Midterm 2019

8.16

Specify the following queries on the COMPANY relational database schema shown in Figure 5.5 using the relational operators discussed in this chapter. Also show the result of each query as it would apply to the database state in Figure 5.6.

1. Retrieve the names of all employees in department 5 who work more than 10 hours per week on the ProductX project.

SELECT Fname, Lname

FROM EMPLOYEE, WORKS\_ON, PROJECT

WHERE Dno =5, AND Hours > 10 AND Pname = ‘ProductX’

1. List the names of all employees who have a dependent with the same first name as themselves.
2. Find the names of all employees who are directly supervised by ‘Franklin Wong’.

Temp<- Select Fname Franklin and Lname Wong

Project Fname Minit Lname (Temp join SSN = SuperSSN Employee)

1. For each project, list the project name and the total hours per week (by all employees) spent on that project.
2. Retrieve the names of all employees who work on every project.

Temp <- proj ESSN, Pno (WORKS\_ON) / rename Pno (proj Pnumber(PROJECT))

PROJ Fname, Minit, Lname(Temp join ESSN =SSN EMPLOYEE)

1. Retrieve the names of all employees who do not work on any project.

TEMP<- WORKS\_ON join ESSN = SSN EMPLOYEE

TEMP2 <- proj SSN (EMPLOYEE)- proj SSN(TEMP)

TEMP3 <- TEMP2 natural join EMPLOYEE

Proj fname minit lname (TEMP3)

1. Calculate the minimum salary of the whole company and list the name of all the employees who earn that minimum salary, with the name of the department they work in.

Temp1 <- Proj salary(EMPLOYEE)

Min <– temp1 - project salary (select salary > sal2( (Temp1 x rename sal2 Temp1 )))

Proj f,m,l, Dname((Min \* EMPLOYEE) join dno = Dnumber DEPARTMENT)

1. Compute the maximum salary of all the female employees.

Temp1 <- Proj salary(select sex = ‘female’ (EMPLOYEE))

Temp1 - project salary (select salary < sal2( (Temp1 x rename sal2 Temp1 ))))

1. Find the names and addresses of all employees who work on at least one project located in Houston but whose department has no location in Houston.

TEMP <- select Plocation = ‘houston’ (PROJECT)

TEMP2 <- proj essn (Works\_on join PNO = pnumber temp)

TEMP3 <- TEMP2 join ESSN = SSN EMPLOYEE

TEMP4 <- TEMP3 join DNO =DNUMBER DEPT\_LOCATIONS

Proj f,m,l, address ( select Dlocation != ‘Houston’ Temp4)

1. List the last names of all department managers who have no dependents

TEMP <- DEPARTMENT join MGR\_SSN = SSN EMPLOYEE

TEMP2 <- TEMP join SSN = ESSN DEPENDENT

TEMP3 <- proj SSN (TEMP) – proj SSN (TEMP2)

Proj f,m,l (EMPLOYEE natural join TEMP3)

8.18

Consider the LIBRARY relational database schema shown in Figure 8.14, which is used to keep track of books, borrowers, and book loans. Referential integrity constraints are shown as directed arcs in Figure 8.14, as in the notation of Figure 5.7. Write down relational expressions for the following queries:

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

TEMP1 <- select Branch\_Name = ‘Sharpstown’(LIBRARY\_BRANCH)

TEMP2 <- select Title = “The Lost Tribe’ (BOOK)

Project No\_of\_copies ((BOOK\_COPIES\*TEMP1)\*TEMP2)

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

TEMP1 <- select Title = “The Lost Tribe’ (BOOK)

Project Branch\_name, No\_of\_copies ((BOOK\_COPIES\*TEMP1)\*LIBRARY\_BRANCH)

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

TEMP <- proj card\_no (BOOK\_LOANS)

TEMP2 <- proj card\_no (BORROWER) -TEMP

Proj name(BORROWER\*TEMP2)

1. For each book that is loaned out from the Sharpstown branch and whose Due\_date is today, retrieve the book title, the borrower’s name, and the borrower’s address.

TEMP1 <- proj Branch\_id (select Branch\_Name = ‘Sharpstown’(LIBRARY\_BRANCH))

TEMP2 <- Select Due\_date = today (BOOK\_LOANS \* TEMP1)

Proj Title, Name, Address ((TEMP2\*BORROWER)\*BOOK)

1. Find the title, publisher and authors of the book for which a branch has the greatest (largest) number of copies.

TEMP <- proj No\_of\_copies(BOOK\_COPIES)

Max <– temp1 - project No\_of\_copies (select No\_of\_copies < copies( (Temp1 x rename copies Temp1 )))

proj Title, Publisher\_name, Author\_name (((Max\* BOOK\_COPIES)\*BOOK)\*BOOK\_AUTHORS)

1. What can you add to the database to determine how many books has each borrower checked out? Explain in detail and try to keep it simple.
2. 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.

BA <- σAuthor\_name=’Stephen King’(BOOK\_AUTHORS)

BR <- σBranch\_name=’Central’(LIBRARY\_BRANCH)

ΠTitle, No\_of\_copies(BOOK \* (BA \* (BOOK\_COPIES \* BR)))