

Server-Side RAD Order Tracking System

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1 Description

Write a Spring Boot MVC application that allows a logged-in user to manage orders of products for customers.

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:

- Product
 - Product ID
 - Description
 - Quantity In Stock
- Customer
 - Customer ID
 - Customer Name
- Order
 - Order ID
 - Order Quantity
 - Order Date

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

3 Marks

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

4 Submission

A zipped file containing the source code of the entire application should be uploaded to Moodle before 5:00pm on Friday April 28th 2017.

5 Skeleton

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:

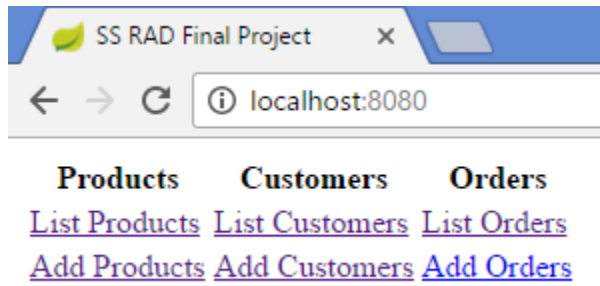
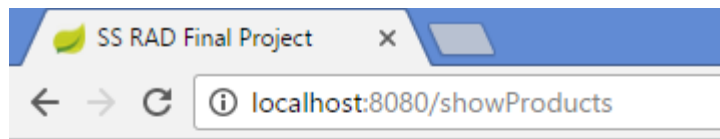


Figure 1 Main Screen

6.2 List Products

This screen shows the list of Products in the sales database:



List of Products

Product ID	Description	Quantity in Stock
100	TV	54
200	Samsung Tablet	109
300	Philips VCR	1

[Home](#) [Add Product](#) [List Products](#) [List Orders](#) [Logout](#)

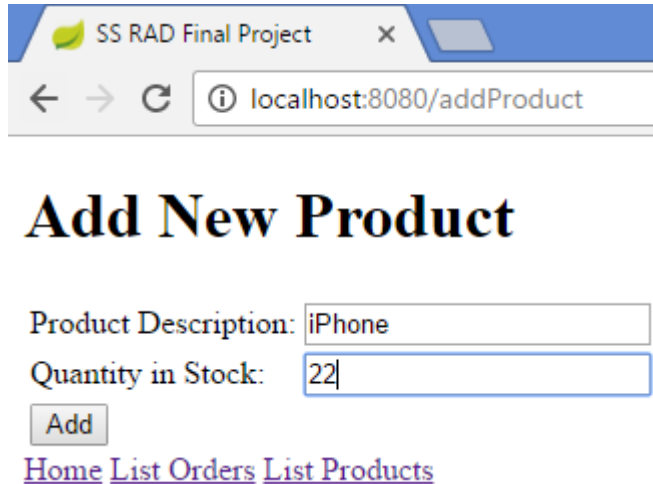
Figure 2 List Products

6.3 Add New Product

This screen allows the user to add a new Product.

6.3.1 Success Conditions

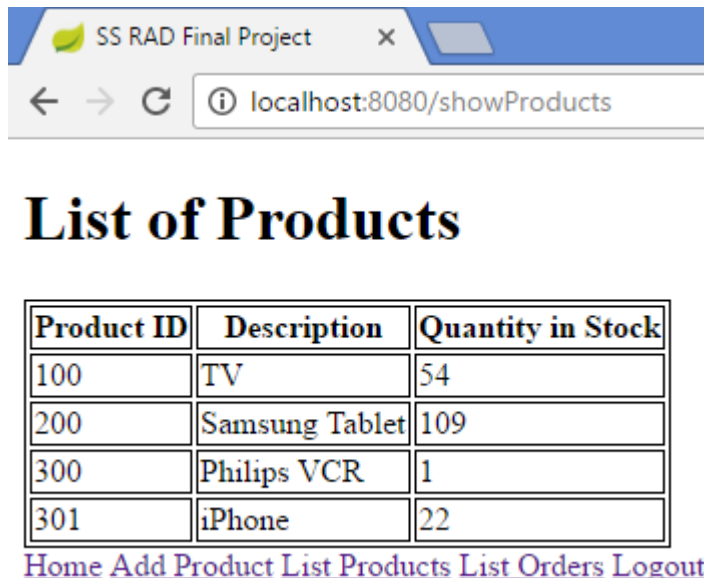
If all information is entered correctly, the sales database is updated with the new product information:



The screenshot shows a web browser window with the title 'SS RAD Final Project'. The address bar displays 'localhost:8080/addProduct'. The main content area has a large heading 'Add New Product'. Below this, there are two input fields: 'Product Description:' with the value 'iPhone' and 'Quantity in Stock:' with the value '22'. An 'Add' button is positioned below these fields. At the bottom, there are three underlined links: 'Home', 'List Orders', and 'List Products'.

