

Advanced Data Centric
Web Applications
Library Project

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1 Description

Write a Spring Boot MVC application that allows a logged-in user to manage customers, books and loans in an online library.

2 Requirements

The application should be written in Spring Boot based on the skeleton application available on Moodle and should use the Spring MVC n-tier architecture – Controllers, Services, Repositories, Views, with the appropriate data/logic in each tier.

The Model for the application consists of three objects:

- Customer
 - Customer ID
 - Customer Name
 - Load Period
- Book
 - Book ID
 - Title
 - Author
- Loan
 - Loan ID
 - Customer ID
 - Book ID
 - Due Date

These models have been given in the skeleton code for the project and their dependencies already set up.

3 Submission

A zipped file containing the source code of the entire application should be uploaded to Moodle no later than **Monday April 29th 2019 at 9:00am.**

4 Marks

This assignment is worth 50% of the marks for the module.

4.1.1 Marking Scheme

85% of the marks will be awarded for implementing the functionality described in this document.

15% of the marks will be awarded for innovation and good programming practice.

Please describe your innovation (if any) in a document entitled *innovation.doc* which should be stored in the root folder of your project.

4.1.2 Plagiarism

Plagiarism will be dealt with in accordance with the institute's [Plagiarism policy](#).

5 Skeleton and Databases

The application should be created by updating the skeleton application available on Moodle.

6 Functionality

6.1 Main Screen

When the application starts, the user should see the following screen:

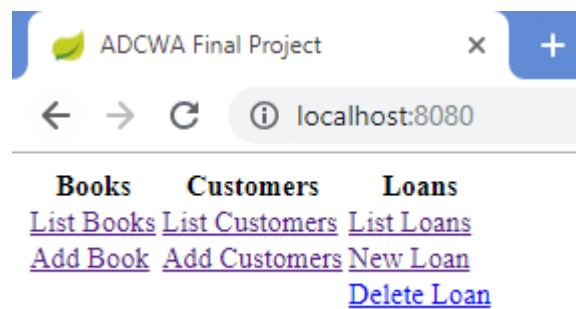
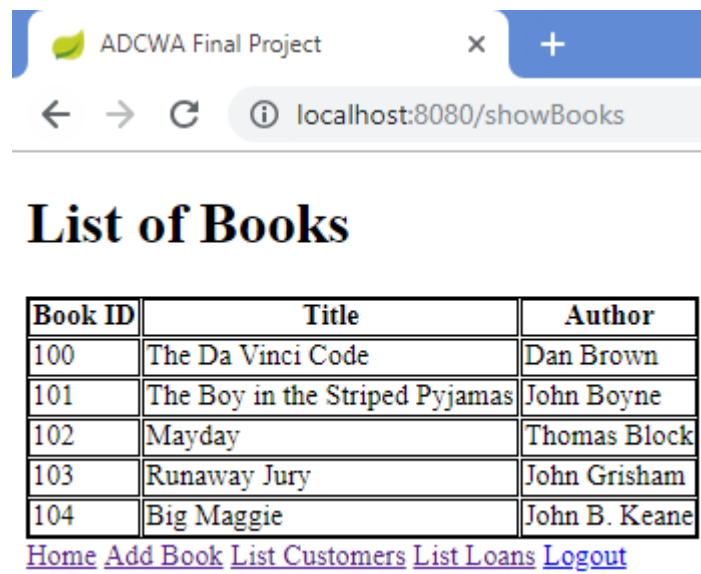


Figure 1 Main Screen

6.2 List Books

This screen shows the list of Books in the *books* database:



ADCWA Final Project

localhost:8080/showBooks

List of Books

Book ID	Title	Author
100	The Da Vinci Code	Dan Brown
101	The Boy in the Striped Pyjamas	John Boyne
102	Mayday	Thomas Block
103	Runaway Jury	John Grisham
104	Big Maggie	John B. Keane

[Home](#) [Add Book](#) [List Customers](#) [List Loans](#) [Logout](#)

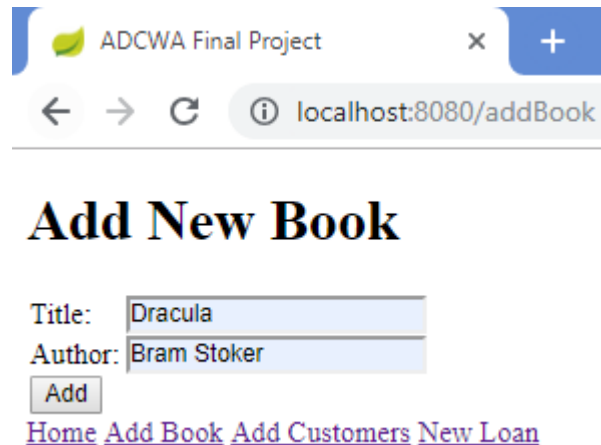
Figure 2 List Books

6.3 Add New Book

This screen allows the user to add a new Book.

