

Islington College



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Application Development

CS6004

Group Work: Library Management System

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Table of Contents

| | |
|--|----|
| 1. Introduction | 1 |
| 2. User Manual | 2 |
| 3. Architecture of the System | 10 |
| a. Class diagram..... | 10 |
| 4. Description of Implemented methods..... | 15 |
| 5. Testing | 19 |
| Test Case 1: Changing the password of user | 19 |
| Test Case 2: Adding new Books | 20 |
| Test Case 3: Delete Author | 21 |
| Test Case 4: Update members..... | 22 |
| 6. Reflections | 23 |

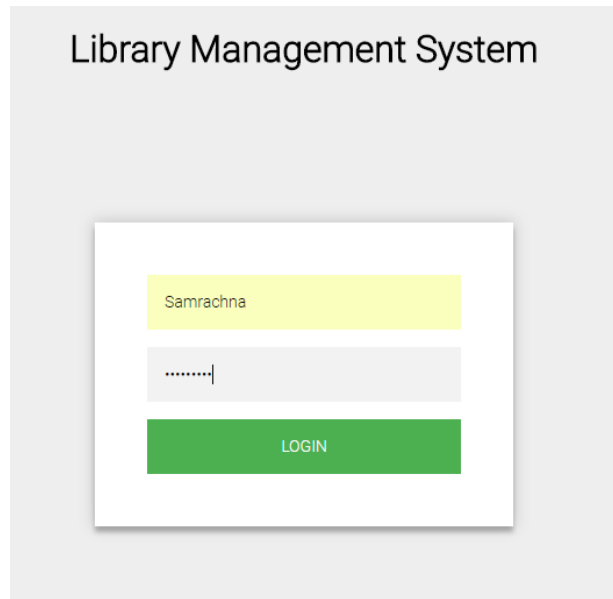
1. Introduction

This report is the documentation for the Library Management System which was assigned to us in the module, Application Development (AD). This is the second coursework of this year long module which was done in a group of three. The requirement for developing this system was in the C# programming language.

We were assigned to develop this system using .Net in the IDE Microsoft Visual Studio (2013). Here, we needed to make a web application which is in C#'s Module View Controller (MVC) pattern. The system should be able to monitor and control transactions conducted in a library. The system “Library Management System” that we have designed comprises of the number of copies of book, list of all books according to the author's name and publisher's name in the shelves. The system should be able to update new information, search book and be able to loan and return the book as well. According to system, only members of the system should be able to loan the book. The system is designed in a way where the admin of the system will be able to manage and organize the library easily. Likewise, the system is also user-friendly and easy to understand.

2. User Manual

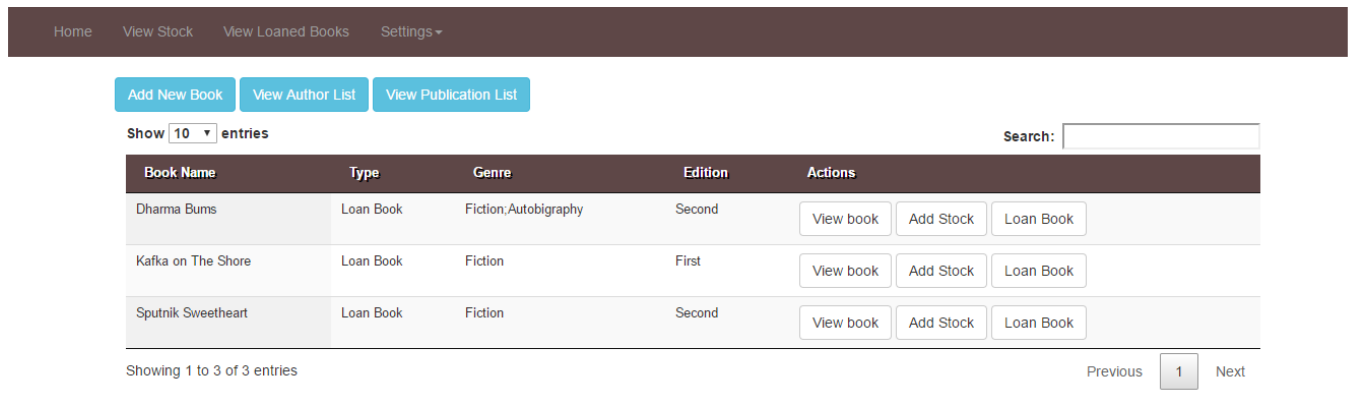
- User can Log in to the system using their given credentials.



