

# Advanced Data Centric Web Applications 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.

### 3.1.1 Plagiarism

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

## 4 Submission

A zipped file containing the source code of the entire application should be uploaded to Moodle before 5:00pm on Friday April 30<sup>th</sup> 2020.

## 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:

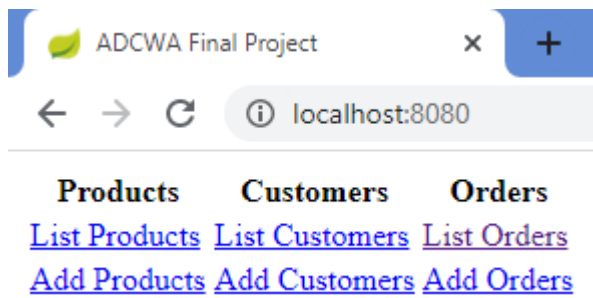


Figure 1 Main Screen

## 6.2 List Products

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

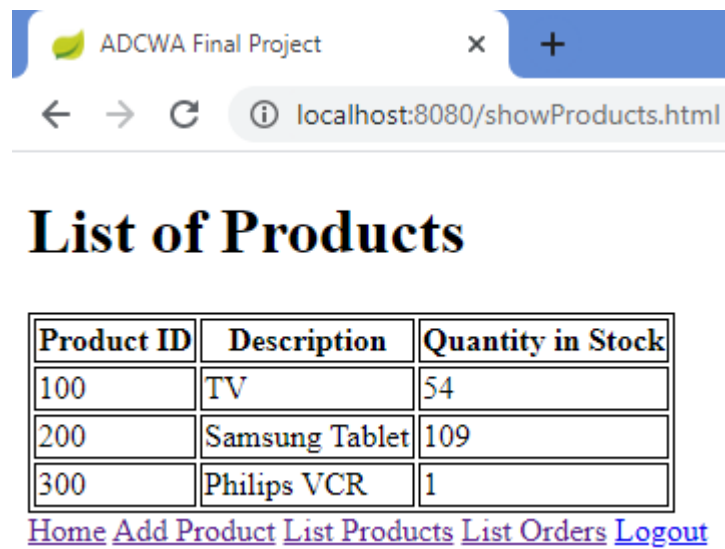


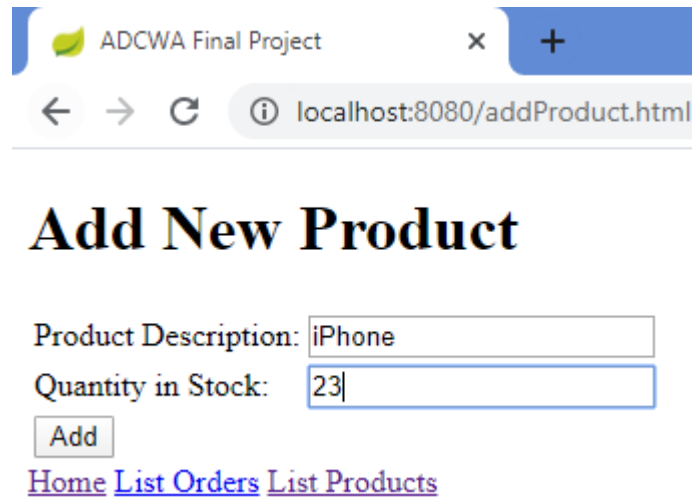
Figure 2 List Products

## 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 'ADCWA Final Project' and the address bar displaying 'localhost:8080/addProduct.html'. The page has a large heading 'Add New Product'. Below the heading, there are two input fields: 'Product Description:' with the value 'iPhone' and 'Quantity in Stock:' with the value '23'. An 'Add' button is located below these fields. At the bottom, there are four navigation links: 'Home', 'List Orders', 'List Products', and 'List Products'.

