Database

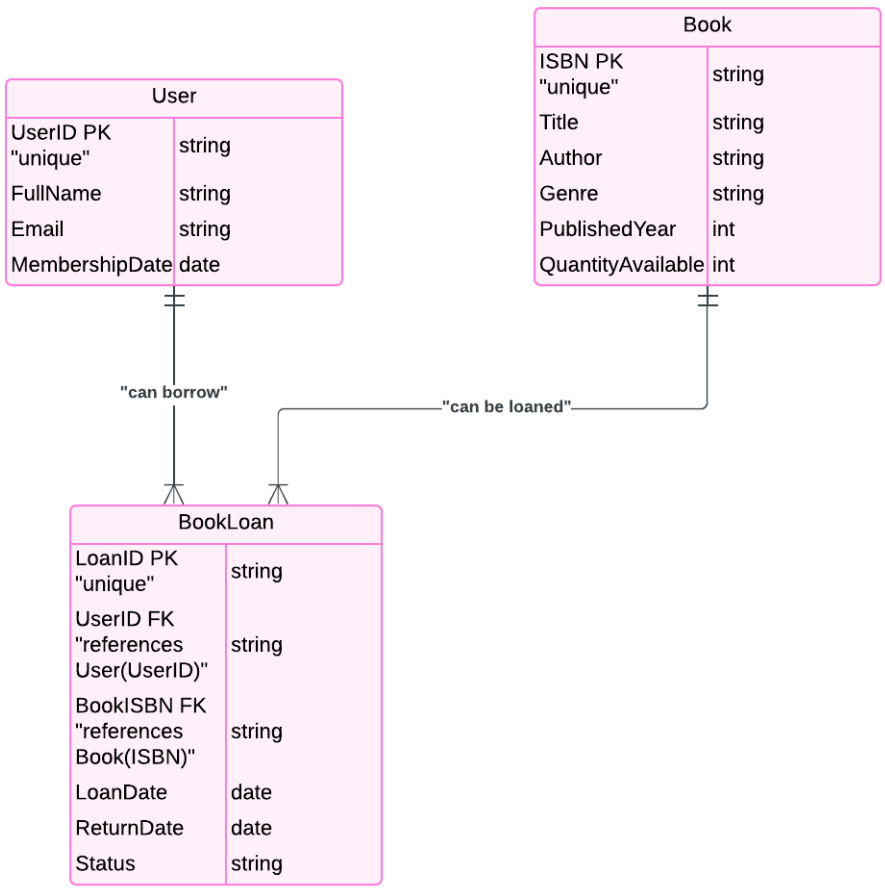
Lab4

Name: Nelissa Tuden BSSE - 2

Entity-Relationship (ER) Diagram

Part 1: Conceptual Design

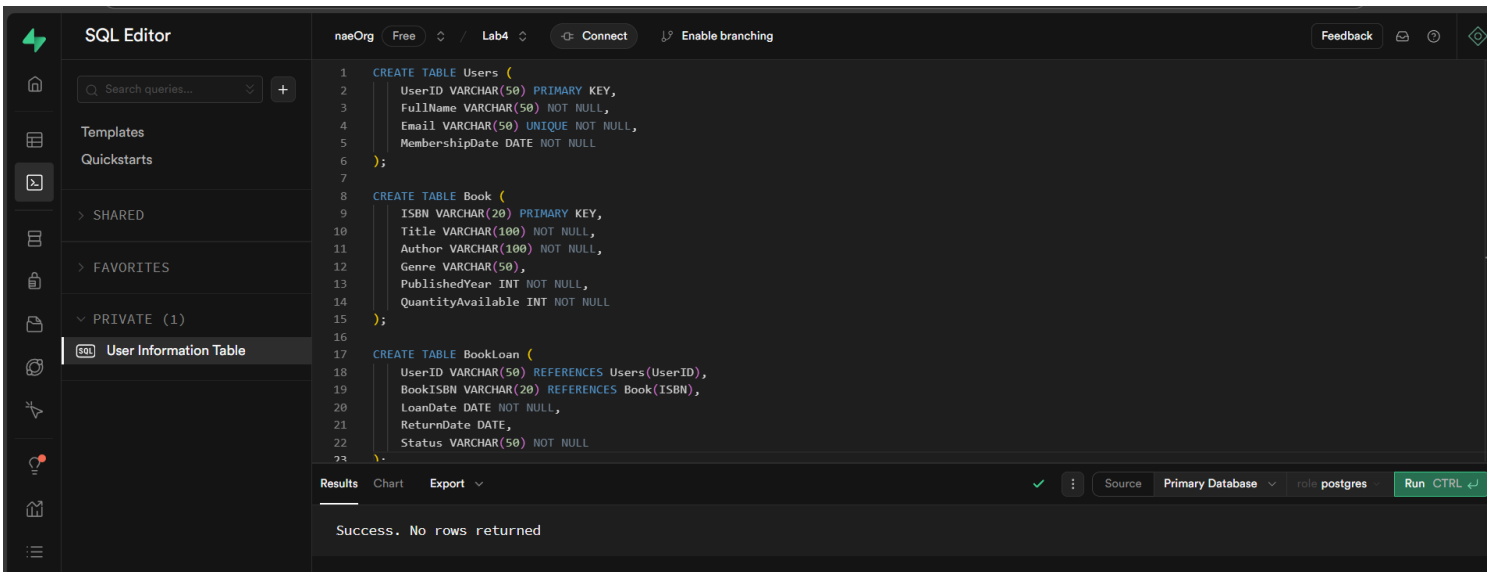
Conceptual Design



A user can borrow many books, but a book can only have a one book loan.