The login page features a central white box on a light gray background. Inside the box, there is a yellow input field for the username 'Samrachna', a gray input field for a password represented by dots, and a green 'LOGIN' button below them.

Figure 1. Log In page of the system

- Once they log in they will be redirected to the dashboard where they can view the list of the books in the system



The dashboard has a dark brown header with navigation links: Home, View Stock, View Loaned Books, and Settings. Below the header are three blue buttons: 'Add New Book', 'View Author List', and 'View Publication List'. A search bar is located on the right. The main content area displays a table of books with columns for Book Name, Type, Genre, Edition, and Actions. The table lists three books: 'Dharma Bums', 'Kafka on The Shore', and 'Sputnik Sweetheart'. Each book has three action buttons: 'View book', 'Add Stock', and 'Loan Book'. At the bottom, it shows 'Showing 1 to 3 of 3 entries' and pagination controls for 'Previous', '1', and 'Next'.

| Book Name | Type | Genre | Edition | Actions |
|--------------------|-----------|-----------------------|---------|-------------------------------|
| Dharma Bums | Loan Book | Fiction;Autobiography | Second | View book Add Stock Loan Book |
| Kafka on The Shore | Loan Book | Fiction | First | View book Add Stock Loan Book |
| Sputnik Sweetheart | Loan Book | Fiction | Second | View book Add Stock Loan Book |

Figure 2. Dashboard

- There are various functional buttons on the top left of page through which the user can add new book, view author list and view publication list respectively.

Add New Book
View Author List
View Publication List

Show 10 entries
Search:

| Book Name | Type | Genre | Edition | Actions |
|----------------------------|----------------|-----------------------|---------|-------------------------------|
| Dharma Bums | Loan Book | Fiction;Autobiography | Second | View book Add Stock Loan Book |
| Fundamentals of Prgramming | Reference Book | Science and Computing | Third | View book Add Stock Loan Book |
| Kafka on The Shore | Loan Book | Fiction | First | View book Add Stock Loan Book |
| Sputnik Sweetheart | Loan Book | Fiction | Second | View book Add Stock Loan Book |

Showing 1 to 4 of 4 entries
Previous 1 Next

Figure 3. Buttons on dashboard to add new book, View Author and publication

○ Adding New book

Home
View Stock
View Loaned Books
Settings

Back
Form to add Book
New Content Rating
New Publication
New Author

Title : Fundamentals of Prgramming
Publish Date : 03/06/2002
Edition : Third
Content Rating : 13+
Book Type : Reference Book
Publication : Oxford Publication
Genre : Science and Computing
Author : Roman Nurik
Select a Author
Select a Author

Add A Book

Figure 4. Adding new book

Add New Book
View Author List
View Publication List

Show 10 entries
Search:

| Book Name | Type | Genre | Edition | Actions |
|----------------------------|----------------|-----------------------|---------|-------------------------------|
| Dharma Bums | Loan Book | Fiction;Autobiography | Second | View book Add Stock Loan Book |
| Fundamentals of Prgramming | Reference Book | Science and Computing | Third | View book Add Stock Loan Book |
| Kafka on The Shore | Loan Book | Fiction | First | View book Add Stock Loan Book |
| Sputnik Sweetheart | Loan Book | Fiction | Second | View book Add Stock Loan Book |

