



Software Design Specification

Course Name: Software Engineering 1

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VERSION 2



CS251: Phase 2 – Team DS_3, Books Network Software Design Specification

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Team

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Document Purpose and Audience

- **The purpose of this document:**
 - To give a brief overview about the design specifications of the “Books Network” system.
 - The design specifications that will be delivered are five important elements:
 1. The System Decomposition
 2. The Class Diagram
 3. The Sequence Diagram
 4. The Physical Entity-Relationship Diagram
 5. The User Interface Design
- **The target audience of this document:**
 - This document targets the client.
 - It will be proposed to the client to view, modify and approve it.

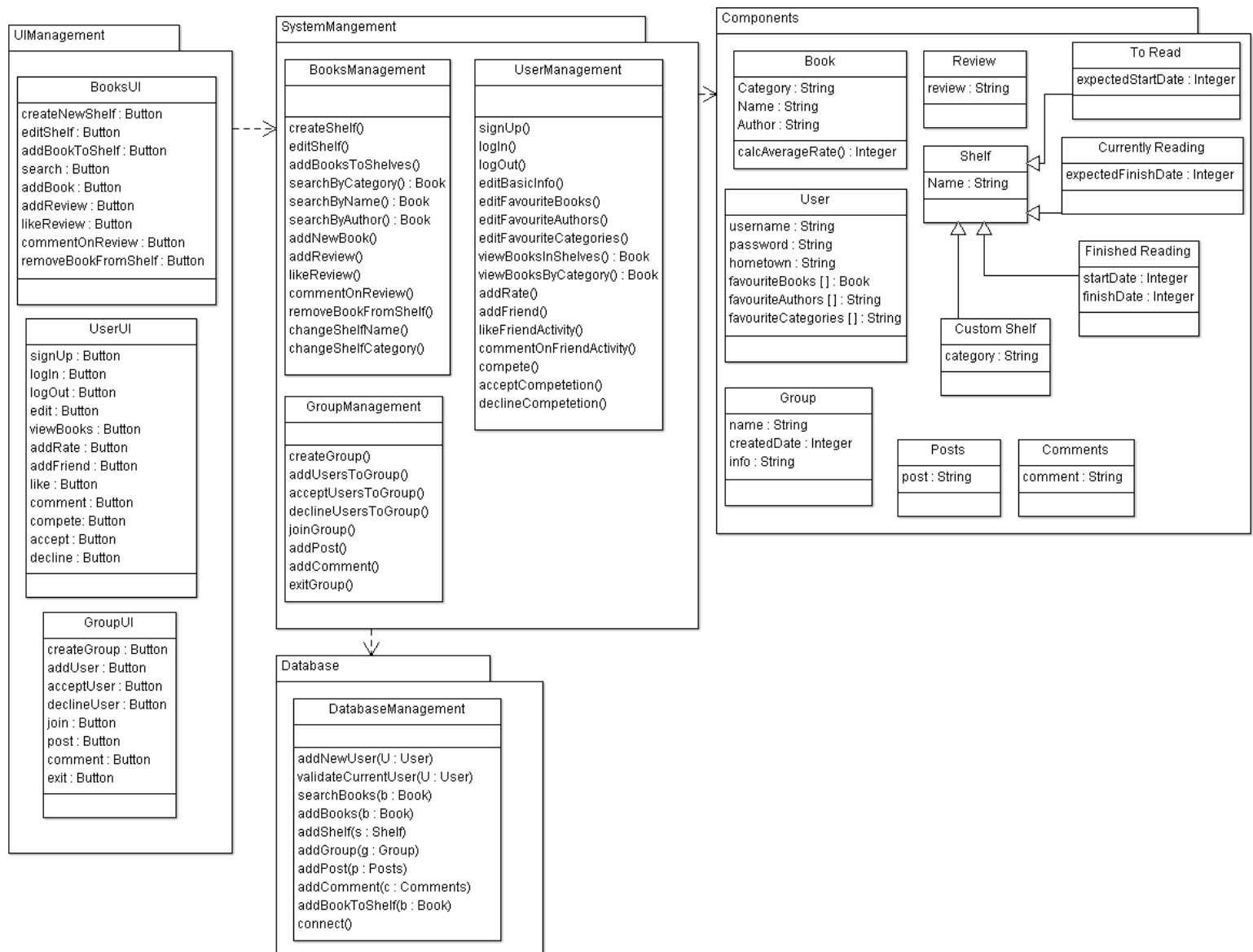


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System Models

System Decomposition



The diagram illustrates the architecture of a social reading application, organized into several functional layers:

- UI Layer:**
 - BooksUI:** Includes buttons for creating, editing, adding, searching, liking, reviewing, and removing books and shelves.
 - UserUI:** Includes buttons for signing up, logging in, logging out, editing, viewing books, adding rates, adding friends, commenting, competing, accepting, and declining.
 - GroupUI:** Includes buttons for creating, adding, accepting, declining, joining, posting, commenting, and exiting groups.
- Management Layer:**
 - BooksManagement:** Contains methods for shelf and book management, including search and review handling.
 - UserManagement:** Contains methods for user registration, login, profile editing, and social interactions (friends, competition).
 - GroupManagement:** Contains methods for group creation, user management, and post/comment handling.
- Domain Layer (Entities):**
 - Book:** Attributes include Category, Name, Author, and an average rate. It is carried by shelves and has reviews.
 - Shelf:** Attribute is Name. It carries books and is owned by users.
 - User:** Attributes include username, password, hometown, and lists of favorite books/authors/categories. It owns shelves, custom shelves, and posts, and is part of groups.
 - Group:** Attributes include name, creation date, and info. It contains posts.
 - Post:** Attribute is post content. It is created by users and includes comments.
 - Comments:** Attribute is comment content.
- Database Layer:**
 - DatabaseManagement:** Provides the underlying data access methods for all entities.
- Associations and Relationships:**
 - Shelf to Book:** 0..* shelves carry 0..* books.
 - User to Shelf:** 1 user owns 0..* shelves.
 - User to Custom Shelf:** 1 user owns 0..* custom shelves.
 - User to Post:** 1 user posts 0..* posts.
 - User to Group:** 1 user joins 0..* groups.
 - Group to Post:** 1 group contains 0..* posts.
 - Post to Comments:** 1 post includes 0..* comments.
 - Book to Review:** 1 book has 0..* reviews.
 - User to Review:** 0..* users make 0..* reviews.
 - User to Friends:** 0..* users have 0..* friends.
 - User to To Read/Currently Reading/Finished Reading:** 1 user owns 1 instance of each reading state.



