each student's name, the dates and times they volunteered during a month, and the jobs for which they volunteered.

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 a transaction table. Think about the business events that occur when students volunteer for different jobs. 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.)
...	...
...	...

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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 a form, six queries, and two reports.

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 students and 8 jobs, as outlined in the Background section of this case. Use your name as one of the students. Enter home addresses, telephone numbers, email addresses, and credit card information for students. Create volunteer records for many dates and times during a single month. Consider using Microsoft Excel to generate the data with the Randbetween function and then importing the data into Access.
- 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 one form with a subform, six queries, and two reports, as outlined in the Background section of this case.

Form

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

The screenshot shows the 'Students' form in Microsoft Access. The form has the following fields:

- Student ID: 101
- Last Name: Dickerson
- First Name: Allen
- Home Address: 138 Woodlawn Ave
- City: Seattle
- State: WA
- Zip: 98119
- Phone: (206)256-0097
- Email Address: AED@stateu.edu
- Credit Card Details: 453612365478

Below the main form is a subform titled 'Jobs Worked subform' which displays a table of volunteer records:

ID	Student ID	Date	Time In	Time Out	Job ID	Senior Contact
15	101	9/15/2015	3:00:00 PM	3:45:00 PM	508	Susan
24	101	9/18/2015	3:00:00 PM	3:45:00 PM	504	
31	101	9/23/2015	1:00:00 PM	1:55:00 PM	505	
35	101	9/15/2015	10:00:00 AM	11:00:00 AM	509	
63	101	9/14/2015	4:30:00 PM	5:00:00 PM	506	
76	101	9/30/2015	1:00:00 PM	1:55:00 PM	504	
124	101	9/28/2015	3:00:00 PM	3:45:00 PM	505	
125	101	9/13/2015	10:00:00 AM	11:00:00 AM	506	
133	101	9/21/2015	3:00:00 PM	3:45:00 PM	501	
138	101	9/4/2015	1:00:00 PM	1:55:00 PM	504	
145	101	9/9/2015	1:00:00 PM	1:55:00 PM	501	

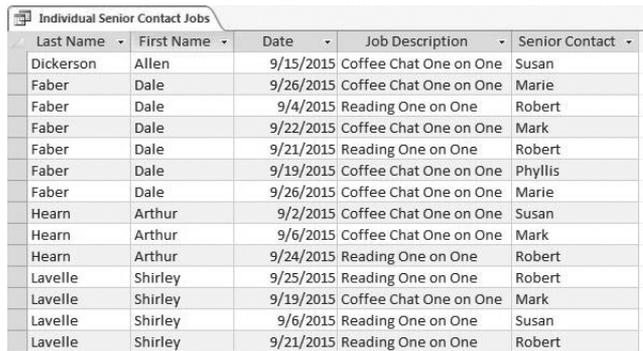
Source: Microsoft product screenshots used with permission from Microsoft Corporation.

FIGURE 3-2 Students form and subform

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Query 1

Create a select query called Individual Senior Contact Jobs that lists which student volunteers have worked one on one with seniors. The query should display columns for each student's Last Name, First Name, Date, Job Description, and Senior Contact. Sort the output in alphabetical order according to Last Name. Your query should only list jobs that require direct contact with an individual senior. Your output should resemble that shown in Figure 3-3, although your data will be different. Note that only the top portion of the query output appears in the figure.



Last Name	First Name	Date	Job Description	Senior Contact
Dickerson	Allen	9/15/2015	Coffee Chat One on One	Susan
Faber	Dale	9/26/2015	Coffee Chat One on One	Marie
Faber	Dale	9/4/2015	Reading One on One	Robert
Faber	Dale	9/22/2015	Coffee Chat One on One	Mark
Faber	Dale	9/21/2015	Reading One on One	Robert
Faber	Dale	9/19/2015	Coffee Chat One on One	Phyllis
Faber	Dale	9/26/2015	Coffee Chat One on One	Marie
Hearn	Arthur	9/2/2015	Coffee Chat One on One	Susan
Hearn	Arthur	9/6/2015	Coffee Chat One on One	Mark
Hearn	Arthur	9/24/2015	Reading One on One	Robert
Lavelle	Shirley	9/25/2015	Reading One on One	Robert
Lavelle	Shirley	9/19/2015	Coffee Chat One on One	Mark
Lavelle	Shirley	9/6/2015	Reading One on One	Susan
Lavelle	Shirley	9/21/2015	Reading One on One	Robert

