Cognizant

COGNIZANT

Cognizant Academy

Novel Hub

ASP.Net Core MVC, Entity Framework Core,

SQLServer – Integrated Capability Test

Cognizant

Table of Contents

1.0 Introduction

1.1 Purpose of this document

The code is intended to facilitate managing a library system through a web application interface. It allows users to perform various tasks such as creating and viewing details related to branches, books, librarians, and memberships.

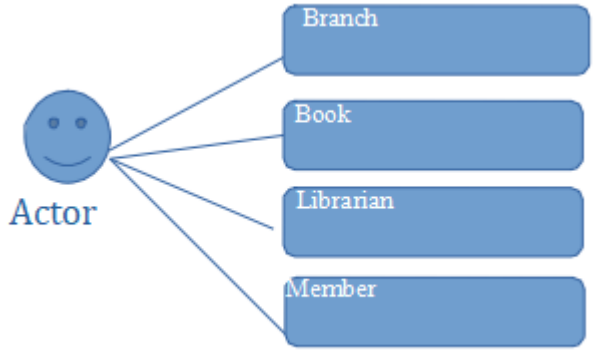
1.2 Definitions & Acronyms

Definition / Acronym	Description
C#	C# (prounced C sharp) is an object-oriented server-sideprogramming language for developing .NET application
SQL Server	SQL Server is a powerful relational database for storingdata
Asp.NET Core MVC	Light weight framework for developing server-sideapplication which provides separation of concerns for developing applications using asp.net core
Entity framework Core	Provides an ORM to map a relational model with theobject oriented model.

1.3 Project Overview

Novel Hub is One of the Library Management System. This Website is used to maintaining the records of Books, librarian, Members details

1.4 Use case Diagram



1.5 Scope

The system encompasses modules for managing branches, books, librarians, memberships, and data persistence, facilitating comprehensive library administration and user engagement.

1.6 Target Audience

Advance Level

1.7 Hardware and Software Requirement

1.7.1 Hardware Requirements

#	Item	Specification/Version
1.	PC	8GB RAM

1.7.2 Software Requirements

#	Item	Specification/Version
1.	.NET Framework	6.0
2.	Visual Studio Professional	2022

3	SQLSERVER Enterprise	2014
4	Internet Explorer/Google Chrome/Firefox	-

2.0 System Diagram

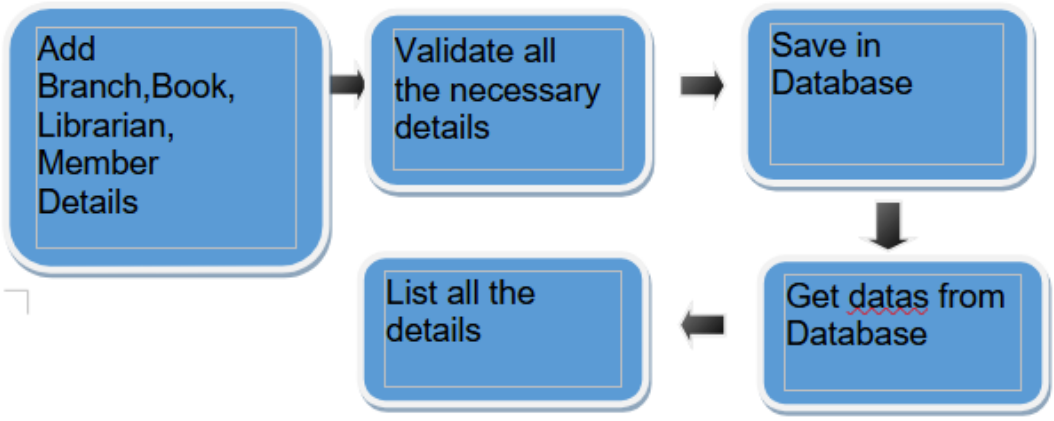


Figure: System Diagram

3.0 Architecture

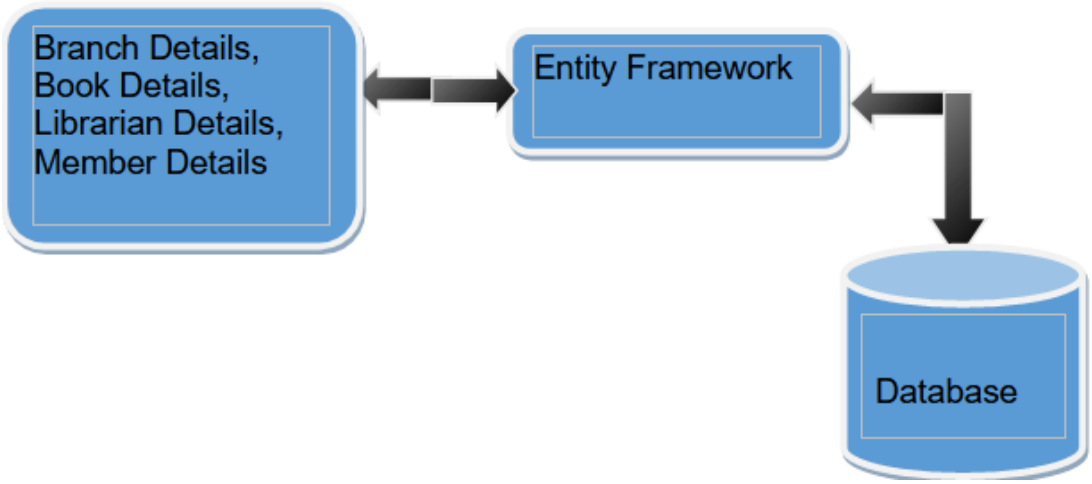


Figure: Architecture Diagram

4.0 Solution Creation

1. Create a new project and choose **ASP.NET Core Web App (Model-View-Controller)** (C#).
2. Give the project name as **"Novel Hub"** and click the Next button.
3. Choose the version **.NET 6.0**.
4. Change the authentication mode to "No Authentication.
5. Ensure to uncheck the following checkboxes
1. Configure for HTTPS.
2. Docker support.
3. Create unit.