6.3.1 Success Conditions

If all information is entered correctly, the books database is updated with the new Book information:



ADCWA Final Project

localhost:8080/addBook

Add New Book

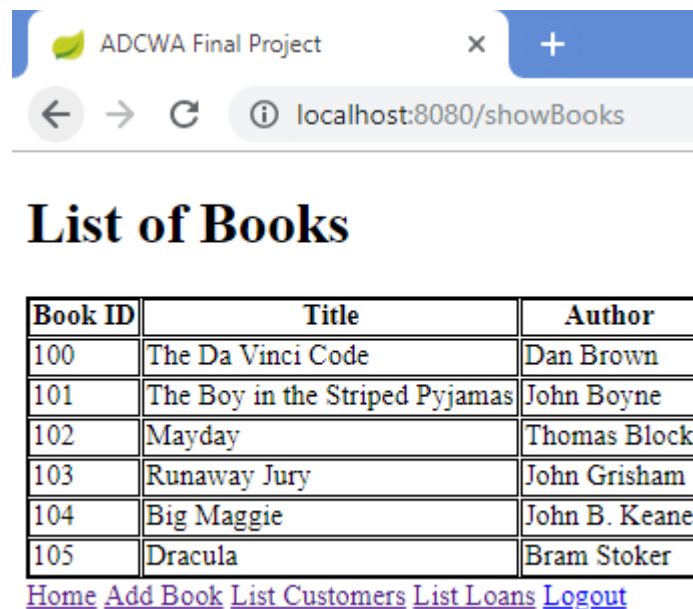
Title:

Author:

[Home](#) [Add Book](#) [Add Customers](#) [New Loan](#)

Figure 3 Add New Book – OK

And the user is immediately brought to the List Books page, where the book just entered is shown:



ADCWA Final Project

localhost:8080/showBooks

List of Books

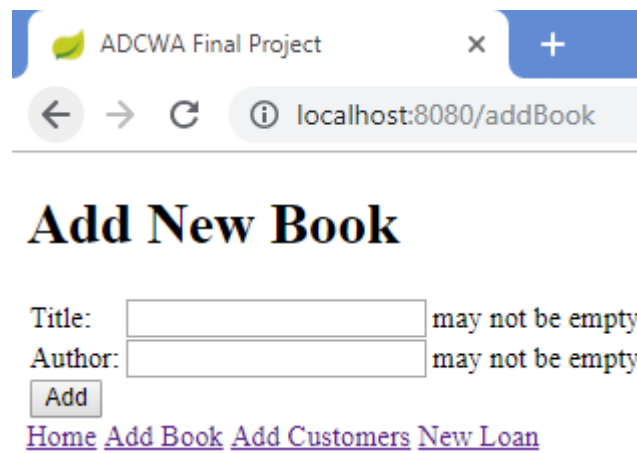
Book ID	Title	Author
100	The Da Vinci Code	Dan Brown
101	The Boy in the Striped Pyjamas	John Boyne
102	Mayday	Thomas Block
103	Runaway Jury	John Grisham
104	Big Maggie	John B. Keane
105	Dracula	Bram Stoker

[Home](#) [Add Book](#) [List Customers](#) [List Loans](#) [Logout](#)

Figure 4 List of Books after new book added

6.3.2 Invalid user input conditions

If the book title and/or author is blank the following errors should be displayed as appropriate, and no book should be added to the books database.



The screenshot shows a web browser window with the title bar 'ADCWA Final Project'. The address bar displays 'localhost:8080/addBook'. The main heading is 'Add New Book'. Below the heading, there are two input fields: 'Title:' and 'Author:'. Both fields are empty and have a red border. To the right of each field is the error message 'may not be empty'. Below the input fields is a button labeled 'Add'. At the bottom, there are four links: 'Home', 'Add Book', 'Add Customers', and 'New Loan'.

