

## Library Management System

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### ABSTRACT

The Library Management System using the Laravel framework is a web-based application that points in building up an automated Integrated library system to keep up all day by day work of the library. This undertaking has numerous highlights that are commonly not accessible in typical integrated library system, facilities like separate user interfaces for different users having different priorities. It also has a facility of admin login. Through this, the admin can monitor the whole system. In this system, users can see the list of books they have taken and its issue date, return date and also they can reserve the books online. The fine count is robotized with exactness. The application is intended to assist clients in maintaining and organizing the library. It is easy to use for both beginners and advanced users. It incorporates a recognizable, well-thoroughly considered, and appealing UI joined with solid searching, insertion and reporting capacities. Generally, this task of our own is being created to help students as well as the staff to keep up the library in the most ideal manner conceivable and decrease human endeavors.

**KEYWORDS:** *Laravel*

**How to cite this paper:** Joshua Shaji | Antony David | Divya Stephen | Amitha Isac | Fepslin Athish Mon S "Library Management System" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-4 | Issue-4, June 2020, pp.1625-1629, URL: [www.ijtsrd.com/papers/ijtsrd31538.pdf](http://www.ijtsrd.com/papers/ijtsrd31538.pdf)



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### 1. INTRODUCTION

The current system LMS is not fully automated. The librarian staff enters the information in the log register on the entry or exit of the user to the library, hence it requires a lot of time. It's difficult to manage a large number of books and transaction details. One cannot check the availability of a book without the help of library staff. If the system crashes or any faces an attack from outside then all information might get lost. The librarian notes the borrow date and due date on the book card. A fine is calculated on the return of the book. This fine is calculated manually. The manual system poses a number of challenges which include: 1. It wastes a lot of time. 2. It's difficult to process large volumes of information concerning books. 3. Fines are calculated manually hence accuracy is not guaranteed. 4. There is no backup for the records hence in case of any exposure to danger, all information gets lost. 5. A lot of paperwork is involved hence more room and staff to handle them which translates to more costs. 6. It's difficult to search for a book without the help of library staff. Using a fully automated library management system should provide better and efficient service. It also provides basic functions in a library like adding new members, new books, update information, searching books and the facility to borrow and return books. It should provide faster retrieval of information. It can also reduce the workload associated with the library staff as most of the works are automated. It should feature a familiar and well-thought-out attractive user interface, combined with strong searching, insertion and reporting capabilities. All details of the book should be available on a click, thus helping the users to check the availability of a book in a

much easier way, that too without the help of any library staff. The Library Management System has been developed with the aim of improving services delivered to its users. This is made possible by automating all the library services such as 1. To develop a system that ensures the privacy of its users. 2. To enable easy maintenance of members and book details. 3. To check the availability of books by simply searching in the system without the help of library staff. 4. To enable easy borrowing and returning of books. 5. To enable automated fine calculation and reports generation. 6. To enable a secure and portable database that eliminates redundant data.

Library Management System is a web-based application that was developed and designed with the sole objective of automating library services. The system was intended to address the current problems experienced. This system aims in automating the processes of cataloging, book transaction, fine calculation, member details maintenance, and reports generation. The system's performance meets user's requirements, hence providing the main benefit of concentrating all the library services and functions within the power of a mouse click and feeding of data into the system. In this system, Books and student modules are included in this which would keep track of the students using the library and also a detailed description of the books a library contains. In this computerized system, there will be no loss of book record or member record. The various modules will help the librarian to manage the library with more convenience and in a more efficient way as compared

to library systems that are not computerized. The Library is regarded as an integral part of any institute; a significant number of the foundations comprehend the importance of the library for the development of the establishment and their clients. LMS supports the general requirement of the library like acquisition, cataloging, circulation. This system offers numerous adaptable and helpful highlights, permitting bookkeepers and library clients to improve efficiency. The Library System gives all detailed information about students, staff, and the transaction of books and fine calculations. It will track how many books are available in the library. It generates reports for management. This system improves services delivered to end-users. Information can be searched from the system and the results displayed promptly. Expenses caused are decreased by reducing the quantity of the library workforce. Data is saved in the most efficient manner by removing duplicate and redundant data. Numerous clients can get to the framework simultaneously. Since the system operates electronically, it ensures less space and also presents a paperless working environment. The system limits unauthorized users from accessing restricted areas. Client security is guaranteed by giving separate login interfaces to different users which checks them to decide their legitimacy to get to the system.