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Class ID	Class Name	Sub-system ID	Description
C_1	BooksUI	1	<p>This is a boundary class of the system (UI).</p> <p>It has buttons so that the user can interact with it.</p> <p>These buttons are:</p> <ol style="list-style-type: none"> createShelf: enables the user to create a new custom shelf. editShelf: enables the user to edit a custom shelf. addBookToShelf: enables the user to add a book to any shelf of his own. search: enables the user to search for a book in the public book's list using any criteria (name, category, author). addBook: enables the user to add a new book to the public books list. addReview: enables the user to add a review about a book that he/she has already read. likeReview: enables the user to like a user's review on a book. commentOnReview: enables the user to comment on a user's review on a book. removeBookFromShelf: enables the user to remove a book from any of his shelves.



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C_2	UserUI	1	<p>This is a boundary class of the system (UI).</p> <p>It has buttons so that the user can interact with it.</p> <p>These buttons are:</p> <ol style="list-style-type: none"> SignUp: enables a new user to create an account on the system. He/she can sign up to the system by a unique username, email address and password. LogIn: enables user to log into his account on the system using his email address and password. logout: enables user to log out of his account on the system. edit: enables user to edit his basic information (change his/her username, his/her hometown where he/she lives, his/her profile picture...) or change his/her favorite books by changing their rate, or change his list of favorite authors, or change his favorite categories. viewBooks: enables user to view the books that are in any of his shelves or to view the books sorted by their category. addRate: enables user to rate a book from 1 to 5. addFriend: enables user to add another user as a friend. like: enables user to like a friend's activity. comment: enables user to comment on a friend's activity. compete: enables user to compete on a book with a user. accept: enables user to accept a competition request on a book that another user has sent him/her. decline: enables user to decline a competition request on a book that another user has sent him/her.
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C_3	GroupUI	1	<p>This is a boundary class of the system (UI).</p> <p>It has buttons so that the user can interact with it.</p> <p>These buttons are:</p> <ol style="list-style-type: none"> 1. createGroup: enables user to create a group on the system. 2. addUser: enables user to add a user to a group that he manages. 3. acceptUser: enables user to accept a user's join request to a group that he manages. 4. declineUser: enables user to decline a user's join request to a group that he manages. 5. join: enables user to join a group that he doesn't manage. 6. post: enables user to write a post in a group. 7. comment: enables user to comment on a post in a group. 8. exit: enables user to leave a group.
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C_4	BooksManagement	2	<p>This is a controller class of the system.</p> <p>It is responsible managing books and their attributes and functions performed on it.</p> <p>It has functions:</p> <ol style="list-style-type: none"> createShelf: It is performed when a user wants to create a new shelf for a desired category with a desired name. editShelf: It is performed when a user wants to change a shelf by changing its category or its name. addBooksToShelves: It is performed when a user wants add a book that he found to any of his/her shelves (one of the three default shelves or any other specific shelves that the user has). searchByCategory: It is performed when a user wants to search for books by its category so the function will return an array of all the books in the public books list that are of this category. searchByName: It is performed when a user wants to search for books by its name so the function will return an array of all the books in the public books list that contains this name. searchByAuthor: It is performed when a user wants to search for books by its category so the function will return an array of all the books in the public books list that this author has written. addNewBook: It is performed when a user wants to add a book to the public books list that doesn't exist in it. addReview: It is performed when a user wants to add a review about a book that he/she has already read. likeReview: It is performed when a user wants to like a user's review on a book. commentOnReview: It is performed when a user wants to comment on a user's review on a book removeBookFromShelf: it is performed whenever a user removes a book from the shelf. changeShelfName: it is performed when a user wants to edit any shelf of his own by changing its name. changeShelfCategory: it is performed when a user wants to edit any shelf of his own by changing its category.
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C_5	UserManagement	2	<p>This is a controller class of the system. It is responsible managing books and their attributes and functions performed on it. It has functions:</p> <ol style="list-style-type: none"> SignUp: It is performed when a new user wants to create an account on the system. He/she can sign up to the system by a unique username, email address and password. LogIn: It is performed when a current user wants to log into his account on the system using his email address and password. editBasicInfo: it is performed when a new wants to edit his basic information (change his/her username, his/her hometown where he/she lives, his/her profile picture...) editFavoriteBooks: it is performed when a user wants to change his/her favorite books by changing their rate. editFavoriteAuthors: it is performed when a user wants to change his list of favorite authors. He can either add a new author that he/she likes or remove an author that he/she doesn't like anymore. editFavoriteCategories: it is performed when the user wants to add a new books category that he/she likes or delete a category that he/she doesn't like anymore. viewBooksInShelves: it is performed when the user wants to view the books that are in any of his shelves. viewBooksByCategory: it is performed when the user wants to view the books sorted by their category. addRate: It is performed when a user wants to rate a book from 1 to 5. addFriend: It is performed when a user wants to add another user as a friend. likeFriendActivity: It is performed when a user wants to like a friend's activity. commentOnFriendActivity: It is performed when a user wants to comment on a friend's activity. compete: It is performed when a user wants to compete on a book with a user. acceptCompetition: It is performed when a user wants to accept a competition request on a book that another user has sent him/her. declineCompetetion: It is performed when a user wants to decline a competition request on a book that another user has sent him/her. logout: It is performed when a user wants to log out of his account on the system.
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C_6	GroupManagement	2	<p>This is a controller class of the system.</p> <p>It is responsible managing books and their attributes and functions performed on it.</p> <p>It has functions:</p> <ol style="list-style-type: none"> 1. createGroup: It is performed when a user wants to create a group on the system. 2. addUsersToGroup: It is performed when a user wants to add a user to a group that he manages. 3. acceptUsersToGroup: It is performed when a user wants to accept a user's join request to a group that he manages. 4. declineUsersToGroup: It is performed when a user wants to decline a user's join request to a group that he manages. 5. joinGroup: It is performed when a user wants to join a group that he doesn't manage. 6. addPost: It is performed when a user wants to write a post in a group. 7. addComment: It is performed when a user wants to comment on a post in a group. 8. exitGroup: It is performed when a user wants to leave a group.
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C_7	DatabaseManagement	3	<p>This is a class that manages the database of the system.</p> <p>Only controller classes can access this class.</p> <p>It is responsible for functions related to the system's database:</p> <ol style="list-style-type: none"> addNewUser: it is performed when a new user sign up to the system, so a new user is added to the system's database. validateCurrentUser: it is performed when a user logs in using his username and password to check from the database that he has an account on the system and that his username and password are correct. searchBooks: it is performed when a user searches for a book in the public books list, so it will search in the system's database. addBooks: it is performed when the user doesn't find a book that he wants, so he will add this book manually into the public books list, so it's added to the system's database. addShelf: It is performed when a user creates a new shelf for a desired category with a desired name, so it must be added to the system's database. addGroup: It is performed when a user creates a group on the system, so a new group is added to the system's database. addPost: It is performed when a user writes a post in a group, so a new post is added to the system's database. addComment: It is performed when a user comments on a post in a group, so a new comment is added to the system's database. addBookToShelf: it is performed whenever a user adds a new book to his shelf so it must be added through the system's database. connect: it opens the connection to the system's database.
C_8	Book	4	<p>This is an entity class.</p> <p>It is responsible for all books and their attributes and functions.</p> <p>Each book has a category, name, and author.</p> <p>It has only one method to calculate the average rate for a given book:</p> <ol style="list-style-type: none"> calcAverageRate: it is performed whenever a user enters a new rate, it sums all the different rates by different users and divides them by their number to give the average rate for the given book.