Add New Book

Title: may not be empty

Author: may not be empty

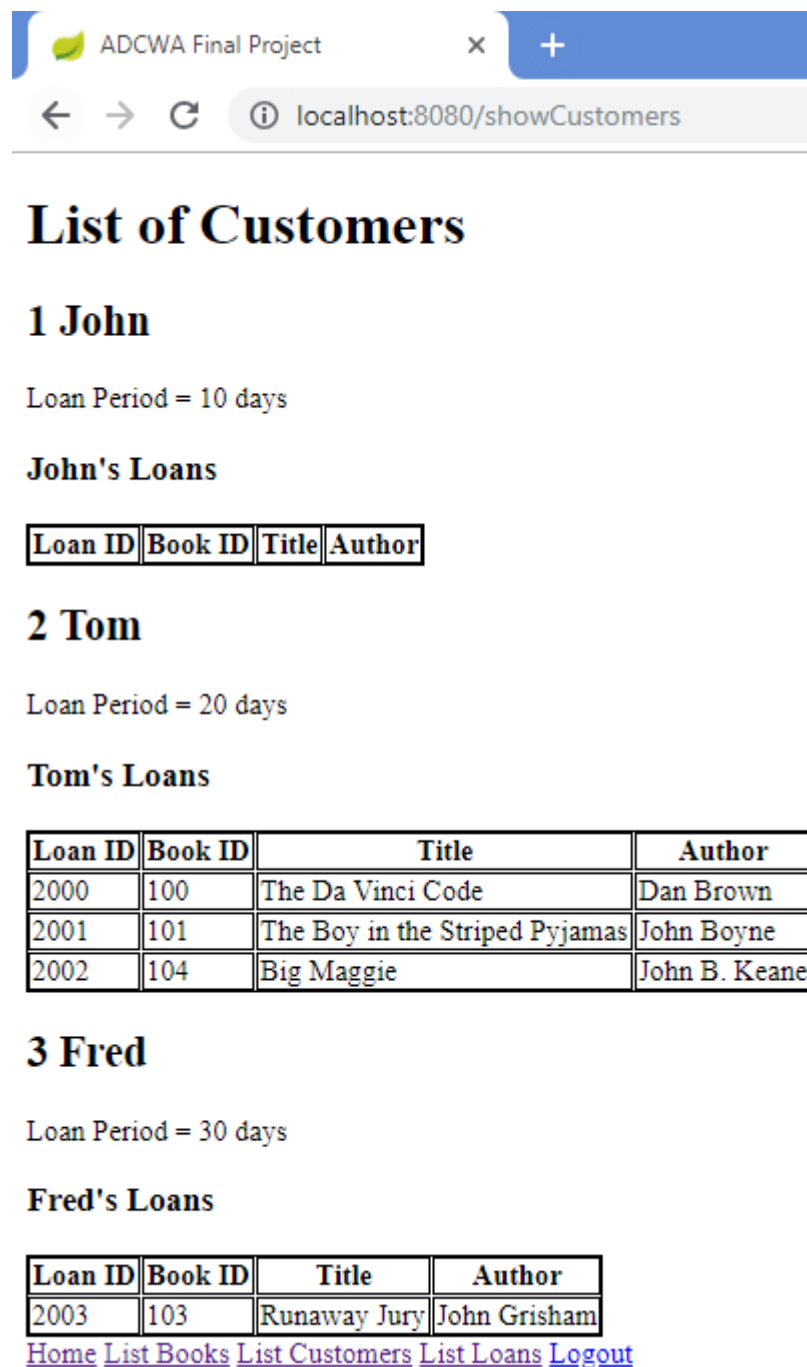
[Home](#) [Add Book](#) [Add Customers](#) [New Loan](#)

Figure 5 Add New Book – NOK

6.4 List Customers

This screen shows the list of Customers in the books database.

Underneath each Customer is the list of loans they currently have, if any.



List of Customers

1 John

Loan Period = 10 days

John's Loans

Loan ID	Book ID	Title	Author
---------	---------	-------	--------

2 Tom

Loan Period = 20 days

Tom's Loans

Loan ID	Book ID	Title	Author
2000	100	The Da Vinci Code	Dan Brown
2001	101	The Boy in the Striped Pyjamas	John Boyne
2002	104	Big Maggie	John B. Keane

3 Fred

Loan Period = 30 days

Fred's Loans

Loan ID	Book ID	Title	Author
2003	103	Runaway Jury	John Grisham

[Home](#) [List Books](#) [List Customers](#) [List Loans](#) [Logout](#)

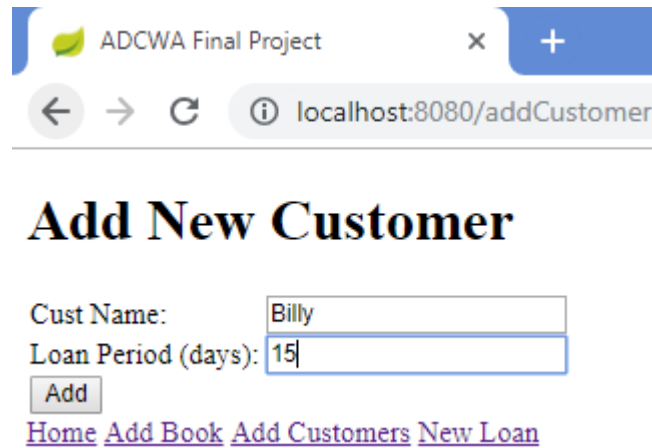
Figure 6 List of Customers

6.5 Add New Customer

This screen allows the user to add a new Customer.

6.5.1 Success Conditions

If all information is entered correctly, the books database is updated with the new customer information:



The screenshot shows a web browser window with the title 'ADCWA Final Project'. The address bar displays 'localhost:8080/addCustomer'. The main heading is 'Add New Customer'. Below this, there are two input fields: 'Cust Name:' with the value 'Billy' and 'Loan Period (days):' with the value '15'. An 'Add' button is positioned below the 'Loan Period' field. At the bottom, there are four underlined links: 'Home', 'Add Book', 'Add Customers', and 'New Loan'.

