LAB 2

In this Lab you will implement the Library Management System (LMS) available on Canvas. Make sure to read that document first.
You will progressively implement features until you have a complete LMS, so the labs are accumulative! Make sure to backup all your files.

Presentation

For the lab presentation, make sure you have the following ready to be shown to the TA:

- Database diagram with all the tables and relations which are in BCNF-form
- The previously detailed queries ready to be executed.
- Code for the database creation showing keys, domains etc.

Project Background

After doing the first queries, you got a grasp of how the KTH library system works and stores information. For this second lab, KTH Library has requested to extend the current database and create a series of new queries, as well as making sure that the queries from Lab 1 still work and return the expected values.

The queries only need to be executed in PostgreSQL, so there is no need to create a User Interface yet.

Required features

You are required to do the following tasks in order to pass this Lab, *keep in mind that the first and second task is part of homework 2.*

- Recreate the LMS database with the following criteria:

1. Decompose the database to BCNF.
2. Create an ER-Diagram
3. Create the LMS database containing the following:
    - 3.1. All the books provided in the document.
        - 3.1.1. At least 5 of which have 3 or more copies.
        - 3.1.2. At least 10 of which are currently borrowed
        - 3.1.3. At least 10 of which are not currently borrowed.
        - 3.1.4. At least 10 of which have been borrowed at a previous point.
        - 3.1.5. At least 10 cases of borrowed books being returned.
        - 3.1.6. At least 5 of which were returned late.
    - 3.2. All the students provided in the document.
        - 3.2.1. At least 5 of which are currently borrowing a book.
        - 3.2.2. At least 5 of which were late returning a book.
    - 3.3. All the staff provided in the document.
        - 3.3.1. At least 5 of which are currently borrowing a book.

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- Create the queries that retrieve the following data:

1. Present a table that shows the sum of books each student has borrowed from each genre.

    a. *Example:*
    Student Name | Genre | Amount borrowed
    Lucas | Fantasy | 3
    Lucas | Sci-fi | 0

2. Present a table that shows for each student their preferred genre of choice based on their previous borrowed books.

    You are not expected to present a genre for students who have not previously borrowed a book, they can be excluded from this table. Students with no clear preference can be presented with any genre from their previously borrowed books.

    a. *Example:*
    Student Name | Genre
    Donald | Philosophy

3. Present a table that for each book shows the amount of students that have at some point borrowed the book. Sort the table by the highest to lowest amount of borrowed books.

    a. *Example:*
    Book | Times borrowed
    Oliver Twist | 5

4. Present a table that shows a monthly report for the number of books borrowed/returned for each week (for example week 1-4)

    a. *Example*:
    Week | Borrowed | Returned | Missing
    4 | 10 | 5 | 5

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5. Present a table that shows the 5 most fined programs at KTH according to the borrowed books by their students.
   a. *Example*:
   Program | Fine | Rank
   Interactive Media Technology | 29 | 1

6. Present a table that shows the top 3 borrowed books for each publisher, also showing their corresponding rank.

   a. *Example:*
   Book | Publisher | Times borrowed | Rank
   Pippi Långstrump | Rabén & Sjögren | 20 | 1
   Emil i Lönneberga | Rabén & Sjögren | 15 | 2
   .
   .
   .
   A study in scarlet | Ward Lock & Co | 5 | 1

7. Present a table that shows the top 10% of students with the highest sum of fines, also showing their corresponding rank.

   Make sure that your query is adaptable to tables with varying amounts of data.

   a. *Example:*
   Student Name| Total fine | Rank
   Lisa | 1000 | 1
   Bolívar | 760 | 2

8. For each book series, present a table that shows the name of each book and its sequel(s) and prequel(s) which is shown with arrows. The table should present the series, the total length of the series and the total number of pages.
   a. *Example*:
   The Lord of the Rings: The Fellowship of the Ring => The Two Towers => The Return of the King | 3 | 9,250