Library Management System

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Abstract: Library Management System is an application for assisting a librarian to manage and monitor the status of a book within the library. Library Management System contains number of modules like Add Books, View Books, Issue Books, Return Books, Search Books, Add Members, View Members, Search Members and etc., Using Add Members module, the librarian can add/update members and using Add Books module, the librarian can add/update books. Library Management System includes the maintenance of back-end database and front-end application development aspects. The main features of the library management system is that all the books available in the library can be displayed in a list so that students need not roam through the entire library to find a book. The librarian can easily find a book by giving author/title of the book. The fine amount can be calculated based on return date of the lending book and the transactions has been processed. The book is issued quickly based on the details given by a member. The librarian can add/update a student or faculty in a college. The list of available books is shown which is easier to take a book from library.

1. Introduction

Computer software has played a vital role in book management of library now. Computer software can retrieve books quickly and it also has high effective, long operating life, low costs advantage. The biggest characteristic of the library is a highly professional books collection that provides a convenient conditions for teachers and students to access information. But with largely increasing number of the library's books, the traditional manual operation management is very low efficiency. Therefore, the development of computer technology not only provide reliable basis for the books management automation, but also greatly improve the quality of the service for members so that the member can find their needed books conveniently.

Based on the above mentioned, the system employs the three-layer architecture, chooses the UML to establish the system demand model, and to build system front desk interface. The backend database uses SQL Server 2005.

2. Need for the system

Stone Age is replaced with fabulous achievements with science. Today's world is computer age. Humans are trying to become automated in each and every office need. Basically automation is an act of replacing human labor by machines. Automation is useful because when there are machines in place of humans then the probability of errors is minimized and time is saved.

In a Library Management System, there is a need of huge paper work. Lot of time is spent in its processing. Along with time, there is a substantial cost in doing so. Hence comes the need of automation. This paper is for product purchase which can be done through a computer itself. It will provide efficient storage and management of large amount of data. The project **"LIBRARY MANAGEMENT SYSTEM"** aims at computerizing all the transactions that take place in the library. The users are provided with a user-friendly environment to carry out these activities.

3. Research Status

At present, the library management system is usually based on two-layer architecture of the client/server mode, namely the C/S structure, it has the disadvantage of long development cycle, taking up the clients more resources, and is difficult to system install and maintain. In contrast, the three-layer architecture of the C/S model not only simplifies the client, but also simplifies the development and maintenance of the system. In addition, because the core of modern library management system has a workflow of adopting, editing, flowing and inspection, so that it can construct with the administrators and members as the object of the three-layers of structure model, and put the core workflow in the business logic layer to centralism processing, such lavatory is benefit for system development and deployment, and improve the efficiency of the information resources.

Use-case analysis

The most important part of the analysis phase is the establishment of the use case diagram. The use case diagram stresses the function which users want to get and through which the external users of participants have been able to look into the system function model figure. Through the user view, users are clear to what task in the system design stage should be done. The whole software implementation is focus on the use-cases of the requirements phase. Through the analysis of the system, it can determine two kinds of system roles and system related use-cases. The member can inquiry, borrow and return the books. As well as the librarian can manage the information of books and members, lend and return. According to the above analysis, figure1 shows the system overall use case diagram.

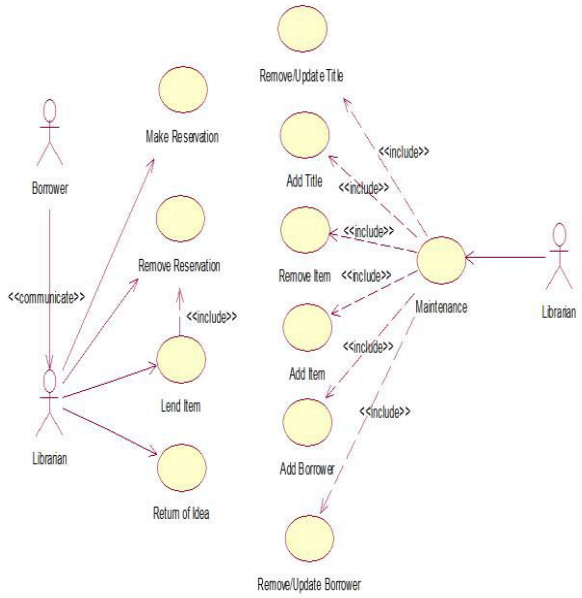


Fig 1. Library Management System Use-case diagram

4. System Architecture

Software system structure is software super-structure, and good software architecture has the leading role in the whole life cycle of the software. The different software architecture in the different levels of the application, has different effects of operation. Therefore, different levels of the software application system choosing the appropriate software system structure has important meaning to improve the efficiency of software development, reduce the software costs, increase the software maintainability.