ADCWA Final Project

localhost:8080/addCustomer

Add New Customer

Cust Name:

Loan Period (days):

[Home](#) [Add Book](#) [Add Customers](#) [New Loan](#)

Figure 7 Add New Customer – OK

When a new Customer is successfully added, the user is immediately brought to the List Customers page, where the customer just entered is shown:

List of Customers

1 John

Loan Period = 10 days

John's Loans

Loan ID	Book ID	Title	Author
---------	---------	-------	--------

2 Tom

Loan Period = 20 days

Tom's Loans

Loan ID	Book ID	Title	Author
2000	100	The Da Vinci Code	Dan Brown
2001	101	The Boy in the Striped Pyjamas	John Boyne
2002	104	Big Maggie	John B. Keane

3 Fred

Loan Period = 30 days

Fred's Loans

Loan ID	Book ID	Title	Author
2003	103	Runaway Jury	John Grisham

4 Billy

Loan Period = 15 days

Billy's Loans

Loan ID	Book ID	Title	Author
---------	---------	-------	--------

[Home](#) [List Books](#) [List Customers](#) [List Loans](#) [Logout](#)

Figure 8 List of Customers after new customer added

6.5.2 Invalid user input conditions

If the customer name is blank, or the loan period is less than 1 day, the following errors should be displayed, and no customer should be added to the books database.



The screenshot shows a web browser window with the title 'ADCWA Final Project'. The address bar displays 'localhost:8080/addCustomer'. The main heading is 'Add New Customer'. Below the heading, there are two input fields. The first field is labeled 'Cust Name:' and is empty, with a red error message 'may not be empty' to its right. The second field is labeled 'Loan Period (days):' and contains the value '0', with a red error message 'must be greater than or equal to 1' to its right. Below the input fields is a button labeled 'Add'. At the bottom, there are four links: 'Home', 'Add Book', 'Add Customers', and 'New Loan'.

Add New Customer

Cust Name: may not be empty

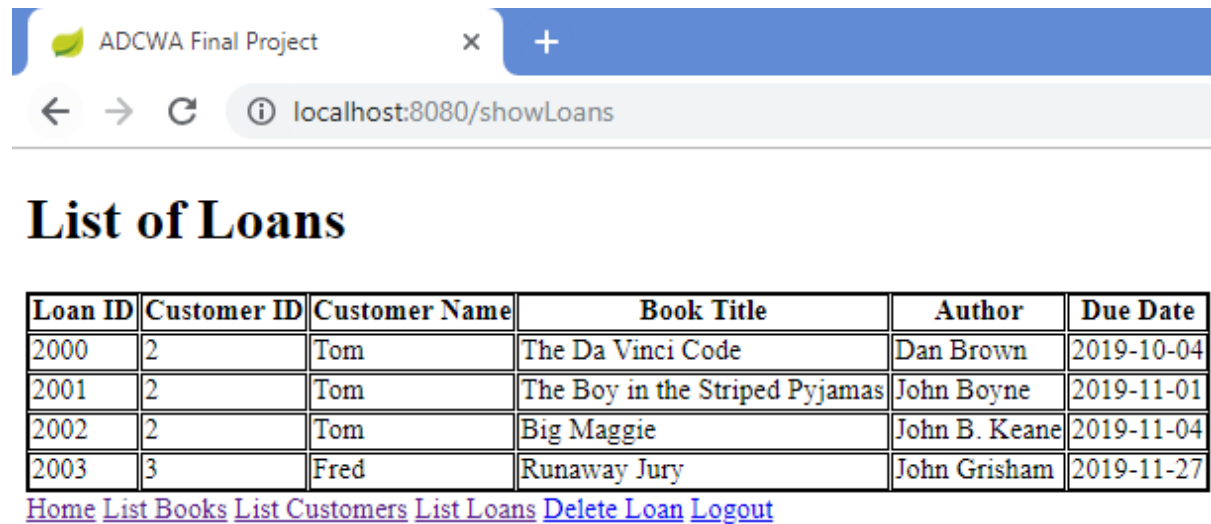
Loan Period (days): must be greater than or equal to 1

[Home](#) [Add Book](#) [Add Customers](#) [New Loan](#)

Figure 9 Add New Customer – NOK

6.6 List Loans

This screen shows the list of Loans in the books database. The table consists of the loan ID, Customer ID associated with the loan, Customer Name, Book Title and Author of the Book on loan by the Customer, and due date of the loan.



