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Library Management System using RFID

AUNG KYAW SAN[1], CHAW MYAT NWE[2]

[1]Dept of Electronics Engineering, Mandalay Technological University, Mandalay, Myanmar,
Email: premier996@gmail.com.

[2]Dept of Electronics Engineering, Mandalay Technological University, Mandalay, Myanmar,
Email: chawmyatnwe77@gmail.com.

Abstract: The purpose of the Library Management system is to allow for storing details of a large number of books, magazines, Journals, thesis and allow for add, search, borrow, return facilities separately to administrator/Librarian, staff and students. The traditional services such as maintain the records of all the Books, journal, magazines, newspapers, international papers and students holding membership for that library is implemented by Microsoft Visual Studio and Microsoft SQL Server as IDE. C# language is used to implement this system. The registered member/user of that library must login with the valid name and password and can borrow the books and return books himself easily. The new user and librarian can register as library member under the permission of staff/administrator via Graphical User Interface (GUI).Staff will give the username and password to every member and member can change his/her password by himself/herself. This system will save time and can reduce manual error of librarians.

Keywords: RFID Tag and Reader, Microsoft Visual Studio, Database.

I. INTRODUCTION

Library is a place in which books, manuscripts, recordings, films, or reference material or kept for private or public uses. Generally a library must be able to handle some housekeeping tasks such as acquisition, interlibrary loan, cataloging, circulation, serials management, statistical reports and references. RFID based library management system is made to automate this housekeeping information more quickly and efficiently. The great increase on RFID based implementations provide a great development on the speed of processing and give comfort to the people. For example a simple inventory operation for huge data storage can be done in a few seconds with using RFID technology. Aim of this project is implementing new generation of Library Management System.The administrator/librarian can add /remove book and member to the database and fine the user (if any).Whenever a new book is added to the library, an RFID tag is attack into the book and the information of book like, shelf no, author name, categories of book is also captured in the computer database. All information of user in that library is stored in the computer database. Each user is registered and supplied with a userid and password by the librarian as identification data for them. If a user/student wants to borrow a book, he can do it without any manual intervention.

II. SYSTEM DESIGN

The aim of the system is to transform manual management system to automatic system with the help of Microsoft Visual studio, Microsoft SQL Server and RFID technology. C # language is used to implement this system. This system could be used by two categories of people mainly administrator\staff category and users. The administrator/librarian can add /remove book and member to the database and fine the user (if any).Whenever a new book is added to the library, an RFID tag is attack into the book and the information of book like, shelf name, author name, categories of book is also captured in the computer database. All information of user in that library is stored in the computer database. Each user is registered and supplied with a user name and password by the librarian as identification data for them. If a user/student wants to borrow a book, he can do it without any manual intervention. He walks to the computer of library that is connected LAN with the server computer and login with valid user name and password. He can search book with one of these book name, author name, category of book. If the selected book is available computer will show the location of book via the GUI and then the user wave that book near the reader and the computer will record all these data against his user name. When he wants to return book login in and wave that book on the reader of RFID the computer will automatically delete the list from the borrow list of the database. This system is good for all users able to search book and self-check in/out from any network computer. This system will save time and can reduce manual error of librarians. This system works until the used software is in existence. It can be used in offices and modifications can be easily done according to requirements. The following

diagram 1 shows the System block diagram of the library management system.

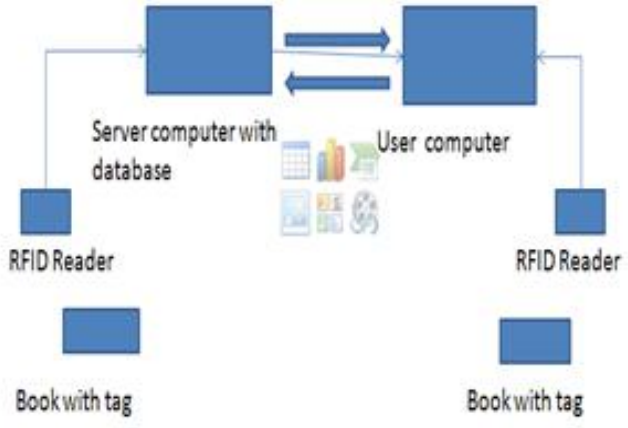

Figure1. System block diagram of the library management system.

III. FUNCTIONAL REQUIREMENTS

Administrator is capable of whole and sole that means all DBA features will be implemented in Admin module with the support of GUI features.