Showing 1 to 4 of 4 entries
Previous 1 Next

Figure 5. Added book

- View Author List

| Authors List | |
|---------------------------|---|
| < Back | + Add New Author |
| Author Name | |
| Paulo Coelho | Edit Delete |
| J.K Rowling | Edit Delete |
| John Green | Edit Delete |
| Haruki Murakami | Edit Delete |
| Milan Kundera | Edit Delete |
| Banana Yoshimoto | Edit Delete |
| Jack Kerouac | Edit Delete |
| Markus Zusak | Edit Delete |
| Steve Jobs | Edit Delete |
| Roman Nurik | Edit Delete |

Figure 6. Author List

Through this page user can either add new author, edit authors or delete them.

| | |
|---------------------------|---|
| < Back | Add Author |
| AuthorName | <input type="text" value="Barack Obama"/> |
| | Add Author |

| Authors List | |
|---------------------------|---|
| < Back | + Add New Author |
| Author Name | |
| Paulo Coelho | Edit Delete |
| J.K Rowling | Edit Delete |
| Haruki Murakami | Edit Delete |
| Milan Kundera | Edit Delete |
| Banana Yoshimoto | Edit Delete |
| Jack Kerouac | Edit Delete |
| Markus Zusak | Edit Delete |
| Steve Jobs | Edit Delete |
| Roman Nurik | Edit Delete |
| Barack Obama | Edit Delete |

Figure 7. Adding new author to the author list

- Add Publisher

Back Add Publication

PublicationName Islington

Add Publication

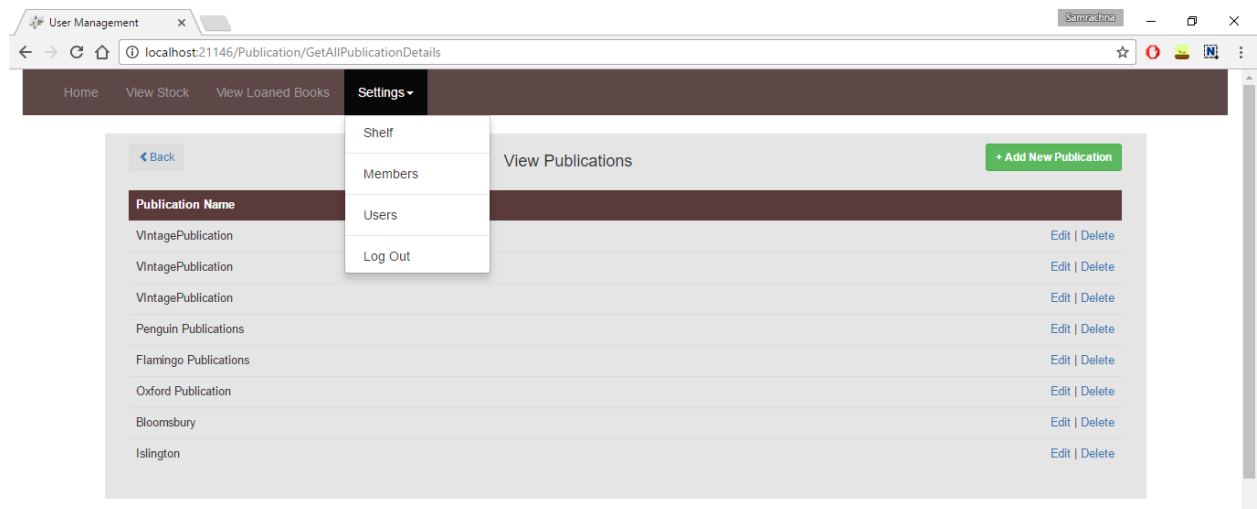
○ View Publisher

Back View Publications + Add New Publication

| Publication Name | |
|-----------------------|---------------|
| VintagePublication | Edit Delete |
| VintagePublication | Edit Delete |
| VintagePublication | Edit Delete |
| Penguin Publications | Edit Delete |
| Flamingo Publications | Edit Delete |
| Oxford Publication | Edit Delete |
| Bloomsbury | Edit Delete |
| Islington | Edit Delete |

Figure 8. Adding new publisher to the publisher list

- Through the navigation of the application on the top of the page, users can navigate through home, viewing the stocks of the books, view loaned books.
- There is also a drop down in the navigation section through which users can go to the Shelves page, Members page, user's page or logout.



