CIS-310 Database Design
Small Group Activity #11
30 points

Names of group members: _____
_____

1. Get in touch with your group. See Groups folder on Blackboard.
2. Discuss and complete the assignment together via E-mail, Discussion Forum, Blackboard Collaborate Ultra, and/or MS Teams.
3. Choose a recorder to prepare the final copy (one per group) and submit it via the Blackboard Assignments/Small Group Activities folder to the instructor.
4. Be sure all group members' names are on final copy. Do not add names of your group classmates who did not participate in the assignment.

In this small group activity, you will be using the Henry Books database. Your task is to write two stored procedures with the cursor construct and three triggers. Discuss each of the five problems with your group, write a T-SQL (SQL Server) code for each problem, and run the code on the U of L installation of SQL server. Save the code in a single file in your account on J drive. Every group member should run the code for each problem and save the code in his/her account on J drive. Capture the T-SQL code from SQL Server and paste it after the description of each problem. Also capture the output generated by your code and paste the output which will be in the Messages tab and/or the Results tab.

After you paste the queries and the output they produced save this document as Word or pdf file named SGA11_Groupxx, where xx stand for the group number and submit via Blackboard. See the Assignments/Small Group Activities/Small Group Activity 11 folder.

Watch the video placed in the Panopto & MS Teams Recordings content area for Week 15. It will be available on Mon, Nov 29. In the video I discuss several similar examples of the stored procedures with cursors and triggers based on the Premiere Products database. I also run the T-SQL code for them on SQL Server.

Once your compile stored procedures successfully, you should see them under objects in Programmability/Stored Procedures folder. Once you compile triggers successfully, you should see them as objects in the Tables/INVENTORY folder.

Problem 1

Write a stored procedure with the cursor construct named DISP_PUB_BOOK to retrieve and output the book code, book title, book type, price for every book whose publisher code is stored in variable @pubcode (an input formal parameter). Call the procedure for publisher 'PL'.

Copy/capture the T-SQL code for the procedure from SQL Server and the output it generated for publisher 'PL' and paste it below this line.

```
CREATE PROC DISP_PUB_BOOK
@pubcode char(2)
AS
DECLARE @book_code char(4), @book_title varchar(50), @book_type char(3), @price decimal(9,2)

DECLARE my_cursor CURSOR READ_ONLY
FOR
SELECT BOOK_CODE, TITLE, TYPE, PRICE
FROM BOOK
WHERE PUBLISHER_CODE = @pubcode

OPEN my_cursor
FETCH NEXT FROM my_cursor INTO @book_code, @book_title, @book_type, @price
      WHILE @@FETCH_STATUS = 0
      BEGIN
      PRINT @book_code + '  ' + @book_title + '     ' + @book_type + '  ' + CAST(@price as char(12))
      FETCH NEXT FROM my_cursor INTO @book_code, @book_title, @book_type, @price
      END
CLOSE my_cursor
DEALLOCATE my_cursor;

EXEC DISP_PUB_BOOK 'PL';
```

100 %

Messages

```
138X  Beloved     FIC  12.95
6128  Jazz     FIC  12.95
9627  Song of Solomon     FIC  14.00

Completion time: 2021-11-30T21:53:11.1562619-05:00
```

Problem 2

Write a stored procedure with the cursor construct named DISP_BOOK_BY_BRANCH to retrieve and list the book title, the author first and last name, the publisher name, the amount on hand for all books stored in a specific branch number. The branch number, @in_branch, is an input parameter through which the branch number will be supplied to the procedure. Call the procedure for branch number 1. (Note that in this problem you have to join several tables.)

Copy/capture the T-SQL code for the procedure from SQL Server and the output it generated for branch number 1 and paste it below this line.