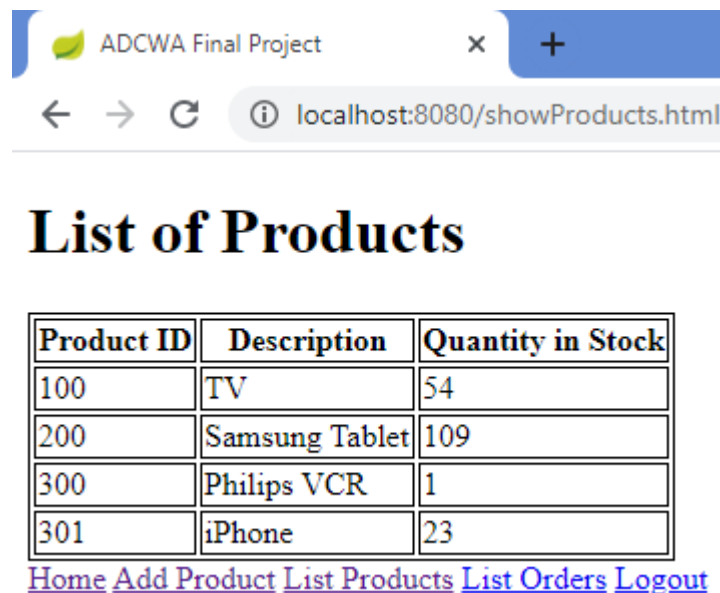
Product Description:

Quantity in Stock:

[Home](#) [List Orders](#) [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 'ADCWA Final Project' and the address bar displaying 'localhost:8080/showProducts.html'. The page has a large heading 'List of Products'. Below the heading, there 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 navigation links: 'Home', 'Add Product', 'List Products', 'List Orders', and 'Logout'.

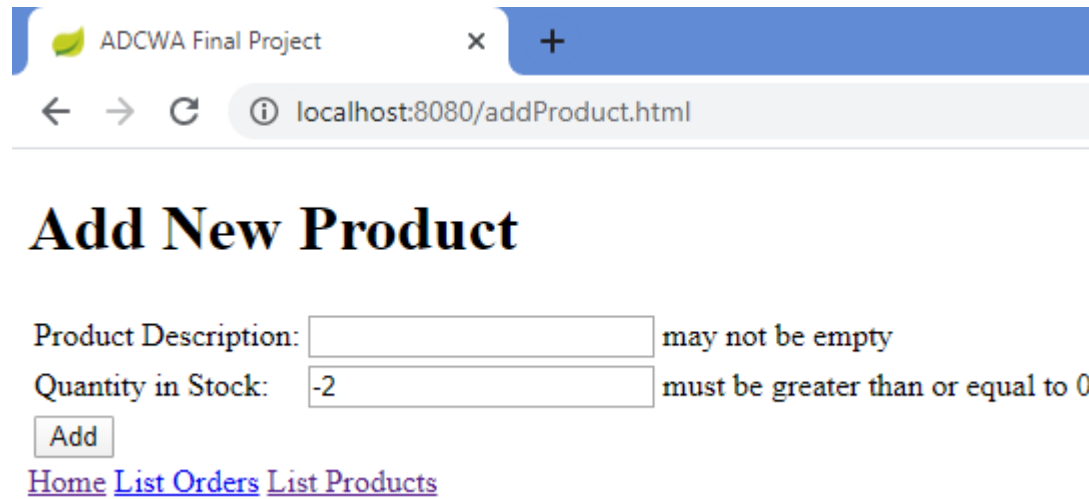
Product ID	Description	Quantity in Stock
100	TV	54
200	Samsung Tablet	109
300	Philips VCR	1
301	iPhone	23

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

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 'ADCWA Final Project'. The address bar displays 'localhost:8080/addProduct.html'. The main heading is 'Add New Product'. Below the heading, there are two input fields. The first field is labeled 'Product Description:' and is empty; to its right, the text 'may not be empty' is displayed. The second field is labeled 'Quantity in Stock:' and contains the value '-2'; to its right, the text 'must be greater than or equal to 0' is displayed. Below these fields is a button labeled 'Add'. At the bottom of the form, there are three links: 'Home', 'List Orders', and 'List Products'.

