

LIBRARY MANAGEMENT SYSTEM

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ABSTRACT

Library management system is a project which aims in developing a computerized system to maintain all the daily work of library. This project has many features which are generally not available in normal library management systems like facility of user login and a facility of teachers login. It also has a facility of admin login through which the admin can monitor the whole system. It also has facility of an online notice board where teachers can student can put up information about workshops or seminars being held in our colleges or nearby colleges and librarian after proper verification from the concerned institution organizing the seminar can add it to the notice board. It has also a facility where student after logging in their accounts can see list of books issued and its issue date and return date and also the students can request the librarian to add new books by filling the book request form. The librarian after logging into his account i.e admin account can generate various reports such as student report, issue report, teacher report and book report Overall this project of ours is being developed to help the students as well as staff of library to maintain the library in the best way possible and also reduce the human efforts.

1. INTRODUCTION

With the improvement of people's level of knowledge, the library has become an indispensable part of daily life. But the library storage and the business volume are huge, the traditional accounts' management is merely not feasible. At the time, library management system comes into being and becomes an important part of information construction gradually. In order to develop, build and adapt to the modern information society, establishing a management information system becomes the main trend, and also we can't avoid the problem. The implementation of electronic book management can help human resource officials free themselves from the heavy deskwork to complete some more important work. Library management system is to reduce and solve the cumbersome manual management, so that the library can rise to a perfect electronic management. The history of the library management system could date back to the late 1960s. At that time, computer technology had entered the practical stage. Meanwhile in most large-scale libraries, it's very time-consuming and easy to make mistakes to find books or statistical information manually. In order to solve this situation, the first generation of book lending management system came into being. But due to the immature technical conditions and the constraints of demands, the user was very small. There was no doubt that its appearance showed a bright future for the management of book lending, that is, with the computer's high speed and automation to replace the huge amount of manual work and with the computer's high accuracy to avoid manual mistakes and errors. The second generation of the library management system appeared in the late 1970s. On account of the rapid development of computer technology, whether the popularity of computers, or the developments of computer system tools and database technology, it provided the possibility for the phasic development of library lending management system. But it failed to systematically consider the needs and concepts of book borrowing. The revolutionary change in the library management system occurred in the late 1990s. With the information explosion and the arrival of the era of knowledge-driven economy, individuals, units and social had a higher demand on library management system. In the meantime, due to the pullulation of database technology, customer/server technology, especially Internet/Intranet technology, the third generation of books borrowing management system had become inevitable. The third generation of library

management system was characterized by the angle of book borrowing management, it dealt with almost all data related to the book lending with a centralized database. The friendly user interface, powerful report generation tools, analysis tools and information sharing allowed managers to get rid of heavy daily work and focus on planning and policies of book lending from a strategic perspective. At first, the library management system software is mainly written in assembly language. With the birth of C language and its advantages and powerful features (from [1]), library management system based on the C language produced. The author [2] pointed out: at this stage, digital library management system is a prerequisite for students to create a better reading environment. The core is how to make it with the perfect combination of the Internet, and truly achieve timeliness and accuracy. Authors in [3] and [4] have analyzed the status of the digital construction of university libraries, and tried to put forward their own construction plans for the digital construction of local university libraries. The authors in [5] pointed out that many miniature libraries had begun to fully understand the importance of computer technology in library management, and began to use computer technology to achieve the practical application of library books. However, miniature libraries usually have fewer funds, lack of professional management and have other issues. There are many problems of using such a large system, so small and medium-sized libraries do not have such conditions to configure large-scale systems. In view of this problem, the development of miniature library management system has become an urgent affair. Some authors in [6] mentioned it respectively specifics the development process of the library management from the demand analysis and summary design to the detailed design system. And it minutely introduces the interaction between the various modules of library management system. Through the development of the system, it solves some contradictions in the management of library data and achieves the efficient management of data. Basing on Visual Basic 6.0 and SQL Server 2000 system developing to achieve a new library management system is imperative. The author in [7] used mainly B/S structure and ASP.NET + SQL Server technology as a web development tool to develop the public book system. Firstly, it makes a system analysis and divided the main function of the system. Then, it provides the key technology of the system design and the database design of the system. In [8] an implementation procedure of library management system database design and system function was introduced. It used C/S and B/S combined technology to achieve the book and journals computer network management and Web query function. With the increasing of volume, the difficulty of books recorder and inquiry also increased. Then usual methods cannot meet the requirements. In [9], the author pointed out that the development of library information system mainly includes two aspects: using database technology and developing application systems. In [10], authors elaborated some thoughts about the problems existed in the processing of library digitization. In [11], a sub-cycle management library 2.0 model was proposed. Taking VC as the development platform, the book information management system is under the Dos system and based on C language. Its simple and friendly interface and Compact structure make it easy to operate. System objectives are: for the administrator, it provides all the details of the borrower, as well as the details of the library inventory; for students or ordinary users, it has two functions includes borrowing and returning books; the administrator can also record new books, delete old books and so on. Visitors can also enter the system without a registering user, but there are certain functional limitations.

