Lab week 4 (ISYS2120 sem2 2022)

Welcome to week 4's lab. This week we are going to focus on relational algebra and on SQL grouping and nesting queries. We also provide you some time to work on assignment 1, as well as to show your individual progress for the week (as described in the Asst1 instructions).

A. Reading Relational Algebra

Consider the following schema:

Book (isbn, title, publisher, publicationYear)

Author (aname, birthdate)

Publisher (pname, address)

Wrote (isbn, aname) // thjs author is one of those who wrote this book

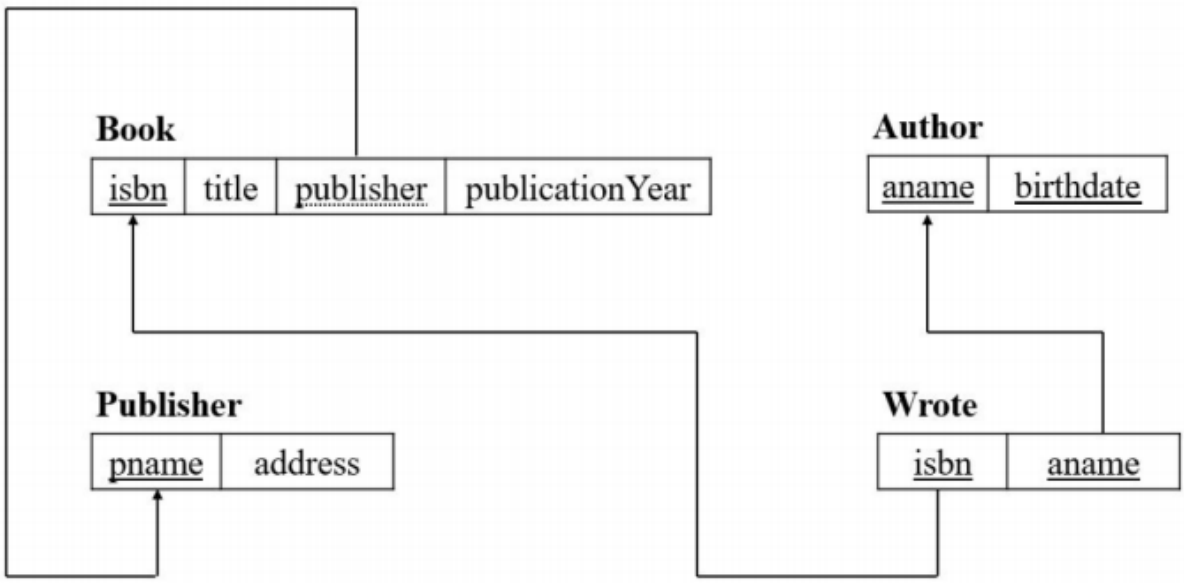

Figure 1: Schema Diagram

What is the English explanation of the following Relational Algebra expressions?

a) $\pi_{title,publicationYear}(Book)$

b) $\pi_{pname}\,(\sigma_{address='NewYork'}(Publisher))$

c) $\pi_{aname}\,(\sigma_{title='A\ First\ Course\ in\ Database\ Systems'}(Book \bowtie Wrote))$

d) $\pi_{address}\,(\sigma_{title='Database'\ \vee\ title='Data\ Management'}$
$(Publisher \bowtie_{pname=publisher} Book))$

e) Why do the two previous queries ((c) and (d)) have to formulate the join differently?

f) What is wrong with the following?
$\sigma_{title='NewYork'}(\pi_{pname}\ (Publisher))$

B. Writing Relational Algebra

We consider the same schema as the previous question. Use relational algebra to express the following queries:

a) Find the book titles published by Acme Publishers
b) Find all authors (give their name) of the book with ISBN 0444455551
c) Find the authors (by name) who published at least one book with Acme Publishers
d) Find all authors (name) who never published a book with Acme Publishers.

C. Grouping and Nesting SQL Queries

Answer the following questions with SQL (try to use a single ingle SQL statement for each part):

a) How many books were published by each publisher
b) For each author, show their name and the total number of books which they wrote and were published after 1975
c) Which book(s) were published most recently
d) Find the authors who wrote a book published in 1995 and also wrote a book published in 2015. Answer using a set operator, and then try to answer using a sub-query; can you also find an single select-from-where query (without subqueries) to calculate this?
e) Find any author who wrote every book which has "Database" in its title

D. Time to work on Assignment 1, get feedback from lab demonstrator, and show individual progress

Please bring to lab the combined group's relational schema diagram, showing all the tables and their columns. As well, each member should have written the SQL CREATE TABLE statement for one of the tables in the schema. Show these to the lab demonstrator, when they speak with your group. If some member can't attend the lab, they can upload a document with their SQL in Canvas for the week 4 individual contribution task, and let the demonstrator know (via other members) to find it and award marks for it.

In the time when the demonstrator is with other groups, you should make progress towards your combined submission, for example, by allocating responsibility for the other tables (not yet done), or discussing how each constraint from the ER diagram will be captured in SQL (eg as primary key, foreign key or check constraints).

Before the end of the week

Before Sunday August 28, you need to finish the assessments that are due (of course complete and have some member submit Assignment 1, and also you should complete the individual assessments: SQL Tasks 7,58and 9; Quiz4).