Database Concepts

8th Edition

David M. Kroenke • David J. Auer

Scott L. Vandenberg • Robert C. Yoder

Online Appendix D

James River Jewelry Project Questions

VP Editorial Director: Andrew Gilfillan
Senior Portfolio Manager: Samantha Lewis
Content Development Team Lead: Laura Burgess
Program Monitor: Ann Pulido/SPi Global
Editorial Assistant: Madeline Houpt
Product Marketing Manager: Kaylee Carlson
Project Manager: Katrina Ostler/Cenveo® Publisher Services
Text Designer: Cenveo® Publisher Services
Interior design: Stock-Asso/Shutterstock; Faysal Shutterstock
Cover Designer: Brian Malloy/Cenveo® Publisher Services
Cover Art: Artwork by Donna R. Auer
Full-Service Project Management: Cenveo® Publisher Services
Composition: Cenveo® Publisher Services
Printer/Binder: Courier/Kendallville
Cover Printer: Lehigh-Phoenix Color/Hagerstown
Text Font: 10/12 Simoncini Garamond Std.

Credits and acknowledgments borrowed from other sources and reproduced, with permission, in this textbook appear on the appropriate page within text.

Library of Congress Cataloging-in-Publication Data

Kroenke, David M., 1948- author. | Auer, David J., author.
Database concepts / David M. Kroenke, David J. Auer, Western Washington University, Scott L. Vandenberg, Siena College, Robert C. Yoder, Siena College.
Eighth edition. | Hoboken, New Jersey : Pearson, [2017] | Includes index.
LCCN 2016048321| ISBN 013460153X | ISBN 9780134601533
LCSH: Database management. | Relational databases.
LCC QA76.9.D3 K736 2017 | DDC 005.74--dc23
LC record available at https://lccn.loc.gov/2016048321

Appendix D — 10 9 8 7 6 5 4 3 2 1

Appendix Objective

- Provide a set of project questions that can be used to practice the concepts and techniques discussed in the various chapters of *Database Concepts*, 8th edition.

What Is the Purpose of This Appendix?

This appendix is intended to supplement David M. Kroenke, David J. Auer, Scott L. Vandenberg, and Robert C. Yoder, *Database Concepts,* 8th edition (Upper Saddle River, NJ: Prentice Hall, 2017) [referred to hereinafter as **DBC**].

In order to keep DBC to a reasonable length (and to keep the cost of the book as low as possible), we have moved all of the James River Jewelry Project Questions, which would normally be found at the end of each chapter, to this online appendix. The James River Jewelry project is an ongoing project that spans every chapter in the book. Therefore, the answers to one set of project questions are often dependent upon work completed in a previous set of project questions. This appendix provides all the James River Jewelry project questions and associated materials that would otherwise be found in the text itself. Each set of project questions should be used in conjunction with the associated chapter.

James River Jewelry Project Questions for Chapter 1

James River Jewelry is a small jewelry shop. While James River Jewelry does sell typical jewelry purchased from jewelry vendors, including such items as rings, necklaces, earrings, and watches, it specializes in hard-to-find Asian jewelry. Although some Asian jewelry is manufactured jewelry purchased from vendors in the same manner as the standard jewelry is obtained, many of the Asian jewelry pieces are often unique single items purchased directly from the artisan who created the piece (the term *manufactured* would be an inappropriate description of these pieces). James River Jewelry has a small but loyal clientele, and it wants to further increase customer loyalty by creating a frequent buyer program. In this program, after every 10 purchases, a customer will receive a credit equal to 50 percent of the average of his or her 10 most recent purchases. This credit must be applied to the next (or 11th) purchase.

A. Create a sample list of customers and purchases and a second list of customers and credits. Your lists should include customer data you think would be important to James River along with typical purchase data. Credit data should include the date of the credit, the total amount of the 10 purchases used as the basis of the credit, and the credit amount.

B. Describe modification problems that are likely to occur if James River attempts to maintain the lists in a spreadsheet.

C. Split the lists into tables such that each has only a single theme. Create appropriate ID columns. Use one ID to represent the relationship between a purchase and a customer and use another ID to represent the relationship between a credit and a customer.

D. Attempt to combine the two lists you created in part A into a single list. What problems occur as you try to do this? Look closely at Figure 1-35. An essential difference exists between a list of the three themes customer, purchase, and credit and a list of the three themes PetName, Owner, and Service in Figure 1-35. What do you think this difference is?

E. Change the tables from part C so that the purchase list has not only the ID of Customer but also the ID of Credit. Compare this arrangement to the tables in your answer to question 1.11. What is the essential difference between these two designs?