6. Go to NuGet Package Manager.
7. Download the below-mentioned packages:
1. **Microsoft.EntityFrameworkCore.**
2. **Microsoft.EntityFrameworkCore.SqlServer.**
3. **Microsoft.EntityFrameworkCore.Tools.**

8. Create the below-mentioned models:
1. BranchDetails.
2. BookDetails.
3. Librarian.
4. Members.

9. Models should relate to constraints. Branch' primary key, "branchId," should be used as a foreign key in the other three models.
10. Create Dependency Injection and register all table names on the Dependency Injection page.
11. Configure the connection in "**Appsettings.json.**"

1. Give a database name as LYMS.

12. Register the connection string in "**Program.cs.**"
13. Migrate the model to create tables in the database.
14. Create a controller named "**LibraryController.**"
15. Create views for the UI.

```
<Project Sdk="Microsoft.NET.Sdk.Web">

  <PropertyGroup>
    <TargetFramework>net6.0</TargetFramework>
    <Nullable>enable</Nullable>
    <ImplicitUsings>enable</ImplicitUsings>
  </PropertyGroup>

  <ItemGroup>
    <PackageReference Include="Microsoft.EntityFrameworkCore" Version="6.0.29" />
    <PackageReference Include="Microsoft.EntityFrameworkCore.SqlServer" Version="6.0.29" />
    <PackageReference Include="Microsoft.EntityFrameworkCore.Tools" Version="6.0.29">
      <PrivateAssets>all</PrivateAssets>
      <IncludeAssets>runtime; build; native; contentfiles; analyzers; buildtransitive</IncludeAssets>
    </PackageReference>
    <PackageReference Include="Microsoft.VisualStudio.Web.CodeGeneration.Design" Version="6.0.16" />
  </ItemGroup>

</Project>
```

Figure: LibraryManagementSystem.csproj

1. Go to solution explorer, Program.cs - in that set the pattern as per the below snapshot

```
app.MapControllerRoute(
    name: "default",
    pattern: "{controller=Home}/{action=Index}/{id?}");
```

Figure: Program.cs Pattern

NOTE:

A. Solution is already created for you on the platform. Do not make any changes to connection string in **appsettings.json** file on the platform

B. After creating all 4 models, Follow the below-given instructions to create migrations

C. For Creating Migration, Use this below code in the Package Manager Console

1. add-migration SampleName- once this migration is successful, then move to next step

2. update-database

You can give any name instead of **SampleName**

5.0 Create Branch Details

5.1 Requirement Flow

Steps Explanation:

1 User launches the application and index.cshtml page is displayed to the user as follows

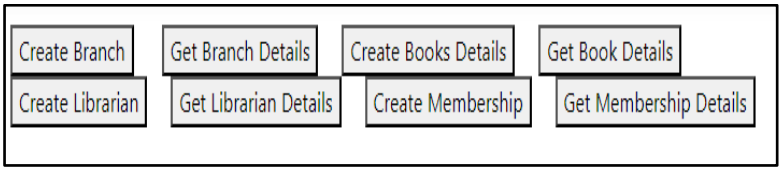


Figure : Index page

2 When the user clicks the "Create Branch" button, the Create.cshtml page is displayed to the user as follows.

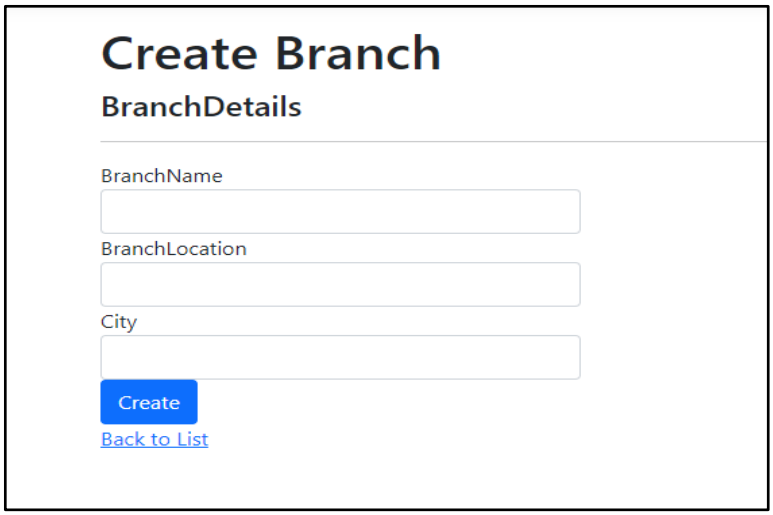


Figure: Create Branch form

3 Users can create a new branch as follows:

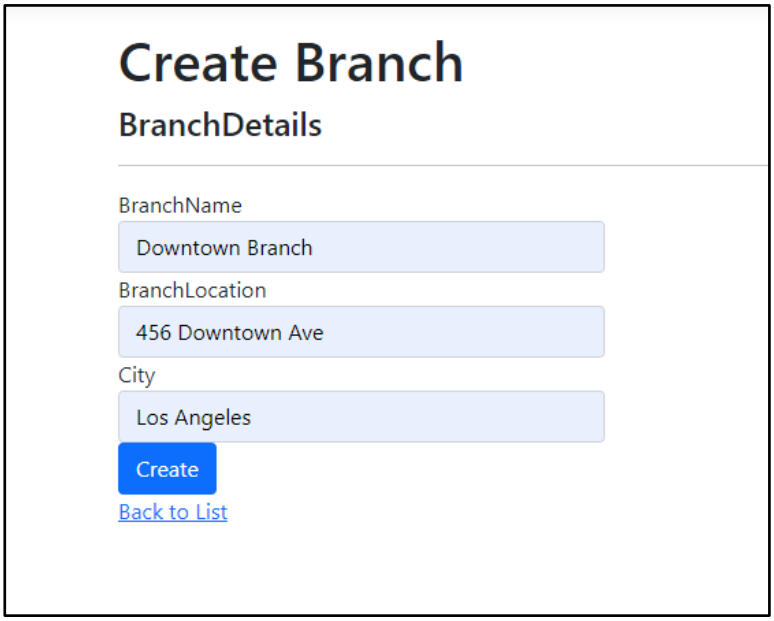


Figure: Create Branch form

4 If there is any validation failures application will display appropriate validation messageas follows

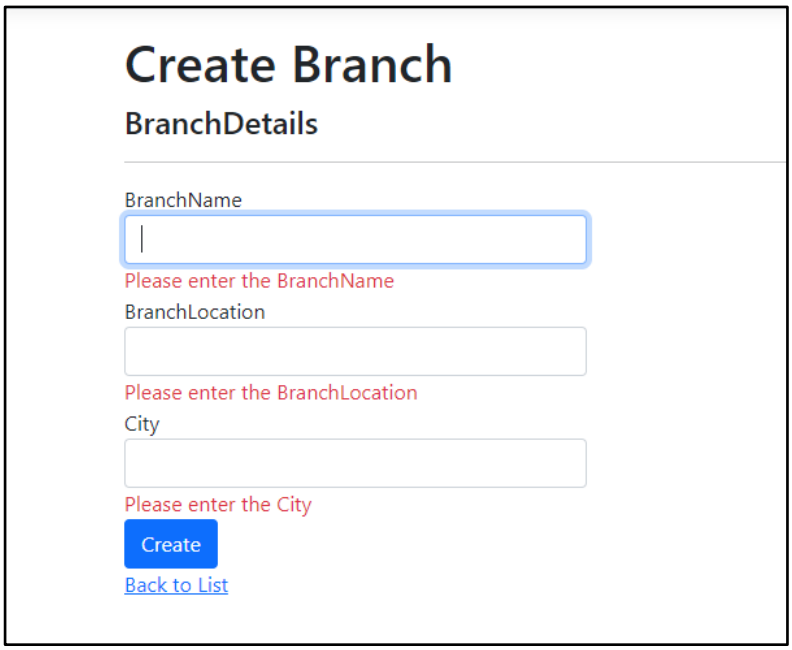


Figure: Create Branch form validation

5 User will fill up all the required details and click the create button which will save the Division details into the database and displays a message to user as follows

