

Exercise 6 ⁽¹⁾

NOTE: Exercises which are related to the lecture, should be considered of **higher importance** than the practical exercises related to building a web-based client / server system.

The practical exercises do NOT require to become experts or understand in detail the covered topics (e.g., UML, Apache Tomcat Servlet Engine). The tasks can - and should - be solved with the information provided on the ECommerce page.

Scope: Lecture material

6.1: As you know, Servlets you define have to be subclasses of the *HttpServlet* class. What is the benefit of a common superclass for Servlets? Consider the environment (server) that executes the Servlet as well as handling of requests.

6.2 a) What are the advantages and disadvantages of making session data persistent?

b) Does it make sense to persist session data in your business scenario? Give reasons.

6.3: Explain the differences between JSP pages and Java Servlets and explain when and how a JSP page is transformed to a Java Servlet.

6.4: What are the benefits of component frameworks for realizing ECommerce applications? Name 2-3 benefits and explain each shortly.

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6.5: What are Common Business Objects and Business Processes (as defined e.g., in the ecommerce frameworks proposed in chapter 3)? What are domain-specific / application-specific Business Objects and Business Processes? Give two examples for each category that are related to your business scenario.

6.6: Are Common Business Objects and Domain / Application-specific Business Objects sufficient to realize the business logic layer of your business solution? What is missing? Justify your answer.

Scope: Realization of a web-based software system

Note: The exercises 6.7 – 6.9 have been repeated from exercise 5, as the additional material had not been provided in time.

6.7 Serve static pages: Replace the *GetPostServlet* by the *StaticPageServlet* that serves files. Add the HTML pages and images so that the Servlet provides access to your online business homepage and the about page (with all included images).

6.8 Add dynamic content: Decide on what dynamic content you want to add and where you want to add dynamic content on your pages (to start with, you could add the current time and the overall number of users). Add placeholders to your HTML pages, making them *templates*.

Use the *DynamicPageServlet* that uses the Velocity template engine. Read the provided documentation on the Apache Velocity Template engine and the *DynamicPageServlet*.

Exercise 6 (3)

Business logic layer modelling:

6.9 Refine the class diagram you have created in exercise 4. Note that this exercise is on a *design* level (implementation will be in 6.9).

User modeling

a) Add a class *User*. A user shall be identified by a *login name* and has a *password*. Add the corresponding attributes.

Business objects

b) For each attribute, add a getter and setter method (see documentation)

c) For each business object class, add a primary key attribute called *id* (of type String).

Containers for life-cycle management and search functionality

d) Add container classes for *Product* and *User*. The container classes should be called *ProductContainer* and *UserContainer*, or *Products* and *Users*.

e) Add *life-cycle management functionality* to the containers.

f) Add *search functionality* to the containers.

Find information related to the tasks 6.7 – 6.9 on the ECommerce page.

Exercise 6 (4)

Business Logic Layer implementation

The business object modeling that of exercise 6.8 shall be implemented (realized in Java).

6.10: a) Realize the Business Objects

☐ *User*, *Shopping Cart* and *Product* and their respective *Containers*.

b) Realize the following business processes:

☐ Create a new, anonymous user with an empty shopping cart.

☐ Search for products by product name

☐ Add product to user's shopping cart

To keep implementation work to a minimum, on the ECommerce page, you find a sample solution for this exercise. Of course, you can solve this on your own!

6.11: Integrate your presentation layer functionality with the business logic layer (processes and objects). For this, invoke the Business Processes from the Servlet. To have access to the current user information from the Servlets, keep a reference to the current user in Servlet Session object.

Find more documentation on the ECommerce page on how to connect presentation layer and business logic layer.

Presentation: If possible, please present the current state of the realization of your online business in the next lab class.