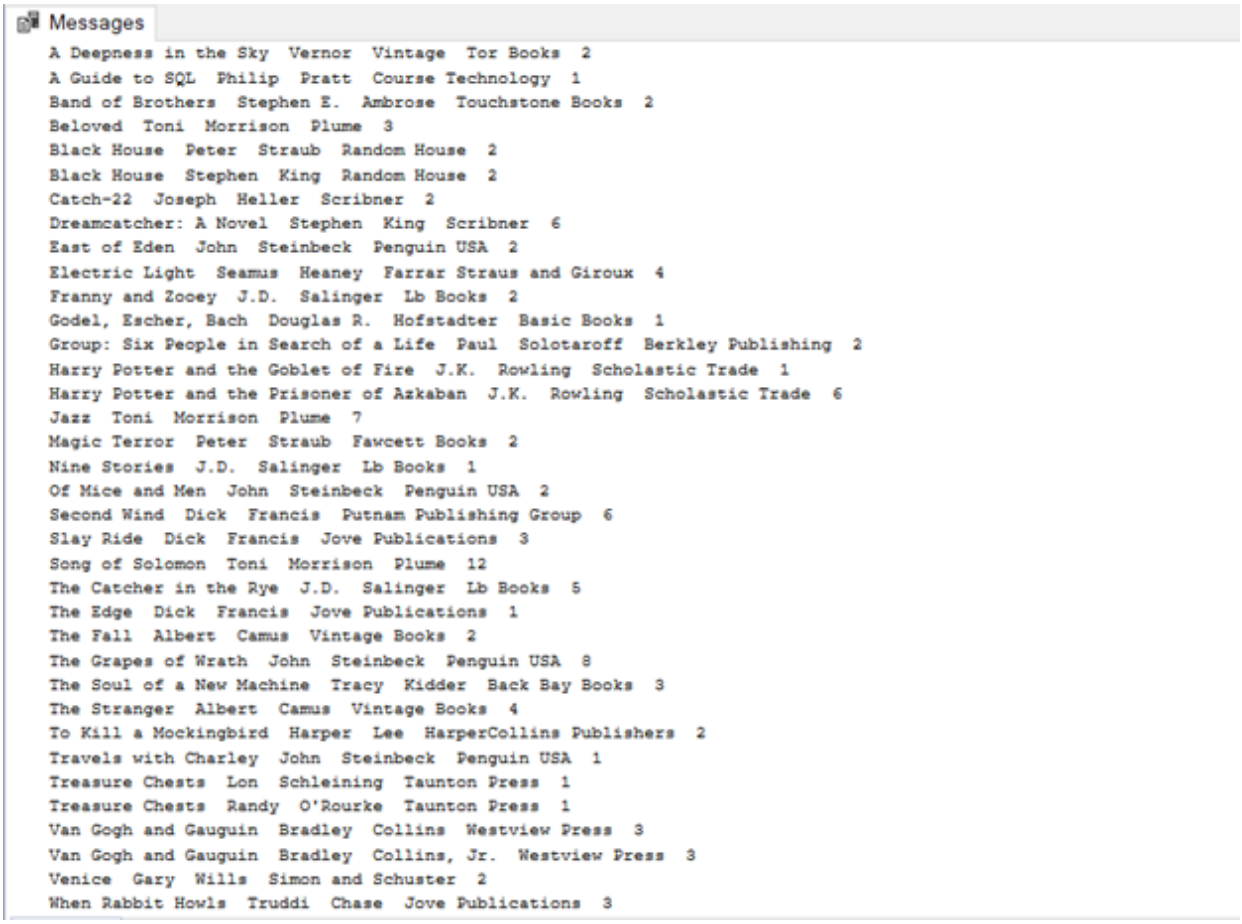
```
DROP PROC IF EXISTS DISP_BOOK_BY_BRANCH;

CREATE PROC DISP_BOOK_BY_BRANCH
@in_branch char(3)
AS
DECLARE @book_title varchar(50), @author_first varchar(50),
        @author_last varchar(50), @pub_name varchar(100),
        @on_hand_by_branch int
DECLARE my_cursor CURSOR READ_ONLY
FOR
SELECT TITLE, AUTHOR_FIRST, AUTHOR_LAST, PUBLISHER_NAME, SUM(ON_HAND)
FROM BOOK, WROTE, AUTHOR, PUBLISHER, INVENTORY
WHERE WROTE.BOOK_CODE = BOOK.BOOK_CODE
AND   AUTHOR.AUTHOR_NUM=WROTE.AUTHOR_NUM
AND   PUBLISHER.PUBLISHER_CODE = BOOK.PUBLISHER_CODE
AND   INVENTORY.BOOK_CODE = BOOK.BOOK_CODE
GROUP BY TITLE, AUTHOR_FIRST, AUTHOR_LAST, PUBLISHER_NAME

OPEN my_cursor
FETCH NEXT FROM my_cursor INTO @book_title , @author_first ,
                               @author_last , @pub_name , @on_hand_by_branch
      WHILE @@FETCH_STATUS = 0
      BEGIN
      PRINT @book_title + '  ' + @author_first + '  ' +
            @author_last+ '  ' +@pub_name+ '  ' + CAST(@on_hand_by_branch as char(8))
      FETCH NEXT FROM my_cursor INTO @book_title , @author_first ,
                               @author_last , @pub_name , @on_hand_by_branch
      END
```

```
CLOSE my_cursor
DEALLOCATE my_cursor;

EXEC DISP_BOOK_BY_BRANCH '1';
```