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C_9	Review	4	<p>This is an entity class.</p> <p>It is responsible for all reviews that a book has and their attributes.</p> <p>Each review is like a paragraph that has some sentences in it.</p>
C_10	Shelf	4	<p>This is an entity class.</p> <p>It is responsible for all the user's shelves and their attributes.</p> <p>Each shelf has a name of its own.</p>
C_11	Custom Shelf	4	<p>This is the class where the user can create a new shelf for a desired category with a desired name.</p> <p>Each shelf has its own category.</p>
C_12	Finished Reading	4	<p>This is the class that handles the "Finished Reading" shelf of the user.</p> <p>The "Finished Reading" shelf is a default shelf that exists by default to every user.</p> <p>Each finished book has its own start date and finish date.</p>
C_13	Currently Reading	4	<p>This is the class that handles the "Currently Reading" shelf of the user.</p> <p>The "Currently Reading" shelf is a default shelf that exists by default to every user.</p> <p>Each currently-reading book has its own expected finish date.</p>
C_14	To Read	4	<p>This is the class that handles the "To Read" shelf of the user.</p> <p>The "To Read" shelf is a default shelf that exists by default to every user.</p> <p>Each currently-reading book has its own expected start date.</p>
C_15	User	4	<p>This is an entity class of the system that handles the user's attributes.</p> <p>It has the basic information of the user and his profile as: his username, his password, his hometown, his list of favorite books (array of type Book), his list of favorite authors (string array), and his list of favorite categories (string array).</p>