Library staff individuals are spurred by the system since it makes work simpler. The system has a friendly user interface that is attractive and easy to use. Information concerning all the library activities is stored most securely. The system database is password protected and secured thus forestalling unapproved access and it can also be backed up easily.

## 2. Basics

### 2.1. Laravel Framework

Free open-source PHP web framework. designed for developers who need a simple and elegant toolkit to Laravel was created by Taylor Otwell. Aims to make dev process pleasing without sacrificing quality. The source code of Laravel is available on GitHub and authorized under the terms of MIT License. It is made for developers who need a simple and efficient toolkit to create web applications. Many of the web developers use laravel framework. Because it provides route handling, security layers, models and DB migrations, views/templates, authentication, sessions, error handling, email configuration, cache handling, storage, and file management. Features of the laravel framework are model view controller, blade templating engine, artisan, eloquent ORM (Object Oriented Mapping) and event handling.

Laravel uses the MVC model, therefore there are three core parts of the framework that work together: models, views and controllers. Models are to interact with your database and retrieve your objects' information. Controllers are to handle user requests and retrieve data, by leveraging. Views are to render pages. Most of the work is done by controllers. They connect to models to get, create or update data and display the results on views, which contain the actual HTML structure of the application. Blade Templating Engine is simple and powerful. It is easy to create a blade template, simply create your view file and save it with the.blade.php extension instead of .php. Template Inheritance can extend layout easily and can create custom components. Laravel includes Artisan CLI (Command Link Interface) which

handles many tasks like creating controllers and models and creating database migration files and running migrations. It can also create providers, events, jobs, form requests, etc. Eloquent ORM makes querying and working with DB very easy. The ORM that is offered by laravel has a large number of functions. The framework also provides migration and seeding and also features rollback. Eloquent ORM refers to an advanced implementation of the PHP Active Record Pattern. Eloquent ORM is a very powerful yet very expensive ORM. The framework is capable of handling events across the application. Events provide a simple observer implementation that allows a user to subscribe and listen to various events triggered in the web application. In the app/Events folder, all event classes are stored and in the app/Listeners folder, listeners are stored.

### 2.2. Visual Studio Code

Many of the programming languages use Visual Studio Code which is a source code editor. It allows users to open one or more directories, which may then be saved in workspaces for future reuse. It supports a number of programming languages and features that can handle different languages. Unwanted files and folders are often excluded via the settings. Through extensions Visual Studio Code can be extended which includes multiple extensions for FTP, allowing the software to be used as a free alternative for web development. Visual Studio Code permits clients to set the code page during which the dynamic record is spared which permits it to be utilized on any stage for some random programming language.

### 2.3. MySQL

MySQL is an open-source relational database management system (RDBMS). It's the abbreviation for the Structured Query Language. MySQL is free and open-source programming under the provisions of the GNU General Public License. Many database-driven web applications use MySQL, including Drupal, Joomla, phpBB, and WordPress.

### 2.4. PHP

PHP is a mainstream universally useful scripting language that is particularly fit to web improvement. Regularly PHP code is set up on a web server by a PHP middle person completed as a module, or as a Common Gateway Interface (CGI) executable. On a web server, the result of the interpreted and executed PHP code — which can be any sort of data, like generated HTML or binary image data — would form the full or part of an HTTP response. Various web template systems, web content management systems, and web frameworks exist which may be used to orchestrate or facilitate the generation of that response. Additionally, PHP will be used for several programming tasks outside of the web context like standalone graphical applications. Arbitrary PHP code can even be interpreted and executed via the command-line interface (CLI). PHP has been widely ported and may be deployed on most web servers on almost every operating system and platform, free of charge.

### 2.5. Model - View - Controller

The Model-View-Controller (MVC) system is a structural example that isolates an application into three primary legitimate parts Model, View, and Controller. Thus the truncation MVC. Each component of the architecture is constructed to handle specific development aspects of an application. MVC separates the business logic and

presentation layer from one other. It had been traditionally used for desktop graphical user interfaces (GUIs). MVC architecture has become popular for designing web applications as well as mobile apps nowadays.