Problem 3

Problem 3 contains three Parts: A, B, and C.

Assume the BOOK table contains a column called TOTAL_ON_HAND that represents the total units on hand in all branches for that book. Write the T-SQL code for the following three triggers described in Parts A, B, and C.

Before you start to write the code for the three triggers you **must** write and run the SQL code to add the TOTAL_ON_HAND column to the BOOK table, and then write and run the SQL code to populate the column with the data values. To reiterate, each row in the TOTAL_ON_HAND column in the BOOK table should contain the total units on hand in all branches for that book.

Insert the SQL code that you wrote to add column TOTAL_ON_HAND and populate it with the data values below this line.

```
ALTER TABLE BOOK
ADD TOTAL_ON_HAND INT;

UPDATE BOOK
SET BOOK.TOTAL_ON_HAND = I.TOTAL_BOOK
FROM BOOK B
JOIN (SELECT BOOK_CODE, SUM(ON_HAND) AS TOTAL_BOOK
FROM INVENTORY
GROUP BY BOOK_CODE) I
ON B.BOOK_CODE = I.BOOK_CODE;

SELECT * FROM BOOK;
```

100 %

Results | Messages

	BOOK_CODE	TITLE	PUBLISHER_CODE	TYPE	PRICE	PAPERBACK	TOTAL_ON_HAND
1	0180	A Deepness in the Sky	TB	SFI	7.19	Y	2
2	0189	Magic Terror	FA	HOR	7.99	Y	2
3	0200	The Stranger	VB	FIC	8.00	Y	4
4	0378	Venice	SS	ART	24.50	N	2
5	079X	Second Wind	PU	MYS	24.95	N	6
6	0808	The Edge	JP	MYS	6.99	Y	1
7	1351	Dreamcatcher: A Novel	SC	HOR	19.60	N	6
8	1382	Treasure Chests	TA	ART	24.46	N	1
9	138X	Beloved	PL	FIC	12.95	Y	3
10	2226	Harry Potter and the Prisoner of Azkaban	ST	SFI	13.96	N	6
11	2281	Van Gogh and Gauguin	WP	ART	21.00	N	3
12	2766	Of Mice and Men	PE	FIC	6.95	Y	2
13	2908	Electric Light	FS	POE	14.00	N	4
14	3350	Group: Six People in Search of a Life	BP	PSY	10.40	Y	2
15	3743	Nine Stories	LB	FIC	5.99	Y	1
16	3906	The Soul of a New Machine	BY	SCI	11.16	Y	3
17	5163	Travels with Charley	PE	TRA	7.95	Y	1
18	5790	Catch-22	SC	FIC	12.00	Y	2
19	6128	Jazz	PL	FIC	12.95	Y	7
20	6328	Band of Brothers	TO	HIS	9.60	Y	2
21	669X	A Guide to SQL	CT	CMP	37.95	Y	1
22	6908	Franny and Zooey	LB	FIC	5.99	Y	2
23	7405	East of Eden	PE	FIC	12.95	Y	2
24	7443	Harry Potter and the Goblet of Fire	ST	SFI	18.16	N	1
25	7559	The Fall	VB	FIC	8.00	Y	2
26	8092	Godel, Escher, Bach	BA	PHI	14.00	Y	1
27	8720	When Rabbit Howls	JP	PSY	6.29	Y	3
28	9611	Black House	RH	HOR	18.81	N	2
29	9627	Song of Solomon	PL	FIC	14.00	Y	7
30	9701	The Grapes of Wrath	PE	FIC	13.00	Y	8
31	9882	Slay Ride	JP	MYS	6.99	Y	3
32	9883	The Catcher in the Rye	LB	FIC	5.99	Y	5
33	9931	To Kill a Mockingbird	HC	FIC	18.00	N	7