Part 2: Logical Design

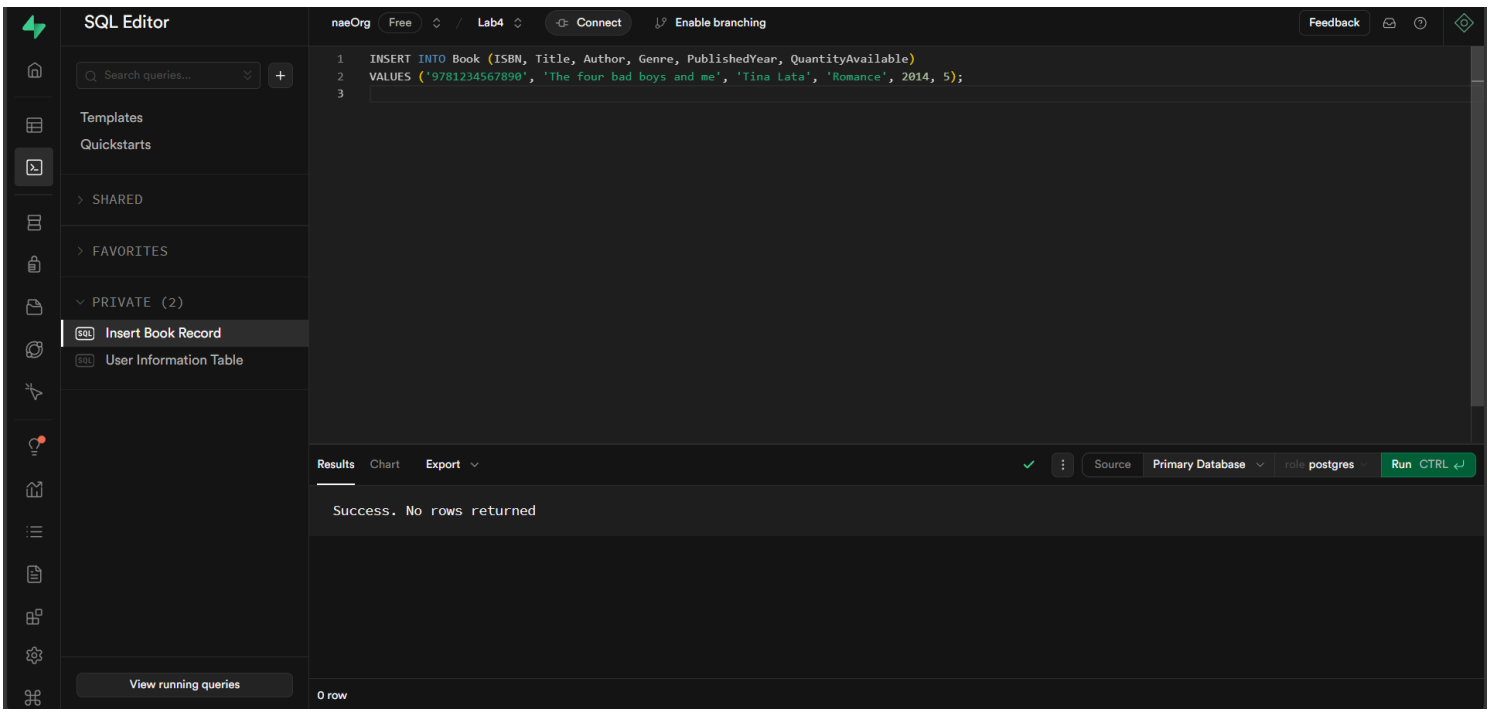
Logical Design