- An End – User (may be a faculty or student) should be able to login into the system after their registration done by the Library Administrator.
- After his/ her login is done then user can access their account details like No. of books taken from library, No. of books returned, Due date for the books . . . etc;
- Accession number, roll number and teacher identification must all be unique as they form the primary keys of the respective tables.
- All new books must be entered in the accession table first, to avoid problems later.
- A book must not be deleted from student profile unless and until she pays the appropriate fine or the same book.
- While inserting values in the database, only valid values must be entered.

IV. SOFTWARE IMPLEMENTATION FOR THE SYSTEM

To accomplish the system, the choosing of software is very important. The Microsoft SQL Server 2008 and Microsoft Visual Studio 2008 are used as Integrated Development Environment (IDE). The C# language is also used to implement the system. The C# language is familiar with many users and suitable for GUI design.

A. Microsoft SQL Server

Microsoft SQL Server is a relational database management system developed by Microsoft. As a database, it is a software product whose primary function is to store and retrieve data as requested by other software applications, be it those on the same computer or those running on another computer across a network.

B. Microsoft Visual Studio

Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs for Microsoft Windows super family of operating systems, as well as web sites, web applications and web services. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms applications, Windows Presentation Foundation and Windows Store. This IDE can connect with database by using query language. The C# language is used to write the program.

C. C# language

C sharp is a programming language that is designed for building a variety of applications that run on the .NET Framework. C# is simple, powerful, type-safe, and object-oriented. The many innovations in C# enable rapid application development while retaining the expressiveness and elegance of C-style languages.

D. Flow Chart of the System

The system can be recognized easily by seeing the flow chart of the over all system shown in figure 4. This system used by two categories of people mainly administrator\staff category and users.Both of them have to registere and login to manage library for staff and borrow books. When the login people is user ,if he wants to return book return it as the library proceser and if user wants to borrow books search the book with the title of book, type of book or author of book.If the searching book is availbe borrow and take but if searching book is not abailable search another book or exit.

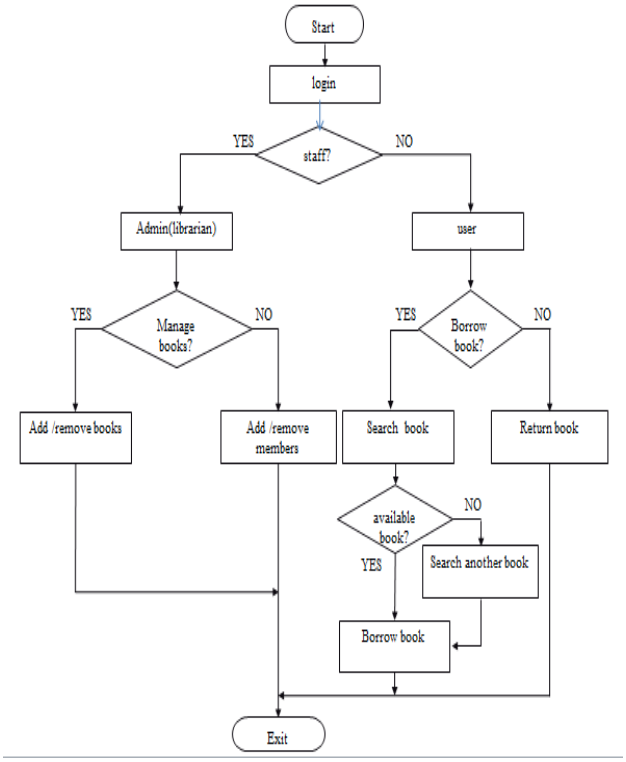

Figure 2.Flow Chart for the Library Management System.

When login people is staff or librarian, can manage the books such as adding or removing book and managing member such as registering new user or deleing the user. If the staff wants to manage the book he can add the new book with its all data (as title name, author name and type of book) and can remove book which lose or damage. If the staff wants to manage the user or member he can allow the new user registering and remove the unused user.

V. Simulation and Experimental Results of the System

The administrator/librarian can add /remove book and member to the database and fine the user (if any).Whenever a new book is added to the library, an RFID tag is attack into the book and the information of book like, shelf no, author name, categories of book is also captured in the computer database. All information of user in that library is stored in the computer database. Each user is registered and supplied with a userid and password by the librarian as identification data for them. When the staff is login in the system with the correct password and userid the staff's login page (figure 2) will be shown by the system and the staff can manage the member and the books such as remove or add to the database of the system.