Note that the triggers will execute in background so you will not see their explicit execution like you do for stored procedures or views.

Part A. When inserting a row in the INVENTORY table, add the ON_HAND value to the TOTAL_ON_HAND value for the appropriate book. To test the effect of the trigger step by step issue a series of the following simple commands.

```
--To see that the TOTAL_ON_HAND value for book 9931 is 2, execute
SELECT *
FROM BOOK
WHERE BOOK_CODE='9931';

--To see that the ON_HAND value for book 9931 is 2 execute
SELECT *
FROM INVENTORY
WHERE BOOK_CODE='9931';

--Trigger is executed after this INSERT event in table INVENTORY
INSERT INTO INVENTORY
VALUES ('9931', 2, 5)

--To see that the row has been added for BOOK_CODE='9931' and
--BRANCH_NUM = 2, execute
SELECT *
FROM INVENTORY
WHERE BOOK_CODE='9931';

--The TOTAL_ON_HAND value is modified by on hand value = 5 inserted
--for book 9931 for branch 2. Now TOTAL_ON_HAND = 7. It was 2 before.
--To see it, execute
SELECT *
FROM BOOK
WHERE BOOK_CODE='9931';
```

Copy/capture the T-SQL code for the trigger from SQL Server and the output generated by all of the above SQL statements and paste it below this line.

```
DROP TRIGGER IF EXISTS INSERT_ON_HAND;

CREATE TRIGGER INSERT_ON_HAND
ON INVENTORY
AFTER INSERT
AS
DECLARE @total int
select @total = (SELECT ON_HAND FROM INSERTED)
UPDATE INVENTORY
SET ON_HAND = ON_HAND + @total;
```

```
100 %
Messages
Commands completed successfully.

Completion time: 2021-11-30T14:40:07.1226652-05:00
```

```
--To see that the TOTAL_ON_HAND value for book 9931 is 2, execute
SELECT *
FROM BOOK
WHERE BOOK_CODE='9931';
```

100 %

Results | Messages

	BOOK_CODE	TITLE	PUBLISHER_CODE	TYPE	PRICE	PAPERBACK	TOTAL_ON_HAND
1	9931	To Kill a Mockingbird	HC	FIC	18.00	N	2

```
--To see that the ON_HAND value for book 9931 is 2 execute
SELECT *
FROM INVENTORY
WHERE BOOK_CODE='9931';
```

100 %

Results | Messages

	BOOK_CODE	BRANCH_NUM	ON_HAND
1	9931	1	2

```
--Trigger is executed after this INSERT event in table INVENTORY
INSERT INTO INVENTORY
VALUES ('9931', 2, 5)

--To see that the row has been added for BOOK_CODE='9931' and
--BRANCH_NUM = 2, execute
SELECT *
FROM INVENTORY
WHERE BOOK_CODE='9931' AND BRANCH_NUM ='2';
```

100 %

Results | Messages

	BOOK_CODE	BRANCH_NUM	ON_HAND
1	9931	2	5

```
--The TOTAL_ON_HAND value is modified by on hand value = 5 inserted
--for book 9931 for branch 2. Now TOTAL_ON_HAND = 7. It was 2 before.
--To see it, execute
SELECT *
FROM BOOK
WHERE BOOK_CODE='9931';
```

