Session Topic/Title	Session No.	Session Duration (Minutes)
Practicing Complex Queries	8	100

1- Session Outcomes	*Please list the Session Learning Outcomes (SLOs), as presented in the ABET Student Outcomes A to K.* ***Note**: The sequence of instruction may vary and you may start with the most essential SLO. 1 is the most important one, followed by 2, 3 and 4, as per time availability.*

- Outcome A: To learn about complex queries using Union, Intersection, difference etc.

2- Tool(s)/Software

MySQL Workbench

3- procedural steps (Tasks)

Description

Exercise 1 :

Specify the following queries on the COMPANY relational database schema, using the relational operators discussed in this chapter. Also show the result of each query as it would apply to the database state + Write them in Tuple calculus .

a) Retrieve the names of employees in department 5 who work more than 10 hours per week on the 'ProductX' project.
b))b) List the names of employees who have a dependent with the same first name as themselves.
c) Find the names of employees that are directly supervised by 'Franklin Wong.'
d) For each project, list the project name and the total hours per week (by all employees) spent on that project.
e) Retrieve the names of employees who work on every project.
f) Retrieve the names of employees who do not work on any project.
g) For each department, retrieve the department name, and the average salary of employees working in that department.
h) Retrieve the average salary of all female employees.
i) Find the names and addresses of employees who work on at least one project located in Houston but whose department has no location in Houston.
List the last names of department managers who have no dependents

Exercise 2 :

Consider the LIBRARY relational schema shown in Figure 6.14, which is used to keep track of books, borrowers, and book loans. Referential integrity constraints are shown as directed arcs in Figure 6.14, as in the notation of Figure 3.7. Write down relational expressions for the following queries on the LIBRARY database:

a) How many copies of the book titled The Lost Tribe are owned by the library branch whose name is "Sharpstown?"
b) How many copies of the book titled The Lost Tribe are owned by each library branch?
c) Retrieve the names of all borrowers who do not have any books checked out.
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.
e) For each library branch, retrieve the branch name and the total number of books loaned out from that branch.
f) Retrieve the names, addresses, and number of books checked out for all borrowers who have more than five books checked out.
g) For each book authored (or co-authored) by "Stephen King", retrieve the title and the number of copies owned by the library branch whose name is "Central".

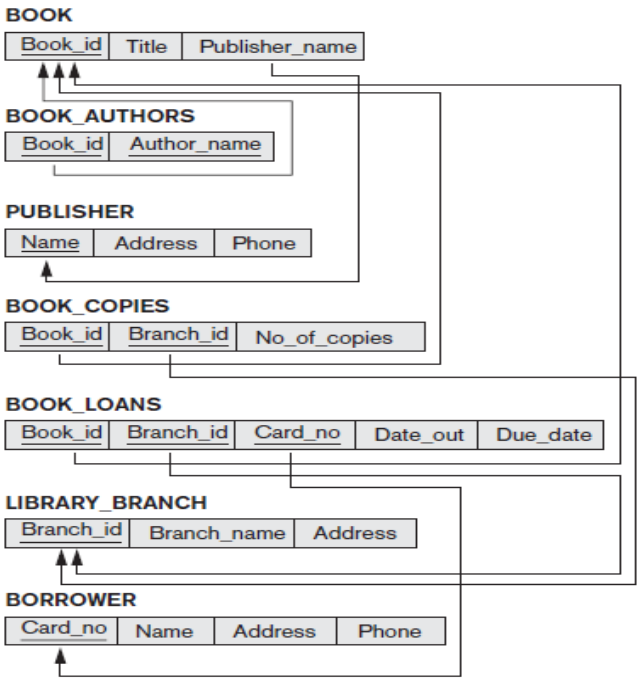

Figure 6.14
A relational database schema for a LIBRARY database.

Deliverables: Students can work with complex queries.

4- Assessment	*Plan questions/tasks to confirm that students have achieved **each** of the above SLOs. Outcome 1 is the most important one, followed by 2, 3 and 4, as per time availability. The questions/tasks below are just for guidance and the laboratory instructor can come up with his own questions/tasks.*

1. Outcome A: Solving the queries with the instructor

5- Resources	*Suggest further resources for the students to manage their learning after the class. Make sure that the resources are specific and different to suit all students, e. g. Figures, Tables, Links, etc.*

- Natural Join

w3resource.com/mysql/advance-query-in-mysql/mysql-natural-join.php

- Current date function

https://www.w3schools.com/sql/func_mysql_curdate.asp

- Group By & Having clause

https://www.guru99.com/group-by.html

- Inner vs Outer Join

https://www.diffen.com/difference/Inner_Join_vs_Outer_Join#:~:text=Outer%20Join,-Diffen%20%E2%80%BA%20Technology%20%E2%80%BA%20Computers&text=In%20SQL%2C%20a%20join%20is,some%20dissimilar%20data%20from%20tables.

- Exists vs IN

http://www.dba-oracle.com/t_exists_clause_vs_in_clause.htm