UML – Library Management System

Library Management System Description:

The college library needs a new Library Management System (LMS) to track and manage its resources. The most obvious resource the library must manage is its books. Books are checked out, checked in, and requested by library patrons. Books can also have a special status if they are placed on reserve or if they are reference books. In either case, such books may not leave the premises. Reminders are mailed to patrons when resources are more than two weeks overdue. Patrons are fined $0.25 per day that books are overdue, to a maximum of $5.00 per overdue item. The library also has other resources that may be checked out, including music CDs, software, and videos, each of which may only be checked out for one week at a time.

Patrons also have a variety of statuses that influence how long a book may be checked out. A patron's status also determines what services are available to him or her. Students may check out books for four weeks, and faculty may check them out for three months. Library staff may keep a book for an entire year. Any checkable library resource may be renewed as long as no other patron has requested it. Faculty and library staff may place a book on reserve for the period of one semester, or they may bring in foreign resources (books, papers, disks, music CDs, magazines, or tapes that do not belong to the library) and put them on reserve.

The library must also manage a large selection of weekly, monthly, and quarterly magazines, which may not be checked out but are available as reference materials. These magazines are annually bound into volumes or recorded as microfiche. Additional activities of the library staff include reshelving books, renewing magazine subscriptions, and ordering new library resources. Library staff members also provide a number of other services supporting activities in the research community and for the general public. Two dozen computers are scattered throughout the library.

These computers provide access to a variety of databases and indexes as well as to the Internet via up-to-date web-browsing software. Designated library staff are available to assist patrons with their research needs using these computer-based tools as well as standard hard-copy indexes. The library must also connect to the holdings of other libraries so that interlibrary loan requests can be fulfilled. A subset of these libraries allow patrons to directly browse their selections.

A final responsibility of the library staff is the acquisition and retirement of books in the collection. In acquiring new books, a balance between meeting the requests of patrons and achieving a representative breadth in the collection is sought. Books are retired when their content is deemed to be out of date and of no historical value. Ideally, when a book

is out of date, it will not be retired until a more up-to-date resource has replaced it in the library's collection.

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1. Use Case Diagram

Create Use case diagram of the high-level functionality of the library management system.

2. Class Diagram

Create a class diagram of the high-level functionality of the library management system.

3. Activity Diagram

Create an activity diagram for the GenerateFormLetter scenario described below:

Scenario: GenerateFormLetter
The first library patron ID number is LMS0001, which is owned by Harry Potter, who is a faculty member. Harry has three books and one music CD checked out. Each resource is queried for its due date, which is compared to the current system date. If the due date is more than 14 days before the system date, a form letter is generated. Harry has one book that is three days overdue, so Harry will not receive a form letter. The next patron ID number is LMS0004, which is owned by Berta Goldman, who is a library staff member. She has five books checked out, none of which is overdue, so no form letter is generated. The next patron ID is LMS0011, owned by Wanda Wirtsschaft, who is a student and has three books, all of which are three weeks overdue. So, Wanda will receive a form letter. An OverdueFormLetter object is created that contains the current system date, the patron name and address, and a list of resources that are over two weeks overdue. This information is used to generate a form letter that is mailed to the patron. The remainder of patron objects are queried in a similar manner.

4. State Diagram

Identify all possible states of a Resource object and create a state diagram for it.