Figure 3 Add New Product – OK

And the user is immediately brought to the List Products page, where the product just entered is shown:



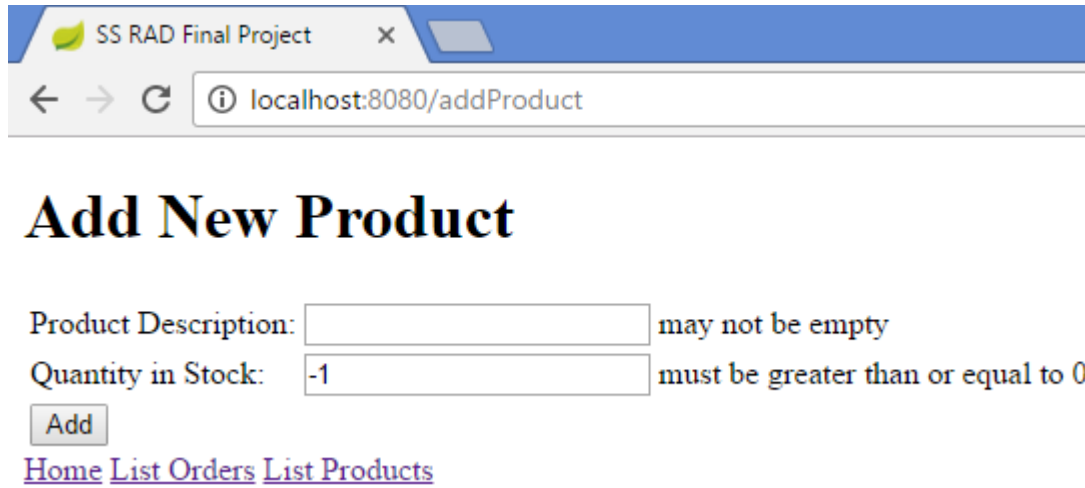
The screenshot shows a web browser window with the title 'SS RAD Final Project'. The address bar displays 'localhost:8080/showProducts'. The main content area has a large heading 'List of Products'. Below this is a table with three columns: 'Product ID', 'Description', and 'Quantity in Stock'. The table contains four rows of data. Below the table, there are five underlined links: 'Home', 'Add Product', 'List Products', 'List Orders', and 'Logout'.

Product ID	Description	Quantity in Stock
100	TV	54
200	Samsung Tablet	109
300	Philips VCR	1
301	iPhone	22

Figure 4 List of Products after new product added

6.3.2 Invalid user input conditions

If the product description is blank, or the quantity in stock is less than 0 (assume it will always be a number – never blank or a string) the following errors should be displayed, and no product should be added to the sales database.



The screenshot shows a web browser window with the title 'SS RAD Final Project'. The address bar displays 'localhost:8080/addProduct'. The main heading is 'Add New Product'. Below the heading, there are two input fields with associated error messages:

- 'Product Description:' followed by an empty text input field and the error message 'may not be empty'.
- 'Quantity in Stock:' followed by a text input field containing '-1' and the error message 'must be greater than or equal to 0'.

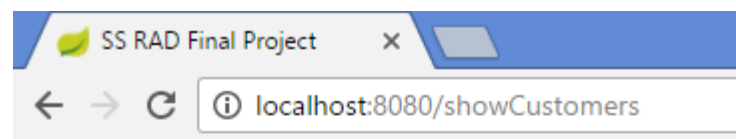
Below the input fields is an 'Add' button. At the bottom of the form, there are three links: 'Home', 'List Orders', and 'List Products'.

Figure 5 Add New Product – NOK

6.4 List Customers

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

Underneath each Customer is the list of orders they have placed, if any.



