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Library Management System

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LIBRARY MANAGEMENT SYSTEM

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***Abstract*— With the need of informationization and modernization of colleges, more and more colleges choose to move towards the direction of digital library management. As a transmission center of information in colleges, library plays a vital role in the dissemination of knowledge and spiritual civilization. The level of library construction is closely related to the quality of teaching in colleges. In the 1990s, with the increasing enrollment, more and more students enter into the university, increasingly updated information and technology rushed to society, it becomes more urgent for students desire to understand new knowledge and technology, while solving this urgent need can not be solved depending on the classroom teaching. The library's old management methods can not adapt to the development of the times, in order to better solve this contradiction, we found that carry out optimization and the upgrade to the management of the library, moving to its automated management, then better meet the needs of colleges and students demand.**

***Keywords :* Java; Library management system ; Database design ; Books ;**

[I] Introduction

With the rapid development of computer technology, the Application of computer technology In all walks of life has been widely Popular. The development of modern information technology has led to the progress of the library in the direction of automation, network and digitization. Due to the increase In the collection of library books and The increasing demand for information, the traditional manual management methods have many shortcomings , The main performance is that the efficiency of handling of borrowing books and returning books process is very low, obviously it can not adapt to the current information society. The library business has been impacted greatly, forcing people to intensify toopen the new information management methods to manage the pace of books in Order to improve efficiency, reduce Staff work pressure and reduce the Probability of error, but also allows readers to have more time to choose books and Read books. Book management system is a Typical information management system, How to use the existing scientific and Technological conditions to improve the Management efficiency of books is our urgent

problem to be considered and solved. This paper Combined the basic requirements of modern Library management system, discussed the specific process of system developmentin detail, including feasibility analysis, demand analysis, system design, database design and coding test and other links. It basically meet the Requirements of the daily management of small Libraries, to achieve the desired design goals.

[II] Literature Review

Beforethe advent of computer in modern age there are different methods of keeping recordsin the library. Records are kept in the library on shelves and each shelf are labelled in analphabetical or numerical order, in which the categories of books available are arranged ondifferent position on the shelves and as well are recorded on the library manuscript and whenany book is to be referenced the manuscript is being referred to, to know the position of suchrequired book by the person that requested for the book.After the invention of computer different researchers have carried out various approach on an automated library management system in which this project is as well all about.The first library management system to be reviewed is the KOHA library management system. Since the original implementation in1999, KOHA functionality has been adopted by thousands of libraries worldwide, each adding features and functions, deepening the capability of the system. With the 3.0 release in 2005, and the integration of the powerful zebra indexing engine, KOHA became a viable, scalable solution for libraries of all kinds.Lib Lime KOHA is built on this foundation. With its advanced feature set, Lib lime KOHA is the most functionally advanced open source Integrated librarySystem in the market today.The major setback of this Library Management System is that it is a web based and as a result it is not security conscious because hackers could have the database hacked and access or modify the information of such user. (www.koha.org).

Another Library Management System is the Capital's library software with the following benefits increases support available for staff and users in any modern library service, provides efficiency, innovative system that's saves library time and Improves the user experience.A library management system usually comprises a relational database, software to interact with that database, and two graphical user interfaces(one for users, one for staff). Most integrated library systems, separate software functions into discrete programs called modules,each of them integrated with a unified interface. Examples of modules might include:

i. Acquisition (ordering, receiving, and invoicing materials)

ii.Cata loguing(classifying and indexing materials)

iii.Circulation (lending materials to patrons and receiving them back)

iv.Serials(tracking magazine and newspaper holdings)

v. The OPAC(public interface for users)

A library management system usually comprises a relational database, software to interact with that database, and two graphical user interfaces (one for users, one for staff). Most library Management System separate software functions into discrete program called modules, each of them integrated with a unified interface. Prior to computerization, library tasks were performed manually and independently from one another. Selectors ordered materials with ordering slips, cataloguers manually catalogued items and indexed them with the card cataloguing system (in which all bibliographic data was kept on a single index card),and users signed books out manually, indicating their name on cue cards which were then kept at the circulation desk. Early mechanization came in 1936, when the University of Texas began using a punch card system to manage library circulation. While the punch card system allowed for more efficient tracking of loans, library services were far from being integrated,and no other library task was affected by this change.The literature study in previous system could give more reference in system development process. All the advantages in the previous system can be implemented during the development of this proposed system.This chapter entails the literature review related to Library Management System initiatives world wide, at national, regional and international levels. Secondary data will be searched from print and online resources. Foreign literatures will be mainly used and some of these had been highlighted to peruse and emulate.