2. LITERATURE REVIEW

Those papers [6], [7] describes the advantage of using proper management in the information system and the sustainability of library systems. They mentioned that fast rising in different types of data creates difficulties to get accurate information. However, our system focuses on building more valuable information for the ACCE library users and the admin of the system have full control to manage the updated data. Library provides information and services that are essential to the learning and development of one's knowledge skills. Although we have a collaborative idea with their papers in maintaining, the long ran of the library system and information facilities. This paper view management is explained by [8] "the art of performing things through people." A manager is noticed as a person who accomplishes the organization's goals by inspiring others to perform well. Moreover, there is a subjective question about whether management [9] is an art or a science; however, it can be said without a doubt that modern management in the environment of technology is becoming more of a science than an art. Moreover, we describe management for Management Information Systems (MIS) as the procedure for planning, organizing, staffing, coordinating, and controlling the efforts of the members of the organization to accomplish the commonly identified aims of the organization. As Asmait Futsumbrhan explained that, a library is a place where a collection of books and other informational materials are made accessible to people for reading, study, or reference in their daily life activity. The library collections have almost contained a diversity of materials making it much easier for everyone who has an interest in reading and finding new things regarding their interests. Contemporary libraries preserve collections that contain printed materials such as manuscripts, books, newspapers, magazines, maps, and photographs. However, we found her explanation limited to the usage of the library. We are converting all the

paperwork activities to a computer system and although adding a new eBook system, so the users can get access inside the library room and outside in digital format. The focal task of a library is to collect, organize, preserve, and provide knowledge and information. In rewarding this mission, libraries preserve valued records of a culture that can convey over the following generations. Libraries are a crucial link in the communication among the past, present, and future generations. Whether the cultural record is limited in books or other Media, libraries must certify the record is preserved and made available for future use. Libraries provide for the users to get access to the information that is essential for work and learning. People in many professions use library materials to assist themselves in their daily work time. Although they use to gain information about their interest or to gain recreational materials such as films and novels. Scholars use library to supplement and boost their classroom proficiencies, to learn abilities in discovering sources of information, and to improve reading habits. One of the most valued activities of the library is to [10] provide information and services that are essential to the learning and development of one's knowledge. According to Ato. Efreem Matiwos, director of the Asmara Public Library said, this newly introduced service is a great help for the readers saving time and energy. He further explained that having introduced this system is one-step forward in the library history and motivating to readers of the Library. However, their library system is more about public content because of its public library, which gives service to the community. Our findings will more focus on the needs of college students and instructors. Concurrently to our research [11], this author explained the Library System as a fast-growing database for information retrieval, which targets in developing computerized systems to preserve the daily work of the library. Well, computerized library will be a benefit for users with fast and prompt services. Their library system denotes to the systematization of library maintenance and activities mainly used computerized. Their work has many structures that are mostly not available in manual LMS like facility of user login. In addition to the similarity of their work, we also proposed the digital archive, which can store the electronic files. This newly developed system has a capability of admin login through which the admin can monitor the whole system. Objectives of this study are to develop and build the database for the records and other facilities to the computer application. To provide numerous search selections to check the convenience of books in the Library to generate the list of books. The author of this [12] paper uses the same idea as our paper in converting an analog format of records to digital format. Their research also covers converting multimedia documents but our paper limits to creating a digital platform for the books and changing library daily activities to a computerized system. Although the authors [13] of this paper briefly describe how to create a digital system, which has a higher acceptance rate and adoption with the users. Their focus was on decreasing the mismatches between system design and local user's realities. To satisfy our users and the library staff needs we are implementing a user-friendly web-based system.