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FIGURE 3-3 Individual Senior Contact Jobs query

Query 2

Create a parameter query called Senior Time Spent on Task that shows the amount of time students have worked with a particular senior. The query prompts the user to enter a senior's name and then displays headings for Senior Contact, Total Time Spent, and Job Description. Make sure your calculation of Total Time Spent is formatted properly. If you enter the name "Marie" when prompted, the output should resemble that shown in Figure 3-4, although your data will be different.



Senior Contact	Total Time Spent	Job Description
Marie	9.4	Coffee Chat One on One

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FIGURE 3-4 Senior Time Spent on Task query

Query 3

Create an update query that updates the database and approves a student as a permanent resident when he or she has lived at the home for at least 30 days. The query changes the Approved field to "Yes" in the table that contains room assignments once a student has lived in a room for 30 days. Save the query as Approvals. Run the query to make sure it works properly and then confirm the results by viewing the data in the Room Assignments table (or whatever you called the table).

Query 4

Create a query that lists the students who volunteer to play music for seniors. Display columns for the Last Name, First Name, and Email Address of music volunteers so Terrence can get in touch with them. Sort the query results in alphabetical order by Last Name. Save the query as Musicians. Your output should resemble the format shown in Figure 3-5, but the data will be different.

Last Name	First Name	Email Address
Dickerson	Allen	AED@stateu.edu
Hearn	Arthur	Ahearn@stateu.edu
Lavelle	Shirley	Shirl121@stateu.edu
Nelson	Janice	NelsJ@stateu.edu
Schwartz	Byron	BS599@stateu.edu
Sunzar	Sam	55SS@stateu.edu
Trapp	John	Trapp334@stateu.edu
Turner	Cynthia	CT@stateu.edu
Wills	Billy	BillyW@stateu.edu

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FIGURE 3-5 Musicians query

Query 5

Create a query called Total Time Worked that displays columns for students' Last Name, First Name, Email Address, and Phone and calculates the Total Time Worked by each student in the home. Sort the query results in alphabetical order by Last Name and ensure that your calculated field is properly formatted. Your output should resemble the format shown in Figure 3-6, but the data will be different.

Last Name	First Name	Email Address	Phone	Total Time Worked
Dickerson	Allen	AED@stateu.edu	(206)256-0097	10.7
Faber	Dale	Oldie@stateu.edu	(212)549-3324	12.8
Hearn	Arthur	Ahearn@stateu.edu	(610)543-7611	20.1
Lavelle	Shirley	Shirl121@stateu.edu	(914)736-5512	15.4
Nelson	Janice	NelsJ@stateu.edu	(210)469-3541	17.9
Schwartz	Byron	BS599@stateu.edu	(203)536-0954	17.6
Sunzar	Sam	55SS@stateu.edu	(301)762-1298	18.1
Trapp	John	Trapp334@stateu.edu	(201)757-8876	14.8
Turner	Cynthia	CT@stateu.edu	(801)675-9812	18.3
Wills	Billy	BillyW@stateu.edu	(513)435-9123	20.6

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FIGURE 3-6 Total Time Worked query

Query 6

Create a query called Popular Jobs that displays a column for Job Description and calculates the Total Time each volunteer job has been performed. Sort the query results so that the job performed most often appears at the top of the list. Your output should resemble the format shown in Figure 3-7, but the data will be different.

Job Description	Total Time
Art	30.7
Bingo	20.8
Flower Arranging	19.1
Coffee Chat One on One	17.6
Music	17.2
Exercise	17.2
Reading One on One	14.8
Dance	13.3

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FIGURE 3-7 Popular Jobs query

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Report 1

Create a report called Mailing List of Rooms that summarizes student information and their room assignments. First, you need to create a query to amass the required data. The report should include headings for Last Name, First Name, Home Address, City, State, Zip, and Room ID. To make the report look more professional, consider adding a graphic in lieu of the default graphic. 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 3-8.