Product Description:  may not be empty

Quantity in Stock:  must be greater than or equal to 0

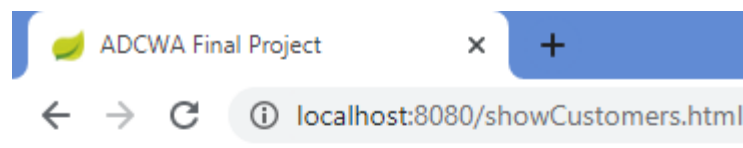
[Home](#) [List Orders](#) [List Products](#)

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

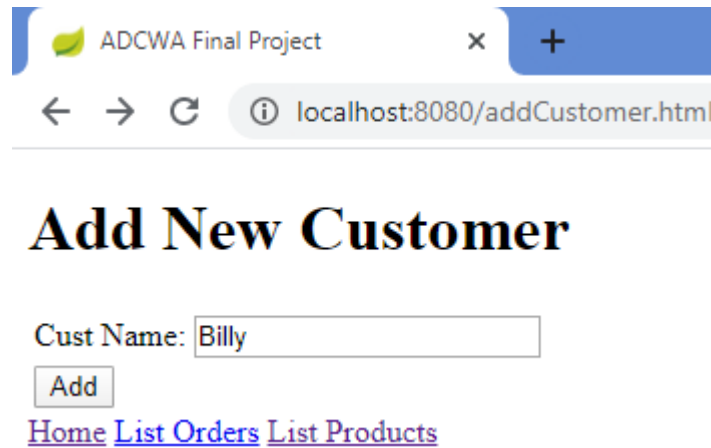


## 6.5 Add New Customer

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 'ADCWA Final Project'. The address bar displays 'localhost:8080/addCustomer.html'. 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 of the form, there are three 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:

**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
----------	----------	------------	-------------

**4 Billy**

**Billy's Orders**

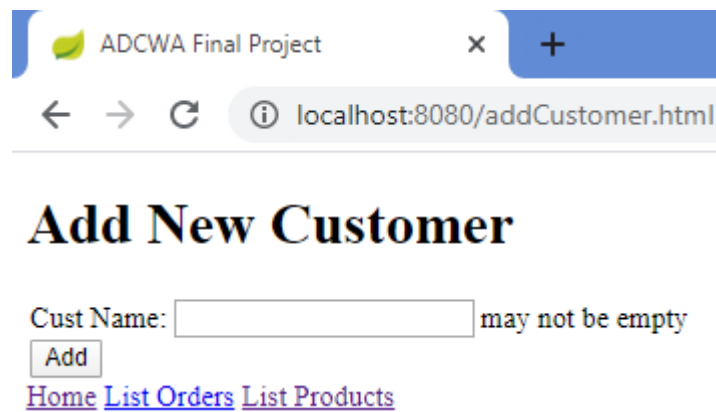
Order ID	Quantity	Product ID	Description
----------	----------	------------	-------------

[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 'ADCWA Final Project'. The address bar displays 'localhost:8080/addCustomer.html'. The main heading is 'Add New Customer'. Below this, there is a form with the label 'Cust Name:' followed by an empty text input field. To the right of the input field, the text 'may not be empty' is displayed in red. Below the input field is a button labeled 'Add'. At the bottom of the form, there are three links: 'Home', 'List Orders', and 'List Products', all underlined and in blue.

**Add New Customer**

Cust Name:  may not be empty

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

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 Condition – Order Created

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

Customer: John ▼  
Product: TV ▼  
Quantity: 12  
  
[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:

**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

556

Quantity	Order Date	Customer ID	Customer Name	Product ID	Description
12	2020-03-21	1	John	100	TV

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

Figure 12 List of Orders after new order added

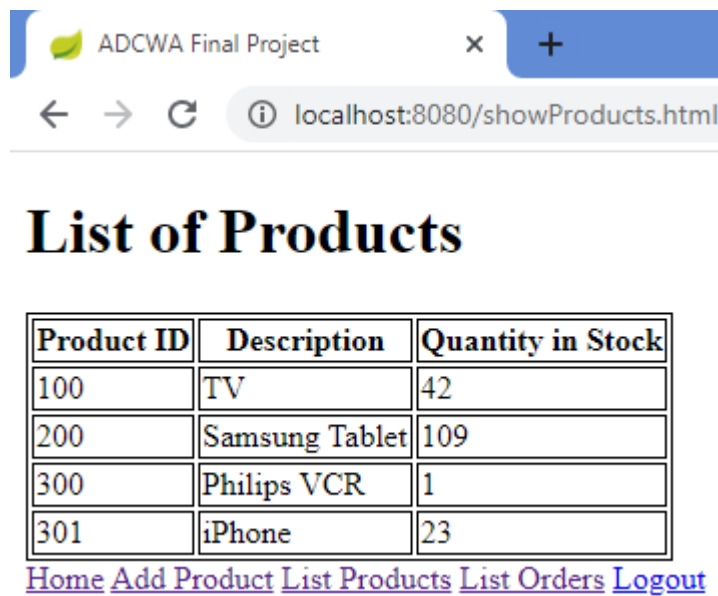
Business Logic for Order Creation:

- 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.  
Quantity in Stock = (Quantity in Stock *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).



