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JavaServer Pages with WebLogic

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Instructor's Guide

Revision 10.3.0



Course Overview and Philosophy

Web development bridges two disciplines. The first is page design, in which HTML authors create professional quality pages for a web site. The second is programming, which involves implementing business logic, accessing databases, etc. – typically in Java. JSP facilitates a clean separation of these roles, and with the advent of native JSP expressions and JSTL this complete division of labor is a practical option.

This course aims to be largely accessible to both programmers who have a little web background and to page designers who know a little Java. That said, it's primary audience is page authors. Java coding is avoided completely, although there is some review of Java code provided with various exercises, just to clarify the role of Java classes in certain techniques.

The first module covers JSP as a whole, devoting roughly equal time to the various types of JSP content. After an introductory chapter on Web applications and technologies (which may or may not be needed in total by a given student group), the module spends a half chapter on overview of architecture, half on JSP directives, and then a chapter each on scripting, interactive applications, Beans, EL/JSTL, and advanced topics – primarily custom tags.

The second module is a fairly straightforward walk through the JSTL libraries. We start with an overview chapter to introduce (or review) the JSP 2.0 expression language and to introduce the JSTL minimally. This chapter also discusses the evolving JSP 2.0 authoring style, beginning with the page "Going Scriptless." Much of this section is best-practice discussion, somewhat in advance of learning the specific techniques, but it seemed the best place for it, to put the remaining chapters in some architectural context.

The remaining chapters each introduce one of the four JST libraries. Every action in every library is documented and discussed, using a standard notation at the top of each such page to simplify the learning process and to make the book easier to use as a reference. The chapters are more than just expanded documentation, though: at various points in each chapter, common techniques and best practice relevant to some group of actions is discussed, and these techniques and practices are amplified in the labs.

The course wraps up with a significant workshop exercise, which departs from the other labs in the module in that it does not walk students through the solution step by step. Students are expected at this point to have developed the skills to attack the problem on their own, perhaps with some instructor assistance. If a client prefers it, this workshop is also designed to work well as a "final exam" for the module to show skills development.





Timeline

Day 1

Chapter 1	Web Server Fundamentals
Chapter 2	JSP Architecture
Chapter 3	Scripting Elements
Chapter 4	Interactive JSP Applications
This may span Days 1 and 2	

Day 2

Chapter 5	Using JavaBeans
Chapter 6	The Expression Language and the JSTL
Chapter 7	Advanced JSP Features
This may span Days 2 and 3	

Day 3

Chapter 1	Effective JSTL
Chapter 2	The Core Actions
Chapter 3	The Formatting and i18n Actions

Day 4

Chapter 4	The SQL Actions
Chapter 5	The XML Actions





Workshop Overlays

Capstone Courseware provides an optional package of workspace and project files for WebLogic Workshop for each module of this course. (See the course Setup Guide for download URLs.) Instructors, use these packages on your own initiative and at your own risk. You should have experience yourself with Workshop before using the overlay package in the classroom. The workspaces and projects have been tested lightly with the course but are not part of the standard product.

And, the “win” in using Workshop for a bunch of JSP editing is probably mostly in the built-in JSP editor, which could be used without actually deploying the web application to a managed server within Workshop. The mode we recommend for using this material is to install and open each provided workspace, but then to use this only as a means to find, open, edit, and save JSP files, while managing a WebLogic server externally, from the command line, as described in the coursebook. This should give the best blend of editing facility and ease of testing, using an external browser.

But it is also possible, as with our other overlays, to perform nearly all the course tasks within the Workshop environment: start/stop a server, publish, test, debug, etc. Each workspace has a built-in WebLogic server profile that assumes a domain exists at (for example) `c:\Capstone\JSP_WebLogic\WLDomain`. So, the best way to get started is to set environment and create the domain as described in the coursebook; then start Workshop and load the workspace; then start the server from within Workshop, and go from there.

Note that the server configurations are the same as in the Workshop workspaces for our servlets course. If you're teaching more than one of these modules, and don't want to have to swap workspaces, you can import the JSP and/or JSTL projects into the servlets workspace, deploy them to the **Servlets_WebLogic/WLDomain**, and test them from there.