- Through the Shelf page users can add new rack numbers for shelves, edit them or delete them.

| < Back | View Shelf | Add New Shelf |
|---------------------------|-------------|---|
| Shelf ID | Rack Number | |
| 2 | 2 | Edit Delete |
| 3 | 3 | Edit Delete |
| 4 | 7 | Edit Delete |
| 5 | 6 | Edit Delete |
| 6 | 10 | Edit Delete |

Figure 9. Shelves page

- Similarly users can go to the Members page through which they can add members or memberships and view the members of the system.

< Back

View Member

Add New Member

Add New Membership

| Member Name | Date of Birth | Phone Number | Email | Membership Type | |
|--------------------|---------------|--------------|----------------------------|-----------------|---|
| Samrachna Adhikari | 2017 April 07 | 9851067560 | samrachna.act360@gmail.com | Silver | Edit Delete |
| Mona Lisa | 2001 June 07 | 3841001412 | monas@gmail.com | Gold | Edit Delete |
| Swarupa Gurung | 1994 April 17 | 9847001412 | swarupa@gmail.com | Silver | Edit Delete |

Figure 10. View Members

- Add Members

| | |
|---|------------|
| < Back | Add Member |
| MemberName <input type="text" value="Mona Lisa"/> | |
| Dob <input type="text" value="06/07/2001"/> | |
| PhoneNumber <input type="text" value="3841001412"/> | |
| Email <input type="text" value="monas@gmail.com"/> | |
| MembershipId <input type="text" value="Gold"/> | |
| Add Member | |

Figure 11. Adding new members

- Add Membership

Back Add Membership

MembershipCategory

Premium

NoOfBooks

10

Add Membership

Figure 12. Adding membership

- Users can also access the user page, add new user, edit them or delete them.
 - View users

Back View User Add New User

| Username | Password | Authentication Type | |
|-----------|-----------|---------------------|---------------|
| Umesh | umesh | Admin | Edit Delete |
| Samrachna | samrachna | Admin | Edit Delete |
| Nikita | nikita | Admin | Edit Delete |
| Melika | melika | Manager | Edit Delete |
| Ashwarya | ashwarya | Manager | Edit Delete |
| Rastra | rastra | Staff | Edit Delete |

Figure 13. Viewing Users

- And, through the last dropdown, Logout, Users can logout of the system.
- Users have the option to view the details of the book, add its respective stock and loan the book from the dashboard.
 - Viewing the details of the book.

Add New Book View Author List View Publication List

Show 10 entries Search:

| Book Name | Type | Genre | Edition | Actions |
|--------------------|-----------|-----------------------|---------|-------------------------------|
| Dharma Burns | Loan Book | Fiction;Autobiography | Second | View book Add Stock Loan Book |
| Kafka on The Shore | Loan Book | Fiction | First | View book Add Stock Loan Book |
| Sputnik Sweetheart | Loan Book | Fiction | Second | View book Add Stock Loan Book |

Showing 1 to 3 of 3 entries Previous 1 Next

[Home](#)
[View Stock](#)
[View Loaned Books](#)
[Settings](#)

Book Name : Dharma Bums

Published Date : 2003 August 14

Edition : Second

Publication Name : VIntagePublication

Content Rating : 18+

Genre : Fiction;Autobiography

Author : Jack Kerouac

[< Back](#)
[Delete](#)

Figure 14. Viewing details of a selected book

- Adding Stocks of the respective book

[Add New Book](#)
[View Author List](#)
[View Publication List](#)