### 3. About Our System

#### 3.1. Existing System

In the existing system, all the transactions are done either manually or partially automated, which takes longer on searching the book, calculating the fine and every other transaction. The information stored within the existing system is vulnerable to cyber hacks and vulnerabilities. The automation feature isn't available in offline, open-source systems thus, it requires manual action to perform operations. Even though there are many existing software systems that are used nowadays, they do not have any proper user interface. It has some limitations in accessing books. Besides, most universities in mid-level countries like Bangladesh are still using the traditional way to manage their library, which prevents faster searching a book, and faster report generation. Another major drawback is that preparing the list of books borrowed and the available books in the library will take more time. Currently, it is doing as a one day process for verifying all records which takes a lot of time in tracing a book. This results in developing an online library management system that provides an interactive interface and users could obtain a fresh and different feeling.

Library management robotic system is a combination of software used to manage the library database and hardware used to manage the book handling. This system helps to keep the records of whole transactions of books available in a library. A robot is a modular design of sensor-operated motors to manage the library. Robot acquires the book information from a stored database. The robot gathers the barcode data from the books and relates the decoded barcode data with the search input[1].

Theoretical perspective studies in outlined that Quick Response (QR) code is one of technologies that could be applied in library management system and suggested that the use of QR code for library offer some advantages involving such as fast process, able to store big data, uses standard technology (only camera to percept the code), can be used by user without specific skills so that it would be able to enhance service quality such as to shorten borrowing or returning transaction as well as increasing security of the books from theft in low cost. Based on these advantages, here, in this published study, the QR code was used in the development of the library management system[2].

Some of the works are about the generic design of the database of LMS and the digitization of the libraries and also discusses about different aspects that exist in digital libraries and those are digital services (digital newspaper reading, open-source e-learning, ask a librarian, and online chat conference), resources and infrastructure of the library, problems in implementing the services, implications of services that means the feedback about the provided services etc[3].

#### 3.2. Proposed System

The project Library Management System aims at developing a fully functional computerized system to maintain all the day to day activity of a library. This project has many

features such as the facility of user login and teachers login. Also on top of all this, there is an admin who will be managing the entire application's authorization and authentication, not any intruder can log in and modify the data, as a login for admin is also available.

Through this system the librarian, student, and admin are connected together with this system, they can access the library database. They can easily process the library transaction, it helps to reduce the workload of an employee. The major facilities of the system are to provide fast transactions of information and reduce data loss and also provide the service of data security. Thus, the system application can help to resolve the problem of existing system issues.

Library Book Management System is divided into a number of modules. A number of functions are enabled in each module. The system has access rights to control access to the modules. The main modules in the library management system are -

1. Log Register
2. Librarian
3. Authentication
4. Student
5. Staff
6. Search
7. Dispatch

##### 3.2.1. Log Register Module

The module consists of the records of the entry and exit of a user into the library. The entry time, as well as the out time, is recorded with their respective name and id of the user.

##### 3.2.2. Librarian/Admin Module

In a Computerized Library Management System, the librarian manages the library activities in the digital set-up. It negates the chances of losing and damage to paper works, documents, and files. The transaction can be conducted with less time and more effect by the user. The books can be maintained properly in the library with the system. Besides that, the library management system also allows users to manage the publisher as well as the lost book module. The librarian can handle only the staff module and can view the report module. The entire system is monitored by the librarian. The tasks carried out by them are as follows;

1. Addition of a new book
2. Modification of the book
3. Deletion of the book
4. Searching of the book
5. Managing User

##### 3.2.3. Authentication Module

In the Registration module, the user has to register himself by giving their details which get stored in database, in the back-end. By registering the user will get his login id and password so that he can access the Library online. Separate Register form will be designed for different types of users such as Student, Faculty, and Librarian with a different interface and also providing special access according to their priority.

##### 3.2.4. Student Module

This system is designed for a user friendly environment so that students can perform the various tasks easily and in an

effective way. Through this part of the portal students can log in and have access to the library data. The students can make requests to the librarian to book books for them. Students are allowed to have access to all learning materials but they have the least priority than staff interface. They can view the details of the available book, return date and due amount from their login. Fine will be calculated if they don't return the book before the due date.