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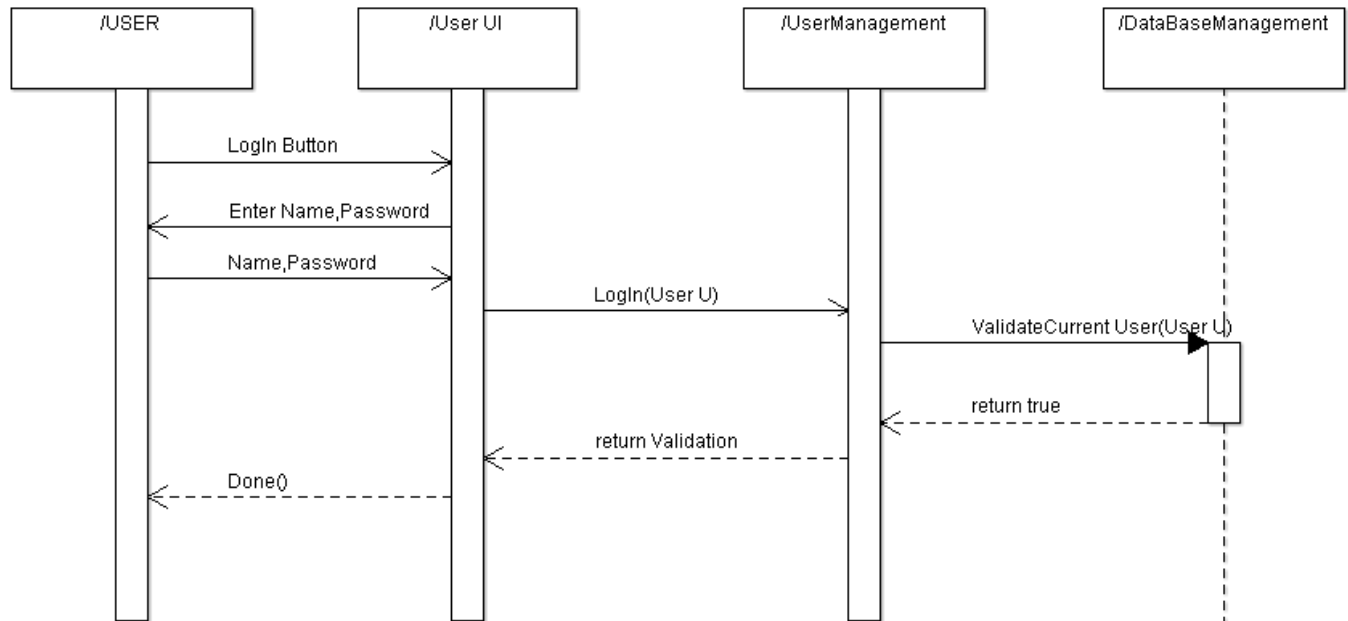
C_16	Group	4	<p>This is an entity class.</p> <p>It is responsible for all the groups that are involved in the system</p> <p>Each group has a name, a created date to show when it was created, and information about it.</p>
C_17	Posts	4	<p>This is an entity class.</p> <p>It is responsible for all the posts in a given group.</p> <p>Each post is like some sentences (a string).</p>
C_18	Comments	4	<p>This is an entity class.</p> <p>It is responsible for all the comments in a given post in a given group.</p> <p>Each comment is like some sentences (a string).</p>