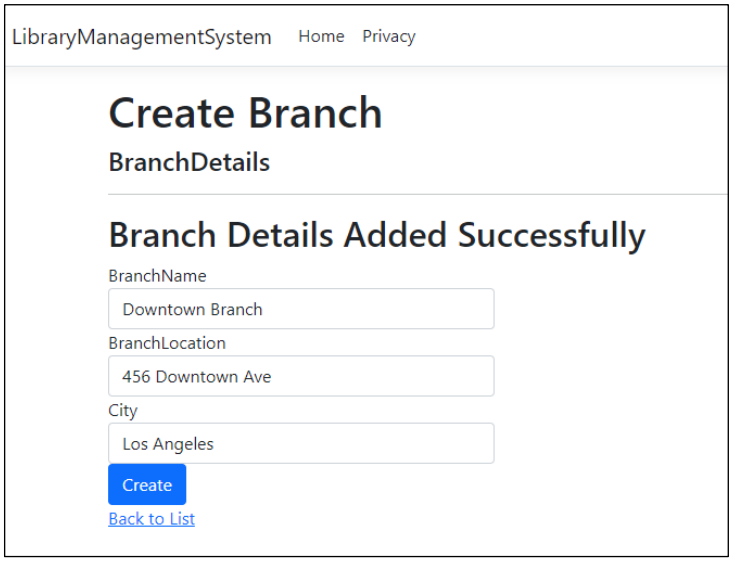


Figure: Branch Details Added

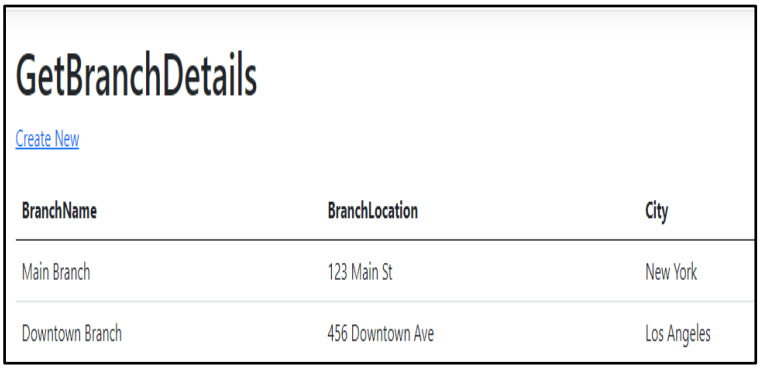


Figure: Branch Details Retrieved

5.2 Technical Guidelines

5.2.1 Implementing POCO/Entity class

Implementing BranchDetails.cs

1. Create a new class in the "Models" folder with the name as "**BranchDetails**" With the following specification.

Table: BranchDetails

Property Name	Type	Modifier
BranchId	int	public

BranchName	string	public
BranchLocation	string	public
City	string	public

2. BranchDetails entity class will be used as POCO class for generating the database table and also for creating strongly typed views for the actions method.

3. Modify the **"BranchDetails"** class with appropriate DataAnnotations to match thefollowing validation rules

Property	Validation	Error Message
BranchId	Key	
BranchName	Must not be blank	Please enter the BranchName
BranchLocation	Must not be blank	Please enter the BranchLocation
City	Must not be blank	Please enter the City

Table : BranchDetails class validations specifications

6.0 Create Book Details

6.1 Requirement Flow

Steps Explanation :

1. User launches the application and index.cshtml page is displayed to the user as follows

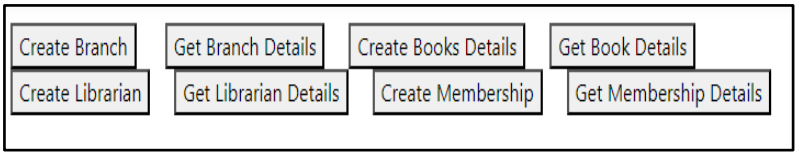


Figure : Index page

2. When the user clicks the "Create Books Details" button, the **"CreateBooksDetails.cshtml"** page is displayed to the user as follows:

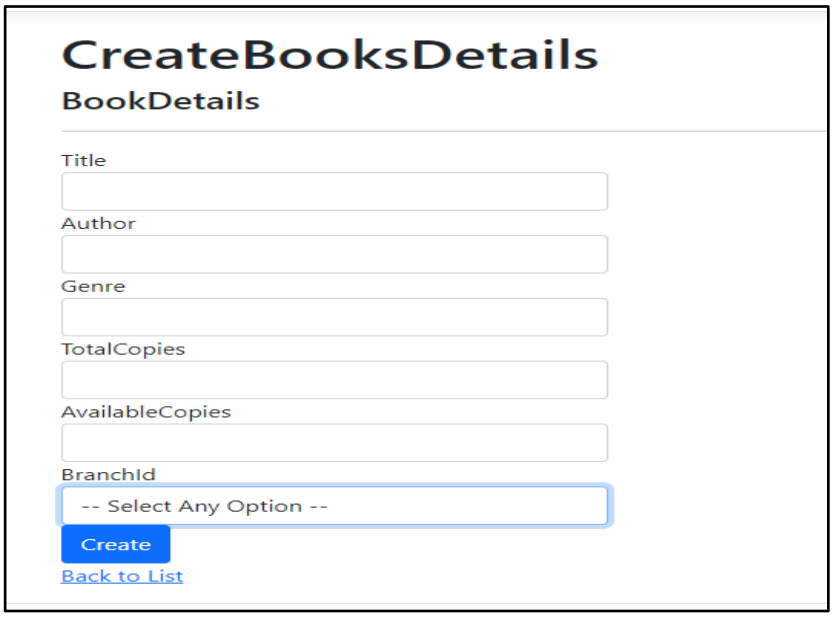


Figure : CreateBooksDetails page

3. The user can add new books as follow

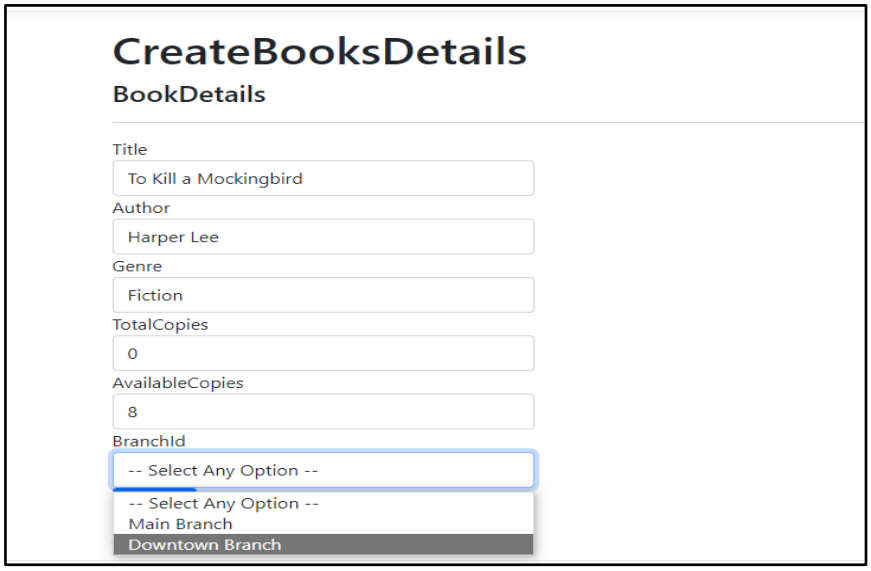


Figure: CreateBooksDetails form

4. If there is any validation failures application will display appropriate validation message as follows

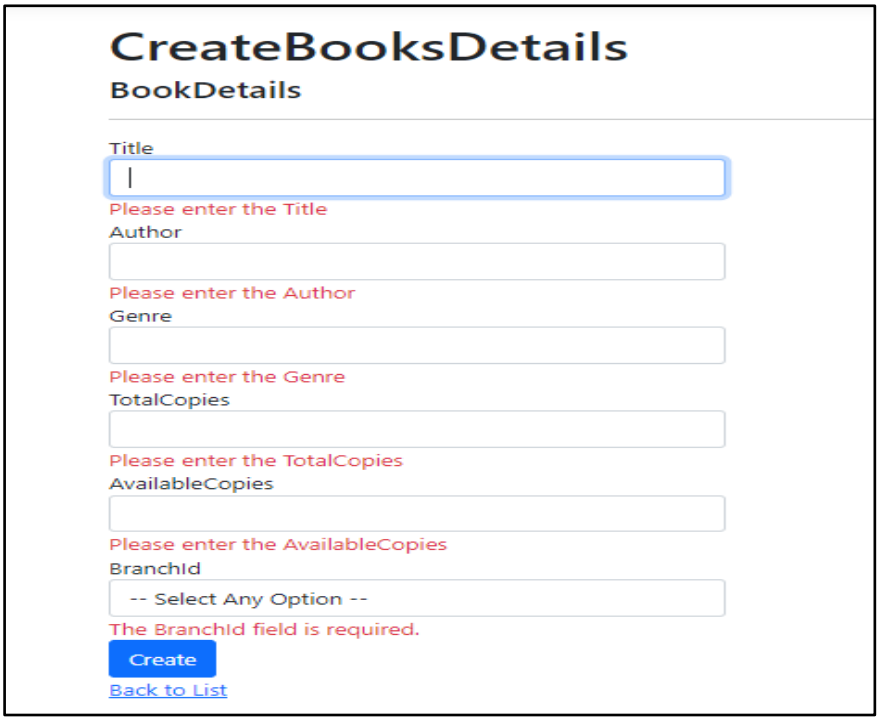


Figure : CreateBookDetails form validation

5. User will fill up all the required details and click the create button which will save the Book details into the database and displays a message to user as follows

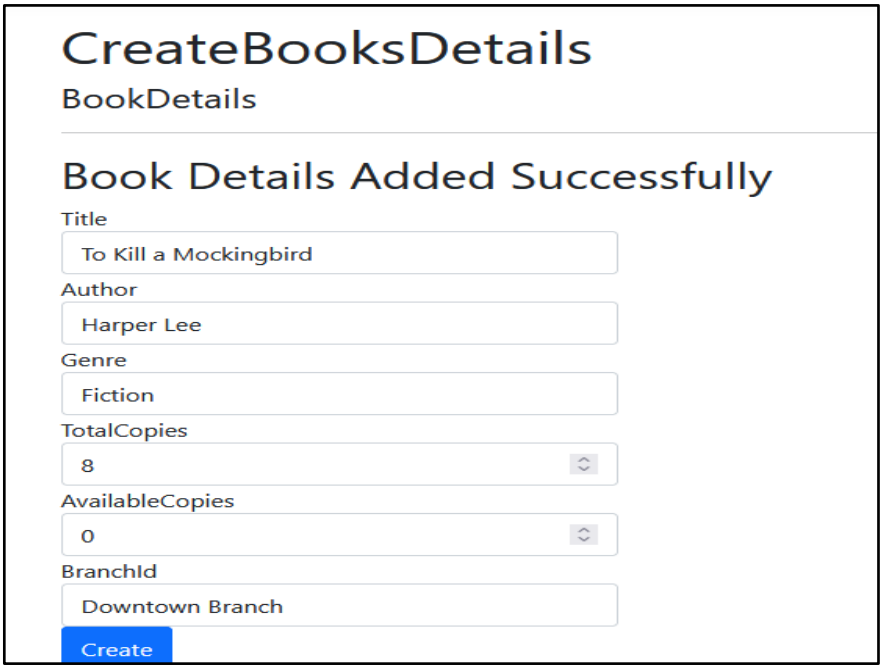


Figure : BookDetails Added

Title	Author	Genre	TotalCopies	AvailableCopies	Branch
The Great Gatsby	F. Scott Fitzgerald	Classic	10	5	Main Branch
To Kill a Mockingbird	Harper Lee	Fiction	8	0	Downtown Branch

Figure : BookDetails Retrieved

6.2 Technical Guidelines

6.2.1 Implementing POCO/Entity class

Implementing BookDetails.cs

1. Create a new class in the "Models" folder with the name as "**BookDetails**" with the following specification.

Table : BookDetails class

Property Name	Type	Modifier
Id	int	public
Title	string	public

Author	string	public
Genre	string	public
TotalCopies	int	public
AvailableCopies	int	public
BranchId	int	public
Branch	BranchDetails?	public
Branches	SelectList?	public

2. **BookDetails** entity class will be used as POCO class for generating the database table and alsofor creating strongly-typed views for the actions method.

