Discussion #2

Answers to Selected Problems of Chapter 8

Q1: Specify the following queries on the database of Figure (1) bellow in SQL:

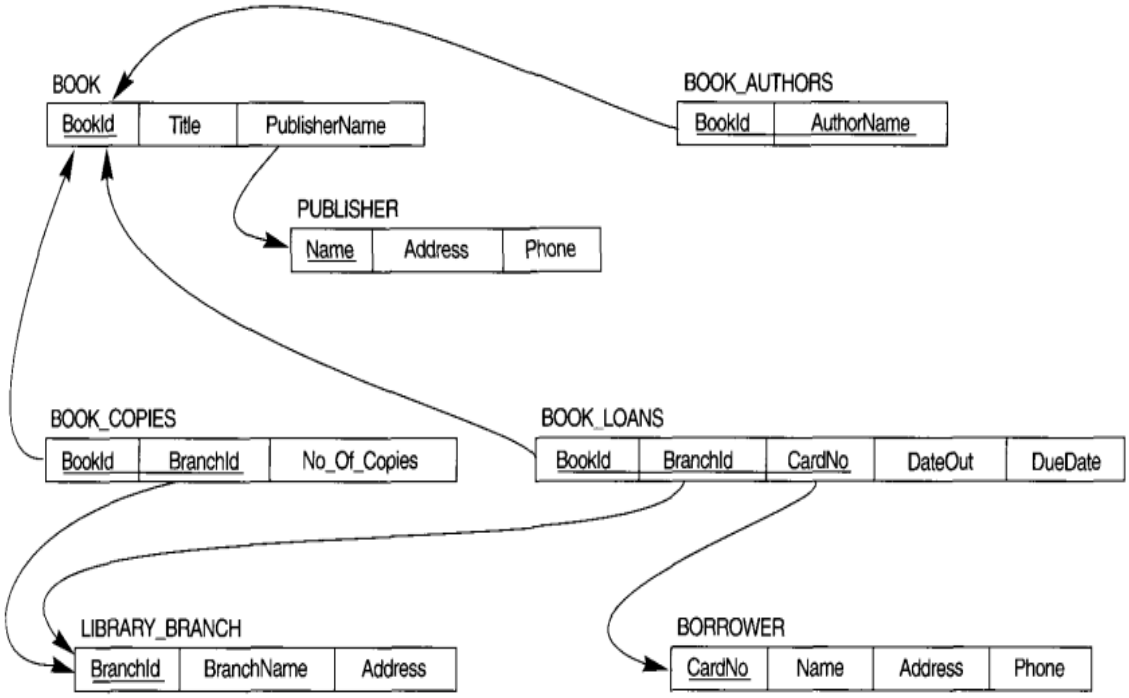

Figure 1

a. How many copies of the book titled The Lost Tribe are owned by the library branch whose name is 'Sharpstown'?

```
SELECT NoOfCopies

FROM ( (BOOK NATURAL JOIN BOOK_COPIES ) NATURAL JOIN LIBRARY_BRANCH )

WHERE Title='The Lost Tribe' AND BranchName='Sharpstown'
```

b. How many copies of the book titled The Lost Tribe are owned by each library branch?

```
SELECT BranchName, NoOfCopies
FROM ( (BOOK NATURAL JOIN BOOK_COPIES ) NATURAL JOIN LIBRARY_BRANCH )
WHERE Title='The Lost Tribe'
```

c. Retrieve the names of all borrowers who do not have any books checked out.

```
SELECT Name
FROM BORROWER B
WHERE NOT EXIST ( SELECT *
                  FROM BOOK_LOANS L
                  WHERE B.CardNo = L.CardNo ).
```

d. For each book that is loaned out from the 'Sharpstown' branch and whose DueDate is today, retrieve the book title, the borrower's name, and the borrower's address.

```
SELECT B.Title, R.Name, R.Address
FROM BOOK B, BORROWER R, BOOK_LOANS BL, LIBRARY_BRANCH LB
WHERE LB.BranchName='Sharpstown' AND LB.BranchId=BL.BranchId AND
BL.DueDate='today' AND BL.CardNo=R.CardNo AND BL.BookId=B.BookId
```

e. For each library branch, retrieve the branch name and the total number of books loaned out from that branch.

```
SELECT L.BranchName, COUNT(*)
FROM BOOK_LOANS B, LIBRARY_BRANCH L
WHERE B.BranchId = L.BranchId
GROUP BY L.BranchName
```