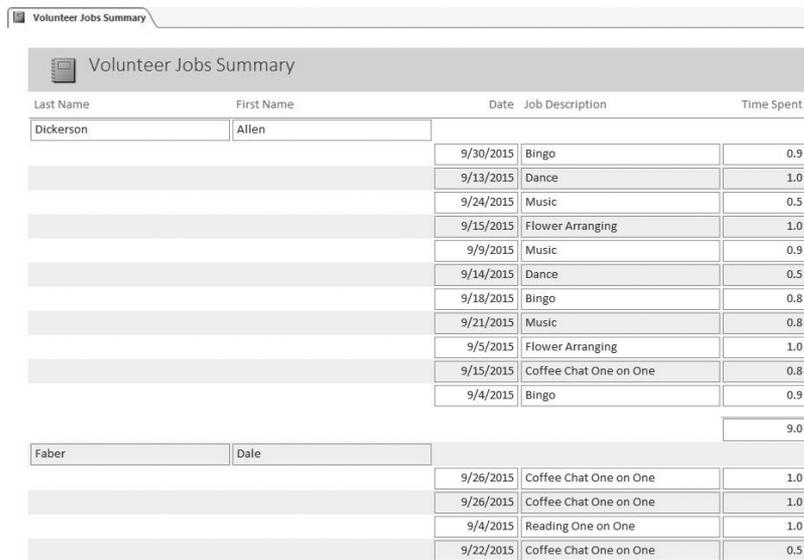
Last Name	First Name	Home Address	City	State	Zip	Room ID
Dickerson	Allen	138 Woodlawn Ave	Seattle	WA	98119	A-59
Faber	Dale	121 Chaucer Lane	Bronx	NY	10463	A-75
Hearn	Arthur	26 Julie Court	Media	PA	19063	B-29
Lavelle	Shirley	4001 Birch Street	Peekskill	NY	10566	D-19
Nelson	Janice	23 Geneva Blvd	Piscataway	NJ	08854	C-32
Schwartz	Byron	2 Waverly Rd	Deep River	CT	09776	D-19
Sunzar	Sam	103 Chadd Rd	Owings Mills	MD	21117	A-29
Trapp	John	220 E Main Street	Scotch Plains	NJ	07076	B-13
Turner	Cynthia	1502 Valley Stream Lane	Salt Lake City	UT	84109	B-12
Wills	Billy	25 Brown Lane	Centerville	OH	45459	C-11

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FIGURE 3-8 Mailing List of Rooms report

Report 2

Create a report called Volunteer Jobs Summary that summarizes the students' jobs at the home, the dates they worked, and the amount of time spent on each job. First, you need to create a query to collect the required data. The report should include headings for Last Name, First Name, Date, Job Description, and Time Spent, which is a calculated field. Group the report by Last Name. Include subtotals that display the total amount of time worked by each student. 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.



Last Name	First Name	Date	Job Description	Time Spent		
Dickerson	Allen	9/30/2015	Bingo	0.9		
		9/13/2015	Dance	1.0		
		9/24/2015	Music	0.5		
		9/15/2015	Flower Arranging	1.0		
		9/9/2015	Music	0.9		
		9/14/2015	Dance	0.5		
		9/18/2015	Bingo	0.8		
		9/21/2015	Music	0.8		
		9/5/2015	Flower Arranging	1.0		
		9/15/2015	Coffee Chat One on One	0.8		
		9/4/2015	Bingo	0.9		
						9.0
		Faber	Dale	9/26/2015	Coffee Chat One on One	1.0
9/26/2015	Coffee Chat One on One			1.0		
9/4/2015	Reading One on One			1.0		
9/22/2015	Coffee Chat One on One			0.5		

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FIGURE 3-9 Volunteer Jobs Summary report

ASSIGNMENT 3: MAKING A PRESENTATION

Create a presentation that explains the database to Terrence and his staff and demonstrates how it is used. Discuss future improvements to the database, such as moving the system online. 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: Students
4. Query 1: Individual Senior Contact Jobs
5. Query 2: Senior Time Spent on Task
6. Query 3: Approvals
7. Query 4: Musicians
8. Query 5: Total Time Worked
9. Query 6: Popular Jobs
10. Query 7: for report, Mailing List of Rooms
11. Report 1: Mailing List of Rooms
12. Query 8: for report, Volunteer Jobs Summary
13. Report 2: Volunteer Jobs Summary
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.

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