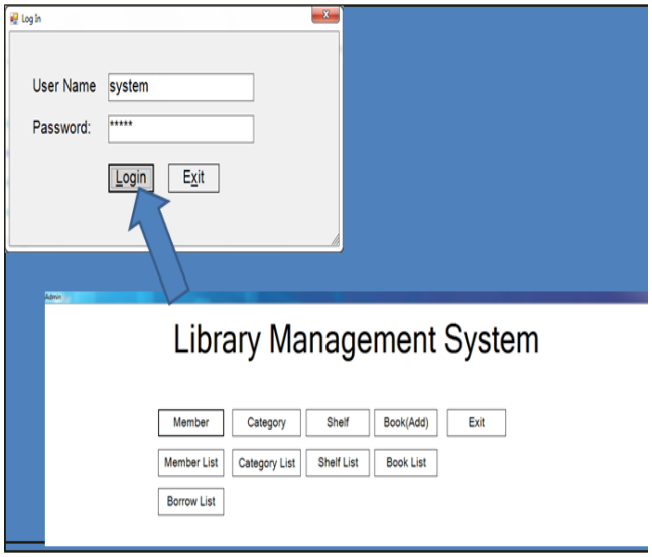

Figure 3.Staff's Login Screen.

The staff or librarian can manage the member such as registering new user,removing unwanted user.For the librarian to add book in the system must have category list (for the type of book) and shelf name (for the location of book in the library).Then librayrian can add book with all information of book to the databased of library as shown in figure 5.And he can also be look the list of book of the system as in figure 6.librarian known the list of borrowed book by see the borrow list (figure 7)of the system. If a user/student wants to borrow a book, he can do it without any manual intervention. He walks to the computer of library that is connected LAN with the server computer and login with valid userid and password. The user page(figure 9) will shown by the system .

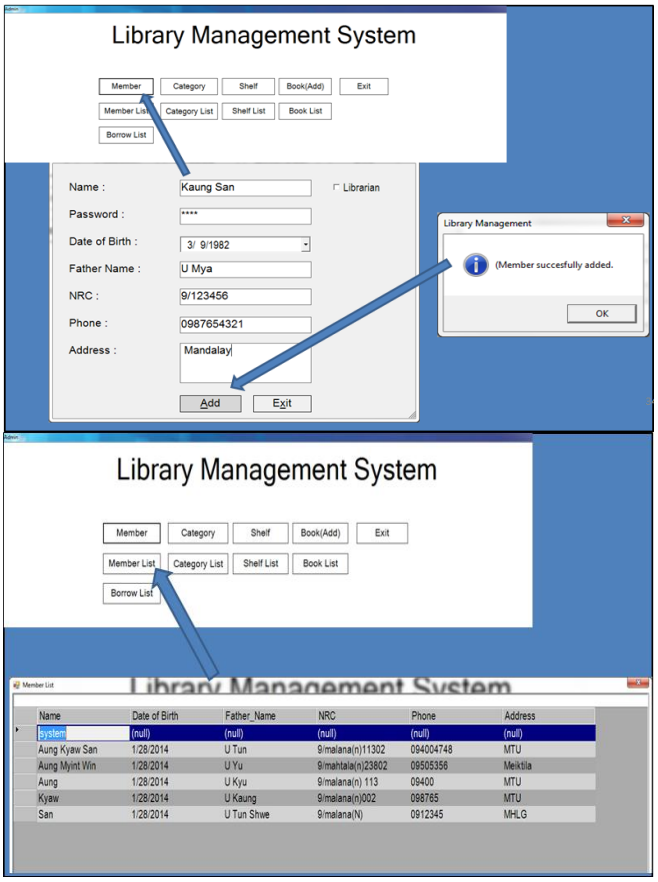

Figure 4 New user registaration.

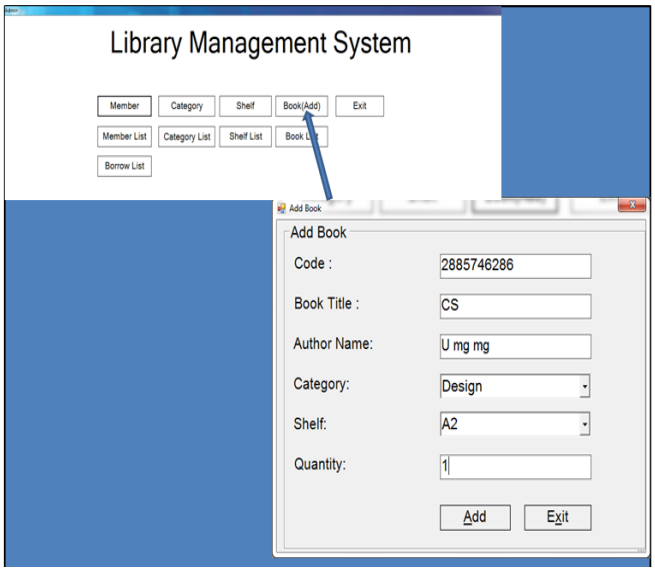

Figure 5.Adding Books.