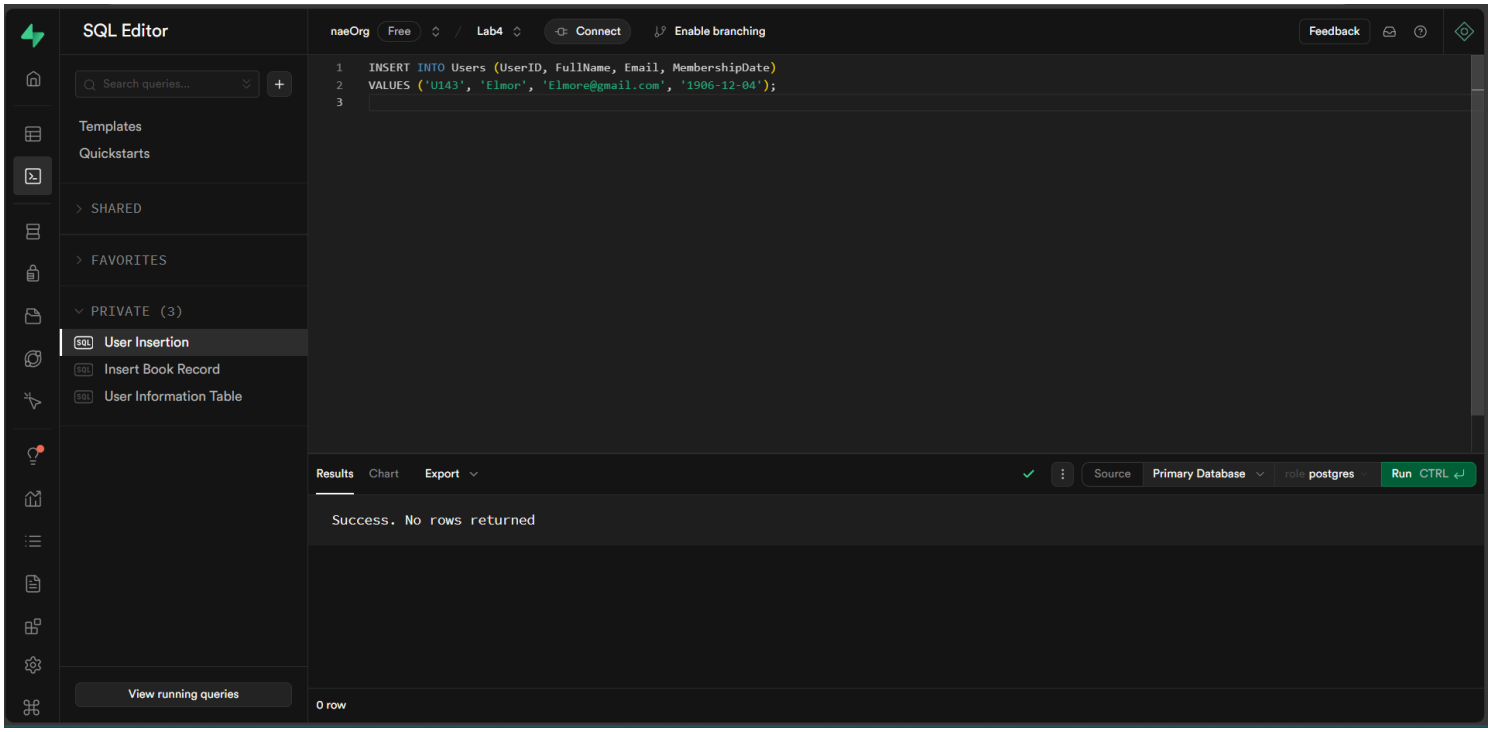
Creating tables for the users, book and bookloan.