List of Customers

1 John

John's Orders

Order ID	Quantity	Product ID	Description
111	11	100	TV
444	1	100	TV
222	20	200	Samsung Tablet
333	1	300	Philips VCR

2 Tom

Tom's Orders

Order ID	Quantity	Product ID	Description
555	5	100	TV

3 Fred

Fred's Orders

Order ID	Quantity	Product ID	Description
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[Home](#) [Add Customer](#) [List Products](#) [List Orders](#) [Logout](#)

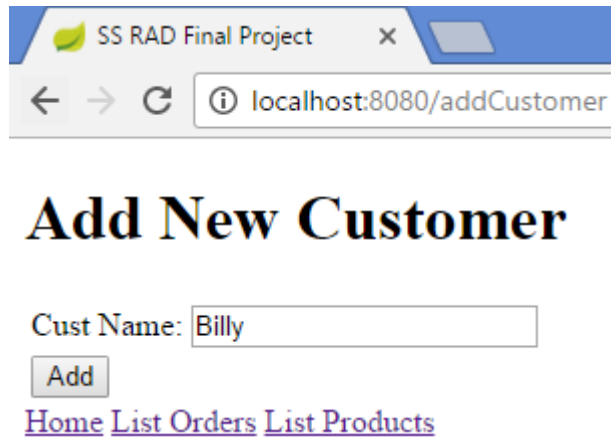
Figure 6 List of Customers

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 sales database is updated with the new customer information:



The screenshot shows a web browser window with the title 'SS RAD Final Project'. The address bar displays 'localhost:8080/addCustomer'. The main heading is 'Add New Customer'. Below this, there is a text input field labeled 'Cust Name:' containing the text 'Billy'. To the right of the input field is an 'Add' button. At the bottom, there are three underlined links: 'Home', 'List Orders', and 'List Products'.

Figure 7 Add New Customer – OK

And the user is immediately brought to the List Customers page, where the customer just entered is shown:

SS RAD Final Project

localhost:8080/showCustomers

1 John

John's Orders

Order ID	Quantity	Product ID	Description
111	11	100	TV
444	1	100	TV
222	20	200	Samsung Tablet
333	1	300	Philips VCR

2 Tom

Tom's Orders

Order ID	Quantity	Product ID	Description
555	5	100	TV

3 Fred

Fred's Orders

Order ID	Quantity	Product ID	Description
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4 Billy

Billy's Orders

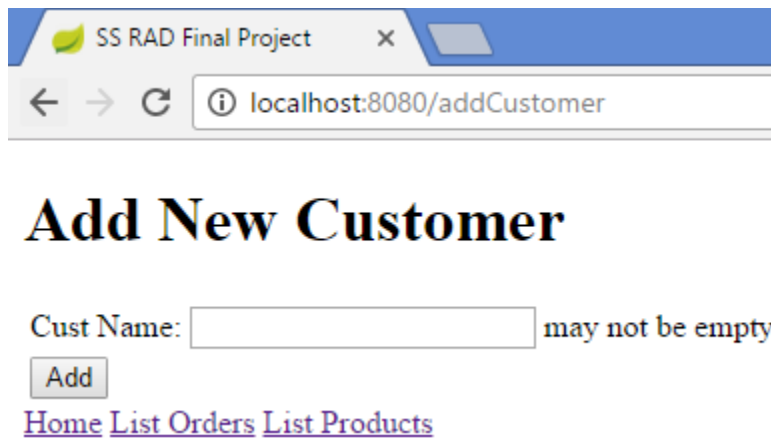
Order ID	Quantity	Product ID	Description
----------	----------	------------	-------------

[Home](#) [Add Customer](#) [List Products](#) [List Orders](#) [Logout](#)

Figure 8 List of Customers after new customer added

6.5.2 Invalid user input conditions

If the customer name is blank the following error should be displayed, and no customer should be added to the sales database.