100 %

Results | Messages

	BOOK_CODE	TITLE	PUBLISHER_CODE	TYPE	PRICE	PAPERBACK	TOTAL_ON_HAND
1	9931	To Kill a Mockingbird	HC	FIC	18.00	N	7

Part B. When updating a row in the INVENTORY table, add the difference between the new ON_HAND vale and the old ON_HAND value to the TOTAL_ON_HAND value for the appropriate book. To test the effect of the trigger step by step issue a series of the following simple commands.

```
--This update event causes execution of the trigger
UPDATE INVENTORY
SET ON_HAND=8
WHERE BOOK_CODE='9931' AND BRANCH_NUM=2

--To see the ON HAND value updated for book 9931 in branch 2
SELECT *
FROM INVENTORY
WHERE BOOK_CODE='9931';

--To see the effect of the above UPDATE in table BOOK
SELECT *
FROM BOOK
WHERE BOOK_CODE='9931';
```

Copy/capture the T-SQL code for the trigger from SQL Server and the output generated by all of the above SQL statements and paste it below this line.

```
DROP TRIGGER IF EXISTS UPDATE_ON_HAND;

CREATE TRIGGER UPDATE_ON_HAND
ON INVENTORY
AFTER UPDATE
AS
DECLARE @old_on_hands INT
DECLARE @new_on_hands INT
SELECT @old_on_hands = (SELECT ON_HAND FROM DELETED)
SELECT @new_on_hands = (SELECT ON_HAND FROM INSERTED)
UPDATE BOOK
SET TOTAL_ON_HAND = TOTAL_ON_HAND - (@old_on_hands + @new_on_hands)
FROM BOOK B
JOIN DELETED D ON B.BOOK_CODE = D.BOOK_CODE
JOIN INSERTED I ON B.BOOK_CODE = I.BOOK_CODE;
```

```
100 %
Messages
Commands completed successfully.

Completion time: 2021-11-30T16:06:30.0373749-05:00
```

```
--This update event causes execution of the trigger
UPDATE INVENTORY
SET ON_HAND=8
WHERE BOOK_CODE='9931' AND BRANCH_NUM=2

--To see the ON HAND value updated for book 9931 in branch 2
SELECT *
FROM INVENTORY
WHERE BOOK_CODE='9931';
```

100 %

Results | Messages

	BOOK_CODE	BRANCH_NUM	ON_HAND
1	9931	1	2
2	9931	2	8

```
--To see the ON HAND value updated for book 9931 in branch 2
SELECT *
FROM INVENTORY
WHERE BOOK_CODE='9931';

--To see the effect of the above UPDATE in table BOOK
SELECT *
FROM BOOK
WHERE BOOK_CODE='9931';
```

100 %

Results | Messages

	BOOK_CODE	TITLE	PUBLISHER_CODE	TYPE	PRICE	PAPERBACK	TOTAL_ON_HAND
1	9931	To Kill a Mockingbird	HC	FIC	18.00	N	10

Part C. When deleting a row in the INVENTORY table, subtract the add the difference between the new ON_HAND vale and the old ON_HAND value to the TOTAL_ON_HAND value for the appropriate book. To test the effect of the trigger step by step issue a series of the following simple commands.

```
--This delete event cause execution of the trigger
DELETE FROM INVENTORY
WHERE BOOK_CODE='9931' AND BRANCH_NUM=2;

--To see the row deleted. Now there is no row for book 9931 in branch 2.
SELECT *
FROM INVENTORY
WHERE BOOK_CODE='9931';
```

```sql
--To see the effect of the above delete in table BOOK.
--TOTAL_ON_HAND is 2 again.
SELECT *
FROM BOOK
WHERE BOOK_CODE='9931';
```

Copy/capture the T-SQL code for the trigger from SQL Server and the output generated by all of the above SQL statements and paste it below this line.

```sql
DROP TRIGGER IF EXISTS DELETE_ON_HAND;

CREATE TRIGGER DELETE_ON_HAND
ON INVENTORY
AFTER DELETE
AS
DECLARE @deletebooks INT
SELECT @deletebooks = (SELECT ON_HAND FROM DELETED)
UPDATE BOOK
SET TOTAL_ON_HAND = TOTAL_ON_HAND - @deletebooks
FROM BOOK B
JOIN DELETED D ON B.BOOK_CODE = D.BOOK_CODE;
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2021-11-30T16:23:59.7681902-05:00
```

```sql
--This delete event cause execution of the trigger
DELETE FROM INVENTORY
WHERE BOOK_CODE='9931' AND BRANCH_NUM=2;

--To see the row deleted. Now there is no row for book 9931 in branch 2.
SELECT *
FROM INVENTORY
WHERE BOOK_CODE='9931';
```

