

Media Library System

The MLS indexes all documents that belong to the Media Library (over 50000 documents). The documents are currently composed of books and journals, but the library intends to soon extend its offer to other types of media (CD, DVD...).

Each document has a title, a publication year, an editor, a short descriptive summary, and a unique reference. A book has one or more authors, and an ISBN (International Standard Book Number). Each journal has a volume, a number, and an ISSN (International Standard Serial Number).

Each copy of a document has a unique identifier that is composed of an order number and the date of purchase. The number of available copies of each document is stored in the MLS. A copy that is currently in the library is said to be “available”. Only copies which are available can be loaned to library members. When a member borrows a copy it is set to the status “borrowed”. A copy which has not been returned within the allowed delay is said to be « late ». A copy of a document is said to be « reserved » if it is in the library but not available for loan (i.e. it cannot be taken out of the library). Document copies are periodically taken out of the library for repairs, and said to be “mending”. As soon as it has been mended it is put back into the library.

Each copy of a document has a state, which can take one of 5 values : new, very good, good, used, damaged. If, upon returning a book its state has been degraded by more than 2 levels, a maintenance fee will be asked from the library member. The fee is set according to a standard chart that defines a fee depending on the document value. Damaged documents are sent to be mended before replacing them in the library.

The system records all information about library members in a database. There are three types of members: occasional users, who can borrow a single document at a time for a maximum duration of 15 days, full members can borrow a maximum of 4 documents for at most one month, and privileged members who can borrow up to 8 documents for at most one month. Every loan of a document is recorded in the system. A loan has a limited duration defined by a start and end date. If a member does not return the document in due time, his account will be blocked and he will no longer be able to borrow documents, for a duration equal to the overdue delay. A user who has some documents overdue cannot borrow any more documents until he returns those he has and waits for the prescribed delay.

Users which are late are first sent a reminder mail on the evening of due date, then 2 more mails at one week intervals. The librarians can consult the list of users who are more than 3 weeks late to take appropriate measures to obtain the return of the document (including surface mail).

Librarians form several categories according to their hierarchical position. *Intern* librarians are only present for a short duration, and help *principal* librarians in their work. They can only register the loan and the return of documents. Principal librarians can also extend a loan duration, forbid a member from borrowing books (as a disciplinary measure), and consult the list of late users.

The system also allows both users and librarians to search for a document based on multiple criterions (title, author...), and if the search is successful allows to see which copies of the document exist in the library and their availability.

ANALYSIS

1. Identify the actors of the system.
2. Build a use case diagram for the MLS system.
3. Write a detailed description of at least two use cases.
4. Build an analysis class diagram for the system, allowing to represent the system data.
5. Build a sequence diagram for at least three use cases including “borrow” and “return a document”.
6. Write 5 validation tests that cover the use cases you have detailed.

DESIGN

1. Define an architecture in terms of components for the system.
2. Refine the analysis sequence diagrams to match the proposed architecture.
3. Deduce the signatures of component interfaces.
4. Draw a use case diagram for at least one component.
5. Define using class diagrams the body of each component.