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Sequence diagrams

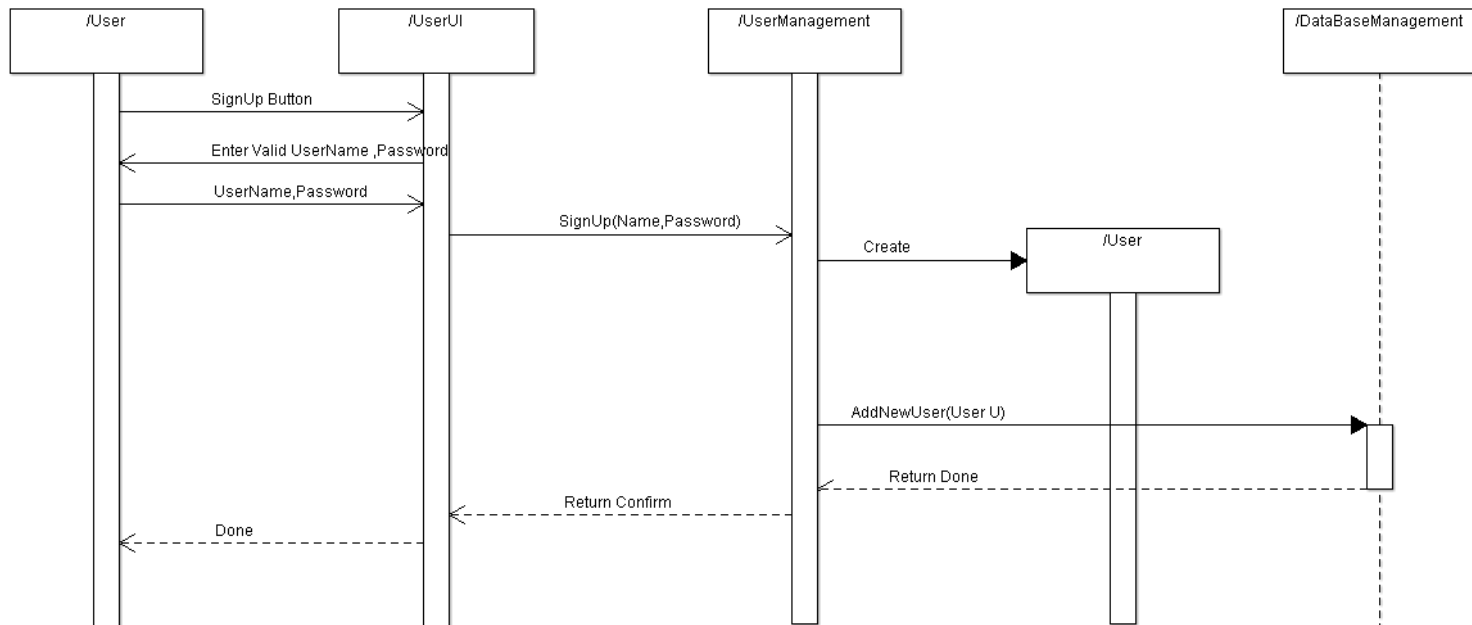
1. LogIn





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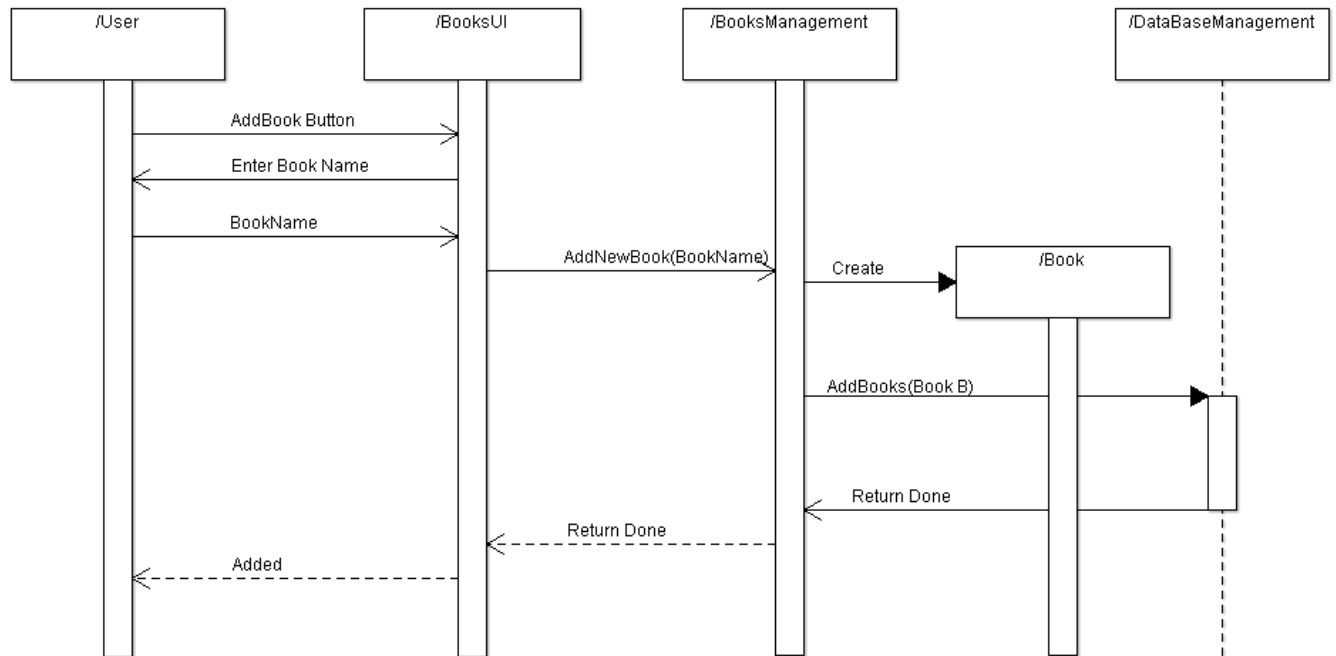
2. SignUp





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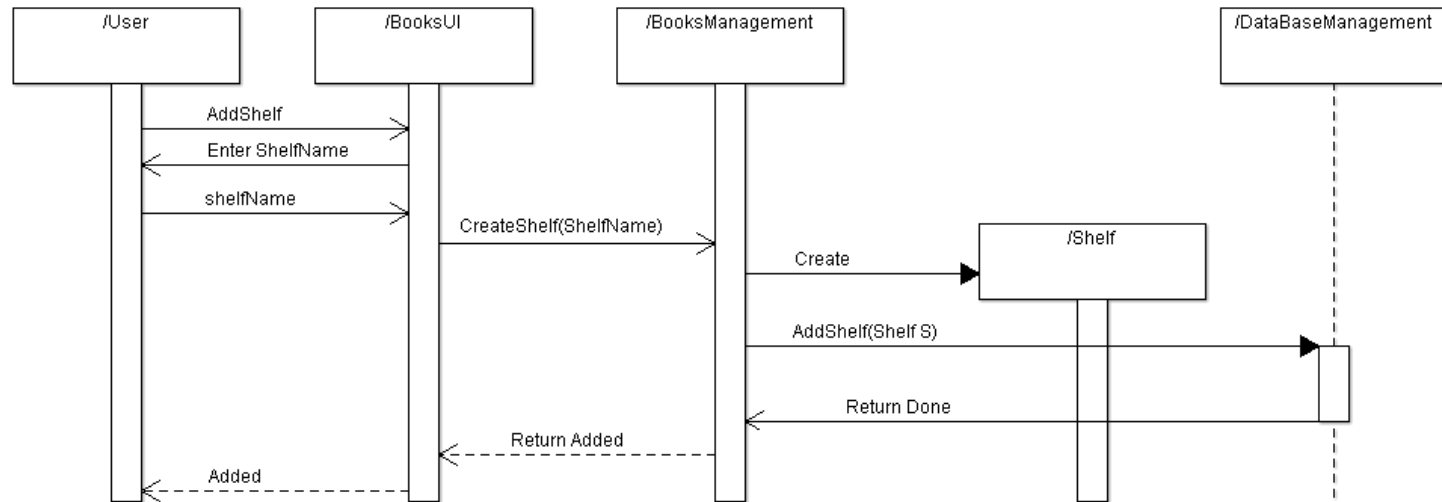
3. AddBook