100 %

Results | Messages

	BOOK_CODE	BRANCH_NUM	ON_HAND
1	9931	1	2

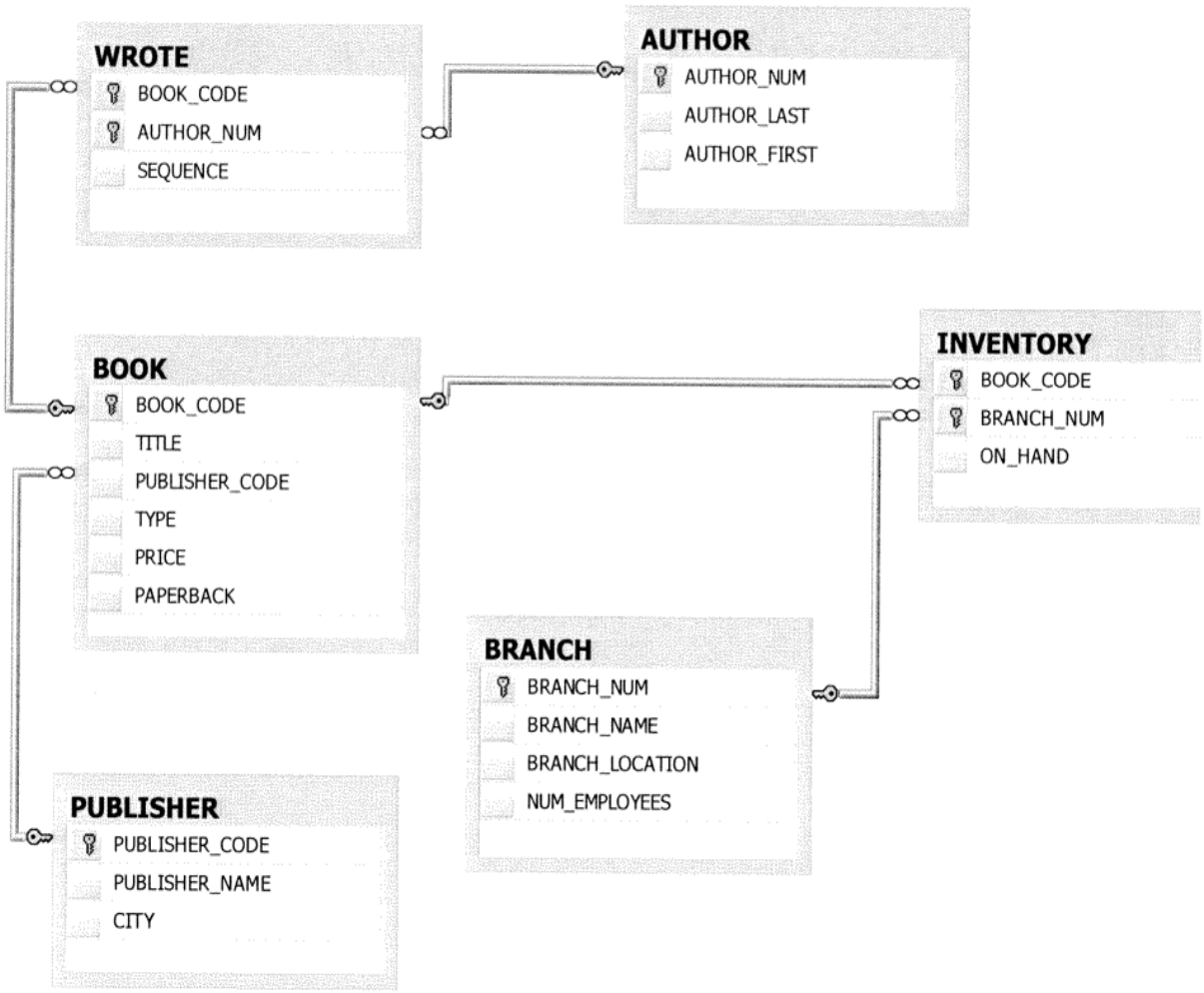
```
--To see the effect of the above delete in table BOOK.
--TOTAL_ON_HAND is 2 again.
SELECT *
FROM BOOK
WHERE BOOK_CODE='9931';
```