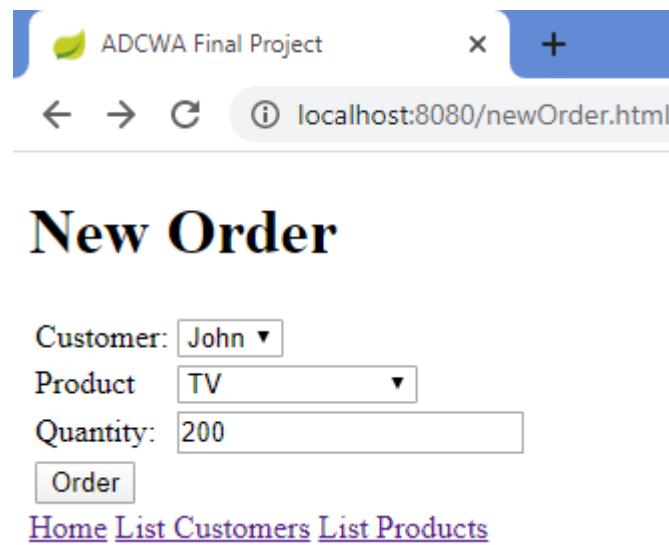
Product ID	Description	Quantity in Stock
100	TV	42
200	Samsung Tablet	109
300	Philips VCR	1
301	iPhone	23

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

Figure 13 List of Products updated after successful order

### 6.7.2 Error Condition – Order Quantity too large

If the user enters a Quantity for an order greater than the Quantity in Stock for example, there are only 42 units of product 100 in stock, but the user is trying to order 200:



ADCWA Final Project

localhost:8080/newOrder.html

## New Order

Customer: John ▼

Product: TV ▼

Quantity: 200

Order

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

Figure 14 New order for quantity greater than quantity in stock

the following error page should be displayed:



ADCWA Final Project

localhost:8080/newOrder.html

## Error Creating the following Order

### Quantity too large: Product stock = 42

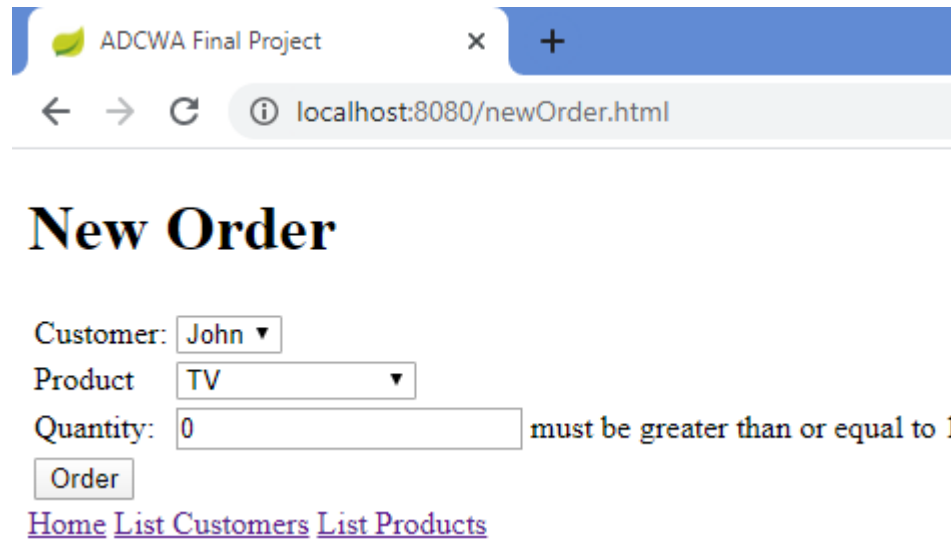
Product ID	Customer ID	Quantity
100	1	200

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

Figure 15 Order Quantity too large error

### 6.7.3 Error Condition – Order Quantity too small

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.