James River Jewelry Project Questions for Chapter 2

Figure D-1 shows data that James River Jewelry collects for its frequent buyer program.

A. Using these data, state assumptions about functional dependencies among the columns of data. Justify your assumptions on the basis of these sample data and also on the basis of what you know about retail sales.

Name	Phone	EmailAddress	InvoiceNumber	InvoiceDate	PreTaxAmount
Elizabeth Stanley	555-236-7789	Elizabeth.Stanley@somewhere.com	1001	5/5/2017	$ 155.00
Fred Price	555-236-0091	Fred.Price@somewhere.com	1002	5/7/2017	$ 203.00
Linda Becky	555-236-0392	Linda.Becky@somewhere.com	1003	5/11/2017	$ 75.00
Pamela Birch	555-236-4493	Pamela.Birch@somewhere.com	1004	5/15/2017	$ 67.00
Richardo Romez	555-236-3334	Richard.Romez@somewhere.com	1005	5/15/2017	$ 330.00
Elizabeth Stanley	555-236-7789	Elizabeth.Stanley@somewhere.com	1006	5/16/2017	$ 25.00
Linda Becky	555-236-0392	Linda.Becky@somewhere.com	1007	5/25/2017	$ 45.00
Elizabeth Stanley	555-236-7789	Elizabeth.Stanley@somewhere.com	1008	6/6/2017	$ 445.00
Samantha Jackson	555-236-1095	Samantha.Jackson@somewhere.com	1009	6/7/2017	$ 72.00

Figure D-1 — Sample Data for James River Jewelry

B. Given your assumptions in part A, comment on the appropriateness of the following designs:

1. **CUSTOMER (Name, Phone, EmailAddress, InvoiceNumber, InvoiceDate, PreTaxAmount)**

2. **CUSTOMER (Name, Phone, EmailAddress, InvoiceNumber, InvoiceDate, PreTaxAmount)**

3. **CUSTOMER (Name, Phone, EmailAddress, InvoiceNumber, InvoiceDate, PreTaxAmount)**

4. **CUSTOMER (CustomerID, Name, Phone, EmailAddress, InvoiceNumber, InvoiceDate, PreTaxAmount)**

5. **CUSTOMER (Name, Phone, EmailAddress)**

   and:

   PURCHASE (InvoiceNumber, InvoiceDate, PreTaxAmount)

6. **CUSTOMER (Name, Phone, EmailAddress)**

   and:

   PURCHASE (InvoiceNumber, InvoiceDate, PreTaxAmount, *EmailAddress*)

7. **CUSTOMER (Name, Phone, EmailAddress)**

   and:

   PURCHASE (InvoiceNumber, Phone, InvoiceDate, PreTaxAmount, *EmailAddress*)

C. Modify what you consider to be the best design in part B to include a column called AwardPurchaseAmount. The purpose of this column is to keep a balance of the customers' purchases for award purposes. Assume that returns will be recorded, with invoices having a negative PreTaxAmount.

D. Add a new AWARD table to your answer to part C. Assume that the new table will hold data concerning the date and amount of an award that is given after a customer has purchased 10 items. Ensure that your new table has appropriate primary and foreign keys.

James River Jewelry Project Questions for Chapter 3

Assume that James River designs a database with the following tables:

CUSTOMER (CustomerID, LastName, FirstName, Phone, EmailAddress)

PURCHASE (InvoiceNumber, InvoiceDate, PreTaxAmount, *CustomerID*)

PURCHASE_ITEM (*InvoiceNumber*, InvoiceLineNumber, *ItemNumber*, RetailPrice)

ITEM (ItemNumber, ItemDescription, Cost, ArtistLastName, ArtistFirstName)

The referential integrity constraints are:

CustomerID in PURCHASE must exist in CustomerID in CUSTOMER

InvoiceNumber in PURCHASE_ITEM must exist in InvoiceNumber in PURCHASE

ItemNumber in PURCHASE_ITEM must exist in ItemNumber in ITEM

Assume that CustomerID of CUSTOMER, ItemNumber of ITEM, and InvoiceNumber of PURCHASE are all surrogate keys with values as follows:

CustomerID	**Start at 1**	**Increment by 1**
InvoiceNumber	**Start at 1001**	**Increment by 1**
ItemNumber	**Start at 1**	**Increment by 1**

Data for the James River Jewelry tables is shown in Figures D-2, D-3, D-4, and D-5. These tables, referential integrity constraints, and data are used as the basis for the SQL statements you will create in the exercises that follow. If possible, run these statements in an actual DBMS, as appropriate, to obtain your results. Name your database **JRJ**.

