

Sheet 3

GRASP

Library Management

The design of our LibSoft system continues (our library staff still likes software design!). There are more responsibilities to be incorporated and we need to take a more structured approach. As you already learned about GRASP, this is a good reference for justifying the way how you assigned responsibilities.

Exercise 1

20 points

The *controller* principle provides the idea for having a single access point to the system and we should use it. You can either choose an existing class or define a new class that plays the role of the *controller*.

Please also provide source code for the *controller* class. It needs to implement the interface provided by the *controller* and the method calls to respective classes.

Exercise 2

40 points

You were asked to assign some responsibilities to your design. However, you did not know about *GRASP* back then. You should now verify the responsibilities from the previous sheet and validate them. These are the ones you recently added:

searchBook find a book in the catalogue

checkAvailability determine copies that are available for renting

deactivateUser an existing user needs to be deactivated so that he/she cannot borrow books anymore

rentBook renting an available copy of a book

returnBook return a copy that has been rented before

addBook add a new copy of an existing title

createBook add a new title to the catalogue

checkISBN check the validity of an ISBN based on its checksum

registerUser adding a new user to the system

generateBibTeX create a bibtex file for a given title

Please, verify them based on GRASP. You should either ...

- ... explain their assignment to the corresponding class by referring to corresponding GRASP principle.
- ... assign the responsibility to a new class in case the assignment cannot be justified by GRASP. Explain why you moved it to another class.

Exercise 3

40 points

There are some more responsibilities to be assigned to correct classes. You also need to explain why you assigned them to the corresponding class by referring the GRASP principle.

removeBook remove a copy from the catalogue

checkBookAvailability check availability of a book (Title and Copy)

authenticateUser an existing user wants to log in and his/her credential need to be checked

extendRental an existing rental need to be extended

findBookLocation finding the location of the book in the library (i.e. shelf number

openOnlineLocation open a copy that is available online

reportBookRentalHistory get a list of rentals for a given time period for a book

reportLenderRentalHistory get a list of rentals for a given time period for a lender

reserveBook reserving a book that is currently not available for rental

remindUser send an email to a user reminding him/her of the due date for returning a book

Expected Deliverables:

You are expected to submit a single PDF file containing your solution. It must contain the following diagrams:

- 1. Architecture diagram, including descriptions listed below*
- 2. UML class diagram(s), including descriptions of classes listed below*
- 3. Explanations for assignment of responsibilities*
- 4. Source code for controller*