Show entries
Search:

| Book Name | Type | Genre | Edition | Actions |
|--------------------|-----------|-----------------------|---------|---|
| Dharma Bums | Loan Book | Fiction;Autobiography | Second | View book Add Stock Loan Book |
| Kafka on The Shore | Loan Book | Fiction | First | View book Add Stock Loan Book |
| Sputnik Sweetheart | Loan Book | Fiction | Second | View book Add Stock Loan Book |

Showing 1 to 3 of 3 entries
[Previous](#)

[Next](#)

Add To Stock

Book Name : Dharma Bums

Quantity :

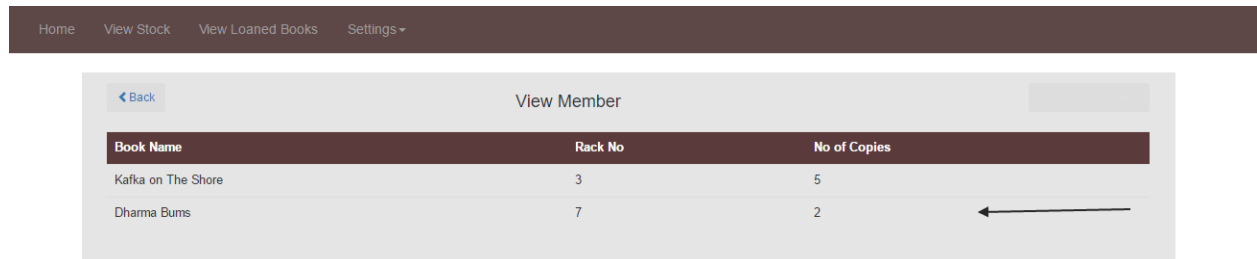
Bought Date :

Location :

[< Back](#)
[Add Book Copies](#)

Figure 15. Adding stocks of the existing book

- After adding the Stocks, users can view the added stocks from the View Stock tab in the navigation bar.



The screenshot shows a web application interface for a library management system. At the top, there is a dark brown navigation bar with links: Home, View Stock, View Loaned Books, and Settings with a dropdown arrow. Below this, the main content area has a light gray background. At the top of this area, there is a 'View Member' header with a '< Back' button on the left and a search bar on the right. Below the header is a table with three columns: 'Book Name', 'Rack No', and 'No of Copies'. The table contains two rows of data. An arrow points to the 'No of Copies' column in the second row.

| Book Name | Rack No | No of Copies |
|--------------------|---------|--------------|
| Kafka on The Shore | 3 | 5 |
| Dharma Bums | 7 | 2 |

Figure 16. Added no. of Copies

- They can also search the book they want to view from the search bar which is situated above the book list table.

3. Architecture of the System

a. Class diagram



Figure 17. Class diagram for Copies Controller



Figure 18. Class diagram for Loan Charge Controller

A small, faint icon representing a class diagram, showing a rectangular box with a small circle at the top.

Figure 19. Class diagram generated for Home Controller

A small, faint icon representing a class diagram, showing a rectangular box with a small circle at the top.

Figure 20. Class diagram generated for Loan Controller



Figure 21. Class diagram generated for Member Controller



Figure 22. Class diagram generated for Membership Controller



Figure 23. Class diagram generated for Publication Controller



Figure 24. Class diagram generated for User Controller

A small, faint icon representing a class diagram, showing a rectangular box with a small circle at the top.

Figure 25. Class diagram generated for Shelf Controller

A small, faint icon representing a class diagram, showing a rectangular box with a small circle at the top.

Figure 26. Class diagram generated for Author Controller



Figure 27. Class diagram generated for Book Controller

4. Description of Implemented methods

➤ **Copies Controller**

- AddCpies(id:integer)
This method add the number of copies of the books to database.
- CopiesController()
Copies controller handle all the Create, Edit, Update and destroy operation for books copies.

➤ **LoanChargeController**

- AddCharge
This method is generated to add charge on delayed loan book which was loaned by users.
- EditChargeDetails(id:integer)
This method is generated to edit the charge paid by the library member whom have borrowed the books.
- GetAllChargeDetails()
This method will the details of members and the charge collected from each member.
- LoanChargeController()
This controller is created to carry-out the CRUD operations of charge collected on loaned book.