CustomerID	LastName	FirstName	Phone	EmailAddress
1	Stanley	Elizabeth	555-236-7789	Elizabeth.Stanley@somewhere.com
2	Price	Fred	555-236-0091	Fred.Price@somewhere.com
3	Becky	Linda	555-236-0392	Linda.Becky@somewhere.com
4	Birch	Pamela	555-236-4493	Pamela.Birch@somewhere.com
5	Romez	Richardo	555-236-3334	Richard.Romez@somewhere.com
6	Jackson	Samantha	555-236-1095	Samantha.Jackson@somewhere.com

Figure D-2 — Sample Data for JRJ CUSTOMER Table

ItemNumber	ItemDescription	Cost	ArtistLastName	ArtistFirstName
1	Gold Bracelet	$ 120.00	Josephson	Mary
2	Gold Necklace	$ 160.00	Baker	Samantha
3	Bead Earrings	$ 50.00	Josephson	Mary
4	Gold Bracelet	$ 180.00	Baker	Samantha
5	Silver Necklace	$ 135.00	Baker	Sam
6	Bead Earrings	$ 25.00	Josephson	Mary
7	Bead Earrings	$ 22.50	Josephson	Mary
8	Gold Earrings	$ 50.00	Lintz	John
9	Gold Necklace	$ 160.00	Lintz	John
10	Bead Earrings	$ 20.00	Josephson	Mary
11	Bead Earrings	$ 35.00	Josephson	Mary
12	Bead Earrings	$ 45.00	Josephson	Mary
13	Gold Necklace	$ 225.00	Lintz	John
14	Silver Earrings	$ 55.00	Lintz	John
15	Gold Bracelet	$ 200.00	Lintz	John
16	Bead Earrings	$ 25.00	Josephson	Mary
17	Bead Earrings	$ 45.00	Josephson	Mary
18	Gold Bracelet	$ 210.00	Baker	Samantha
19	Silver Necklace	$ 165.00	Baker	Sam

Figure D-3 — Sample Data for JRJ ITEM Table

InvoiceNumber	InvoiceDate	PreTaxAmount	CustomerID
1001	5/5/2017	$ 155.00	1
1002	5/7/2017	$ 203.00	2
1003	5/11/2017	$ 75.00	3
1004	5/15/2017	$ 67.00	4
1005	5/15/2017	$ 330.00	5
1006	5/16/2017	$ 25.00	1
1007	5/25/2017	$ 45.00	3
1008	6/6/2017	$ 445.00	1
1009	6/7/2017	$ 72.00	6

Figure D-4 — Sample Data for JRJ PURCHASE Table

Use data types consistent with the DBMS you are using. If you are not using an actual DBMS, consistently represent data types using either the SQL Server 2016, Oracle Database XE, or MySQL 5.7 data types shown in Figure 3-5. For each SQL statement you write, show the results based on your data.

InvoiceNumber	InvoiceLineNumber	ItemNumber	RetailPrice
1001	1	1	$ 155.00
1002	1	2	$ 203.00
1003	1	3	$ 75.00
1004	1	6	$ 35.00
1004	2	7	$ 32.00
1005	1	4	$ 240.00
1005	2	8	$ 90.00
1006	1	10	$ 25.00
1007	1	11	$ 45.00
1008	1	5	$ 175.00
1008	2	9	$ 215.00
1008	3	12	$ 55.00
1009	1	14	$ 72.00

Figure D-5 — Sample Data for JRJ PURCHASE_ITEM Table

Write SQL statements and answer questions for this database as follows:

A. Write SQL CREATE TABLE statements for each of these tables.

B. Write foreign key constraints for the relationships in each of these tables. Make your own assumptions regarding cascading deletions and justify those assumptions. (*Hint*: You can combine the SQL for your answers to parts A and B.)

C. Write SQL statements to insert the data shown in Figures D-2, D-3, D-4, and D-5 into these tables. Assume that surrogate key column values will be supplied by the DBMS.

D. Write SQL statements to list all columns for all tables.

E. Write an SQL statement to list ItemNumber and ItemDescription for all items that cost more than $100.

F. Write an SQL statement to list ItemNumber and ItemDescription for all items that cost more than $100 and were produced by an artist with a name ending with the letters *son*.

G. Write an SQL statement to list LastName and FirstName of customers who have made at least one purchase with PreTaxAmount greater than $200. Use a subquery.

H. Answer part G but use a join using JOIN ON syntax.

I. Write an SQL statement to list LastName and FirstName of customers who have purchased an item that costs more than $50. Use a subquery.