Loan ID	Customer ID	Customer Name	Book Title	Author	Due Date
2000	2	Tom	The Da Vinci Code	Dan Brown	2019-10-04
2001	2	Tom	The Boy in the Striped Pyjamas	John Boyne	2019-11-01
2002	2	Tom	Big Maggie	John B. Keane	2019-11-04
2003	3	Fred	Runaway Jury	John Grisham	2019-11-27

[Home](#) [List Books](#) [List Customers](#) [List Loans](#) [Delete Loan](#) [Logout](#)

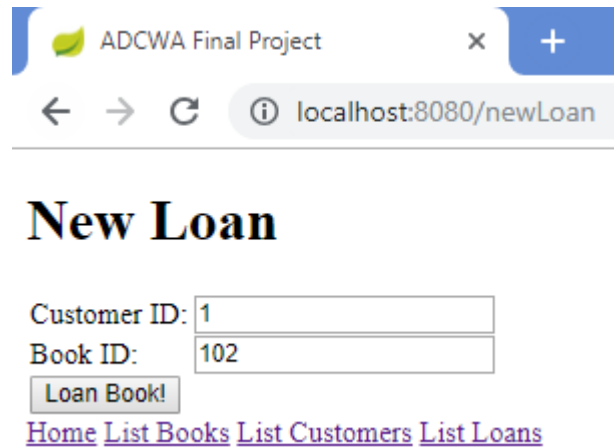
Figure 10 List of Loans

6.7 Add New Loan

This screen allows the user to add a new Loan.

6.7.1 Success Conditions

If all information is entered correctly, the books database is updated with the new customer information:



The screenshot shows a web browser window with the title 'ADCWA Final Project'. The address bar displays 'localhost:8080/newLoan'. The main heading is 'New Loan'. Below this, there are two input fields: 'Customer ID:' with the value '1' and 'Book ID:' with the value '102'. A 'Loan Book!' button is positioned below the 'Book ID' field. At the bottom, there are four navigation links: 'Home', 'List Books', 'List Customers', and 'List Loans'.

Customer ID: 1

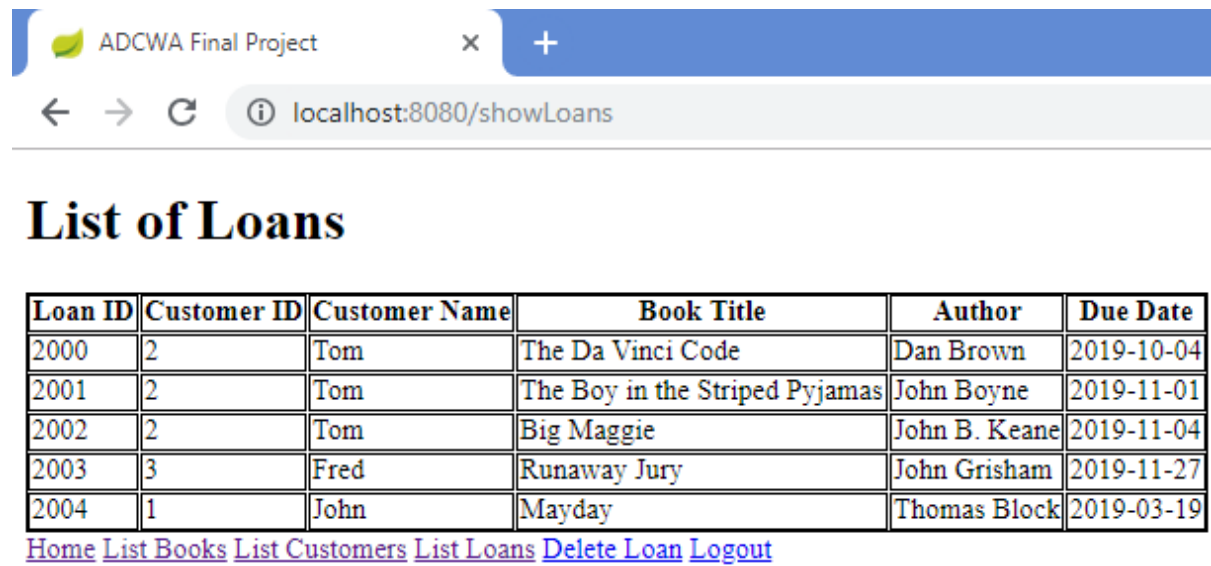
Book ID: 102

[Loan Book!](#)

[Home](#) [List Books](#) [List Customers](#) [List Loans](#)

Figure 11 New Loan - OK

And the user is immediately brought to the List Loans page, where the loan just entered is shown:



ADCWA Final Project

localhost:8080/showLoans

List of Loans

Loan ID	Customer ID	Customer Name	Book Title	Author	Due Date
2000	2	Tom	The Da Vinci Code	Dan Brown	2019-10-04
2001	2	Tom	The Boy in the Striped Pyjamas	John Boyne	2019-11-01
2002	2	Tom	Big Maggie	John B. Keane	2019-11-04
2003	3	Fred	Runaway Jury	John Grisham	2019-11-27
2004	1	John	Mayday	Thomas Block	2019-03-19

[Home](#) [List Books](#) [List Customers](#) [List Loans](#) [Delete Loan](#) [Logout](#)