Again, Capstone Courseware can only offer complete technical support on the standard course, and while we hope this overlay is convenient, it is not as thoroughly tested as the core lab image at this time. If a given exercise is giving trouble, please be certain to build and run it from the command line, using the SDK tools as prescribed in the student guide, before contacting Capstone.





Module 1 – Introduction to JSP

Chapter 1. Web Applications

This chapter reviews the fundamentals of web technology, including HTML and HTTP. Various approaches to developing web applications are discussed, including CGI. The chapter provides a hands-on introduction to servlets and JSP with some small examples. The important points of this chapter are the Web technology review, introducing servlets and JSP in context, and establishing the authoring environment so that students can do hands-on work throughout the module.

Chapter 2. JSP Architecture

This chapter provides a conceptual overview of how servlets and JSP work. It also starts a systematic survey of the various kinds of JSP content and the most important implicit objects, such as **request** and **response**. JSP 2.0 has evolved into a broad diversity of possible syntax, and there are many ways to encode the same basic functions: scripting elements, standard actions, JSP expressions and JSTL actions overlap significantly in their capabilities. This chapter is partially meant to establish each of these and to distinguish them from one another ahead of time, so students don't start to get lost as they see multiple ways of solving a problem. Successive chapters will address each of these possible syntaxes.

Chapter 3. Scripting Elements

This chapter explains the uses of scripting elements: scriptlets, expressions and declarations. These are covered for the sake of completeness, but by the end of the module the use of scripts will have fallen from favor by contrast to the action- and expression-oriented authoring style encouraged by the JSP 2.0 specification. It might be a good idea to soft-peddle these techniques, so students (especially those with Java experience who might find scripts the most natural way to code pages) don't get too attached.

By the end of this chapter the student should already be able to do quite a lot of JSP development. The "odd and even" example gives a simple illustration of processing input data from clients by having the input supplied explicitly after a question mark on the URL. This provides a workable way to exercise some small JSPs and helps students without much Web background understand more about HTTP, without yet the details of HTML forms.





Chapter 4. Interactive JSP Applications

At this point the student already knows quite a lot about JSP, and the time has come to provide a more interesting example. The “electronic store” is a miniature e-commerce site. HTML forms are introduced for submitting data to the server, and JSP code provides handling of data. The application simulates purchasing of a single item, and provides motivation for session handling to implement a shopping cart. In this chapter the servlet session API is introduced, which is illustrated by a small program. The actual shopping cart example is postponed until the next chapter, where a simpler solution is provided. The chapter also includes a discussion of error handling, including an error page and explicitly throwing exceptions in your own Java code.

In the exercises that use the **errorPage** directive, the coursebook mentions a problem with using IE6. The longer story here is that IE6 shows what it calls “friendly” error messages by default: based only on the HTTP error code, it will show its own standard page, discarding whatever HTML is carried in the actual HTTP response body. This “helpful” feature gets in the way here; to turn it off, choose Tools|Options from the IE6 menu, select the Advanced tab, and under the Browsing category, see “Show friendly HTTP error messages” and uncheck this option. With this change IE6 will work correctly with JSP error pages, as other browsers will out of the box.

Chapter 5. Using JavaBeans

This is a key chapter, because it is with JavaBeans that some serious inroads can be made in removing business logic from the page itself. Actually, you can put business logic in ordinary Java classes, which can be called from simple scriptlet code or using standard actions.

Chapter 6. The Expression Language and the JSTL

The newest features of JSP are covered here: the native expression language and the use of JSTL. The students are well on their way now to seeing the whole 2.0 authoring style, in which business logic lives completely off-page, and even presentation logic can be packed into reusable fragments. Scripts are becoming a thing of the past.

While the EL is laid out in detail, only the most basic JSTL is covered; we’re just trying to understand the role of JSTL in page authoring and to learn to recognize its use.





Chapter 7. Advanced JSP Features

The course concludes with a chapter that briefly introduces several more advanced topics. The topic of custom tags is both very large and very important, and really warrants a course in its own right, especially as custom tag libraries are becoming more widely available. The chapter discusses both the more traditional approach of developing custom tags with Java handler classes and the newer, more facile technique of building tag files with snippets of callable JSP code.