J. Answer part I but use a join using JOIN ON syntax.

K. Write an SQL statement to list the LastName and FirstName of customers who have purchased an item that was created by an artist with a name that begins with the letter *J*. Use a subquery.

L. Answer part K but use a join using JOIN ON syntax.

M. Write an SQL statement to show the name and sum of PreTaxAmount for each customer. Use a join using JOIN ON syntax.

N. Write an SQL statement to show the sum of PreTaxAmount for each artist (*Hint:* the result will have only one line per each artist). Use a join using JOIN ON syntax, and sort the results by ArtistName in ascending order.

O. Write an SQL statement to show the sum of PreTaxAmount for each artist but exclude any items that were part of purchases with PreTaxAmount less than $25. Use a join using JOIN ON syntax, and sort the results by ArtistName in descending order.

P. Write an SQL statement to show which customers bought which items, and include any items that have not been sold. Include CUSTOMER.LastName, CUSTOMER.FirstName, InvoiceNumber, InvoiceDate, ItemNumber, ItemDescription, ArtistLastName, and ArtistFirstName. Use a join using JOIN ON syntax, and sort the results by ArtistLastName and ArtistFirstName in ascending order.

Q. Write an SQL statement to modify all ITEM rows with an artist last name of Baxter to an artist first name of Rex.

R. Write SQL statements to switch the values of ArtistLastName so that all rows currently having the value Baker will have the value Baxter and all rows currently having the value Baxter will have the value Baker.

S. Given your assumptions about cascading deletions in your answer to part B, write the fewest number of DELETE statements possible to remove all the data in your database but leave the table structures intact. **Do *not* run these statements if you are using an actual database**!

James River Jewelry Project Questions for Appendix E

NOTE: Online Appendix E covers SQL Views and other advanced SQL topics, and logically that material should be studied in conjunction with Chapter 3 on SQL. Therefore, the James River Jewelry Project Questions for Appendix E are presented in this location in this appendix.

The James River Jewelry Project Questions for Appendix E are based on the work done in the James River Jewelry Project Questions for Chapter 3. Base your answers to the questions that follow on the James River Jewelry database as described there. If possible, run your SQL statements in an actual DBMS to validate your work.

A. Add a column to the CUSTOMER table named ReferredBy, which will contain data on which customer referred the new customer to the store. Customers may refer only one new customer. The column characteristics for the ReferredBy column are shown in Figure D-6. Populate the column with the data shown in Figure D-7.

B. Add a column to the ITEM table named ArtistHasBeenPaid, which will contain data showing whether the artist has been paid for the piece of jewelry James River Jewelry acquired. Column characteristics for the JRJ ArtistHasBeenPaid column are shown in Figure D-8. Populate the column with the data shown in Figure D-9.

C. How did your steps to add the ArtistHasBeenPaid column differ from your steps to add the ReferredBy column? Why was (were) the additional step(s) necessary?

D. Add an SQL CHECK constraint to the ITEM table to ensure that only the values of *Waiting for invoice*, *In process*, or *Paid* are allowed as data in the ArtistHasBeenPaid column.

E. Write an SQL SELECT statement to create a recursive query on the CUSTOMER table that shows each customer's FirstName (as CustomerFirstName) and LastName (as CustomerLastName) followed by the name of the customer who referred him or her to James River Jewelry using the referring customer's FirstName (as ReferrerFirstName) and LastName (as ReferrerLastName). Do *not* include customers who were not referred by another customer.

Column Name	Type	Key	Required	Remarks
ReferredBy	Integer	Foreign Key	No	UNIQUE REF: CustomerID in CUSTOMER

Figure D-6 — Column Characteristics for the New Column in the JRJ CUSTOMER table

CustomerID	LastName	FirstName	...	ReferredBy
1	Stanley	Elizabeth	...	NULL
2	Price	Fred	...	1
3	Becky	Linda	...	NULL
4	Birch	Pamela	...	2
5	Romez	Ricardo	...	3
6	Jackson	Samantha	...	NULL

Figure D-7 — Data for the New Column in the JRJ CUSTOMER table

Column Name	Type	Key	Required	Remarks
ArtistHasBeenPaid	Varchar (25)	No	Yes	CHECK Values: "Waiting for invoice", "In process", "Paid"

