

## Java Level 3

### Course Summary

#### Description

This course is designed for programmers who are familiar with JEE Web Development and who want to be familiar with web Model View Controller and Apache Struts Framework. The students will also learn how to apply common Gang of Four Design Patterns and J2EE Design Patterns in their web applications. It will also include an overview of Enterprise JavaBeans 3.0 and how to develop and use Stateless Session EJB 3.0 in the web tier.

#### Objectives

At the end of this course, students will be able to:

- Be familiar with web Model View Controller and Apache Struts Framework
- Learn how to apply common Gang of Four Design Patterns and J2EE Design Patterns in their web applications
- Understand how to develop and use Stateless Session EJB 3.0 in the web tier

#### Topics

- Review of UML
- Object Oriented Design Concepts
- Basic Design Patterns
- Gang of Four Design Patterns
- Client Tier Components in Web Development
- Review of MVC Paradigm Using Servlets/JSP//JavaBeans
- JSP Standard Tag Libraries (JSTL)
- Struts Framework 1.3
- Annotations in Servlet
- Apply J2EE Design Patterns
- Overview of J2EE Architecture
- Overview of Enterprise JavaBeans 3.0
- Stateless Session Enterprise JavaBeans 3.0

#### Audience

This course is designed for programmers who are familiar JEE Web Development.

#### Prerequisites

The student should have a working knowledge or equivalent of J2EE Web Development course.

#### Duration

Five Days

Due to the nature of this material, this document refers to numerous hardware and software products by their trade names. References to other companies and their products are for informational purposes only, and all trademarks are the properties of their respective companies. It is not the intent of ProTech Professional Technical Services, Inc. to use any of these names generically

## Java Level 3

### Course Outline

#### I. UML Overview

- A. UML Overview
- B. UML
- C. Types of UML Diagrams
- D. Use Case Diagram
- E. Class Diagram
- F. Associations
- G. Aggregate Associations
- H. Generalization
- I. Association Specifiers
- J. Sequence Diagrams

#### II. Object Oriented Design Concept

- A. Cohesion
- B. Encapsulation
- C. Coupling
- D. Implementation Inheritance
- E. Composition
- F. Interface Inheritance
- G. Polymorphism
- H. OO Design Principles

#### III. Basic Design Patterns

- A. Design Patterns
- B. Design Pattern Catalogs
- C. Documenting Design Patterns
- D. Basic Patterns
- E. The Interface Pattern
- F. Abstract Parent Class Pattern
- G. Private Methods Pattern
- H. Accessor Methods
- I. Constant Data Manager Pattern
- J. Immutable Object Pattern
- K. Monitor Pattern

#### IV. Gang of Four Design Patterns

- A. Template Method
- B. Strategy
- C. Factory Method
- D. Singleton
- E. Adapter
  - i. Class Adapter
  - ii. Object Adapter
- F. Facade

#### V. Client Tier in Web Development

- A. HTML
  - i. HTML Tags
  - ii. HTML Document
  - iii. HTML Data Structure
  - iv. HTML Form Creation
  - v. HTML <form> tag
  - vi. HTML <input> tag
  - vii. HTML Input Form - An Example
- B. CSS
  - i. Defining Style Sheets
    - 1. Cascading Style Sheet
  - ii. CSS Rules
  - iii. Applying CSS Rules
  - iv. External Style Sheets
- C. JavaScript
  - i. What is JavaScript ?
  - ii. What use JavaScript ?
  - iii. An Example
- D. XML Overview
  - i. HTML Capabilities and Limitations
  - ii. Markup and Markup Language
  - iii. Advantages of Using XML Over HTML
  - iv. XML: Its All About Data
  - v. Using XML Data
  - vi. Parts of an XML Document
  - vii. XML and the Web

#### VI. Review MVC Paradigm

- A. Model 2 Architecture
- B. Model-View-Controller
- C. Controller
  - i. HTTP Servlet
  - ii. What is a Servlet ?
  - iii. Servlet Lifecycle
  - iv. service() method
  - v. doGet() vs doPost()
- D. Model
  - i. JavaBeans
- E. Call JSP from Servlet
  - i. Using Request Dispatcher
  - ii. Using sendRedirect() Method
  - iii. sendRedirect() vs forward()
- F. View
  - i. JavaServer Pages
  - ii. Standard Actions
- G. Advantages of MVC