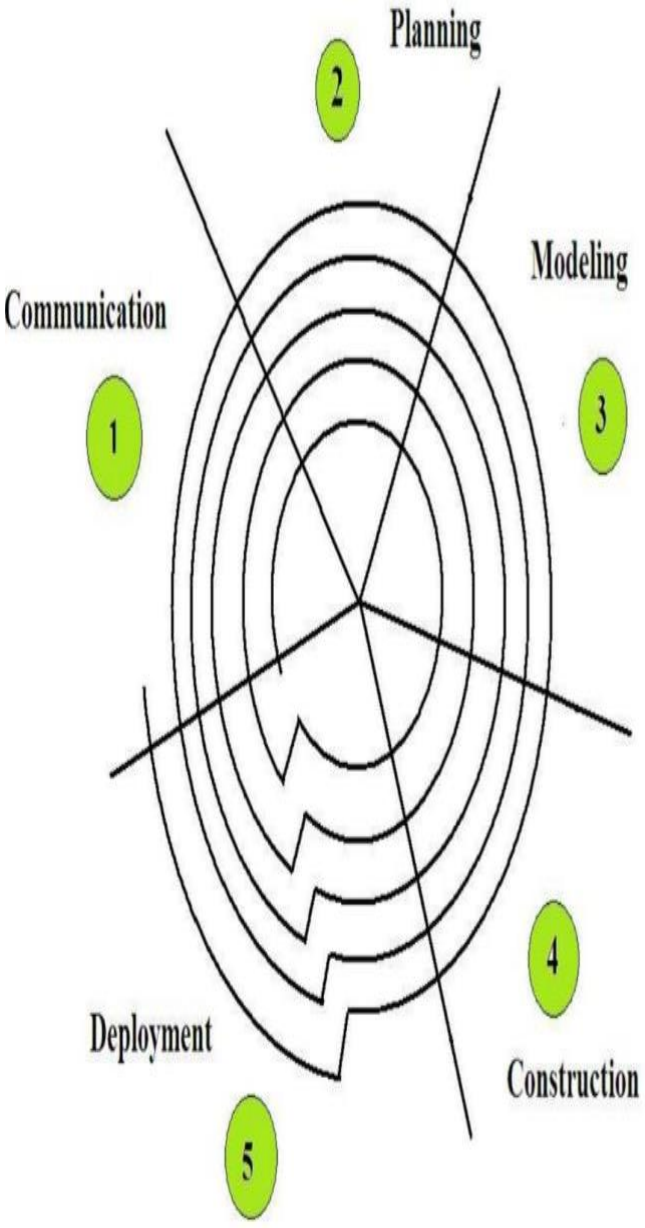
[III] Problem Formulation

Presently, transaction of books in the institutional libraries have been done manually in most cases, thereby taking more time for transaction like borrowing of books or return of books and also searching of member and books. Series of problems occur as a result of this there by resulting to inefficient library management. In most cases as a result of human error there maybe loss and damages of records due to not using a computerized system in the library. Nevertheless, the difficulty in the searching of books which could be termed to be in adequacy in book Management is a problem in the manual library thereby causing inefficiency and time consuming in the library. Also the problem of space consuming erupts after the number of records become large the space for physical storage of file and records also increases if no computerized system is implemented as well as the issue of cost.Due to problem of lack of prompt information and time wastages in the library. In addition due to this cumbersome , in this project software approach will be used to solve these problems.

[IV] Methodology

The Library management system is created using the database java php css . The source code of this is written in Java language. To make sure that the project Library management system faces no probabilities of being disorganized, unsystematic, and/ or having undesirable consequences, a clear perspective has been defined by consenting to use a model for this project. The model that is chosen is called 'Spiral Model'. According to a Software Engineering book, written by Roger S. Pressman, the Spiral Model has five phases: - 1. Communication Phase 2. Planning Phase 3. Modeling Phase 4. Construction Phase 5. Deployment Phase The project has been following this methodology because all the requirements about the problem can't be easily understood and may not be stable .