3. Modify the **"BookDetails"** class with appropriate DataAnnotations to match the following validation rules

Table : BookDetails class validations specifications

Property	Validation	Error Message
Id	Key	
Title	Must not be blank	Please enter the Title
Author	Must not be blank	Please enter the Author
Genre	Must not be left blank	Please enter the Genre
TotalCopies	Must not be left blank	Please enter the TotalCopies
AvailableCopies	Must not be blank	Please enter the AvailableCopies

BranchId	Foreign key From Branches Table	
Branch	Add the NotMapped Attribute	
Branches	Add the NotMapped Attribute	

7.0 Create Librarian Details

7.1 Requirement Flow

Steps Explanation :

1. User launches the application and index.cshtml page is displayed to the user as follows

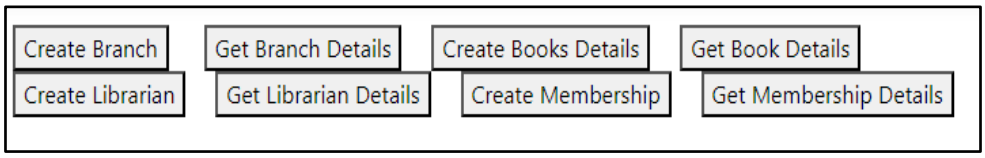


Figure : Index page

2. When the user clicks the "Create Librarian" button, the CreateLibrarian.cshtml page is displayed to the user as follows:

