SWE 4302
Lab 11

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Design Smells & Solutions:

1. Missing abstraction:

`BookServiceImpl`: Line 15, 16, 19, 22, 24, 28 The query statements could be handled using abstraction

`UserServiceImpl`: Line 11, 14, 18 These lines have similar issue with direct query lines

Solution: Handle query using objects. Introduce an abstract service class for all the Service classes

2. Duplicate Abstraction:

`DBUtil`: Line 26 database connection abstraction is duplicated in multiple classes
Solution: Reduce duplicate code by introducing a const

3. Leaky Encapsulation:

`BooksDBConstants`: Line 5, 7, 8, 9, 10, 11 These expose database table names

`UsersDBConstants`: Line 5, 7, 8, 9, 10, 11, 12, 13, 14 These expose database table names

Solution: Use enum for database constants

4. Deficient Encapsulation:

`DBUtil`: Line 26 `DBUtil.getConnection()` is a static function, exposing it everywhere
Solution: Convert `DBUtil` into a proper class with dependency injection

5. Insufficient Modularization:

`BookServiceImpl`: This class handles both logical functions and database handling

`UserServiceImpl`: This class also handles both logical functions and database handling

Solution: Separate the different responsibilities

6. Multifaceted Abstraction:

Cart: Line 33, 51 Abstracts both book quantity and book pricing update in the same class

Solution: Move cart pricing to a dedicated `CartPricing` class

7. Unnecessary Hierarchy:

```
UserRole
```

Solution: Remove the unnecessary enum and implement the two roles in the class instead