Representation of spiral model:-

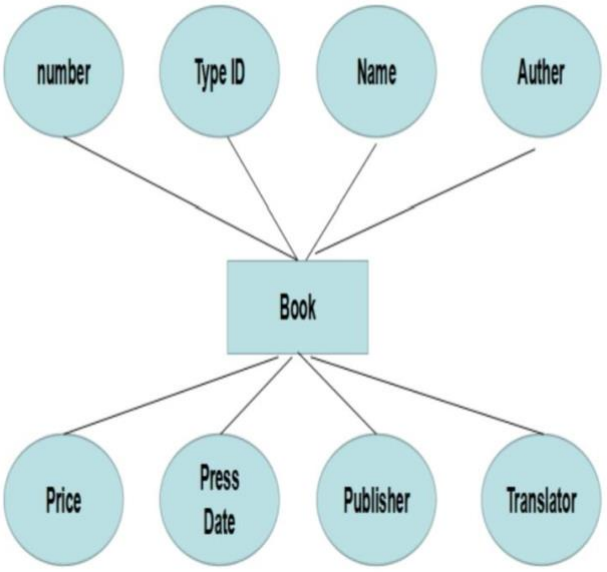


In order to realize a simple and full featured book inventory management information system, Through the communication with the library staff, made an in-depth Analysis on the basic functions of inventory management, holding the basic ideas of first phase of the construction, firstly providing a basic Library inventory management system. On the whole, the inventory management system needs to be Able to provide inventory management, book borrowing And returning functions, the basic management functions of library managers and the user's quick query and retrieval function.

Based on the overall functions of library inventory management information system, the functions of the system are divided into several aspects. The inventory management system is divided from the point of view of functions, including library storage, library management, book circulation management, statistical query function.

Database conception design:-

According to the above analysis of the needs Analysis, the system design to plan the database Entities used in the system, they are book Information entities, book classification entities,Readers information entities, operator information Entities, book borrowing information entities, Inventory information entities, respectively. The book information entity and the book classification Entity, the book borrows the information entity,The storage information entity have the relation, While the reader information entity and the book Borrowing entity also have the relation. Here are the E-R diagrams for several key Entities.Book information entity includes the Book number, book category number, title, author, translators publlisher, price, publishing times and ither attributes.Therein the books number is the primary key of the book information entity, the book category number is the foreign key Of the book information entity, and the book type entity has the outside kry relation. Book information entity
E-R diagram shown below.



System overall design:-

As the name suggests, this database management system project is related to the storage of information regarding the library, Library is the place with the huge collection of books. It is place from where the students and the faculties issue the books for their reference purposes, But the maintenance of keeping the records of issuing and borrowing is difficult if you use a normal book as a registry. To make this task easier, the library management system database will be very useful. The system design of library management system will provide the design phase for the library management system. The main aim of the design phase is to provide the solution for the specified requirements.

Functional decomposition can be defined as the process of dividing the functional relationship into

different parts. This can be resolved later. Modularity must be maintained among the constituent processes. The context flow diagram generalizes the functions of the entire system. A data flow diagram will show the flow of data from the source to the destination. The data flow diagram is the starting step of the design phase and it is a very important to understand the requirements. The descriptions of the components are as follows:

• **Register user** A new user can be registered in this component

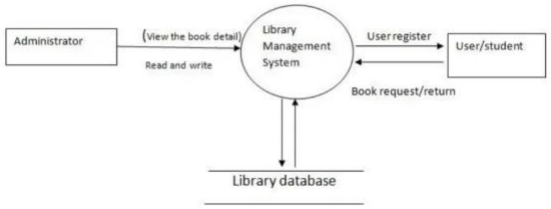
• **Book issue**: Books can be issued to the user and can be added as a record in the database

• **Book return:** The books will be retumed by the user within the final date.

• **Search/View Book details:** ThiS component allow to search or view the books. If located in the particular shelf, it can be searched in order to get the exact location of the book.

• **Update**: The book details can be updated through this component

• **Payment** : Manually the payment must be done if the return date exceeds the final date.