3. METHODOLOGY

3.1 Database Design

Database design controls the duplication of data and it is the method of producing a comprehensive data model of a database. The data model consists of all the required conceptual, logical, and physical storage parameters required to create a design in a Data Definition Language (DDL). DDL is used to create a database. A completely attributed data model holds full attributes for each entity. The method of database design usually contains several stages that are supported out by database designers. Generally, the designer needs to follow those procedures:

3.1.1 Conceptual Design

The objective of the conceptual design stage is to construct a conceptual model based upon the previously recognized requirements, but nearer to the final physical model. A commonly used conceptual model is known as an EntityRelationship (ER) model. Entity-Relationship Diagram (ERD) is a popular high-level conceptual data model. It is a complete, logical illustration of data or an organization for a business area. The E-R model is very crucial for mapping denotations and interactions of real-world enterprises onto a conceptual schema. The ERD Fig.1 shown below gives the entities in LMS, the relationship between the entities and attributes of both entities and their relationships. The ERD describes all data that are input, stored, transformed, and produced by the system. It also emphasizes solely on data objects, their attributes, and the relationships that connect different data objects.

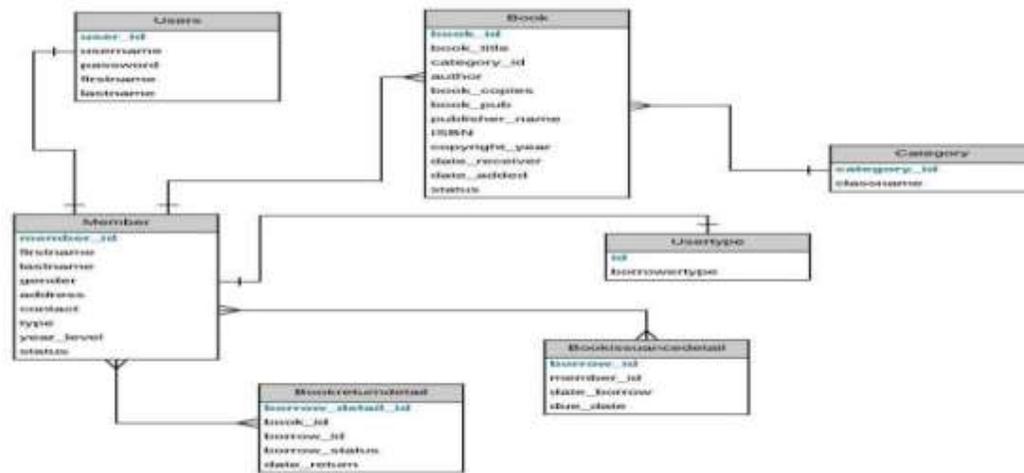


Fig. 1. Entity Relationship Diagram

3.1.2 Logical Design

The development of logical design includes organizing data into a sequence of logical relationships known as entities and attributes. An entity denotes a piece of information. In relational database, an entity regularly maps to a table. An attribute is module of an entity and supports defining the exceptionality of the entity. In relational database, attribute maps to a column, however entity maps to raw

3.1.3 Physical Design

During this phase of design, the plan on how to build the tables, including appropriate data, types, field sizes, attribute domains, and indexes are described. The plan must express adequate details of the relevant fields that anyone can understand and use this plan to build a database. For this project, indexes and attribute domains are excluded from the physical design. The conceptual design and logical design were independent of physical considerations. We are focusing on relational model and on creating database management system (DBMS) using MySQL, although our main focus is on those physical considerations.

