HOMEWORK

Homework 4

Relational algebra

Relational algebra is used to let us see what operations in the relational model look like. And how we can navigate through data between different relations. It can also be used to identify different kinds of constraints that are useful for restricting database contents.

Note: Include your previous database homework schemas to support your answers for this homework.

1. Copy your schemas from previous homework (so it is clear what the relational algebra is based on).
2. Write a relational algebra expression for the following statements (using your own schemas):
    - A list of all books currently being borrowed.
    - A list of users that have not borrowed a single book yet.
    - A list of books that have not been borrowed yet.
    - A list of all users with 4 or more fines.
    - A list of all user *names* that *returned* the third Harry Potter book between the year 2015 and 2020.
    - A list of books with the genre Horror and Fantasy published before the year 2010.

Homework 4 P+

Identifying relational algebra in your solution.

- Identify in your database design a set of relations that applies the following relational algebra expression: If R and S are expressions of relational algebra, then $R \subseteq S$ is a constraint that says “Every tuple in the result of R must also be in the result of S .” of course the result of S may contain additional tuples not produced by R.
- Identify at least one referential integrity constraint in your database design using relational algebra.