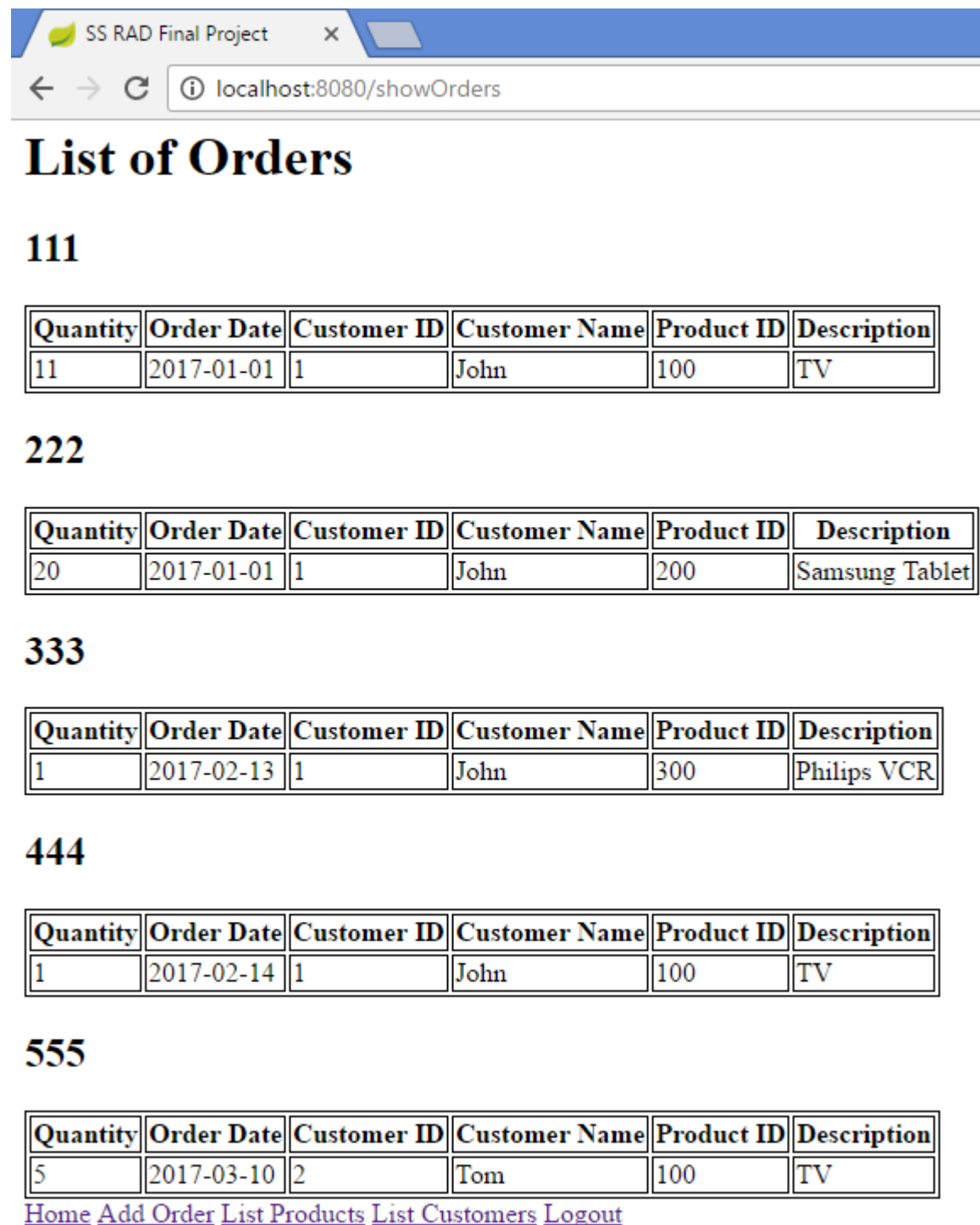


The screenshot shows a web browser window with the title "SS RAD Final Project". The address bar displays "localhost:8080/addCustomer". The main content area features the heading "Add New Customer" in a large, bold, black serif font. Below the heading, the text "Cust Name:" is followed by an empty text input field. To the right of the input field, the error message "may not be empty" is displayed in a smaller, black serif font. Below the input field is a small, rectangular button with the text "Add". At the bottom of the form, there are three underlined links: "Home", "List Orders", and "List Products", all in a purple serif font.

Figure 9 Add New Customer – NOK

6.6 List Orders

This screen shows the list of Orders in the sales database, together with the name of the customer who placed the order and the name of the product that was ordered.



List of Orders

111

Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
11	2017-01-01	1	John	100	TV

222

Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
20	2017-01-01	1	John	200	Samsung Tablet

333

Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
1	2017-02-13	1	John	300	Philips VCR

444

Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
1	2017-02-14	1	John	100	TV

555

Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
5	2017-03-10	2	Tom	100	TV

[Home](#) [Add Order](#) [List Products](#) [List Customers](#) [Logout](#)

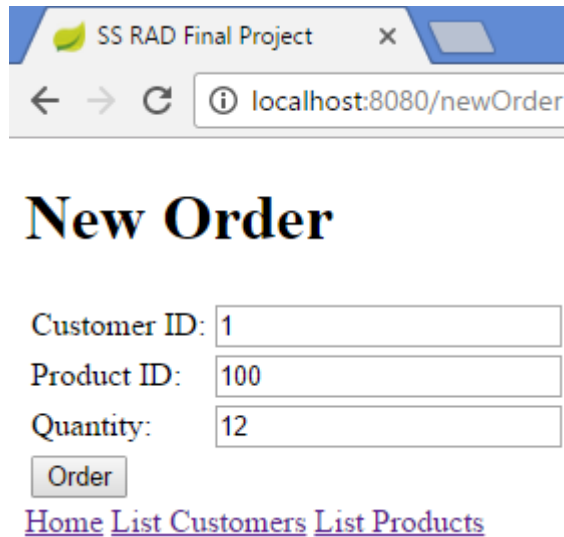
Figure 10 List of Orders

6.7 Add New Order

This screen allows the user to add a new Order.