3.2 Architecture Design

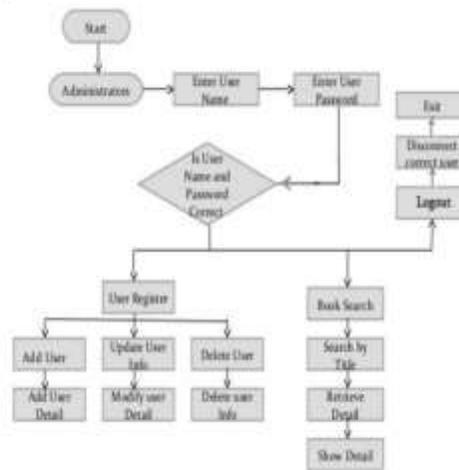
The phase of the design of computer architecture and software architecture is denoted as a high-level design. The model in selecting the architecture should understand all typical lists of modules, brief functionalities of each module, their interface relations, dependencies, database table, architecture diagram, and technology details, etc. The assimilation testing design [12] is carried out in a particular phase. After the necessities of the system are determined, the essential specifications for the hardware, software, data resources, and the information products that will satisfy the functional requirement of the proposed system can be determined. As shown in fig.2, this design will help as to outline for the entire system to identify and manage the connections of different sections.

3.3 Interface Design

User Interface (UI) Design emphasizes expecting what users want to do and confirming that the interface has features that are easy to access, understand, and uses to smooth those actions. This interface collects the concept from visual design, interaction design, and information architecture.

3.4 Module design

Module design level is mentioned as low-level design. The intended system is fragmented into smaller units or segments and each of them is explained, this indicates that the programmer can start coding. Fig.3 explained the flowchart of the entire system, which is the low-level design program



4. EVALUATION METHOD

The system testing process aimed to determine all defects in our project. This program was subjected to a set of test inputs and various observations were made and based on these observations it will be decided whether the program behaves as expected or not. Levels of testing:

4.1 Unit Testing

In the V-Model, Unit Test Plans (UTPs) is developed in the module design phase. This UTPs are implemented to remove bugs at code level or unit level. A Unit is the smallest entity that can exist independently, e.g. program module. Unit testing confirms that the smallest entity can function appropriately even though it's separated from the rest of the codes.

4.2 Integration Testing

Integration Test Plans are implemented in the Architectural Design Period. These tests prove that unit formed and verified independently that can coexist and communicate among themselves. Test results are shared with the customer's group.

4.3 System Testing

System Tests Plans (STP) are developed in System Design Stage. Disparate Unit and Integration Test Plans, STP is composed of the client's business group. System Test certifies that expectations from an application designer are met. The entire application is verified for its functionality, interdependency, and communication. System Testing proves that functional and non-functional necessities have been met. Load and performance testing, stress testing, regression testing, etc. are subset of system testing.

4.4 User Acceptance Testing

User Acceptance Test (UAT) strategies are developed in the analysis phase. Test Strategies are composed of business users. UAT accomplished in a user environment that resembles the production of the environment, using accurate data. UAT proves that the delivered system meets the user's necessity and the system is ready for use in real-time.

5. CONCLUSION

With the development of network technology, the existing library management system is more and more perfect, and the system function becomes more and more comprehensive. Its convenience and usability cannot be comparable. So this article concerns library management system based on the C programming language, compared the system with now popular library management software, it has some advantages. From the angle of system

development, the system has completed some functions such as add, delete, correct, inquiry of the library management system, as well as the user independent query borrowing function. It is better to complete the system development objectives and requirements. But there are also some shortcomings. Coupled with limited personal time, the system appears some errors and hidden bugs, such as data storage capacity is limited. When the number of student users and books increase, the system cannot be used, and the changes that the system made to the data can't be saved for a long time. Each time the system restarts, data also updates. What's more, the system is the interface system, it has cumbersome operation. For example, each time, that users borrow books needs to pass the password for user authentication.

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