Part 3: SQL Queries

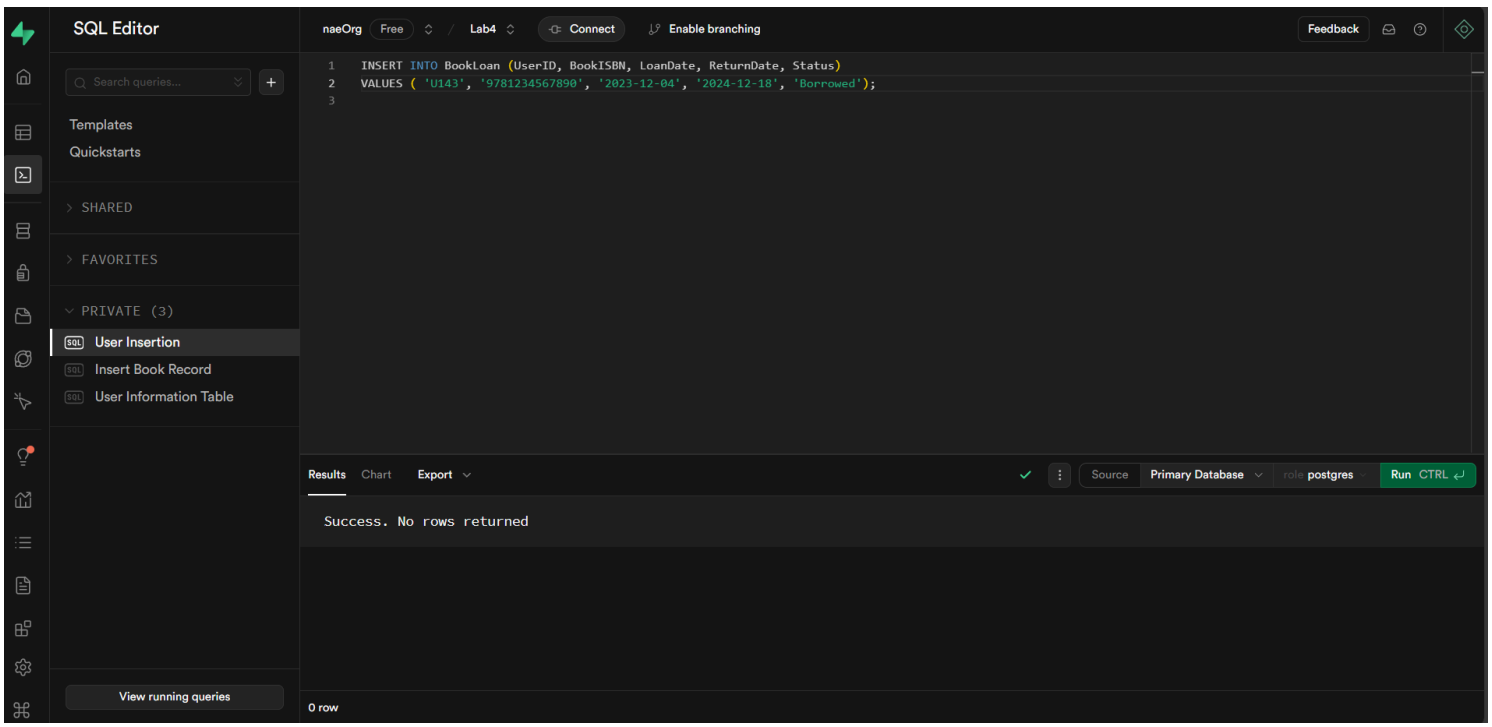
- Insert a new book into the library with a quantity of 5.