Figure D-8 — Column Characteristics for the New Column in the JRJ ITEM table

ItemNumber	ItemDescription	Cost	...	ArtistHasBeenPaid
1	Gold Bracelet	$ 120.00	...	Paid
2	Gold Necklace	$ 160.00	...	Paid
3	Bead Earrings	$ 50.00	...	Paid
4	Gold Bracelet	$ 180.00	...	Paid
5	Silver Necklace	$ 135.00	...	Paid
6	Bead Earrings	$ 25.00	...	Paid
7	Bead Earrings	$ 22.50	...	Paid
8	Gold Earrings	$ 50.00	...	Paid
9	Gold Necklace	$ 160.00	...	Paid
10	Bead Earrings	$ 20.00	...	Paid
11	Bead Earrings	$ 35.00	...	In process
12	Bead Earrings	$ 45.00	...	Paid
13	Gold Necklace	$ 225.00	...	In process
14	Silver Earrings	$ 55.00	...	In process
15	Gold Bracelet	$ 200.00	...	Waiting for invoice
16	Bead Earrings	$ 25.00	...	In process
17	Bead Earrings	$ 45.00	...	Waiting for invoice
18	Gold Bracelet	$ 210.00	...	Waiting for invoice
19	Silver Necklace	$ 165.00	...	Waiting for invoice

Figure D-9 — Data for the New Column in the JRJ ITEM table

F. Write an SQL SELECT statement to create a recursive query on the CUSTOMER table that shows each customer's FirstName (as CustomerFirstName) and LastName (as CustomerLastName) followed by the name of the customer who referred him or her to James River Jewelry using the referring customer's FirstName (as ReferrerFirstName) and LastName (as ReferrerLastName). *Do* include customers who were not referred by another customer.

G. Suppose that James River Jewelry owners are considering changing the primary key of CUSTOMER to (FirstName, LastName). Write a correlated subquery to display any data that indicate that this change is not justifiable. *Hint*: If *no* employees meet this condition, the correct query result will be an **empty set**.

H. Write a user-defined function named FirstNameFirst that concatenates the customer's LastName and FirstName into a single value named FullName and displays, in order, the FirstName, a space, and the LastName (*Hint: Stanley* and *Elizabeth* would be combined to read *Elizabeth Stanley*).

I. Create the following SQL views:

1. Create an SQL view named CustomerPurchaseView that shows CustomerID, LastName, FirstName, InvoiceNumber, InvoiceDate, and PreTaxAmount.

2. Create an SQL view named CustomerFirstNameFirstPurchaseView that shows CustomerID, then LastName and FirstName concatenated using the FirstNameFirst user-defined function and displayed as CustomerName, InvoiceNumber, InvoiceDate, and PreTaxAmount.

3. Create an SQL view named PurchaseItemItemView that shows InvoiceNumber, ItemNumber, ArtistLastName, ArtistFirstName, ItemDescription, Cost, and RetailPrice.

4. Create an SQL view named PurchaseItemItemFirstNameFirstView that shows InvoiceNumber, ItemNumber, then ArtistLastName and ArtistFirstName concatenated using the LastNameFirst user-defined function and displayed as ArtistName, ItemDescription, Cost, and RetailPrice.

J. Create (and run) the following SQL queries:

1. Create an SQL statement to run CustomerPurchaseView, with the results sorted alphabetically by LastName and FirstName.

2. Create an SQL statement to run CustomerFirstNameFirstPurchaseView, with the results sorted alphabetically by CustomerName.

3. Create an SQL statement to run PurchaseItemItemView, with the results sorted by InvoiceNumber and ItemNumber.

4. Create an SQL statement to run PurchaseItemItemFirstNameFirstView, with the results sorted by InvoiceNumber and ItemNumber.

3. Create an SQL query that uses PurchaseItemItemView to calculate and display the sum of Cost as TotalItemCost and the sum of RetailPrice as TotalRetailSales.

K. James River Jewelry sells standard merchandise jewelry, purchased for suppliers, as well as its artisan line. At this point, inventory of these items and the vendors who supply them have been kept in a Microsoft Excel worksheet, as shown in Figure D-10. Management now wants to import this data into one or more database tables.