Due to the nature of this material, this document refers to numerous hardware and software products by their trade names. References to other companies and their products are for informational purposes only, and all trademarks are the properties of their respective companies. It is not the intent of ProTech Professional Technical Services, Inc. to use any of these names generically

## Java Level 3

### Course Outline (continued)

- H. Web Architecture
  - i. HTTP Servlet
  - ii. JavaServer Pages
  - iii. Custom Tag Libraries
  - iv. JSP Standard Tag Library
- VII. Overview of JSP Standard Tag Library**
  - 1.2**
    - A. JSTL v1.2 Libraries
    - B. Expression Language (EL)
    - C. EL Implicit Variables
    - D. JSTL Operators
    - E. Using the JSTL
    - F. Core Library Actions
      - i. <c:out> Action
      - ii. <c:set> Action
      - iii. <c:if> Action
      - iv. <c:forEach> Action
      - v. <c:choose> Action
      - vi. <c:when> Action
      - vii. <c:otherwise> Action
- VIII. Overview of Struts Framework 1.3**
  - A. Struts Overview
  - B. Struts Components
  - C. Dynamic Web Project to Support Struts
  - D. Struts HTML input form
    - i. HTML "form" tags
    - ii. The <html:form /> tag
    - iii. The <html:text /> tag
    - iv. The <html:submit /> tag
    - v. The <html:reset /> tag
  - E. ActionServlet – The Controller
    - i. ActionServlet
    - ii. ActionServlet Class
    - iii. How it Works
    - iv. Configuring the ActionServlet
  - F. The struts-config.xml
    - i. The <form-beans> element
    - ii. The <action-mappings> element
    - iii. Other major elements
  - G. ActionForm – The View
    - i. ActionForm Class
    - ii. Writing AddEmployeeForm class
    - iii. Entry in struts-config.xml
    - iv. ActionForm Methods
  - H. Action – The Controller
    - i. Action class
      - ii. The execute () method
      - iii. Writing AddEmployeeAction class
      - iv. Action class – an example
      - v. Entry in struts-config.xml
- IX. Annotations in Servlet**
  - A. Annotations
  - B. Annotations or Deployment Descriptor ?
  - C. Allowable Annotations in a Servlet
  - D. Standard JDK Annotations
  - E. PostConstruct Annotation
  - F. PreDestroy Annotation
  - G. Resource Annotation
- X. J2EE Design Patterns**
  - A. J2EE Patterns - Defined
  - B. Tier Approach
  - C. Presentation Tier Patterns
  - D. Business Tier Patterns
  - E. Integration Tier Patterns
- XI. Apply J2EE Design Patterns**
  - A. Presentation Tier
    - i. Front Controller Pattern
    - ii. Application Controller Pattern
    - iii. View Helper Pattern
    - iv. Composite View Pattern
  - B. Business Tier
    - i. Service Locator Pattern
    - ii. Session Façade Pattern
    - iii. Business Delegate Pattern
    - iv. Transfer Object Pattern
    - v. Value List Handler Pattern
  - C. Integration Tier
    - i. Data Access Object Pattern (DAO)
- XII. Overview of Enterprise JavaBeans 3.0**
  - A. What is EJB
  - B. EJB Framework Components
  - C. EJB Server
  - D. EJB Container
  - E. EJB Components
  - F. EJB Deployment Descriptors
  - G. Roles

## Java Level 3

### Course Outline (continued)

- H. Benefits of EJB
- I. When to Use EJB ?
- J. Types of Enterprise JavaBeans
  - i. EJB Session Beans
  - ii. EJB Entity Beans
  - iii. EJB Message Driven Beans
- XIII. Stateless Session Beans 3.0**
  - A. Stateless Session Beans
  - B. Life Cycle of Stateless Session Beans
  - C. Creating a Stateless Session Bean
  - D. Business Interface
  - E. Bean Class
  - F. Deployment Descriptor
  - G. Writing the Client