The user can search book with one of these book name, author name, category of book(see in figure 10). If the selected book is available, computer will show the location of book via the GUI. To finish borrowing, the user go and take the book that he searched and wave that book near the reader and the computer will record automatically all the data of that book in the borrow list against his userid.The system will display to the user such as figure 11.

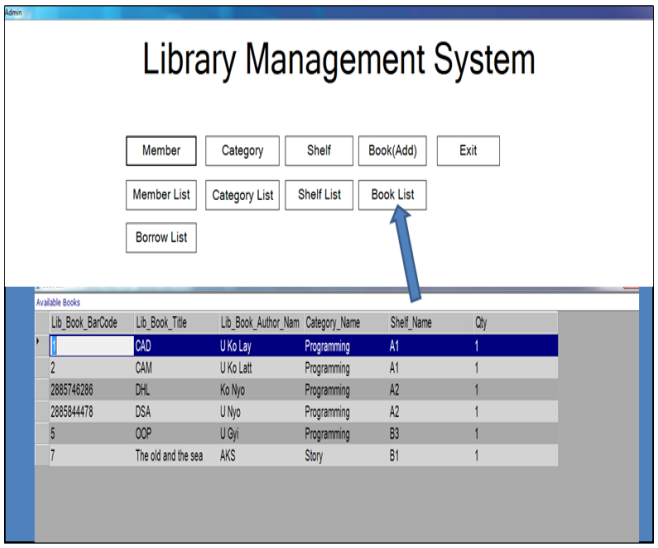

Figure 6. Book List

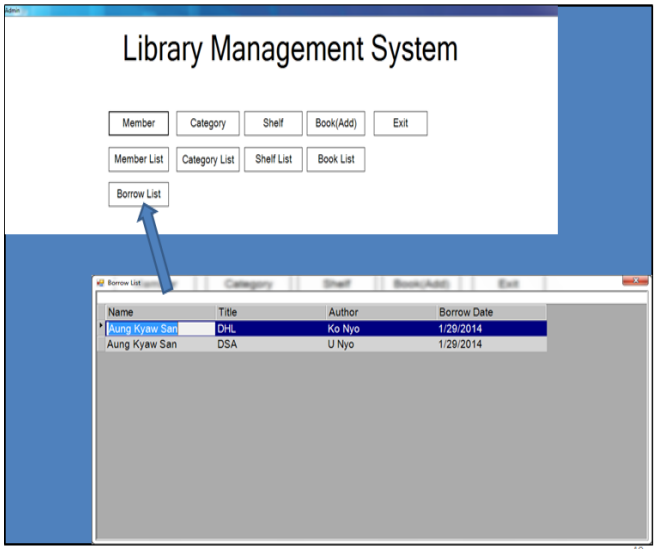

Figure 7.Checking borrow list.

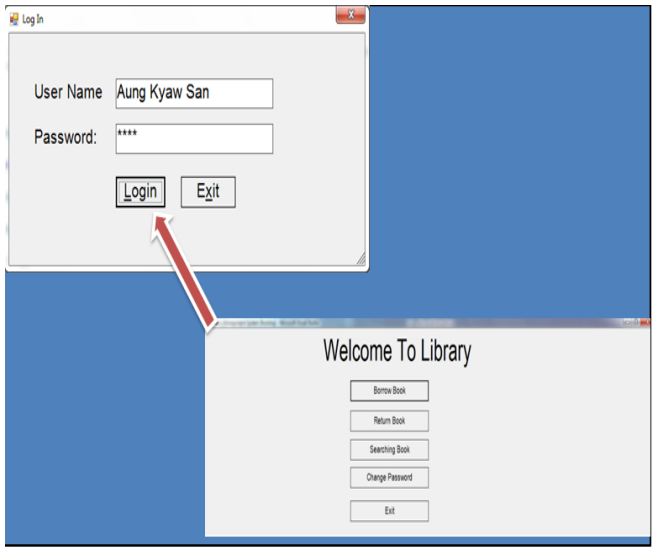

Figure 9.User Login.