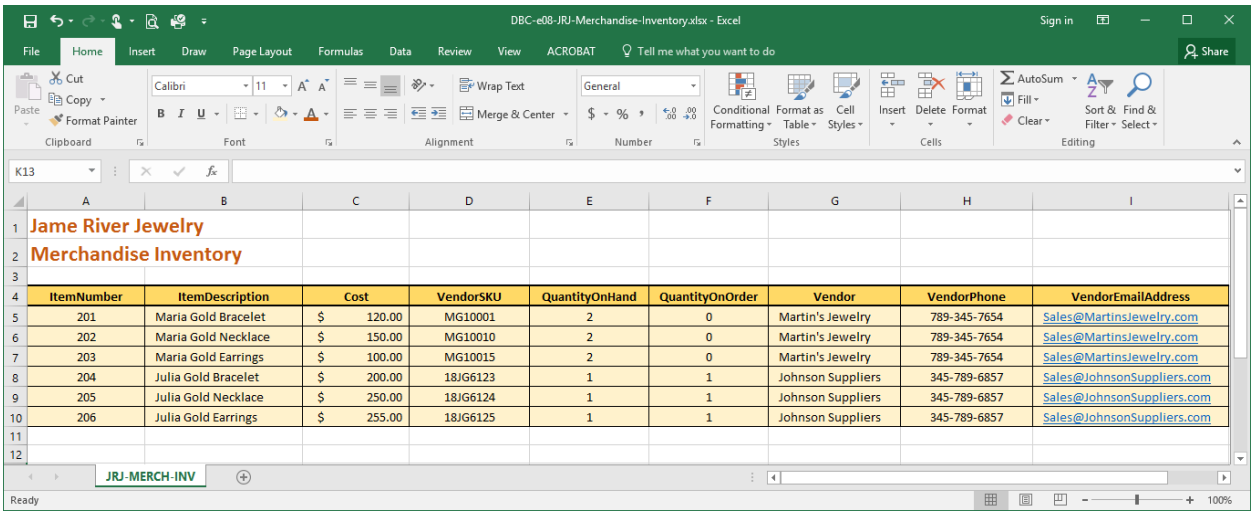
- The steps for importing data into Microsoft SQL Server 2016 from Microsoft Excel 2016 are discussed in Appendix A, "Getting Started with Microsoft SQL Server 2016 Express Edition."
- The steps for importing data into Oracle Database XE from Microsoft Excel 2016 are discussed in Appendix B, "Getting Started with Oracle Database XE."
- The steps for importing data into MySQL 5.7 from Microsoft Excel 2016 are discussed in Appendix C, "Getting Started with MySQL 5.7 Community Server."

1. Duplicate Figure D-10 in a worksheet (or spreadsheet) in an appropriate tool (such as Microsoft Excel or Apache OpenOffice Calc).

2. Import the data into one or more new tables in the JRJ database. You must determine all table characteristics needed (primary key, foreign keys, data types, etc.).

3. Link this (these) new table(s) as appropriate to any other tables in the JRJ database. Explain why you chose to make the connection(s) that you made.

Figure D-10 — The James River Jewelry Merchandise Inventory Worksheet



ItemNumber	ItemDescription	Cost	VendorSKU	QuantityOnHand	QuantityOnOrder	Vendor	VendorPhone	VendorEmailAddress
201	Maria Gold Bracelet	$ 120.00	MG10001	2	0	Martin's Jewelry	789-345-7654	Sales@MartinsJewelry.com
202	Maria Gold Necklace	$ 150.00	MG10010	2	0	Martin's Jewelry	789-345-7654	Sales@MartinsJewelry.com
203	Maria Gold Earrings	$ 100.00	MG10015	2	0	Martin's Jewelry	789-345-7654	Sales@MartinsJewelry.com
204	Julia Gold Bracelet	$ 200.00	18JG6123	1	1	Johnson Suppliers	345-789-6857	Sales@JohnsonSuppliers.com
205	Julia Gold Necklace	$ 250.00	18JG6124	1	1	Johnson Suppliers	345-789-6857	Sales@JohnsonSuppliers.com
206	Julia Gold Earrings	$ 255.00	18JG6125	1	1	Johnson Suppliers	345-789-6857	Sales@JohnsonSuppliers.com

James River Jewelry Project Questions for Chapter 4

James River Jewelry wants to expand its database applications beyond the recording of purchases and purchase awards. (See the description of the award program in the James River Jewelry Project Questions for Chapter 1 in this appendix.) The company still wants to maintain data on customers, purchases, and awards, but it wants to include other data as well. Specifically, James River Jewelry wants to record artists and styles and keep track of which customers are interested in which artists and styles.

James River Jewelry sells most of its jewelry on consignment, so the company does not pay the artist of a piece of jewelry until it is sold. Typically, the company pays artists 60 percent of the sales price, but the terms are negotiated separately for each item. For some items, the artists earn a larger percentage and for others they earn less. Artists and James River Jewelry personnel agree on the initial sales price at the time the item is brought to the shop. When an item has been in the shop for some time, James River Jewelry may reduce the price; sometimes it renegotiates the sales percentage.

