

## Design patterns lab 3

### Generalities

Reference:

For the first lab read descriptions for **Object Pool**, **Prototype**, **Observer**

Lecture slides

<https://www.oodesign.com/>

<https://medium.com/@ronnieschaniel/object-oriented-design-patterns-explained-using-practical-examples-84807445b092>

**First two exercises are graded during the lab!**

### Exercise 1

Implement a pool of database connections (max 5) in Java over a database of your own choice (eg. MySQL) using the Object Pool design pattern. Use a singleton object to control the number of connections that can be created. Test the implementation using concurrent clients.

### Exercise 2

You are working on an RPG game. Each character has different attributes (strength, constitution, dexterity, intelligence, wisdom, charisma) ranging from 3 to 20, a name, a class and a story.

Implement a console application in which the user can setup his character at the start of the game. Users can create their characters from scratch or modify a predefined character. Use prototype design pattern for reusing available characters. Once the setup is complete display the entire character stats.

### Exercise 3

You are implementing an information system for a library. The UI consists of two frames: one to enter a new book, the other to show all existing books. Each book has a name, author, ISBN, number of pages, short description. Once a book is entered it should also appear in the window displaying all books. Use Observer design pattern to decouple the subject from the observer (Food for thought: the displaying window is clearly the observer, but who is the subject? Remember MVC). Draw the design class diagram.