The final topic that is discussed is threading. A simple example illustrates concretely how a race condition can arise on a JSP, and various approaches are discussed that will eliminate such a race condition. The example makes clear a fundamental difference between a JSP tag that separately declares a variable and scriptlet code that declares a local variable. You could mention this issue in the first module when both declarations and scriptlets are introduced, but it is probably better not to spend much time on the issue then. The Student Guide provides a simple forward reference to this last chapter.





Module 2 – The JSP Standard Tag Library

Chapter 1. Effective JSTL

Since students have already understood the EL and a bit about the role of JSTL, this chapter is meant to re-introduce the JSTL, and to delve more deeply into its role and practical use in JSP. Detailed study of particular actions is deferred for the remaining chapters. Instead, focus on the architectural level and the concepts of decomposition in page authoring and organization.

Chapter 2. The Core Actions

Now students get down to brass tacks, learning the core library in a somewhat lengthy chapter that gives plenty of exercise in procedural coding. Do make a point of hammering on the difference between static and dynamic attributes: the basic distinction is obvious enough, but, as the book points out over a couple specific cases, actual usage can be far from intuitive. Explain exactly why the **target** attribute of `<c:set>` can't be primed with a literal string, so students have an idea of where EL evaluation actually occurs and how it can and can't be leveraged.

Note that it is not until partway through this chapter that we do the usual environment setup pages. These are placed here because they are not strictly needed earlier: none of the code examples in Chapter 1 calls for testing. If you think students would be interested in seeing example code running right off the bat, you may want to jump ahead to these pages and to get students' environments set up early.

Chapter 3. The Formatting and `i18n` Actions

This chapter breaks into two sections: one on formatting dates, times, and numbers, and one on multiple language support. Students may or may not have experience with `i18n` problems, so it's possible that some additional discussion of locales, time zones and resources will be appropriate. Having the J2SE SDK documentation on hand in a browser may be useful for reference throughout the chapter.

Note that the book calls for browsers to be configured to establish preferences for one language over another to support the labs. Rather than include explicit instructions for a given browser in the student guide, we ask the instructor to be familiar with this process for the browser of choice in a given classroom, and to walk students through it.





Chapter 4. The SQL Actions

This chapter addresses use of relational data using SQL and JDBC data sources. This chapter is the shortest in the module, partly because (as the book points out) this practice is generally discouraged in JSPs for distributed systems, and partly because there just aren't that many actions to discuss. The SQL library is a very simple wrapper around SQL connection and syntax; between container management of connections and resource references and the literal encoding of SQL text in query and update actions, there's not much to discuss that doesn't wander too far down the road into teaching SQL or JDBC itself. If students do have a great interest in this library, you might want to discuss the use of result collections a bit further, and possibly to plan on an expansion of Lab 5C, which combines SQL and XML skills in a replication exercise. (Perhaps encourage students to write the replication code in both directions.)

Chapter 5. The XML Actions

This final chapter covers XML actions, which brings both XPath and XSLT into play. Students may or may not know XPath or XSLT. The use of each technology is intentionally limited so as not to assume too much about student background in these areas. Even so, there is likely to be a need for expanded discussion of XML, XPath and XSLT to audiences without good experience in them.

This chapter is the longest of the bunch, not in page count but in suggested time. XML is of course an increasingly important language and technology area for JSP authors, and it makes sense to dwell on these actions and techniques, more so than for the SQL actions, for instance. Also, the switch to XPath from EL in the various attribute values will take some getting used to, as will working with XSLT.

The final lab is optional, and can serve as a safety valve of sorts if the class is running ahead or behind schedule: it can be skipped if you're out of time, and it can also be allowed to run long, perhaps even to 2 hours, if there is extra time and students are interested in delving further into techniques. Possible expansions of the lab (one of which is mentioned under Chapter 4 notes) are to add transaction control to the replication process at various levels and to implement bi-directional replication.





Revision History

Revision 10.3.0 is the initial release of the course; it is based on Course 109, version 2.0.3.

Errata

At this time there are no errata for the course.

Feedback

We truly do welcome feedback, both of a specific nature (pointing out mistakes) and general suggestions. For the former sending email with a numbered list of corrections would be most helpful.

Please send feedback to:

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