



Capstone Courseware, LLC

33 Boylston Street
Jamaica Plain, MA 02130

877-227-2477
capstonecourseware.com

114. Jakarta Struts

Version 1.1.3

This advanced course shows JSP and servlet programmers how to build "Model-2" Web applications using the Jakarta Struts project from Apache. Students learn the Struts architecture and see how it captures a great deal of pre-existing best practice in Web application development. They build applications from scratch using the Struts 1.1 code base, advancing through actions and action mappings, form beans, and request forwarding. They use relational data at the model layer and learn to configure JDBC data sources under Struts. Throughout, the course emphasizes the great facility in Struts of using XML declarations to replace boilerplate Java coding.

The course then shifts from these controller techniques to a focus on presentation. Students learn to use various libraries of custom JSP tags: the JSP Standard Tag Library (which supersedes a number of Struts tags), Struts HTML tags for form-building and validation, and the Tiles library for robust and reusable page layouts.

Two chapters near the end of the course treat issues of effective Struts development: one focuses on "under the hood" coding techniques and one on best practices at a design level. By the end of the course, students are building complex, internationalized Web applications that validate user input, handle error conditions gracefully, and make best use and reuse of control and presentation logic through actions, form beans, validators, business and persistence JavaBeans, and Tiles.

The course software also includes an optional overlay of workspace and project files to support use of the Eclipse IDE in the classroom. (This requires that the instructor be experienced in use of Eclipse and able to walk students through basic tasks in the IDE.)

Prerequisites

- Java programming -- Course 103 is excellent preparation.
- Servlets programming -- Course 110.
- JSP -- Course 112.
- Basic knowledge of XML -- Course 501.



Learning Objectives

- Use Struts actions and action mappings to take control of HTTP requests/responses.
- Manage HTML form input and output with form beans, and use these beans to simplify data handling in the controller.
- Use persistent data in a Struts application with JDBC.
- Use JSTL and Struts custom tags to build robust and reusable JSP presentation logic.
- Support multiple client locales with various internationalization techniques.
- Define validation rules for input forms, and provide clear user feedback.
- Build complex presentations using decoupled, reusable tiles, screens and layouts.

Timeline: 5 days.





Chapter 1. Struts Architecture

- MVC and Model 2
- Command Pattern
- Jakarta Struts
- More XML, Less Java!
- Action Mappings
- JavaBeans in Struts
- Working with Forms
- Validation
- Relational Models
- Presentation Technology
- Tiles

Chapter 2. Action Mappings

- Command Pattern for Web Applications
- ActionServlet
- Action
- ActionMapping
- Struts Configuration
- Selecting a Forward
- Global Forwards
- Forwarding Actions
- Other Action Subtypes
- Declarative Exception Handling

Chapter 3. Forms

- Working with HTML Forms
- What Not To Do
- Action Forms
- Relationship to Input
- Relationship to Actions
- Relationship to the Model
- Relationship to Output
- DynaActionForm and Map-Backed Forms
- Validation
- Coarse-Grained Form Beans

Chapter 4. Relational Data

- JDBC





- Drivers
- DriverManager (JDBC 1.0)
- DataSource (JDBC 2.0)
- Connection
- Statement
- ResultSet
- The Struts Data-Source Manager
- Multi-Tier Design
- Business Logic Beans
- Persistence Logic
- EJB

Chapter 5. Struts Tag Libraries

- Building View Components
- Struts Tag Libraries
- Attributes
- Building Forms
- <html:form>
- <html:text> et. al.
- Forms and Form Beans
- Scope and Duration of Form Data
- Managing Hyperlinks
- Error Messages
- Logic Tags

Chapter 6. The JSP Standard Tag Library

- JSTL Overview
- JSP Expression Language
- Core Tags
- Formatting Tags
- XML Tags
- SQL Tags
- Mixing JSTL, EL, Scripts and Actions

Chapter 7. Internationalization and Localization

- i18n in Java
- Locale
- ResourceBundle
- i18n in Actions
- i18n in JSTL





i18n in Validation

Chapter 8. Input Validation

- Validation in Web Applications
- Validation in Struts
- The Struts Validator Plug-In
- Validating ActionForm Subtypes
- Configuring Validation
- Validators
- Rules
- Is `<html:form>` Necessary?
- Reporting Errors
- Multi-Page Validation
- Client-Side Validation
- Limitations on the Client Side
- Implementing a Validator
- Implementing ActionForm.validate

Chapter 9. Under the Hood

- Global Objects and Keys
- Modules
- ActionServlet, RequestProcessor, ExceptionHandler
- Struts Configuration in Depth
- The org.apache.struts.config Package
- Plug-Ins
- Logging with Commons and Log4J
- Configuring Log4J
- Logging in Web Applications
- The org.apache.struts.util Package
- Commons BeanUtils

Chapter 10. Best Practices

- Cardinalities in Struts Design
- Coarse-Grained Form Beans
- Many Actions from One View
- Multiple Forwards
- Many Mappings to One Action
- Chaining Actions
- Dynamic Forwarding
- Form Beans as Mediators





Using Reflection and BeanUtils
Reusing Validation Rules
Mapping-Based Validation
Graceful Validation

Chapter 11. Tiles

Consistent Look and Feel
Reusable Layouts and Content
The Tiles Framework
Instantiating Layouts
Body-Wrap Insertions
Tiles and Stylesheets
Working with Tiles Attributes
The Tiles Context
Definitions
Aggregation and Inheritance
The Tiles Plug-In
Forwarding to Definitions
Performance Considerations

Appendix A. Learning Resources

System Requirements

Hardware Requirements (Minimum)

500 MHz, 256 meg RAM, 500 meg disk space.

Hardware Requirements (Recommended)

1.5 GHz, 512 meg RAM, 1 gig disk space.

Operating System

Tested on Windows XP Professional. Course software should be viable on all systems which support a J2SE 1.4 SDK.

Network and Security

Limited privileges required -- please see our standard security requirements at <http://capcourse.com/Guides/Security.html>.

Software Requirements

All free downloadable tools.