Figure 12 List of Loans after new loan added

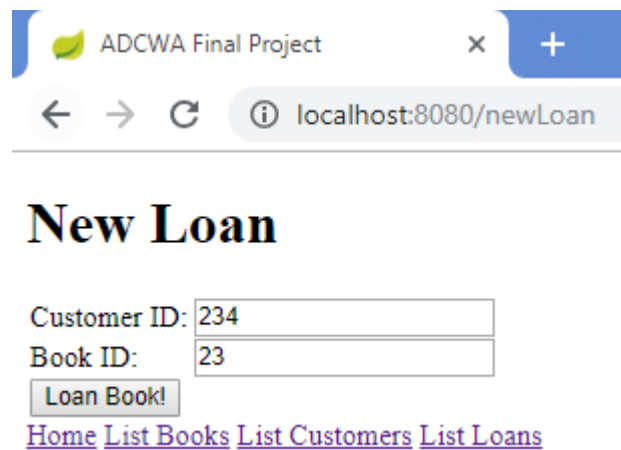
6.7.2 Business Logic for Order Creation

- The Due Date is automatically inserted by the application – the user does not have to enter the date.
- Each user has a loan period which is the number of days he/she can borrow books for. So, if a customer is borrowing a book, the due date is calculated as the current date plus the customers loan period. For example:
 - If the Current Date was April 1st 2019, and the loan period was 10 days the due date would be April 11th 2019, but if the loan period was 30 days the due date would be May 1st 2019.

6.7.3 Invalid user input conditions

(Assume the Customer ID and Book ID will never be blank and never be a String).

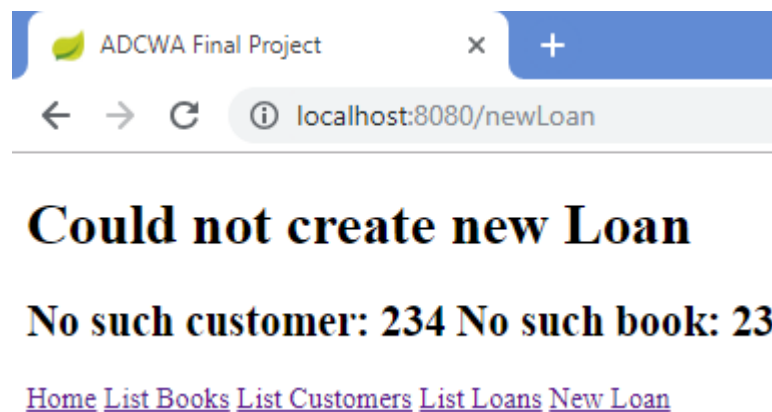
If the Customer ID does not exist and/or the Book ID does not exist:



A screenshot of a web browser window. The browser has a single tab titled 'ADCWA Final Project'. The address bar shows 'localhost:8080/newLoan'. The page content includes a heading 'New Loan' in a large, bold, black serif font. Below the heading are two input fields: 'Customer ID:' with the value '234' and 'Book ID:' with the value '23'. Below these fields is a button labeled 'Loan Book!'. At the bottom of the form are four links: 'Home', 'List Books', 'List Customers', and 'List Loans', all in a purple serif font.

Figure 13 Invalid Customer ID and Book ID entered

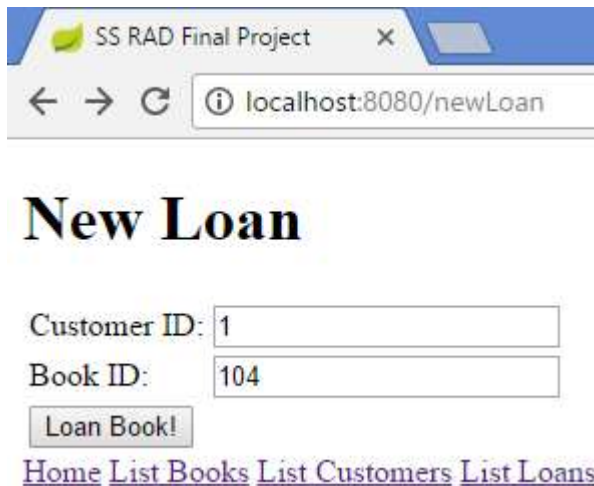
The following error page will be shown:



A screenshot of a web browser window showing an error page. The browser has a single tab titled 'ADCWA Final Project'. The address bar shows 'localhost:8080/newLoan'. The page content includes a heading 'Could not create new Loan' in a large, bold, black serif font. Below the heading is a message 'No such customer: 234 No such book: 23' in a bold, black serif font. At the bottom of the page are five links: 'Home', 'List Books', 'List Customers', 'List Loans', and 'New Loan', all in a purple serif font.