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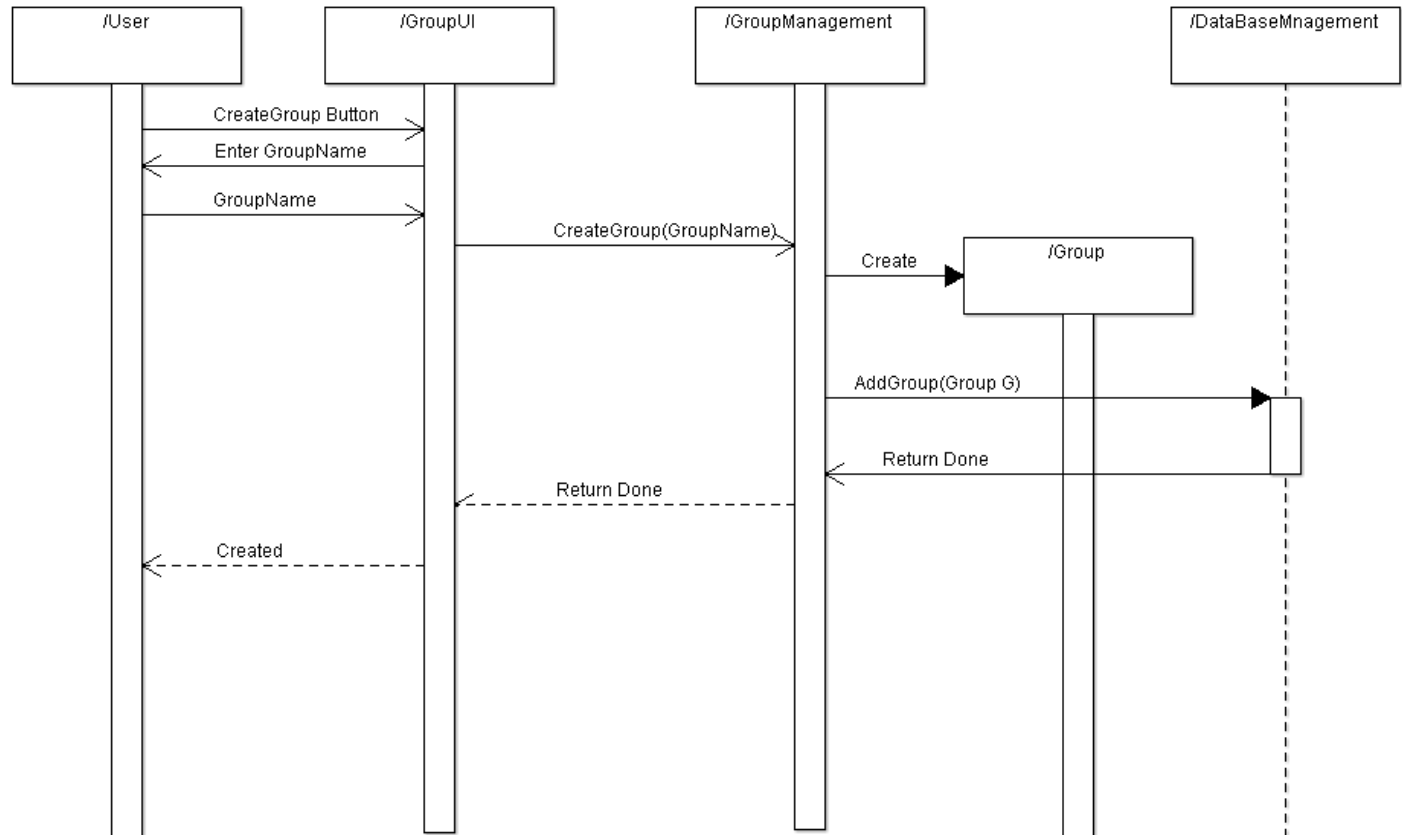
4. AddShelf





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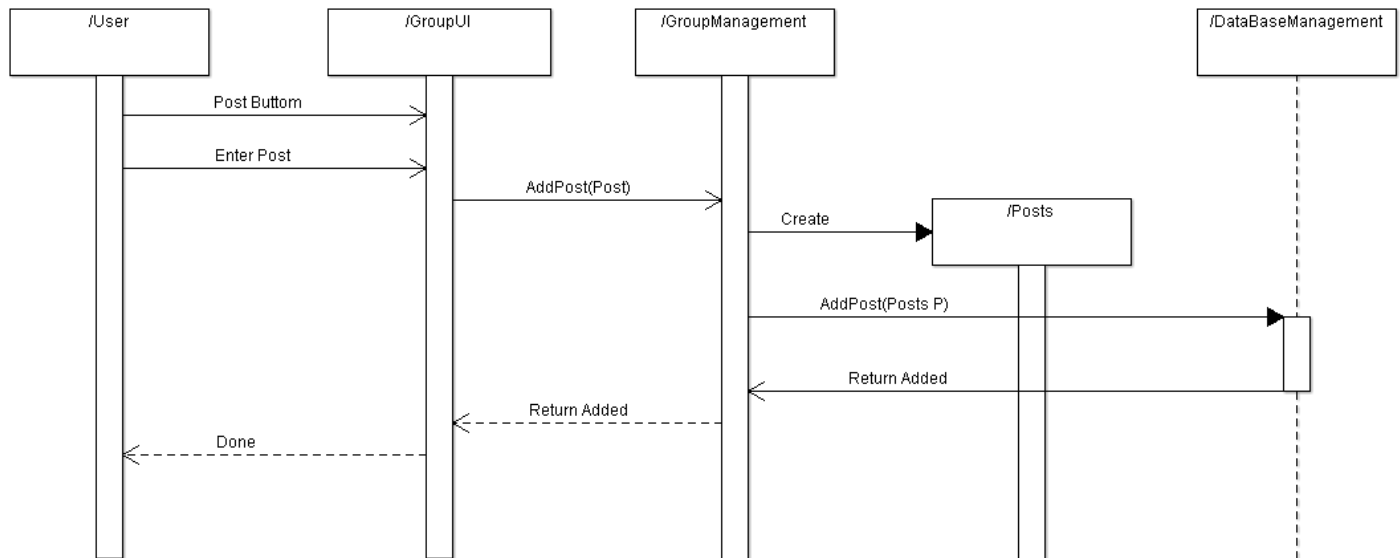
5. AddGroup