A. Draw an E-R data model for the James River Jewelry database schema shown in the James River Jewelry Project Questions for Chapter 3 in this appendix. Use the IE Crow's Foot E-R model for your E-R diagrams. Justify the decisions you make regarding minimum and maximum cardinality.

B. Extend and modify the E-R data model to show James River Jewelry's award program. Use the IE Crow's Foot E-R model for your E-R diagrams. Create appropriate identifiers and attributes for each entity. Justify the decisions you make regarding minimum and maximum cardinality.

C. Extend and modify the E-R data model in part B to meet James River Jewelry's new requirements. Use the IE Crow's Foot E-R model for your E-R diagrams. Create appropriate identifiers and attributes for each entity. Justify the decisions you make regarding minimum and maximum cardinality.

D. Describe how you would go about validating the data model in part C.

James River Jewelry Project Questions for Chapter 5

Convert the data model you constructed for James River Jewelry in part C of the James River Jewelry Project Questions for Chapter 4 in this appendix (or for an equivalent data model that your instructor provides for you to use) into a relational database design for James River Jewelry. Document your database design as follows.

A. Specify tables, primary keys, and foreign keys. Using Figures 5-26 and 5-28 as guides, specify column properties.

B. Describe how you have represented weak entities, if any exist.

C. Describe how you have represented supertype and subtype entities, if any exist.

D. Create an IE Crow's Foot E-R diagram similar to the one in Figure 5-27.

E. Document referential integrity constraint enforcement, using Figure 5-29 as a guide.

F. Document any business rules that you think might be important.

G. Describe how you would validate that your design is a good representation of the data model on which it is based.

James River Jewelry Project Questions for Chapter 6

The James River Jewelry database design that was used in the James River Jewelry Project Questions for Chapter 3 in this appendix was:

CUSTOMER (CustomerID, LastName, FirstName, Phone, EmailAddress)

PURCHASE (InvoiceNumber, InvoiceDate, PreTaxAmount, *CustomerID*)

PURCHASE_ITEM (*InvoiceNumber*, InvoiceLineNumber, *ItemNumber*, RetailPrice)

ITEM (ItemNumber, ItemDescription, Cost, ArtistLastName, ArtistFirstName)

The referential integrity constraints are:

CustomerID in PURCHASE must exist in CustomerID in CUSTOMER

InvoiceNumber in PURCHASE_ITEM must exist in InvoiceNumber in PURCHASE

ItemNumber in PURCHASE_ITEM must exist in ItemNumber in ITEM

James River Jewelry has modified the database by adding two tables—OWNER and JEWELRY_ITEM—as shown below:

OWNER (OwnerID, LastName, FirstName, Phone, EmailAddress, AmountOwed)

JEWELRY_ITEM (*ItemNumber*, DateReceived, DateSold, NegotiatedSalesPrice, ActualSalesPrice, CommissionPercentage, *OwnerID*)

where

OwnerID in JEWELRY_ITEM must exist in OwnerID in OWNER

ItemNumber in JEWELRY_ITEM must exist in ItemNumber in ITEM

The tables are used to record data and maintain owner data about jewelry accepted on consignment. JEWELRY_ITEM (which is a subtype of ITEM—note the referential integrity constraint) is used to record

the negotiated sales price, the commission percentage, and the actual sales price for each item of consigned jewelry.

Assume that office personnel at James River Jewelry use a database application to record consignment data. When an item is received on consignment, owner data are stored in OWNER if the owner is new; otherwise existing owner data are used. New ITEM and JEWELRY_ITEM rows are created. In ITEM, ItemNumber and Description are recorded, Cost is set to $0.00, and if there is an artist associated with the piece, ArtistLastName and ArtistFirstName are entered if known. For JEWELRY_ITEM, data are stored for all columns except DateSold and ActualSalesPrice. James River Jewelry personnel refer to these actions as an Acceptance Transaction. Later, if the jewelry item does not sell, the NegotiatedSalesPrice and CommissionPercentage values may be reduced. This is called a Price Adjustment Transaction. Finally, when an item sells, the DateSold and ActualSalesPrice fields for the item are given values, and the AmountOwed value in OWNER is updated by increasing AmountOwed by the owner's percentage of the ActualSalesPrice value. This third transaction is called a Sales Transaction.

A. Explain why it is important for the changes made by each of these transactions to be atomic.

B. Describe a scenario in which an update of AmountOwed could be lost.

C. Describe a scenario for a nonrepeatable read and a scenario for a phantom read.

D. Explain how locking could be used to prevent the lost update in your answer to part B.

E. Is it possible for deadlock to occur between two Acceptance Transactions? Why or why not? Is it possible for deadlock to occur between two Sales Transactions? Why or why not? Is it possible for deadlock to occur between an Acceptance Transaction and a Sales Transaction? Why or why not?