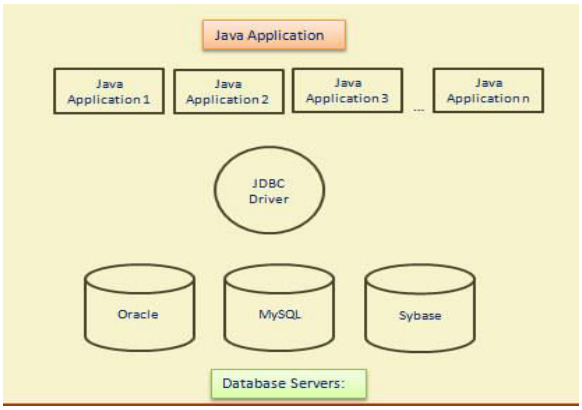
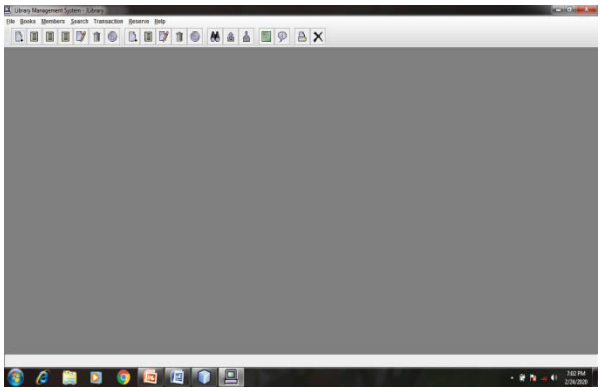


Fig 2. System Architecture

In this system architecture diagram, there are three layers. A Java application is developed through the IDE tool NetBeans which contains design of the library management system. All the information details are stored in database servers like MySQL, Sybase, Oracle, etc., The front end application and backend database is connected through the JDBC driver which acts as a middleware.

4. Modules

The library management system consists of the modules like Books, Members, Transaction, Search, Report, etc.,



I. Books

This module adds a number of books by giving the input book_id, call_no, access_no, author, publisher, edition, title, ISBN and etc., The librarian can update/edit the book details in the library. It also displays all the list of available books in the library.

II. Members

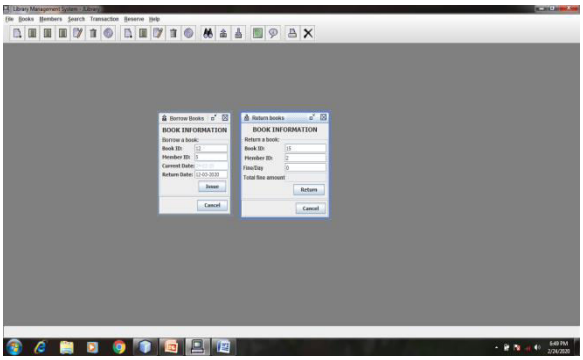
This module adds a member by giving the input member_id, name, email, address, contact and etc., The librarian can update/edit the member details both staff and student. It also displays the details of the members.

III. Transaction

This module consists of two sub modules. They are :

i) Issue Book

ii) Return Book



i) Issue Book

This module issues a book by giving input as book_id, call_no, member_id, member_ name, access_no, department, issue_date, return _ date.

ii) Return Book

This module return a book by giving input call_no, member_id, access_no, issue_da te, fine _amount, return_date.

IV. Search

This module consists of two sub modules. They are :

i) Search Member

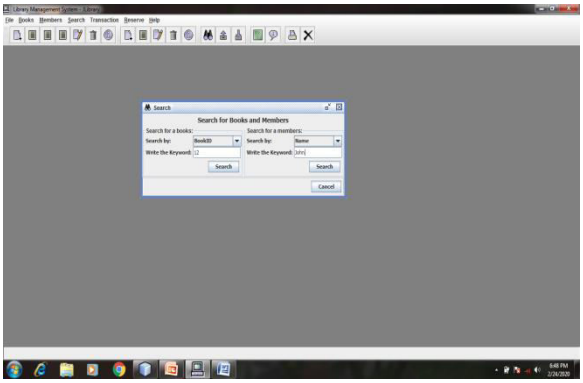
ii) Search Book

i) Search Member

This module searches the member by giving department, member_id and member_ name.

ii) Search Book

This module searches the book by giving author, title of the book.



V. Report

This module consists of the detailed report of the books, members and the transaction takes place in the library.

5. Performance Test

A. Function test

According to the functions and procedures of library management system, we adopt the "Black-box testing" to achieve the functional test, including the system registry, books management, library registration, the return of the books registration, book evaluation, the system maintenance and other functions. In the testing process, we improve where the record does not meet the functional, and make it more in line with the actual needs of the library management system.

B. Structure test

For the structure of the programs and codes, we do a detailed test through the "White-Box testing" which is based on the Java standard coding structure to write. Then, we adjust the code redundancy and correct where the testing code is not neat and the level of detail of comments. By testing, we find many problems further more, such as the messy and not standardized code writing and so on. Then we correct those mistakes through the structure test and make the program more reasonable and clear.

5. Conclusion

In today's ever expanding and demanding world there is always a need as well as scope to enhance the capability of an individual, with the help of technology. In today's world where computers are used extensively so as to speed up various processes. Hence this paper provides with an enhanced alternative which is far cheaper than the conventional methods of record keeping, apart from being cheap it is also very simple to implement.

6. Future Enhancement

In future, online use of the library can be good feature for the Library Management system. Advanced fine payment system can be added. Inventory system can be used to maintain the books of the library.

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