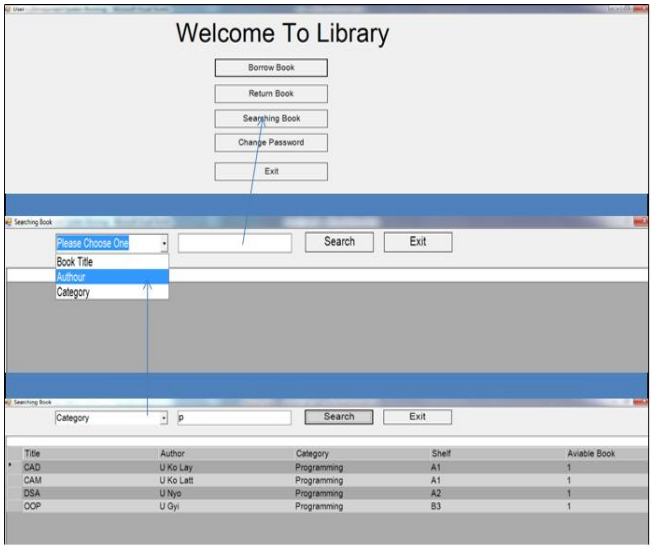

Figure 10.Searching Books.

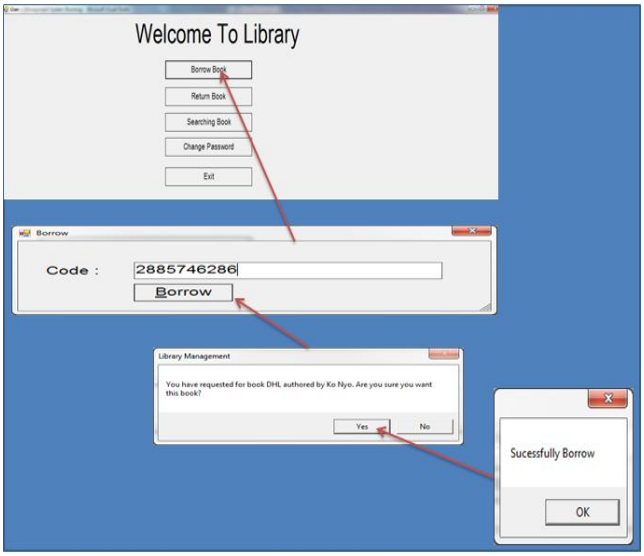

Figure 11.Borrowing Books.

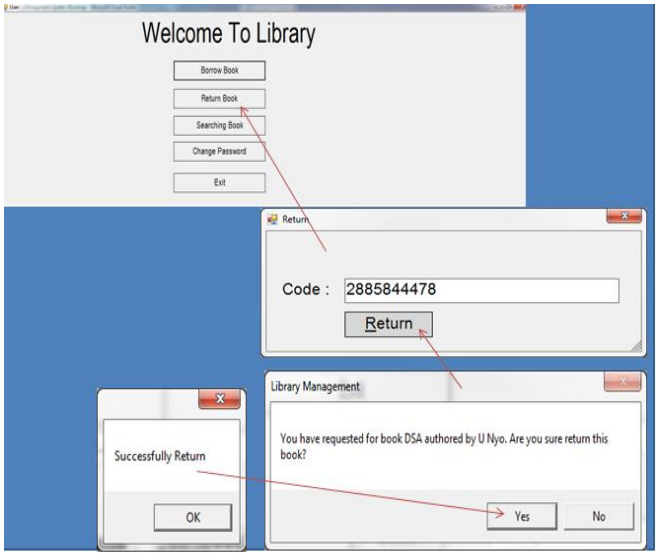

Figure 12. Returning Books.

When user wants to return book, he must login and wave that book on the RFID reader then the computer will automatically delete the data of that book from the borrow list of the database(see in figure 12). The user can also change his password by himself. This system is good for all users able to search book and self check in/out from any network computer.

VI. CONCLUSION

This system mainly reviewed the research and development work with the help of passive RFID technology. By developing this system, the knowledge of RFID system, the database construction, and GUI design using C# language are realized. For this system, passive tags are better than the active tags because of low cost, low power consumption and also radio signals environmental factors. From a proper analysis of positive points and constraints on the component, this system can be safely concluded that the product is a highly efficient GUI based component. This application is working properly and meeting to all user requirements.

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