Description of component:

Function component 1:

Registration: New user can register,

Input: user details

Process definition: Processing information and stored in the database.

Output: User details updated in the databuse.

Function component 2:

Book issue: Here the books will issue to the user.

Input: Book ID.

Process definition: Searching books.

Output: Search and retrieving book information,

Function component 3:

Book return: Here the books will return.

Input: Book ID,

Process definition: Checking book details.

Output: Book is returned.

Function component 4:

Search/view book details. It is used to search and view the details of the book.

Input: Book ID.

Process definition: Searching books.

Output: Details of the book will be shown,

Function component 5:

Update book details: New book entry can be added.

Input: Book ID.

Process definition: Processing the information

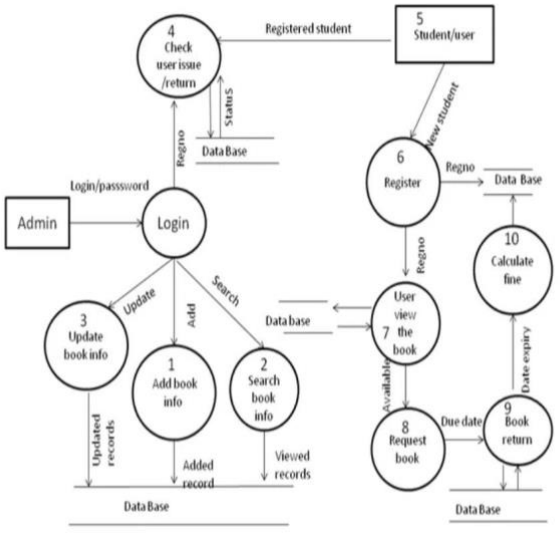
Output: Update in database

Function component 6:

Payment: Here payment is done

Input: User ID.

Process definition: Checking user account details
Output: Book will be issued.



[V] Conclusion

The Library management system needs to be computerized to reduce human errors and to increase the efficiency. The proposed Library management system in this proposal will be a computerized management system developed to maintain all the daily work of library. Library management systems are designed to store all the information about books and members.

The main focus of this project is to lessen human effort and encourage efficient record keeping.

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[VI] References

Roknuzzaman M, Kanai H, Umemoto K. Integration of Knowledge management process into digital library System[J]. Library Review, 2013,58(5):372-386.

Fu P, Fitzgerald M. A Comparative Analysis of the Effect of the Integrated Library System on Staffing Models in Academic Libraries[J]. Information Technology & Libraries, 2013,32:47-58.

Seena S T, Pillaiw K G S. A study of ICT skills among library professionals in the Kerala University Library System[J]. Annals of Library & Information Studies, 2014,61(2).

Taole N, Dick A L. Implementing a common library system for the Lesotho Library Consortium[J]. Electronic Library, 2013,27(1):5-19.

Chen M, Cai W, Ma L. Cloud Computing Platform for an Online Model Library System[J]. Mathematical Problems in Engineering,2013,(2013-4-17), 2013,2013(1):532546.

Hall K, Ames C M, Brice J. Open Source Library Software Development in a Small Rural Library System[J]. Code4lib Journal, 2013,19(19):1-10.

Uppal V, Chindwani G. An Empirical Study of Application of Data Mining Techniques in Library System[J]. Journal of Bacteriology, 2014,74(11):42-46.

Rao N S, Kumari N N. Revitalisation of Public Library System in India: A CSR Perspective[J]. Desidoc Journal of Library & Information Technology, 2013,33(1):25-28.

Kumar R S, Kaliyaperumal K. Applications of GSM technology for documents identification in a library system[J]. Library Philosophy & Practice,2014(1159).

Haslam M, Kwon M L, Marilyn M P, et al. The automated storage and retrieval system (ASRS) in Lied Library[J]. Library Hi Tech, 2013,20(1):71-89.

Pu Y H, Chiu P S, Chen T S, et al. The design and implementation of a Mobile Library APP system[J]. Library Hi Tech, 2015,33(1):15-31.

Iorio A D, Schaerf M. The Organization information integration in the management of a Digital Library System[C]// Digital Libraries. IEEE,2014:461-462.