The screenshot shows a web browser window with the title 'ADCWA Final Project'. The address bar displays 'localhost:8080/newOrder.html'. The main content area has the heading 'New Order'. Below the heading, there are three form fields: 'Customer:' with a dropdown menu showing 'John', 'Product' with a dropdown menu showing 'TV', and 'Quantity:' with a text input field containing '0'. To the right of the 'Quantity' field, an error message reads 'must be greater than or equal to 1'. Below the error message is an 'Order' button. At the bottom of the form, there are three links: 'Home', 'List Customers', and 'List Products'.

Customer: John ▼

Product TV ▼

Quantity: 0 must be greater than or equal to 1

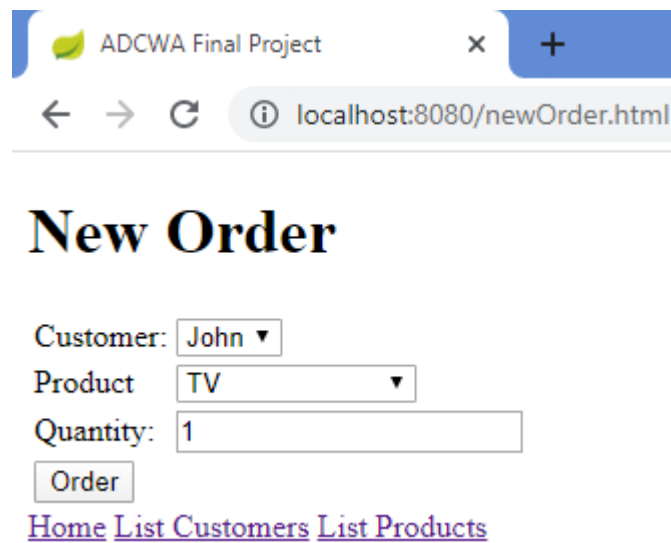
Order

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

Figure 16 Order Quantity < 1 error



6.7.4 Error Condition – Customer/Product manually removed from database  
As this data is read from a database, between the time the data is shown e.g as follows:



Customer: John ▼

Product TV ▼

Quantity: 1

Order

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

Figure 17 Customer & Products read from database

And the time the Order button is pressed, the underlying database may have been updated, maybe the customer or product no longer exists.

If this is the case the following error page should be shown:



## Error Creating the following Order

**ERROR: Customer: 1 and/or Product: 100 does not exist**

Product ID	Customer ID	Quantity
100	1	1

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

Figure 18 Invalid Customer ID and/or Product ID

## 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:

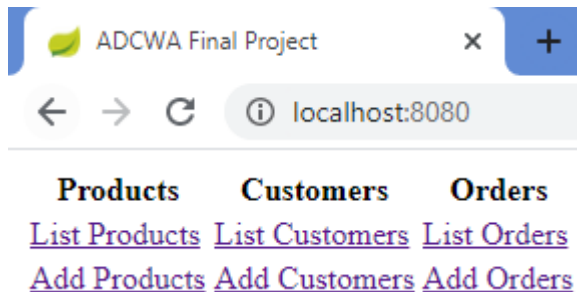
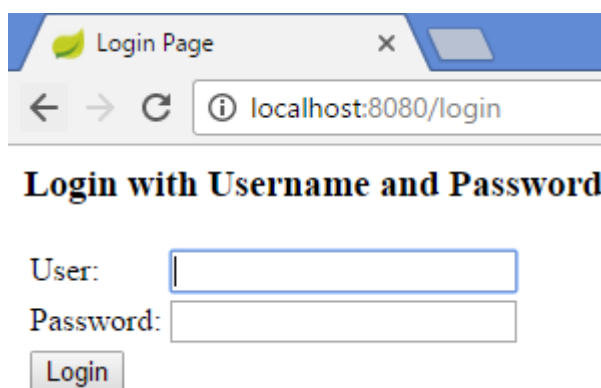


Figure 19 index.html always accessible

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:



**Login with Username and Password**

User:

Password:

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).