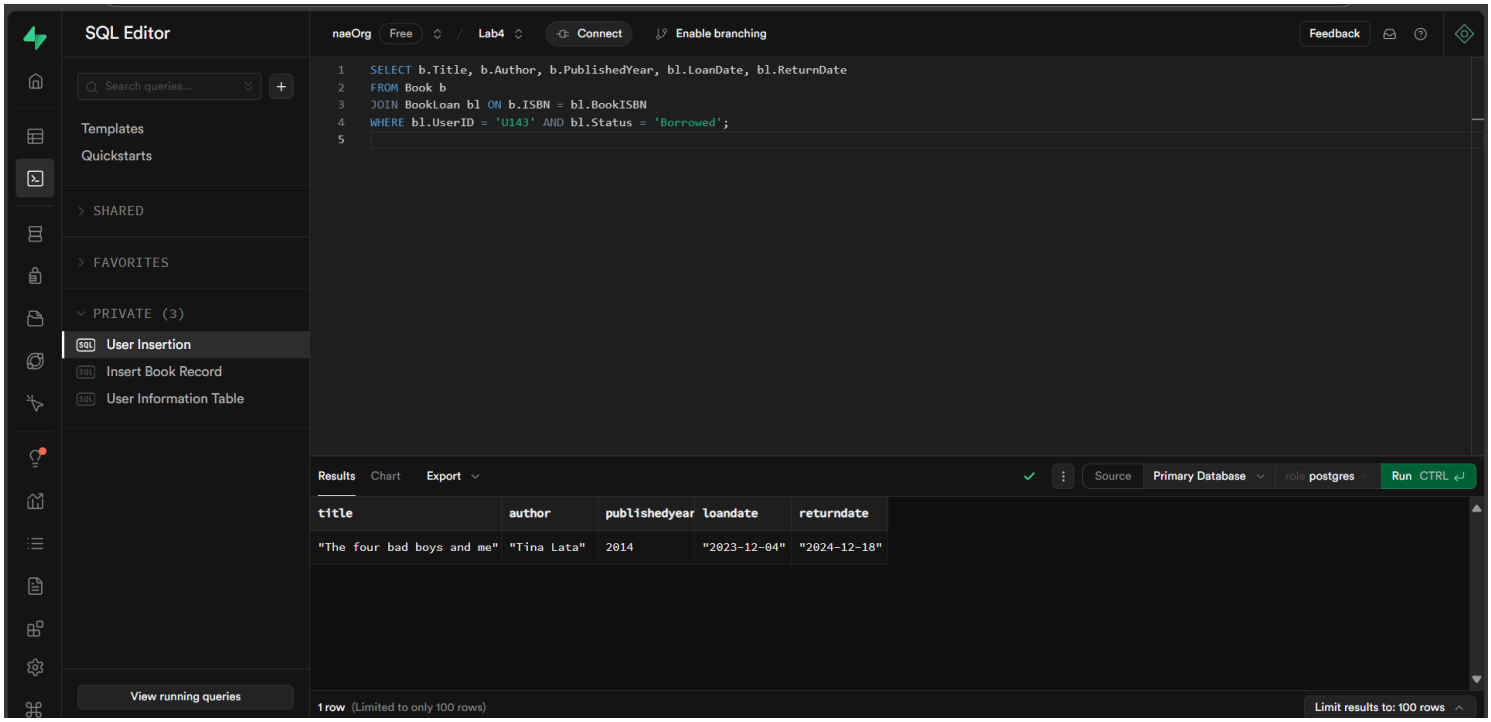
- Add a new user to the system.



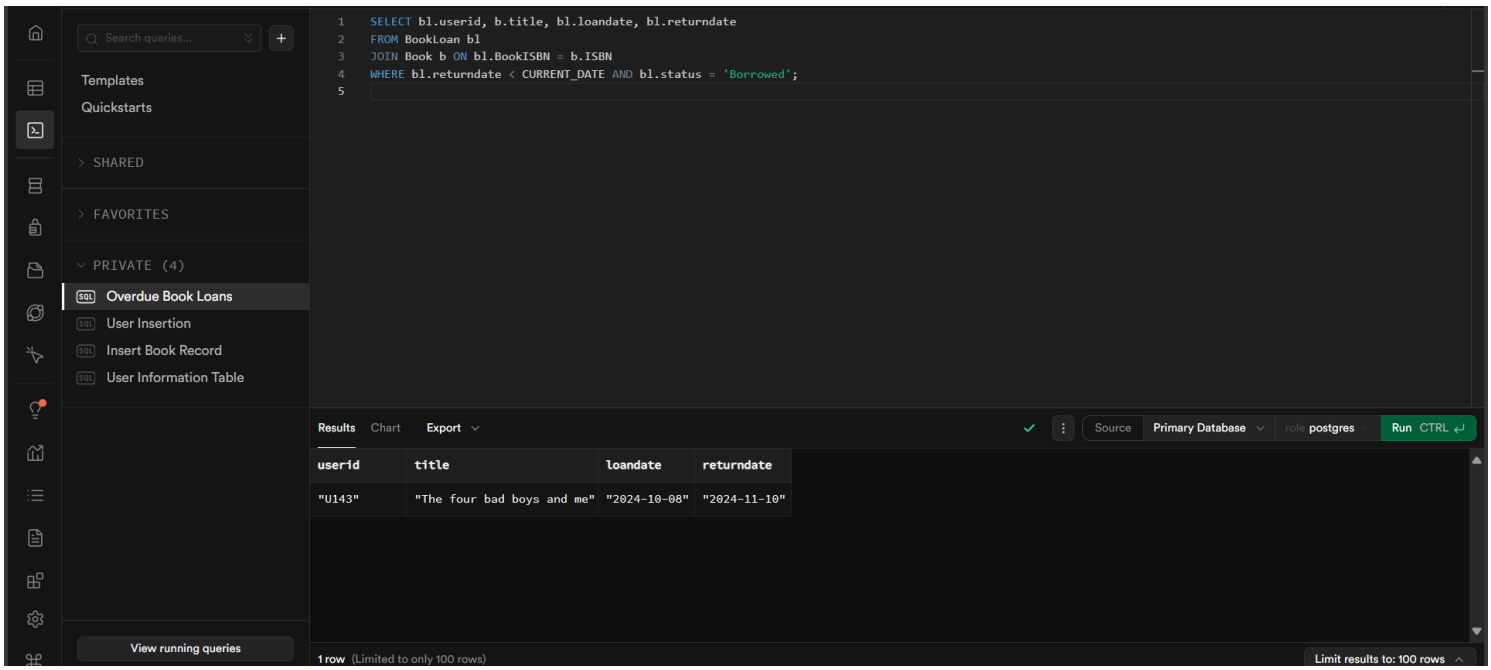
- Record a book loan for a user.