6.7.1 Success Conditions

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



SS RAD Final Project

localhost:8080/newOrder

New Order

Customer ID:

Product ID:

Quantity:

[Home](#) [List Customers](#) [List Products](#)

Figure 11 New Order - OK

And the user is immediately brought to the List Orders page, where the order just entered is shown:

SS RAD Final Project					
localhost:8080/showOrders					
Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
11	2017-01-01	1	John	100	TV
222					
Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
20	2017-01-01	1	John	200	Samsung Tablet
333					
Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
1	2017-02-13	1	John	300	Philips VCR
444					
Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
1	2017-02-14	1	John	100	TV
555					
Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
5	2017-03-10	2	Tom	100	TV
556					
Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
12	2017-03-19	1	John	100	TV
Home Add Order List Products List Customers Logout					

Figure 12 List of Orders after new order added

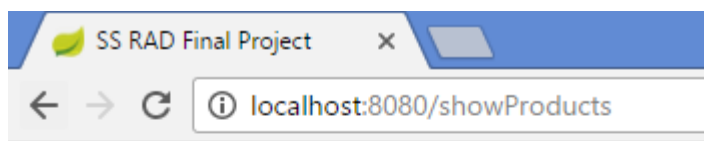
6.7.2 Business Logic for Order Creation:

- The Order date (the current date) is automatically inserted by the application – the user does not have to enter the date.
- The Product table is updated to reflect the new quantity. I.e.
 $\text{Quantity in Stock} = (\text{Quantity in Stock} \text{ minus Order Quantity}).$

In the above example, the Order Quantity for Product 100 was 12 (see Figure 11 New Order - OK).

Before the order was placed the Quantity in Stock for Product 100 was 54 (see Figure 4 List of Products after new product added).

After the order was placed the Quantity in Stock for Product 100 will be 42 (54 – 12).



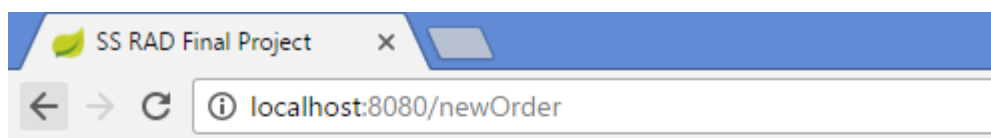
List of Products

Product ID	Description	Quantity in Stock
100	TV	42
200	Samsung Tablet	109
300	Philips VCR	1

[Home](#) [Add Product](#) [List Products](#) [List Orders](#) [Logout](#)

Figure 13 List of Products updated after successful order

- If the user enters a Quantity for an order greater than the Quantity in Stock the following error page should be displayed:



Error Creating the following Order

Quantity too large: Product stock = 109

Product ID	Customer ID	Quantity
200	1	400

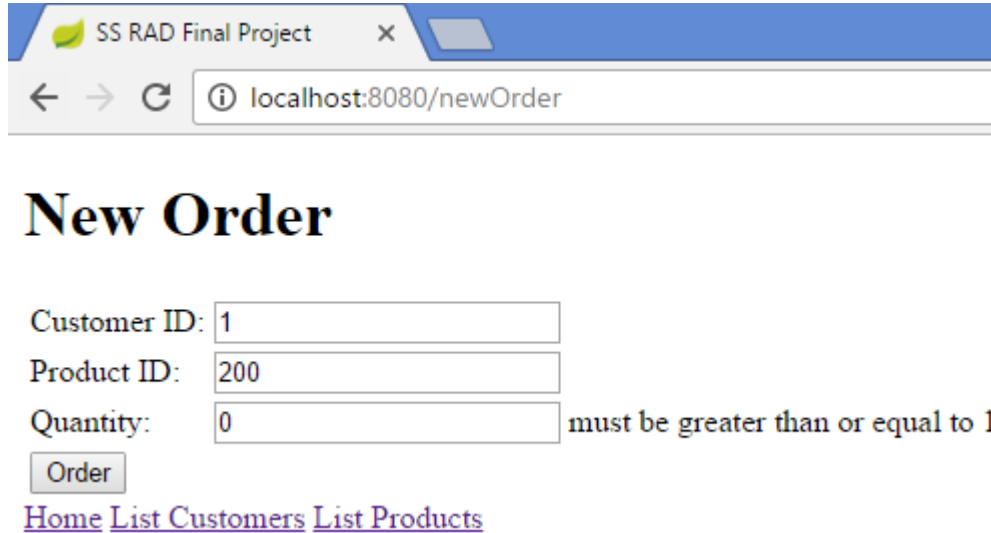
[Home](#) [New Order](#) [List Orders](#)