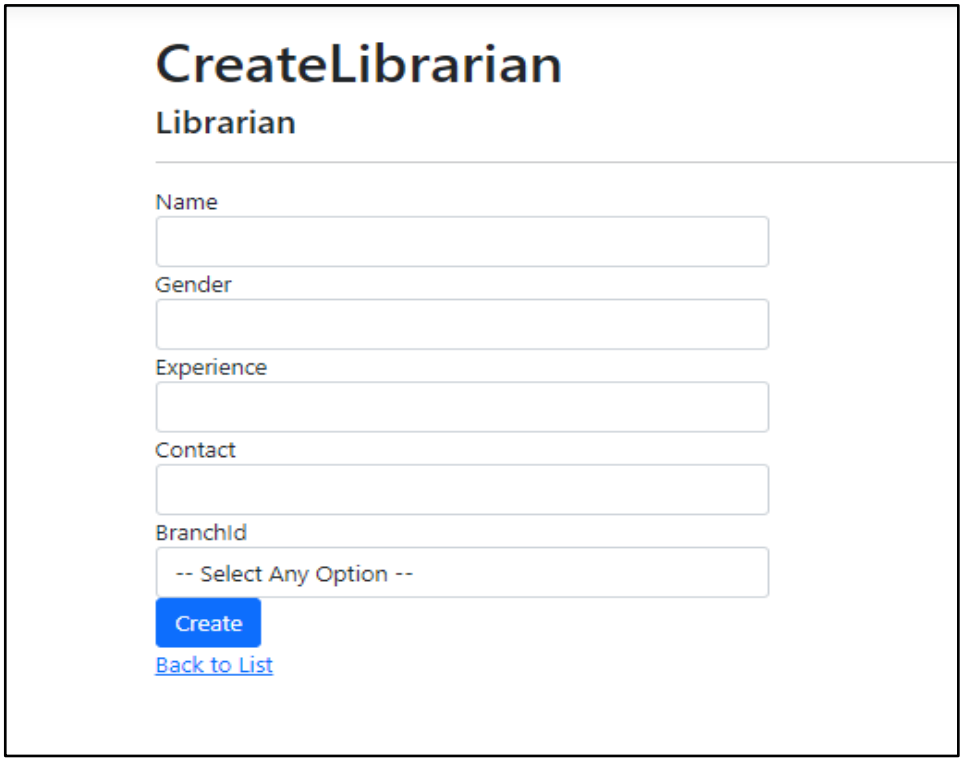


Figure : CreateLibrarian form

3. The user can add new librarian details as follows:

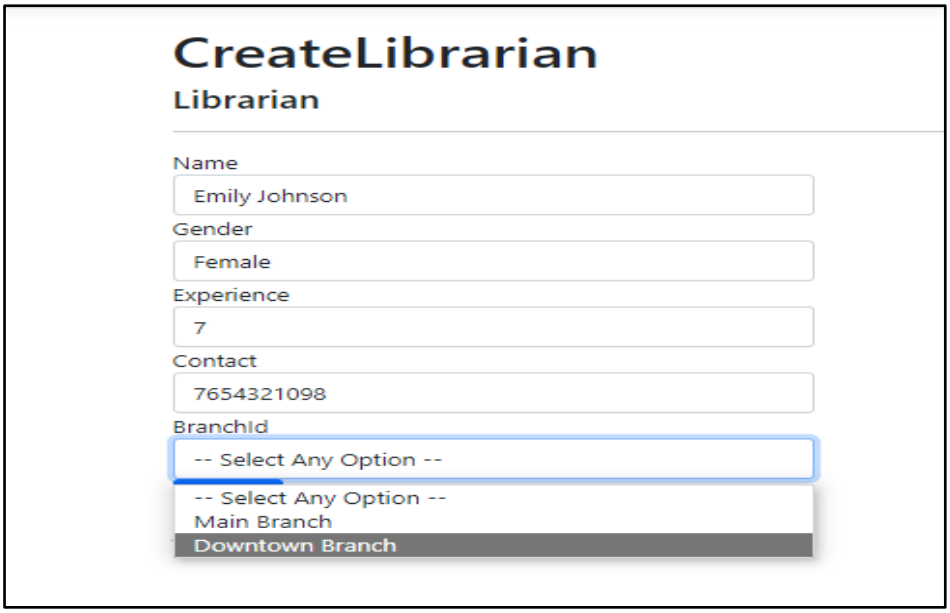


Figure: CreateLibrarian form

4. If there is any validation failures application will display appropriate

validation messageas follows

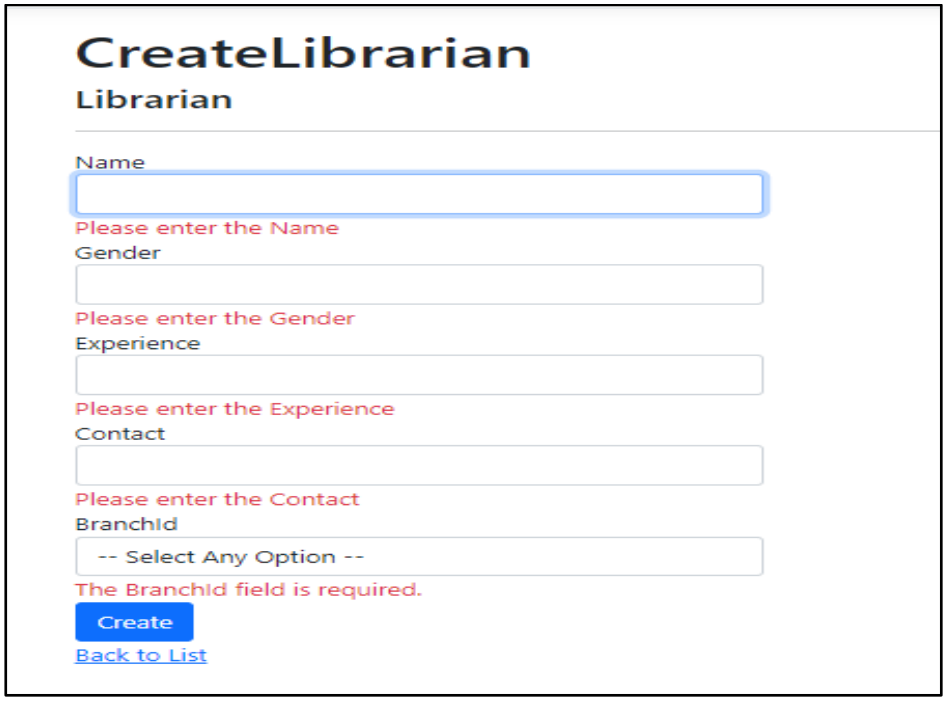


Figure : CreateStpend form validation

5. User will fill up all the required details and click the create button which will save the Stipend details into the database and displays a message to user as follows

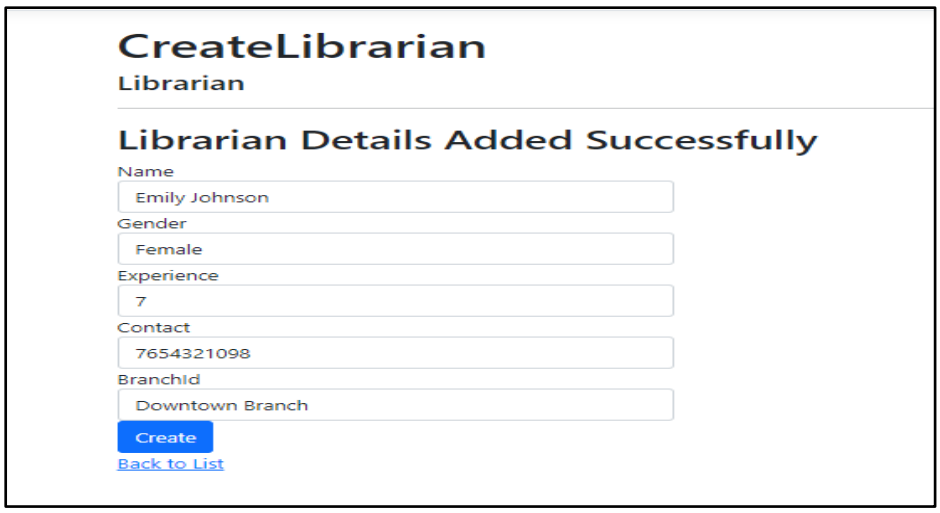


Figure : Librarian Details Added

GetLibrarianDetails

Create New

Name	Gender	Experience	Contact	Branch
John Doe	Male	5	9876543210	Main Branch
Michael Smith	Male	3	8765432109	Main Branch
Emily Johnson	Female	7	7654321098	Downtown Branch

Figure : Librarian Details Retrieved

7.2 Technical Guidelines

7.2.1 Implementing POCO/Entity class

Implementing Librarian.cs

1. Create a new class in the "Models" folder with the name as "**Librarian**" with the following specification.

Table : Librarian class

Property Name	Type	Modifier
Id	int	public
Name	string	public
Gender	string	public
Experience	int	public
Contact	string	public
BranchId	int	public
Branch	BranchDetails?	public

Branches	SelectList?	public

2. Stipend entity class will be used as POCO class for generating the database table and alsofor creating strongly-typed views for the actions method.

3. Modify the **"Librarian"** class with appropriate DataAnnotations to match the following validation rules

Table : Librarian class validations specifications

Property	Validation	Error Message
Id	Key	
Name	Must not be blank	Please enter the Name
Gender	Must not be blank	Please enter the Gender
Experience	Must not be blank	Please enter the Experience
Contact	Must not be blank	Please enter the Contact
BranchId	Must not be blank	
Branch	Add the NotMapped Attribute	
Branches	Add the NotMapped Attribute	

8.0 Create Members Details

8.1 Requirement Flow

Steps Explanation :

1. User launches the application and index.cshtml page is displayed to the user as follows

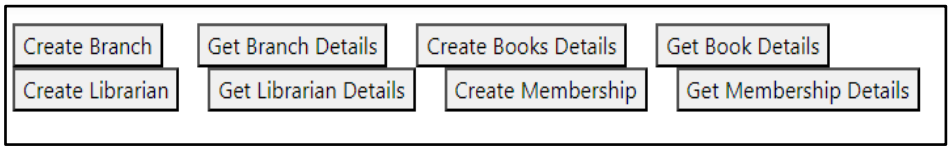


Figure : Index.cshtml

2. When the user clicks the "Create Membership" button, the CreateMembership.cshtml page is displayed to the user as follows:

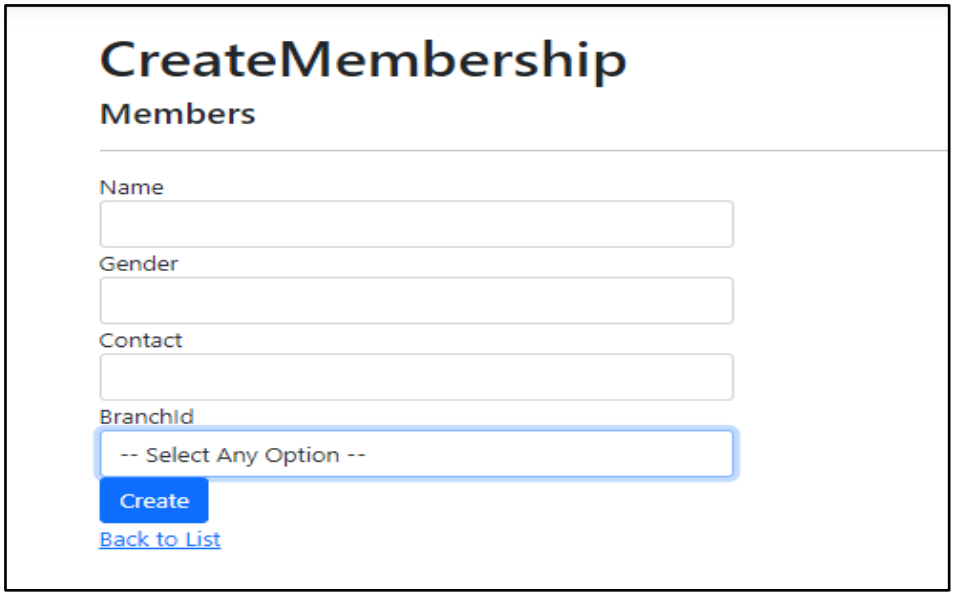


Figure : Membership Details Added form

3. The user can add new member details as follows:

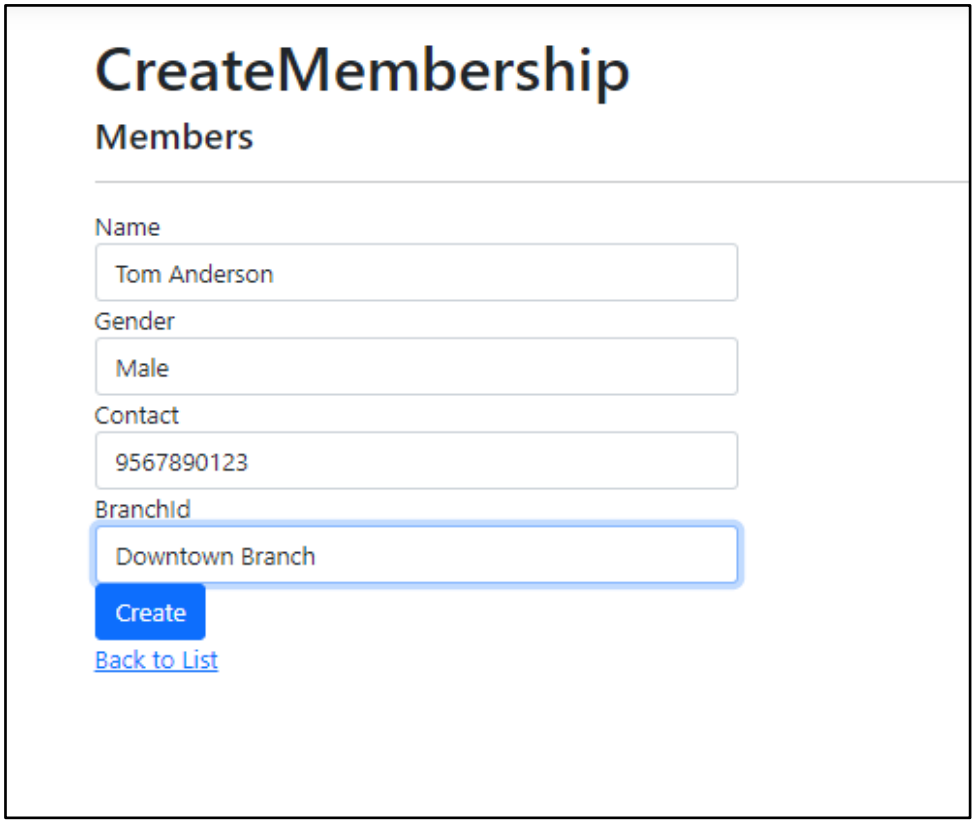


Figure : Membership Details Added form

4. If there is any validation failures application will display appropriate validation message as follows

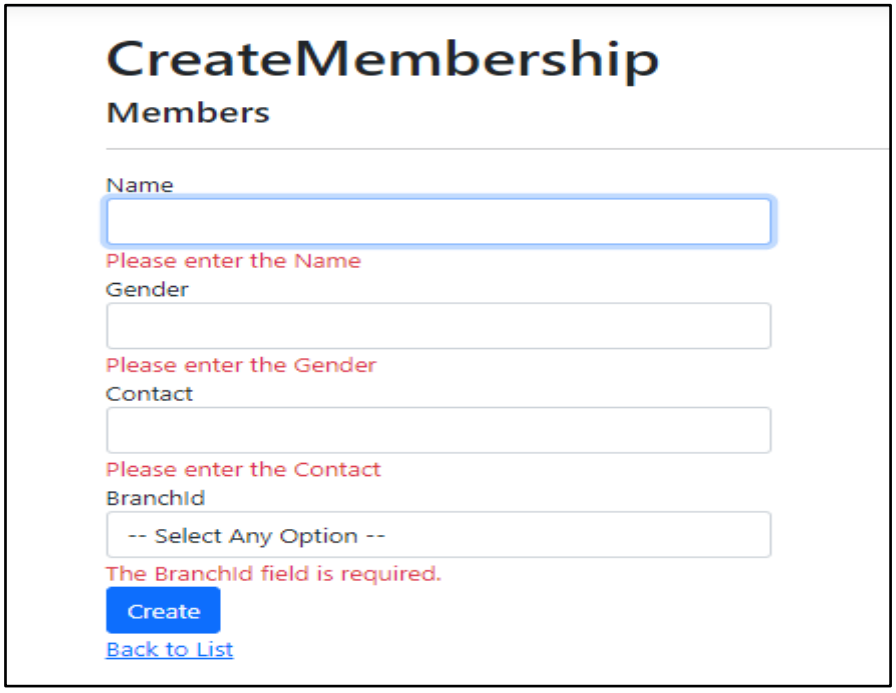


Figure : Membership Details Added form with Validation

5. **"Member Details Added Successfully"** message visible when user submits valid input.