100 %

Results | Messages

	BOOK_CODE	TITLE	PUBLISHER_CODE	TYPE	PRICE	PAPERBACK	TOTAL_ON_HAND
1	9931	To Kill a Mockingbird	HC	FIC	18.00	N	2

The Henry Books Database ERD



Introduction to the Henry Books Database Case

Ray Henry is the owner of a bookstore chain named Henry Books. Like the management of Premiere Products, Ray has decided to store his data in a database. He wants to achieve the same benefits; that is, he wants to ensure that his data is current and accurate. He also needs to create forms to interact with the data and to produce reports from that data. In addition, he wants to be able to ask questions concerning the data and to obtain answers to these questions easily and quickly.

In running his chain of bookstores, Ray gathers and organizes information about branches, publishers, authors, and books. Figure 1.4 shows sample branch and publisher data for Henry Books. Each branch has a number that uniquely identifies the branch. In addition, Ray tracks the branch's name, location, and number of employees. Each publisher has a code that uniquely identifies the publisher. In addition, Ray tracks the publisher's name and city.

BRANCH

BRANCH_NUM	BRANCH_NAME	BRANCH_LOCATION	NUM_EMPLOYEES
1	Henry Downtown	16 Riverview	10
2	Henry On The Hill	1289 Bedford	6
3	Henry Brentwood	Brentwood Mall	15
4	Henry Eastshore	Eastshore Mall	9

PUBLISHER

PUBLISHER_CODE	PUBLISHER_NAME	CITY
AH	Arkham House	Sauk City WI
AP	Arcade Publishing	New York
BA	Basic Books	Boulder CO
BP	Berkley Publishing	Boston
BY	Back Bay Books	New York
CT	Course Technology	Boston
FA	Fawcett Books	New York
FS	Farrar Straus and Giroux	New York
HC	HarperCollins Publishers	New York
JP	Jove Publications	New York
JT	Jeremy P. Tarcher	Los Angeles
LB	Lb Books	New York
MP	McPherson and Co.	Kingston
PE	Penguin USA	New York
PL	Plume	New York
PU	Putnam Publishing Group	New York
RH	Random House	New York
SB	Schoken Books	New York
SC	Scribner	New York
SS	Simon and Schuster	New York
ST	Scholastic Trade	New York
TA	Taunton Press	Newtown CT
TB	Tor Books	New York
TH	Thames and Hudson	New York
TO	Touchstone Books	Westport CT
VB	Vintage Books	New York
WN	W.W. Norton	New York
WP	Westview Press	Boulder CO

Figure 1.5 shows sample author data for Henry Books. Each author has a number that uniquely identifies the author. In addition, Ray records each author's last and first names.

FIGURE 1.5 Sample author data for Henry Books

AUTHOR

AUTHOR_NUM	AUTHOR_LAST	AUTHOR_FIRST
1	Morrison	Toni
2	Solotaroff	Paul
3	Vintage	Vernor
4	Francis	Dick
5	Straub	Peter
6	King	Stephen
7	Pratt	Philip
8	Chase	Truddi
9	Collins	Bradley
10	Heller	Joseph
11	Wills	Gary
12	Hofstadter	Douglas R.
13	Lee	Harper
14	Ambrose	Stephen E.
15	Rowling	J.K.
16	Salinger	J.D.
17	Heaney	Seamus
18	Camus	Albert
19	Collins, Jr.	Bradley
20	Steinbeck	John
21	Castelman	Riva
22	Owen	Barbara
23	O'Rourke	Randy
24	Kidder	Tracy
25	Schleining	Lon

Figure 1.6 shows sample book data for Henry Books. Each book has a code that uniquely identifies the book. For each book, Ray also tracks the title, publisher, type of book, price, and whether the book is a paperback.