➤ **Home Controller**

- HomeController

- This controller is created to restrict and display views for logged in users.
- VerifyUser(checkUser : UserModel)
This method is created to verify user according to the user category and restrict views allowing only authorize user.

➤ **Loan Controller**

- AddLoan(Loan : LoanModel)
This method add the book on loan with the book borrower details.
- DeleteLoan
This method delete the loan book once the member return back the book by the borrower.
- EditLoanDetails(id :Integer, obj : LoanModel)
This method edit the load details which contains the book borrower details and loan details.
- LoanList()
This method is used to display the all the details of loaned book and the borrower.

➤ **Member Controller**

- AddMember(member : MemberModel)
This method add members details in the database.
- DeleteMember(id : Integer)
This method delete the selected member.
- EditMemberDetails(id : Integer)
This method edit selected member from the member list.
- GetAllMemberDetails()
This method get the details of each member.
- MemberController()
This controller is created to carry out the CRUD operations for member that is create, edit, update and destroy.

➤ **Membership Controller**

- AddMembership(Memship : MembershipModel)
The method is created to add membership type to the member.
- DeleteMembership(id : Integer)
The method is to delete membership type of a particular member.
- EditMembershipDetails(id : Integer, obj : MembershipModel)

This method is to edit the membership details of a member.

- GetAllMembershipDetails()

This method is created to get details of all members' memberships.

- MembershipController()

This controller is created to access CRUD operations on Membership.

➤ **Publication Controller**

- AddPublication(publication : PublisherModel)

This method is created to add book publisher to the Publisher model

- AddPublicationFromBooks(bookDetails : BookDetails)

This method is created to add Publication according to book and book details.

- DeletePublication(id : Integer)

This method delete the selected publication along with its details from the model.

- EditPublicationDetails()

This method edit the publication details from the model.

- GetAllPublicationDetails()

This method get all the details of publications.

- PublicationController()

This controller is created to manage the CRUD operations of publication.

➤ **User Controller**

- AddUser(User : UserModel)

This method is created to add user to user model.

- DeleteUser(id : Integer)

This method is created to delete the select or particular user from user model.

- EditUserDetails(id : Integer)

This method is created to edit a particular user details.

- GetAllUserDetails()

This method fetch all the users from user model with their details.

- UserController()

This controller is created to manage CRUD operation of User

➤ **Shelf Controller**

- AddShelf()

This method is created to add shelf to put the book in.

- DeleteShelf(id : Integer)
This method delete the selected shelf from the shelf model.
- EditShelfDetails(id : Integer)
This method is use to edit the selected shelf from the list of shelves.
- GetAllShelfDetails()
This method is use to fetch all the shelves from the shelf model.
- ShelfController()

This controller is create to handle CRUD operation of the shelf.

➤ **Author Controller**

- AddAuthor()
This method is use to add author details to author model.
- AddAuthorFromBooks(bookDetails : BookDetails)
This method is use to add author to the book ddetails.
- DeleteAuthor(id : integer)
This method is use to delete the selected author from author list.
- EditAuthorDetails(id : Integer)
This method is created to edit selected author from author list.
- GetAllAuthor()
This method fetch the list of author.
- AuthorController()
This controller is created to access CRUD operation for author.

➤ **Book Controller**

- AddBook()

This method is to add books to book model.

- BookController()

This controller is created to manage all the CRUD operation in book

- DeleteBooks(id : Integer)

This method is created to delete a selected book from the list of book.

- GetBook(id : Integer)

This method is created to fetch all books from the model.