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6. AddPost





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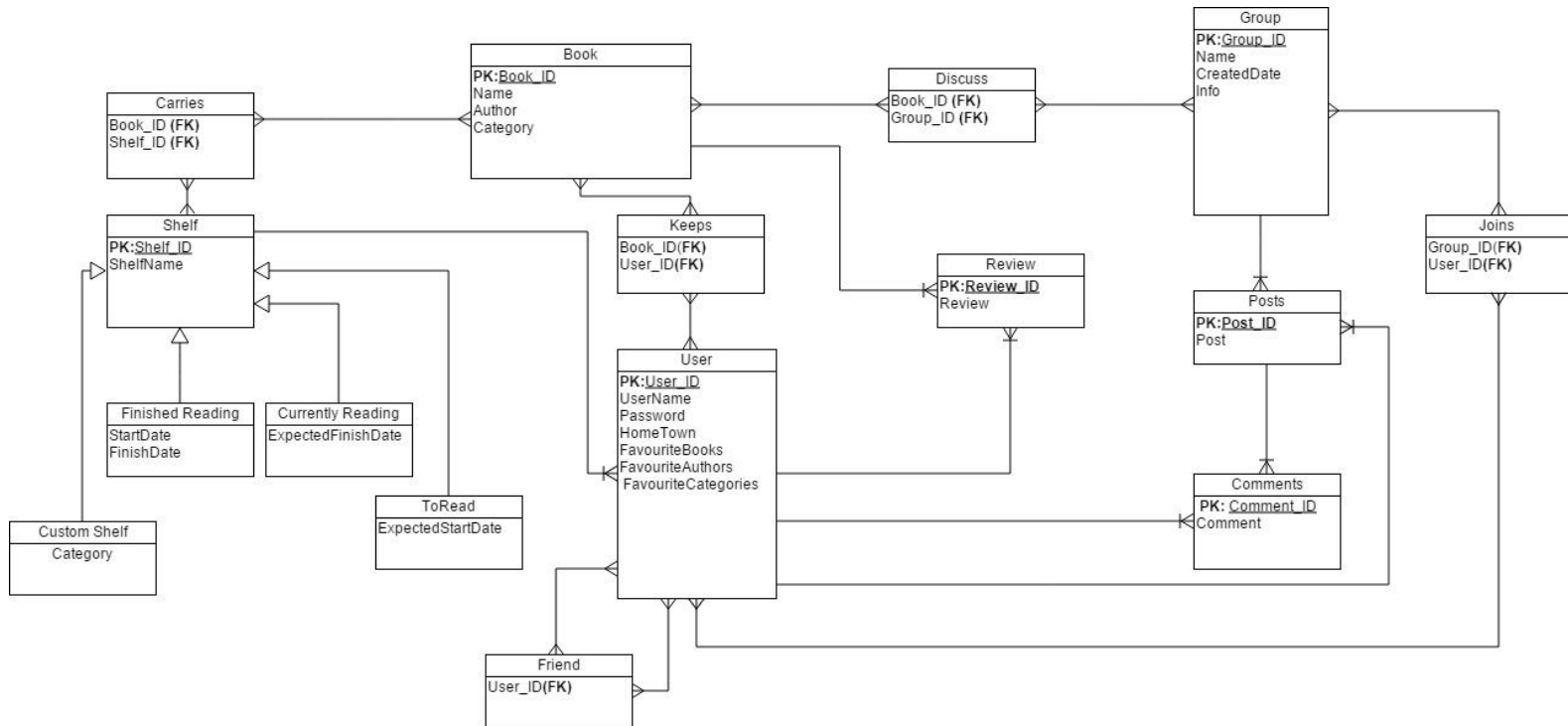
Class - Sequence Usage

Class Name	Sequence Diagrams	Overall used methods
BooksUI	3,4	AddShelf Button AddBook Button
GroupUI	5,6	CreateGroup Button Post Button
UserUI	1,2	LogIn Button SignUp Button
BooksManagement	3,4	AddNewBook(BookName) CreateShelf(ShelfName)
UserManagement	1,2	LogIn(User U) SignUp(Name,Password)
GroupManagement	5,6	CreateGroup(Group Name) AddPost(Post)
DataBaseManagement	1,2 ,3,4,5,6	ValidateCurrentUser(User U) AddShelf(Shelf S) AddNewUser(User U) AddBooks(Book B) AddGroup(Group G) AddPost(Posts P)
Review	None	None
User	2	Create
Book	3	Create
Group	5	Create
Shelf	4	Create
Posts	6	Create
Comment	None	None



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Physical Entity-Relationship Diagram