BOOK

BOOK_CODE	TITLE	PUBLISHER_CODE	TYPE	PRICE	PAPERBACK
0180	A Deepness in the Sky	TB	SFI	7.19	Yes
0189	Magic Terror	FA	HOR	7.99	Yes
0200	The Stranger	VB	FIC	8.00	Yes
0378	Venice	SS	ART	24.50	No
079X	Second Wind	PU	MYS	24.95	No
0808	The Edge	JP	MYS	6.99	Yes
1351	Dreamcatcher: A Novel	SC	HOR	19.60	No
1382	Treasure Chests	TA	ART	24.46	No
138X	Beloved	PL	FIC	12.95	Yes
2226	Harry Potter and the Prisoner of Azkaban	ST	SFI	13.96	No
2281	Van Gogh and Gauguin	WP	ART	21.00	No
2766	Of Mice and Men	PE	FIC	6.95	Yes
2908	Electric Light	FS	POE	14.00	No
3350	Group: Six People in Search of a Life	BP	PSY	10.40	Yes
3743	Nine Stories	LB	FIC	5.99	Yes
3906	The Soul of a New Machine	BY	SCI	11.16	Yes
5163	Travels with Charley	PE	TRA	7.95	Yes
5790	Catch-22	SC	FIC	12.00	Yes
6128	Jazz	PL	FIC	12.95	Yes
6328	Band of Brothers	TO	HIS	9.60	Yes
669X	A Guide to SQL	CT	CMP	37.95	Yes
6908	Franny and Zooey	LB	FIC	5.99	Yes
7405	East of Eden	PE	FIC	12.95	Yes
7443	Harry Potter and the Goblet of Fire	ST	SFI	18.16	No
7559	The Fall	VB	FIC	8.00	Yes
8092	Godel, Escher, Bach	BA	PHI	14.00	Yes
8720	When Rabbit Howls	JP	PSY	6.29	Yes
9611	Black House	RH	HOR	18.81	No
9627	Song of Solomon	PL	FIC	14.00	Yes
9701	The Grapes of Wrath	PE	FIC	13.00	Yes
9882	Slay Ride	JP	MYS	6.99	Yes
9883	The Catcher in the Rye	LB	FIC	5.99	Yes
9931	To Kill a Mockingbird	HC	FIC	18.00	No

FIGURE 1.7 Sample data that relates books to authors and books to branches for Henry Books

WROTE

BOOK_CODE	AUTHOR_NUM	SEQUENCE
0180	3	1
0189	5	1
0200	18	1
0378	11	1
079X	4	1
0808	4	1
1351	6	1
1382	23	2
1382	25	1
138X	1	1
2226	15	1
2281	9	2
2281	19	1
2766	20	1

INVENTORY

BOOK_CODE	BRANCH_NUM	ON_HAND
0180	1	2
0189	2	2
0200	1	1
0200	2	3
0378	3	2
079X	2	1
079X	3	2
079X	4	3
0808	2	1
1351	2	4
1351	3	2
1382	2	1
138X	2	3
2226	1	3

WROTE

BOOK_CODE	AUTHOR_NUM	SEQUENCE
2908	17	1
3350	2	1
3743	16	1
3906	24	1
5163	20	1
5790	10	1
6128	1	1
6328	14	1
669X	7	1
6908	16	1
7405	20	1
7443	15	1
7559	18	1
8092	12	1
8720	8	1
9611	5	2
9611	6	1
9627	1	1
9701	20	1
9882	4	1
9883	16	1
9931	13	1

INVENTORY

BOOK_CODE	BRANCH_NUM	ON_HAND
2226	3	2
2226	4	1
2281	4	3
2766	3	2
2908	1	3
2908	4	1
3350	1	2
3743	2	1
3906	2	1
3906	3	2
5163	1	1
5790	4	2
6128	2	4
6128	3	3
6328	2	2
669X	1	1
6908	2	2
7405	3	2
7443	4	1
7559	2	2
8092	3	1
8720	1	3
9611	1	2
9627	3	5
9627	4	2
9701	1	2
9701	2	1
9701	3	3
9701	4	2
9882	3	3
9883	2	3
9883	4	2
9931	1	2