5. Testing

Test Case 1: Changing the password of user

| | |
|-----------------|--|
| Objective | Changing the password of a given user |
| Action | The password needs to be changed |
| Expected result | The password needs to be changed and that user needs to be able to login to the system through that password |
| Actual result | The password needs was changed and that user was able to login to the system through that password |
| Conclusion | Test was successful. |

Back

View User

Add New User

| Username | Password | Authentication Type | |
|-----------|-----------|---------------------|---|
| Umesh | umesh | Admin | Edit Delete |
| Samrachna | samrachna | Admin | Edit Delete |
| Nikita | nikita | Admin | Edit Delete |
| Melika | melika | Manager | Edit Delete |
| Ashwarya | ashwarya | Manager | Edit Delete |
| Rastra | rastra | Staff | Edit Delete |

| Username | Password | Authentication Type | |
|-----------|-----------|---------------------|---|
| Umesh | umesh | Admin | Edit Delete |
| Samrachna | samrachna | Admin | Edit Delete |
| Nikita | nikita | Admin | Edit Delete |
| Melika | melika | Manager | Edit Delete |
| Ashwarya | ashwarya | Manager | Edit Delete |
| Rastra | bhandari | Manager | Edit Delete |

Figure 28. Editing the password of an existing user

Test Case 2: Adding new Books

| | |
|-----------------|---|
| Objective | Adding new Books to the system |
| Action | A new book needs to be added |
| Expected result | A new book needs to be added in the book list |
| Actual result | A new book was to be added in the book list |
| Conclusion | Test was successful. |

Add New Book
View Author List
View Publication List

Show 10 entries
Search:

| Book Name | Type | Genre | Edition | Actions |
|----------------------------|----------------|-----------------------|---------|-------------------------------|
| Dharma Bums | Loan Book | Fiction;Autobiography | Second | View book Add Stock Loan Book |
| Fundamentals of Prgramming | Reference Book | Science and Computing | Third | View book Add Stock Loan Book |
| Kafka on The Shore | Loan Book | Fiction | First | View book Add Stock Loan Book |
| Sputnik Sweetheart | Loan Book | Fiction | Second | View book Add Stock Loan Book |

Showing 1 to 4 of 4 entries
Previous 1 Next

Home
View Stock
View Loaned Books
Settings

Back
Form to add Book
New Content Rating
New Publication
New Author

Title : Fundamentals of Prgramming
Publish Date : 03/06/2002
Edition : Third
Content Rating : 13+
Book Type : Reference Book
Publication : Oxford Publication
Genre : Science and Computing
Author : Roman Nurik
Select a Author
Select a Author

+ Add A Book

[Add New Book](#)
[View Author List](#)
[View Publication List](#)

Show entries Search:

| Book Name | Type | Genre | Edition | Actions | | |
|----------------------------|----------------|-----------------------|---------|---------------------------|---------------------------|---------------------------|
| Dharma Bums | Loan Book | Fiction;Autobiography | Second | View book | Add Stock | Loan Book |
| Fundamentals of Prgramming | Reference Book | Science and Computing | Third | View book | Add Stock | Loan Book |
| Kafka on The Shore | Loan Book | Fiction | First | View book | Add Stock | Loan Book |
| Sputnik Sweetheart | Loan Book | Fiction | Second | View book | Add Stock | Loan Book |

Showing 1 to 4 of 4 entries Previous **1** Next

Figure 29. Adding a new book to the list of books

Test Case 3: Delete Author

| | |
|-----------------|---|
| Objective | Existing Author needs to be deleted. |
| Action | An existing author needs to be deleted by clicking the delete button. |
| Expected result | Selected Author is deleted form the system. |
| Actual result | Selected Author was deleted form the system. |
| Conclusion | Test was successful. |

| ← Back | Authors List | + Add New Author |
|------------------------|---|----------------------------------|
| Author Name | | |
| Paulo Coelho | Edit Delete | |
| J.K Rowling | Edit Delete | |
| John Green | Edit Delete | |
| Haruki Murakami | Edit Delete | |
| Milan Kundera | Edit Delete | |
| Banana Yoshimoto | Edit Delete | |
| Jack Kerouac | Edit Delete | |
| Markus Zusak | Edit Delete | |
| Steve Jobs | Edit Delete | |
| Roman Nurik | Edit Delete | |

| < Back Authors List + Add New Author | |
|---|---|
| Author Name | |
| Paulo Coelho | Edit Delete |
| J.K Rowling | Edit Delete |
| Haruki Murakami | Edit Delete |
| Milan Kundera | Edit Delete |
| Banana Yoshimoto | Edit Delete |
| Jack Kerouac | Edit Delete |
| Markus Zusak | Edit Delete |
| Roman Nurik | Edit Delete |