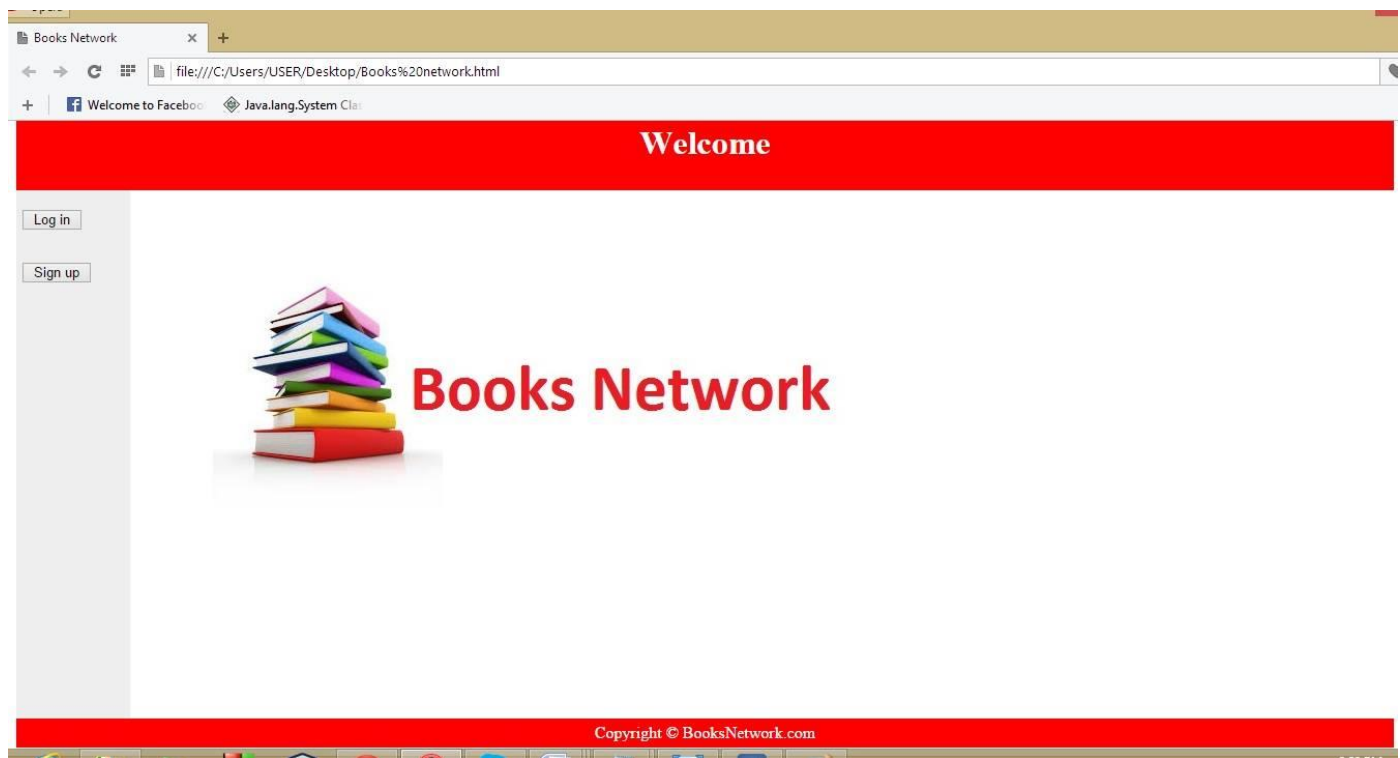




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User Interface Design

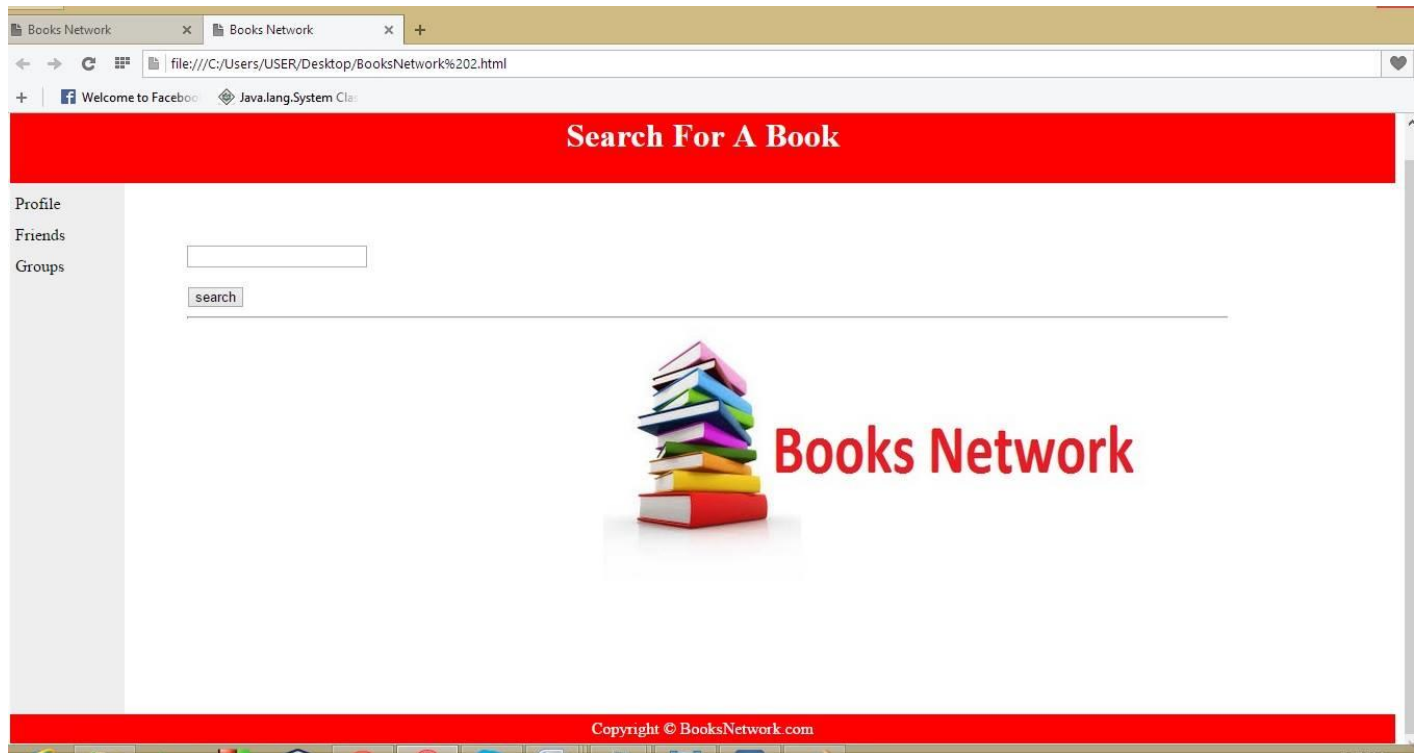
Screen 1 – Main Interface





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Screen 2 – Search Screen





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Ownership Report

Item	Owners
<ul style="list-style-type: none">• UI Design	Hussien Mohamed
<ul style="list-style-type: none">• System Decomposition• Class Diagram	Yousra Mohamed
<ul style="list-style-type: none">• Sequence Diagram• ERD Diagram	Farida Mohamed