Figure 14 Order Quantity too large error

6.7.3 Invalid user input conditions

If the Order Quantity is less than 1 (assume it will always be a number – never blank or a string) the following errors should be displayed, and no product should be added to the sales database.

(Assume the Customer ID and Product ID will never be blank)



The screenshot shows a web browser window titled 'SS RAD Final Project' with the address bar displaying 'localhost:8080/newOrder'. The page content includes a large heading 'New Order'. Below this, there are three input fields: 'Customer ID:' with the value '1', 'Product ID:' with the value '200', and 'Quantity:' with the value '0'. To the right of the 'Quantity' field, there is an error message: 'must be greater than or equal to 1'. Below the input fields is an 'Order' button. At the bottom of the form, there are three links: 'Home', 'List Customers', and 'List Products'.

Figure 15 Order Quantity < 1 error

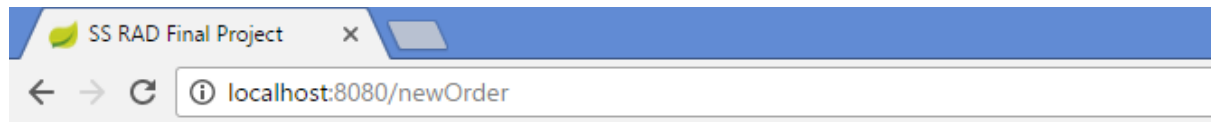
If an invalid Customer ID and/or Product ID is entered, the following page should be shown to the user:



The screenshot shows a web browser window titled 'SS RAD Final Project' with the address bar displaying 'localhost:8080/newOrder'. The page content includes a large heading 'Error Creating the following Order'. Below this, there is a message: 'No such product: 2001 No such customer: 1234'. Below this message is a table with three columns: 'Product ID', 'Customer ID', and 'Quantity'. The table has one row with the values '2001', '1234', and '21'. At the bottom of the form, there are three links: 'Home', 'New Order', and 'List Orders'.

Product ID	Customer ID	Quantity
2001	1234	21

Figure 16 Invalid Customer ID and Product ID



Error Creating the following Order

Quantity too large: Product stock = 109 No such customer: 1234

Product ID	Customer ID	Quantity
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200	1234	5555
-----	------	------

[Home](#) [New Order](#) [List Orders](#)

Figure 17 Invalid Customer ID and Product Quantity too large error

6.8 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:

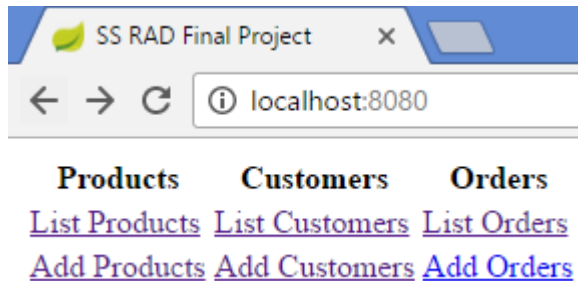
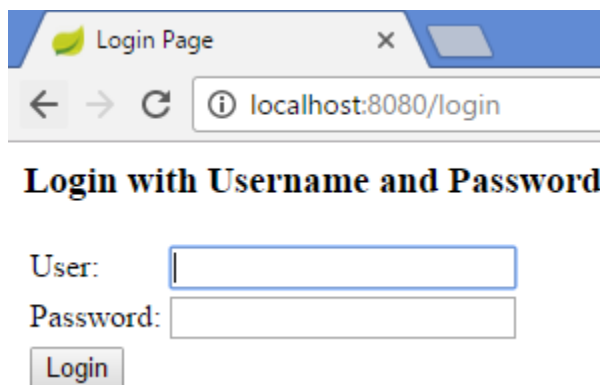


Figure 18 index.html always accessible

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:



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

6.8.1 Logout

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