Figure 30. Deleting an existing user

Test Case 4: Update members

| | |
|-----------------|--|
| Objective | Member details need to be updated. |
| Action | The existing details of the member are to be updated. |
| Expected result | The existing details of the member need to be updated. |
| Actual result | The existing details of the member are updated. |
| Conclusion | Test was successful. |

< Back

View Member

Add New Member

Add New Membership

| Member Name | Date of Birth | Phone Number | Email | Membership Type | |
|--------------------|---------------|--------------|----------------------------|-----------------|---|
| Samrachna Adhikari | 2017 April 07 | 9851067560 | samrachna.act360@gmail.com | Silver | Edit Delete |
| Mona Lisa | 2001 June 07 | 3841001412 | monas@gmail.com | Gold | Edit Delete |
| Swarupa Gurung | 1994 April 17 | 9847001412 | swarupa@gmail.com | Silver | Edit Delete |

< Back

View Member

Add New Member

Add New Membership

| Member Name | Date of Birth | Phone Number | Email | Membership Type | |
|--------------------|-----------------|--------------|---------------------|-----------------|---|
| Samrachna Adhikari | 1995 January 19 | 9851067560 | samrachna@gmail.com | Silver | Edit Delete |
| Mona Lisa | 2001 June 07 | 3841001412 | monas@gmail.com | Gold | Edit Delete |
| Swarupa Gurung | 1994 April 17 | 9847001412 | swarupa@gmail.com | Silver | Edit Delete |

Figure 31. Updating member details

6. Reflections

a. Nikita

In the module, Application Development, our project was to create a 'Library Management System' that could carry various functionalities for libraries. For this project, we were divided into groups, our group members decided to complete the project with the use of ASP.Net MVC Framework on Visual Studio. We were to develop a system and work out the logics that are to be carried for the system to work successfully.

Our project was divided into three group members. The three members of the groups were to carry out different tasks throughout the project. I was assigned to create to create a UI design and web forms along with the validation according to the ER diagram. During the development, I went through a problem where the templates that I created did not run on the visual studio. The program was not accepting the CSS for the project. After reviewing help forums and conduction research, I was able to run the design by creating a new project.

b. Samrachna

Through this module, Application Development, we were assigned the project of creating a general Library Management System that could be of use to libraries to carry out their respective functionalities. This project gave me an insight to how a library management system works and the logics that need to be considered when it comes to maintaining a working system.

The system was completed by following the ASP.Net MVC pattern on Visual Studio 2013. Throughout the progression of the system, I came across learning various aspects that are implemented in this system. I was responsible for creating the database and the store procedures required for the CRUD operations for the functionalities of the system. SQL management studio was a relatively new software to me. I encountered a few problems but solved it by looking it up in the internet. The IDE Visual Studio was familiar to me so it wasn't that difficult when it came to using it and implementing it in programming the system. This coursework helped me enhance my knowledge regarding C# programming and the MVC pattern.

c. Umesh

As final course work of module Application Development. The group were assigned to develop a Library Management System as the final course work of the module. Where basic CRUD operation were implemented and other functionalities like user, registration and authorization among different users need to be implemented.

Working in a group project is a challenging work. Lack of C# programming skills and ASP.Net functionality leads to not finish project on time. Even though the designing UI section was comparatively easy and which was done first. Connecting database with MS-SQL server was quite difficult but that was done by research on websites and watching video tutorials. By referring C# programming tutorials programming problem were solved. Research on MVC working mechanism helped to perform CRUD operation on the project.