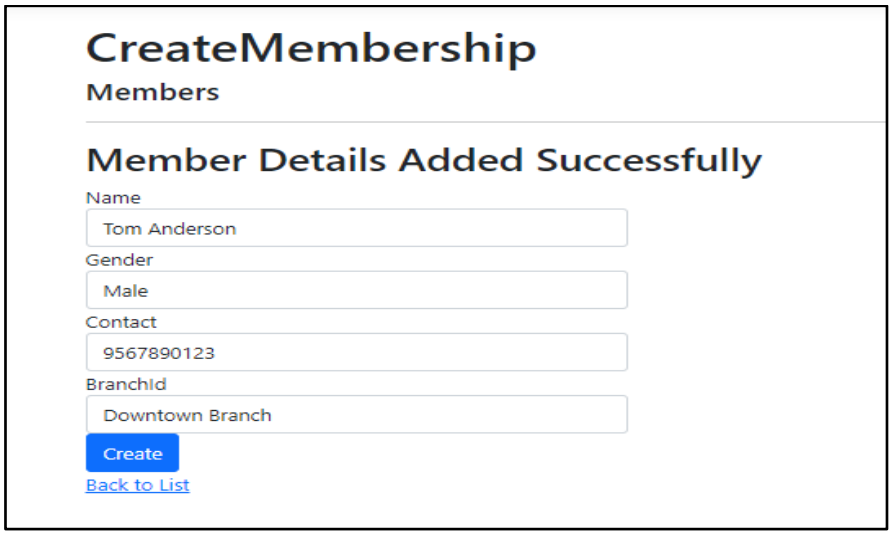


Figure: Membership Details Added

8.1 Technical guideline

8.2.1 Implementing POCO/Entity class

Implementing Members.cs

1. Create a new class in the "Models" folder with the name as "**Members**" with the following specification.

Table: Members class

Property Name	Type	Modifier
Id	int	public
Name	string	public
Gender	string	public
Contact	string	public
BranchId	int	public

Branch	BranchDetails?	public
Branches	SelectList?	public

2. Members entity class will be used as POCO class for generating the database table and for creating strongly typed views for the actions method.
3. Modify the "Members" class with appropriate DataAnnotations to match the following validation rules

Table: Members class validations specifications

Property	Validation	Error Message
Id	Key	
Name	Must not be blank	Please enter the Name
Gender	Must not be blank	Please enter the Gender
Contact	Must not be blank	Please enter the Contact
BranchId	Must not be blank	
Branch	Foreign key From Branches Table	
Branches	Add the NotMapped Attribute	

9.0 Data Context Implementation

1. Create a new folder and name it as Data and create a new file named "**DatabaseContext**" which inherits from the "**DbContext**" class.

2. Modify the **DatabaseContext** to add following details

Table : DatabaseContext class

Property Name	Type	Modifier
BranchesDetails	DbSet<BranchDetails>	public
BooksDetails	DbSet<BookDetails>	public
LibrarianDetails	DbSet<Librarian>	public
MembersDetails	DbSet<Members>	public

10.0 Controllers and Views Implementation

1. Add a new controller named **"HomeController"** in the controllers folder with the following specification.

Table : HomeController Actions

Action Name	Input Parameters	Http Request Type	Modifier	Return Type
Index()	-	Get	public	ActionResult

2. Go to Home/Index.cshtml set title as **"Index"**.
   A. In Index.cshtml view, add a hyperlink or button to LibraryController "Create" action with id=" **lnkCrBranch**" attribute
   B. In Index.cshtml view, add a hyperlink or button to LibraryController "GetBranchDetails" action with id=" **lnkGetBranch**" attribute
   C. In Index.cshtml view, add a hyperlink or button to LibraryController "CreateBooksDetails" action with id=" **lnkCrBook**" attribute
   D. In Index.cshtml view, add a hyperlink or button to LibraryController "GetBookDetails" action with id=" **lnkGetBook**" attribute

E. In Index.cshtml view, add a hyperlink or button to LibraryController "CreateLibrarian" action with id=" **lnkCrLibrarian**" attribute
F. In Index.cshtml view, add a hyperlink or button to LibraryController "GetLibrarianDetails" action with id=" **lnkGetLibrarian**" attribute
G. In Index.cshtml view, add a hyperlink or button to LibraryController "CreateMembership" action with id=" **lnkCrMember**" attribute
H. In Index.cshtml view, add a hyperlink or button to LibraryController "GetMembershipDetails" action with id=" **lnkGetMember**" attribute

3. Add a new controller named "LibraryController" in the controllers folder with the following specification.

Table : LibraryController Constructors

Constructor Type	Input Parameters	Modifier
Parameterized	_databaseContext	public

Table : LibraryController Actions

Action Name	Input Parameters	Http Request Type	Modifier	Return Type
Create()	BranchDetails	Post	public	IActionResult
GetBranchDetails()		Get	public	IActionResult
CreateBooksDetails()	BookDetails	Post	public	IActionResult
GetBookDetails()		Get	public	IActionResult
CreateLibrarian()	Librarian	Post	public	IActionResult
GetLibrarianDetails()		Get	public	IActionResult
CreateMembership()	Members	Post	public	IActionResult
GetMembershipDetails()		Get	public	IActionResult

4. Implement the constructor
5. Implement the CreateBranch(), CreateBooksDetails() and CreateLibrarian() ,CreateMembership () action methods with [HttpGet].

a. Use Scaffold the view using Create template.

b. For CreateBranch-Set an ID attribute on the submit button with the value"**BranchCreationBtn**"
c. For CreateBooksDetails - Set an ID attribute on the submit button with the value"**BookCreationBtn**"
d. For CreateLibrarian - Set an ID attribute on the submit button with the value"**LibrarianCreationBtn**"

e. For Create CreateMembers Stipend - Set an ID attribute on the submit button with the value"**MemberCreationBtn**"

6. Implement the CreateBranch(),CreateBooksDetails()and CreateLibrarian() , CreateMembership()
7. action for http postrequest to carryout the following operations

f. For all 4 post actions Validate the model and return the view if model is invalid
g. If model is valid save the model in the database
h. When the **Branch** details are saved successfully in the database, the put an acknowledgement in ViewBag by creating a "**Message**" property with value as"**Branch Details Added Successfully**"
i. When the **Book** details are saved successfully in the database, the put an acknowledgement in ViewBag by creating a "**Message**" property with value as"**Book Details Added Successfully**"
j. When the **Librarian** details are saved successfully in the database, the put an acknowledgement in ViewBag by creating a "**Message**" property with value as"**Librarian Details Added Successfully**"
k. When the **Member** details are saved successfully in the database, the put an acknowledgement in ViewBag by creating a "**Message**" property with value as "**Member Details Added Successfully**"

8. Modify the Create views to display the value of ViewBag's Message property inside an <h2> element. Assign the ID="**Message**" attribute to <h2>
9. For all the Lists page, the table tag should have the same id as per the below-given id

BranchList Table Id - **getBranches**

BookList Table Id - **getBooks**

LibrarianList Table Id – **getLibrarians**

MemberList Table Id **- getMembers**

11.0 Evaluation Areas

01	Launch of the application from Branch, Book, Librarian and Member pages
02	Logic in create functionality and Success message
03	Validation of input on controls on all pages
04	Creating properties and get post method checking
05	Checking ability in razor engine