### 3.2.5. Staff Module

The staff module is similar to the student module but have more priority than the students. They have special access to the extra contents and their fine calculation is different from the students. They can reserve the book for up to three days.

### 3.2.6. Search Module

This is a small module. Any user can search the books in the library management system by using the title of the book or with the ISSN number, author name, publisher name, etc. They can also see the availability of the book without the help of library staff.

### 3.2.7. Dispatch Module

This is basically the user transaction module where each transaction is recorded. The out will record the datebook was taken and it will record the date the book was returned. If the desired book is found by the user the book will be issued and the due date will be provided if there is a delay in the due date the fine will be calculated automatically. There is also a facility, if the user wants to renew the book then the due date will be extended.

## 4. FUTURE ENHANCEMENTS

Library Management System software, therefore, has complex requirements and must be flexible. It was in the early 2000s when many libraries migrated from their legacy software. As libraries evolved to the demands of the 21st century, but, requirements became ever more complex. All libraries have to deliver to the client whenever, wherever, and increasingly on whatever platform he or she chooses, including mobile devices. Public libraries need to offer self-service, and services need to be shared over a complex system of branches and sub-branches. Academic libraries need to showcase and provide easy access to, their high range of electronic products, which are frequently deployed over large consortia. In many cases, they also need to store their patrons' work in institutional repositories. It is not possible to generate a system that makes all the requirements of the user. User specifications keep changing as the system is being used. Some of the future enhancement that can be done to the systems are:

1. As technology emerges, it is possible to upgrade the system and can be adaptable to the desired system.
2. Based on future security issues, security can be enhanced using emerging technologies.
3. Sub-admin module can be added
4. Use of more extra classes and modules to shut down the code.
5. Changes made by any user can be monitored.
6. Put on network
7. Auto generates forms for every user when they create a user/ member.
8. Many users can login at the same time.
9. More control by the administrator.
10. Make an online chat facility for client and developer interaction.

11. Get notification via mail.
12. The database record shall be encrypted so that it was not read by the user while accessing the database directly into the software.
13. Many more new forms and modules would be added in the next version of this program.

One of the major future scopes is connecting libraries to common data in the center will provide globalization to the libraries, then the user will be able to search for books all over the cities and nearby areas.

## 5. CONCLUSION

The automated version of a library management system which will benefit the students as well as the staff of the library. The library is not an exception to the emerging technology; hence it comes with a good number of advantages when all the activities that take place in it are automated. Automation will always bring more job opportunities to the people. It makes the entire process online where the student can search books, staff can generate reports and do book transactions. It also has a facility for the student login where students can log in and can see the status of books issued as well as request for books or give some suggestions. Staff will always be motivated to work with new automated systems, since a lot of paperwork is eliminated, and functions and services are concentrated just within the power of a mouse click and input of data into the system. Future systems can be modified by adding more features such as online lectures, video tutorials by teachers, etc. And also there is an online assignment submission facility. A forum for discussing various issues of engineering by students can be added thus making it more interactive and useful. And the project fulfills every user's needs in the best and efficient way possible.

## 6. ACKNOWLEDGMENTS

We take this opportunity to express our heartfelt gratitude to all respected personalities who had guided, inspired and helped us in the successful completion of this seminar. First and foremost, we express our thanks to The Lord Almighty for guiding us in this endeavour and making it a success. We take immense pleasure in thanking the Management of Jyothi Engineering College and Fr. Dr. Jaison Paul Mulerikkal CMI, Principal, Jyothi Engineering College for having permitted me to carry out this project. Our sincere thanks to Fr. Dr. A K George, Head of the Department of Computer Science and Engineering for permitting us to make use of the facilities available in the department to carry out the project successfully. We express our sincere gratitude to Mrs. Swapna B Sasi, Project Coordinator for her invaluable supervision and timely suggestions. We are very happy to express our deepest gratitude to our mentor Mr. Fepplin Athish Mon S, Assistant Professor, Department of Computer Science and Engineering, Jyothi Engineering College for his able guidance and continuous encouragement. Last but not least we extend our gratitude to all teaching and non-teaching staff who were directly or indirectly involved in the successful completion of this project and to all our friends who have patiently extended all sorts of help for accomplishing this undertaking.

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