Figure 14 Invalid Customer ID and Book ID

If the Customer ID and Book ID are both valid, but the Book is already on loan:



SS RAD Final Project

localhost:8080/newLoan

New Loan

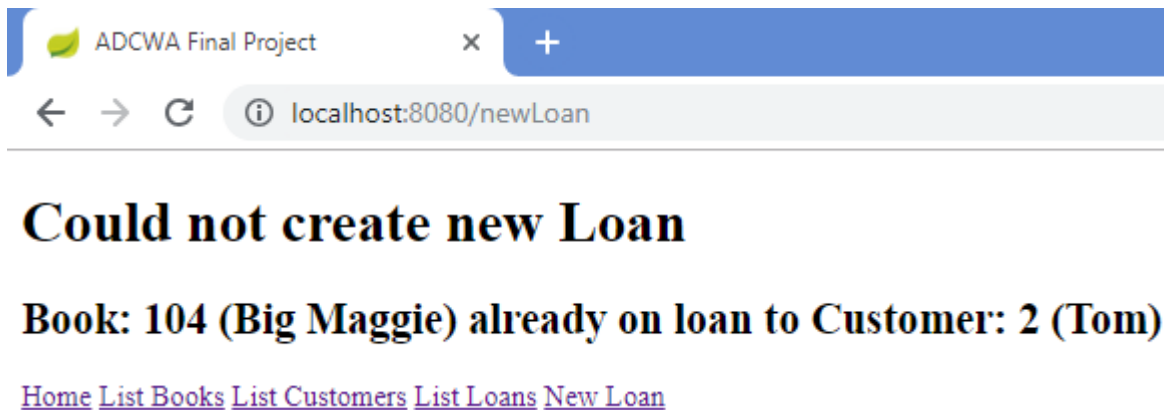
Customer ID:

Book ID:

[Home](#) [List Books](#) [List Customers](#) [List Loans](#)

Figure 15 Book ID 104 already on loan

The following error page is displayed:



ADCWA Final Project

localhost:8080/newLoan

Could not create new Loan

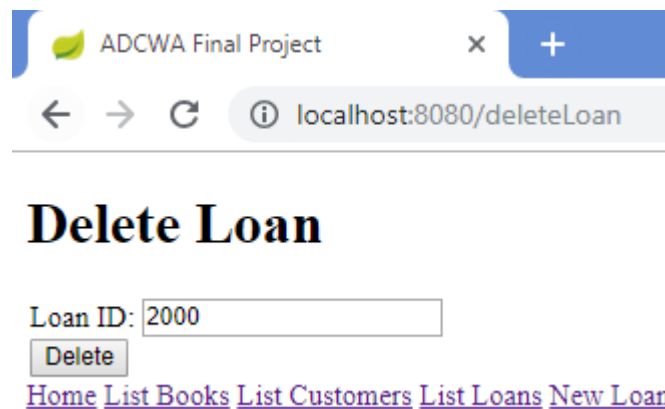
Book: 104 (Big Maggie) already on loan to Customer: 2 (Tom)

[Home](#) [List Books](#) [List Customers](#) [List Loans](#) [New Loan](#)

Figure 16 Error showing that Book already on loan

6.8 Delete Loan

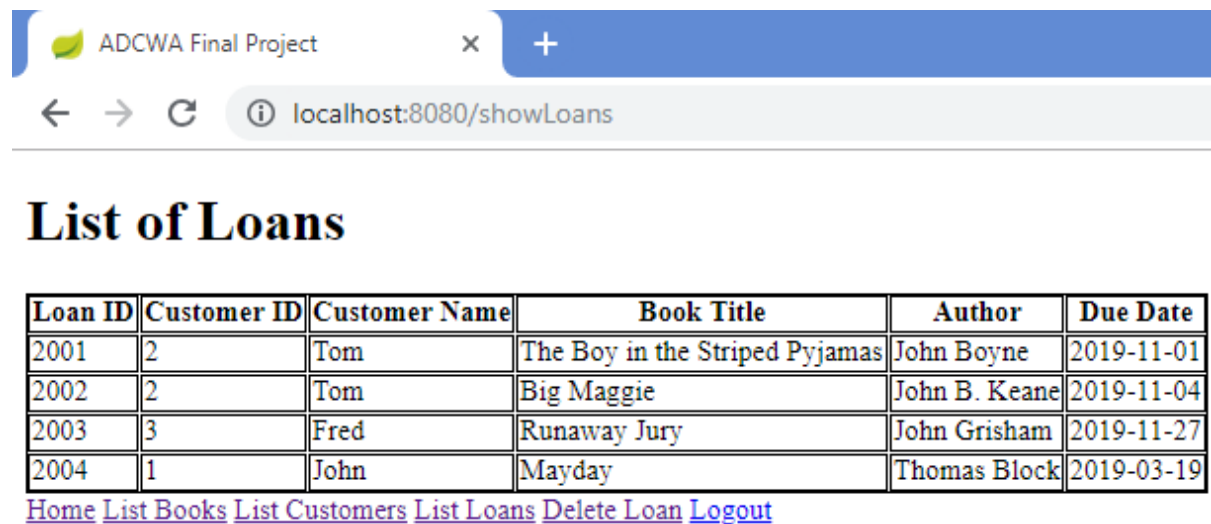
A loan can be deleted by entering the Loan ID:



The screenshot shows a web browser window with the title 'ADCWA Final Project'. The address bar displays 'localhost:8080/deleteLoan'. The main content area has a heading 'Delete Loan'. Below the heading, there is a text input field labeled 'Loan ID:' containing the value '2000'. To the right of the input field is a button labeled 'Delete'. At the bottom of the page, there are several navigation links: 'Home', 'List Books', 'List Customers', 'List Loans', 'New Loan', and 'Logout'.

Figure 17 Load ID to be deleted

The loan is then deleted from the database and the user brought to the List Loans page:



The screenshot shows a web browser window with the title 'ADCWA Final Project'. The address bar displays 'localhost:8080/showLoans'. The main content area has a heading 'List of Loans'. Below the heading, there is a table with 6 columns: 'Loan ID', 'Customer ID', 'Customer Name', 'Book Title', 'Author', and 'Due Date'. The table contains 4 rows of data. Below the table, there are several navigation links: 'Home', 'List Books', 'List Customers', 'List Loans', 'Delete Loan', and 'Logout'.

Loan ID	Customer ID	Customer Name	Book Title	Author	Due Date
2001	2	Tom	The Boy in the Striped Pyjamas	John Boyne	2019-11-01
2002	2	Tom	Big Maggie	John B. Keane	2019-11-04
2003	3	Fred	Runaway Jury	John Grisham	2019-11-27
2004	1	John	Mayday	Thomas Block	2019-03-19

Figure 18 List of Loans after Load 2000 deleted

6.8.1 Invalid user input conditions

If an invalid Loan ID is entered, the following page is displayed:

(Assume that the Loan ID will never be blank, or a String)

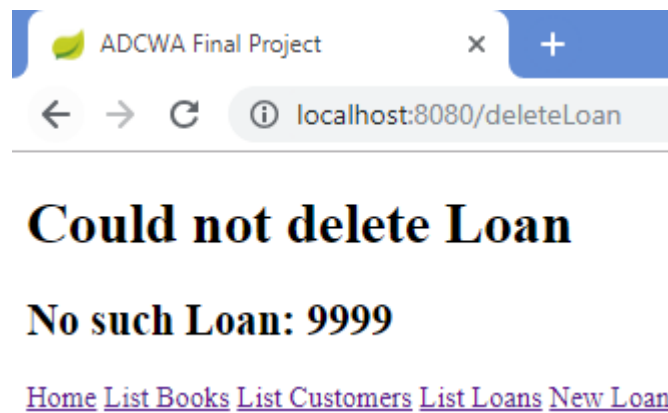


Figure 19 Invalid Load ID to delete

6.9 Security

The application should implement security so that unless a user is logged in they will not be able to navigate to any URL.

The only page they should be able to see is the index.html:

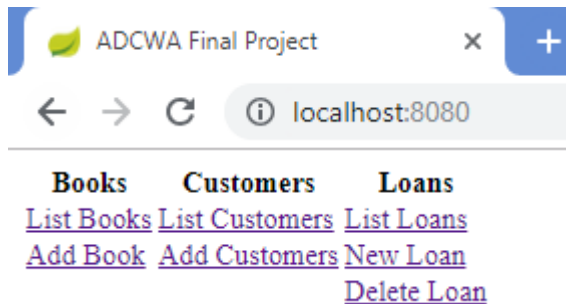
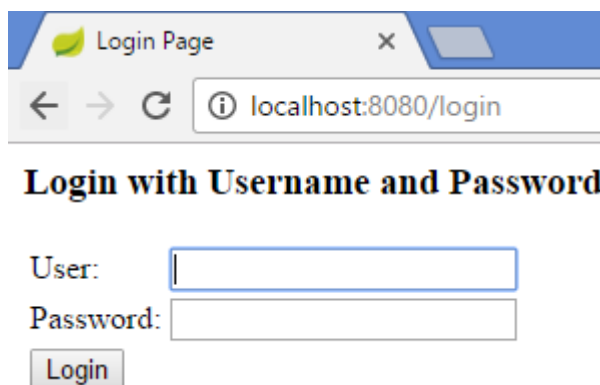


Figure 20 index.html always accessible

If user has not logged in and they attempt to access any of the applications URL endpoints, they should be presented with the following form allowing them to log in:

A screenshot of a web browser window titled "Login Page". The address bar shows "localhost:8080/login". The page content has the heading "Login with Username and Password". Below this are two input fields: "User:" and "Password:". Below the "Password:" field is a "Login" button.

There should be one user (**user**) with password **user**.

6.9.1 Logout

There should be a logout button on the List Customers screen (see Figure 6 List of Customers).