F. For each of these three types of transaction, describe whether you think optimistic or pessimistic locking would be better. Explain the reasons for your answer.

G. Suppose James River Jewelry identifies three groups of users: managers, administrative personnel, and system administrators. Suppose further that managers and administrative personnel can perform Acceptance Transactions and Sales Transactions, but only managers can perform Price Adjustment Transactions. Describe processing rights that you think would be appropriate for this situation. Use Figure 6-17 as an example.

H. James River Jewelry has developed the following procedure for backup and recovery. The company backs up the database from the server to a second computer on its network each night. Once a month, it copies the database to a CD and stores it at a manager's house. It keeps paper records of all purchase and sales transactions for an entire year. If it ever loses its database, it plans to restore it from a backup and unrecorded transactions. Do you think this backup and recovery program is sufficient for James River Jewelry? What problems might occur? What alternatives exist? Describe any changes you think the company should make to this system.

James River Jewelry Project Questions for Chapter 7

If you have not already implemented the James River Jewelry database shown in the James River Jewelry Project Questions for Chapter 3 in this appendix in a DBMS product, create and populate the James River Jewelry database now in the DBMS of your choice (or as assigned by your instructor). Note that this assignment uses SQL views, which are discussed in online Appendix E, "Advanced SQL."

A. Create a user named JRJ-User with the password JRJ-User+password. Assign this user to database roles so that the user can read, insert, delete, and modify data.

B. If you haven't completed exercise 7.51, do it now.

C. Add a new folder to the DBC Web site named JRJ. Create a Web page for James River Jewelry in this folder—use the file name index.html. Link this page to the DBC Web page.

D. Create an appropriate ODBC data source for your database.

E. Code a Web page using PHP to display the data in PURCHASE. Add a hyperlink on the JRJ Web page to access the page. Using your database, demonstrate that your page works.

F. Code a Web page using PHP to display the data in ITEM. Add a hyperlink on the JRJ Web page to access the page. Using your database, demonstrate that your page works.

G. Create a view named Purchase_Item_Item_View that displays PURCHASE.InvoiceNumber, PURCHASE_ITEM.ItemNumber, PURCHASE.InvoiceDate, ITEM.ItemDescription, and PURCHASE_ITEM.RetailPrice. Code a Web page using PHP to display the data in Purchase_Item_Item_View. Add a hyperlink to the JRJ Web page to access the page. Using your database, demonstrate that your page works.

H. Code two HTML/PHP pages to add a new CUSTOMER to the JRJ database. Create data for two new CUSTOMERs and add them to the database to demonstrate that your pages work.

James River Jewelry Project Questions for Chapter 8

If you have not already implemented the James River Jewelry database shown in the James River Jewelry Project Questions for Chapter 3 in this appendix in a DBMS product, create and populate the James River Jewelry database now in the DBMS of your choice (or as assigned by your instructor). Note that this assignment uses SQL views, which are discussed in online Appendix E, "Advanced SQL."

A. You need about 20 PURCHASE transactions in the database. Write the needed SQL statements for any needed additional PURCHASE transactions and insert the data into your database.

B. Design a data warehouse star schema for a dimensional database named JRJ-DW. The fact table measure will be RetailPrice.

C. Create the JRJ-DW database in a DBMS product.

D. What transformations of data will need to be made before the JRJ-DW database can be loaded with data? List all the transformations, showing the original format of the James River Jewelry database data and how it appears in the JRJ-DW database.

E. Write the complete set of SQL statements necessary to load the transformed data into the JRJ-DW database.

F. Populate the JRJ-DW database, using the SQL statements you wrote to answer part E.

G. Write an SQL query similar to the one shown in the text on page 499 that uses retail price as the measure.

H. Write the SQL view equivalent of the SQL query you wrote to answer part G.

I. Create the SQL view you wrote to answer part H in your JRJ-DW database.

J. Create a Microsoft Excel 2016 workbook named JRJ-DW-BI-Exercises.xlsx.

K. Using either the results of your SQL query from part G (copy the results of the query into a worksheet in the JRJ-DW-BI-Exercises.xlsx workbook and then format this range as a worksheet table) or your SQL view from part I (create a Microsoft Excel data connection to the view), create an OLAP report similar to the OLAP report shown in Figure 8-16. (*Hint*: If you need help with the needed Microsoft Excel actions, search in the Microsoft Excel help system for more information.)