f. Retrieve the names, addresses, and number of books checked out for all borrowers who have more than five books checked out.

```
SELECT B.Name, B.Address, COUNT(*)
FROM BORROWER B, BOOK_LOANS L
WHERE B.CardNo = L.CardNo
GROUP BY B.CardNo
HAVING COUNT(*) > 5
```

g. For each book authored (or coauthored) by 'Stephen King,' retrieve the title and the number of copies owned by the library branch whose name is 'Central.'

```
SELECT TItle, NoOfCopies
FROM ( ( (BOOK_AUTHORS NATURAL JOIN BOOK)
 NATURAL JOIN BOOK_COPIES)
NATURAL JOIN LIBRARY_BRANCH)
WHERE Author_Name = 'Stephen King' and BranchName = 'Central
```

Q2: Specify the following queries on the database of Figure (2) bellow in SQL:

STUDENT	Name	StudentNumber	Class	Major
	Smith	17	1	CS
	Brown	8	2	CS

COURSE	CourseName	CourseNumber	CreditHours	Department
	Intro to Computer Science	CS1310	4	CS
	Data Structures	CS3320	4	CS
	Discrete Mathematics	MATH2410	3	MATH
	Database	CS3380	3	CS

SECTION	SectionIdentifier	CourseNumber	Semester	Year	Instructor
	85	MATH2410	Fall	98	King
	92	CS1310	Fall	98	Anderson
	102	CS3320	Spring	99	Knuth
	112	MATH2410	Fall	99	Chang
	119	CS1310	Fall	99	Anderson
	135	CS3380	Fall	99	Stone

GRADE_REPORT	StudentNumber	SectionIdentifier	Grade
	17	112	B
	17	119	C
	8	85	A
	8	92	A
	8	102	B
	8	135	A

PREREQUISITE	CourseNumber	PrerequisiteNumber
	CS3380	CS3320
	CS3380	MATH2410
	CS3320	CS1310

Figure 2

a. Retrieve the names of all senior students majoring in 'COSC' (computer science).

```
SELECT Name
FROM STUDENT
WHERE Major='COSC'
```

b. Retrieve the names of all courses taught by professor King in 85 and 86.

```
SELECT CourseName
FROM COURSE, SECTION
WHERE COURSE.CourseNumber=SECTION.CourseNumber AND Instructor='King'
AND (Year='85' OR Year='86')
```

Another possible SQL query uses nesting as follows:

```
SELECT CourseName
FROM COURSE
WHERE CourseNumber IN ( SELECT CourseNumber
FROM SECTION
WHERE Instructor='King' AND (Year='85' OR Year='86') )
```

c. For each section taught by professor King, retrieve the course number, semester, year, and number of students who took the section.

```
SELECT CourseNumber, Semester, Year, COUNT(*)
FROM SECTION, GRADE_REPORT
WHERE Instructor='King' AND SECTION.SectionIdentifier=GRADE_REPORT.SectionIdentifier
GROUP BY CourseNumber, Semester, Year
```

d. Retrieve the name and transcript of each senior student (Class=5) majoring in COSC. Transcript includes course name, course number, credit hours, semester, year, and grade for each course completed by the student.

```
SELECT Name, CourseName, C.CourseNumber, CreditHours, Semester, Year, Grade

FROM STUDENT ST, COURSE C, SECTION S, GRADE_REPORT G

WHERE Class=5 AND Major='COSC' AND ST.StudentNumber=G.StudentNumber AND

G.SectionIdentifier=S.SectionIdentifier AND S.CourseNumber=C.CourseNumber
```

e. Retrieve the names and major departments of all straight A students (students who have a grade of A in all their courses).

```
SELECT Name, Major

FROM STUDENT

WHERE NOT EXISTS ( SELECT *

FROM GRADE_REPORT

WHERE StudentNumber= STUDENT.StudentNumber AND NOT(Grade='A'))
```

f. Retrieve the names and major departments of all students who do not have any grade of A in any of their courses.

```
SELECT Name, Major

FROM STUDENT

WHERE NOT EXISTS ( SELECT *

FROM GRADE_REPORT

WHERE StudentNumber= STUDENT.StudentNumber AND Grade='A' )
```