- Find all books borrowed by a specific user.

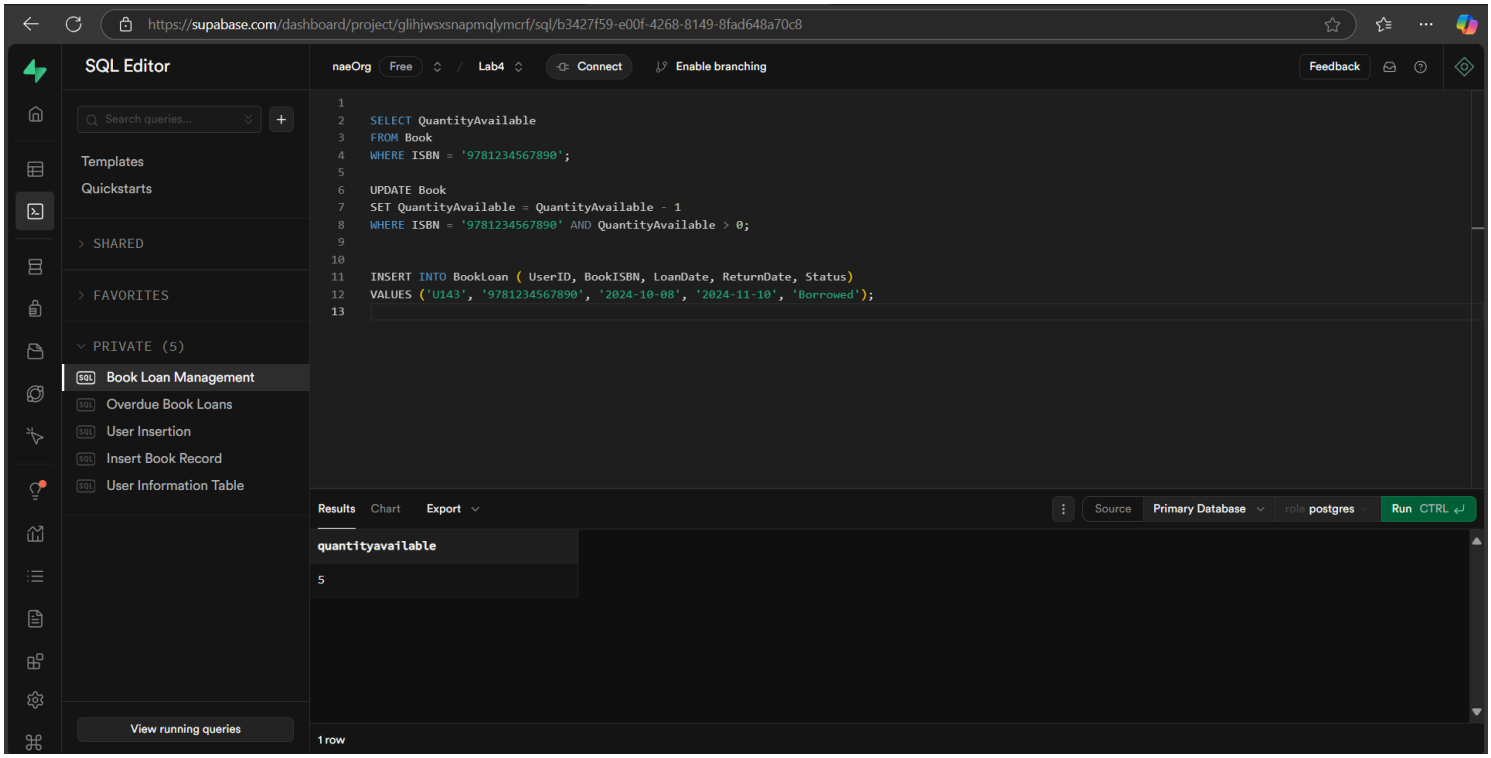


- List all overdue loans.

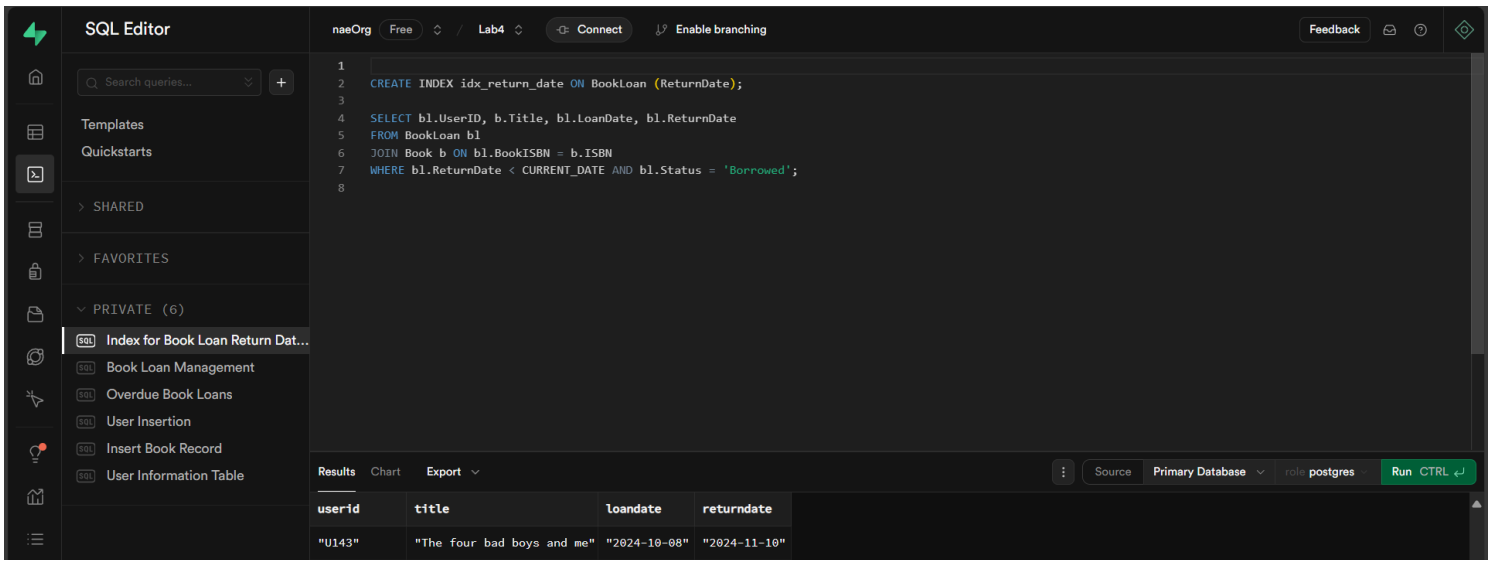


Part 4: Data Integrity and Optimization

- The prevention of borrowing books when no copies are available.



- Fast retrieval of overdue loans.



Part 5: Reflection

What challenges might arise when scaling this database to handle millions of users and books? Suggest one solution for each challenge.

The main challenges that might arise when scaling this database to handle millions of users and books is that it will slow the performance of this

database. As the load increases, performance slow down. I am not that pro in database, but I can suggest this solution. We could split the database into smaller, easier-to-manage parts, so that the database would be able to manage the data given. Also, will use NoSQL database because NoSQL can manage a large amount of data and can scale it easily. Finally, horizontal scaling adds more servers to share the workload. Using these methods together will help keep performance strong as your user base grows.