

Project Name: Library Management System

Project scenario for using UML

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Components of Unified Modelling Language Project:

1. Class diagram: These diagrams depict the behavioral pattern of the system, i.e., how each and every class is inter-related to the other one, which relationship exists among each of the classes, etc. There would be only one class diagram possible for a single system. Class diagrams of one system can be linked to the class diagrams of another system, provided, there is a multi-system requirement.

2. Use case diagram: Use case diagram comprises of use cases and actors such that there would be various kinds of relationships among the use cases and the actors. A use case diagram shows all the actions that a particular actor needs to perform throughout the system at every and any point of time. There would be only one use case diagram per each system.

3. Sequence diagram: This diagram, as the name suggests, contains the sequence of flow of actions that are processed through a system and the life lines of the entities, when and how are they accessed. It also contains the security like which entity can process which entity and which one is visible, etc. There can be many numbers of sequence diagrams per each activity being done.

4. Activity diagram: This diagram denotes the structural flow of the activities in the form of flow chart with decision boxes enhanced and hence is also used for troubleshooting like raising exceptions when a particular action is done and the alternative to be done when something abnormal is done. There can be only one activity diagram for the entire system including all the activities that a system can perform.

5. Statechart diagram: This diagram is a polymorphic form of the activity diagram in which the representation is different but application is the same. It looks similar to a finite state machine state transition diagram.

6. CRC Card Diagram: CRC card diagrams are a simple and effective way to represent the structure and relationships of classes in an object-oriented design. A CRC (Class, Responsibility, Collaborator) card diagram is a useful tool for object-oriented design and analysis.

Case Study:

The Library Management System is a software for the purpose of monitoring and controlling the transactions in a library. It studies on the library management system gives us the complete information about the library and the daily transactions done in a Library. For maintain the record and retrieve the details of books in the library which mainly focuses on basic operations in a library like adding new member, new books, new information, searching books, members, facility to borrow and return books. It features a familiar and well thought-out, an attractive user interface, combined with strong searching, insertion and reporting capabilities. The report generation facility of library system helps to get a good idea of which are the borrowed by the members, makes users possible to generate hard copy.

- Librarian: To maintain and update the records and also to cater the needs of the users.
- Reader: Need books to read and also places various requests to the librarian
- Vendor: To provide and meet the requirement of the prescribed books

Class Diagram

Classes identified: Library, Librarian, Database, User, Vendor.

Use case Diagram

Librarian: Issue a book, update and maintain records, request the vendor for a book, track complaints.

User: Register, login, search a book, request for issue, view history, request to the librarian, unregister.

Books Database: Update records, show books status.

Vendors: Provide books to the library, payment acknowledgement

Sequence Diagram

Sequence diagram for searching a book and issuing it as per the request by the user from the librarian

Activity Diagram

User Login and Authentication.

Search book operation for Reader.

Acknowledge and Issue books to the users by the Librarian.

Provide books requested by the Librarian from the Vendor.

Bill payment from the Librarian to the Vendor.

Status of the books updated in the Books Database.

State Chart Diagram

States: Authentication, successfully logged on or re-login, search for a book (user), request the vendor (librarian), provide the requested book (vendor), receive acknowledgement, logged off/re-search/new function.

Transitions: Authenticate to Logged in, logged in to Search, Search to Acknowledgement, logged in to Request Vendor, Request Vendor to Provide Book, Provide Book to Acknowledgement, logged in to Provide Book, Provide Book to Acknowledgement, Acknowledgement to Logged off

CRC Card Diagram

The library system will track when books are borrowed and returned. It supports librarian work and library should be open staff and users.