

# Java Web Application Development with Servlets, JSP

## 1. Introduction to Web Applications:

- **Objective:** Understand the fundamentals of web applications and how they function in a client-server architecture.
- **Topics:**
  - Definition of web applications.
  - Key components: web server, application server, and database.
  - HTTP protocol and its role in web communication.

## 2. HTML and Form Handling:

- **Objective:** Learn the basics of HTML and how to create forms for user input.
- **Topics:**
  - HTML structure and elements.
  - Creating HTML forms.
  - Input elements (text fields, radio buttons, checkboxes).
  - Form submission using the POST and GET methods.

## 3. Servlets:

- **Objective:** Understand Servlets and how to handle HTTP requests and responses.
- **Topics:**
  - Servlets as Java classes.
  - Servlet life cycle: init, service, destroy.
  - Configuring Servlets in web.xml.
  - Handling different HTTP methods (GET, POST).

## 4. JSP (JavaServer Pages):

- **Objective:** Introduce dynamic content generation using JSP.
- **Topics:**
  - JSP syntax and scripting elements.
  - JSP directives (page, include).
  - Using expressions, scriptlets, and declarations in JSP.

## 5. JSTL (JavaServer Pages Standard Tag Library):

- **Objective:** Enhance JSP development with reusable tags for common tasks.
- **Topics:**
  - Core JSTL tags (c:if, c:forEach, c:set, etc.).
  - Formatting and localization with fmt tags.
  - Handling collections and arrays in JSTL.

## 6. JDBC (Java Database Connectivity):

- **Objective:** Enable interaction with databases in web applications.
- **Topics:**
  - Establishing database connections.
  - Executing SQL queries and updates.
  - Handling result sets and database errors.
  - Prepared statements and connection pooling.

## 7. Session Management:

- **Objective:** Manage user sessions to store and retrieve data.
- **Topics:**
  - Understanding HTTP sessions.
  - HttpSession object and its methods.
  - Cookies and URL rewriting for session tracking.

## 8. Error Handling and Exception Handling:

- **Objective:** Handle errors and exceptions gracefully in web applications.
- **Topics:**
  - Configuring error pages in web.xml.
  - Handling exceptions using try-catch blocks.
  - Custom error pages and error codes.

## 9. WAR Files (Web Application Archive):

- **Objective:** Package and deploy web applications in a standard format.
- **Topics:**
  - Creating a WAR file structure.
  - Deployment descriptor (web.xml).
  - Deploying a WAR file to a servlet container like Tomcat.

## 10. Servlet Filters:

- **Objective:** Understand request and response filtering for various purposes.
- **Topics:**
  - Filter interface and filter chains.
  - Implementing filters for authentication, logging, and data transformation.
  - Filter configuration in web.xml.

## 11. Authentication and Security:

- **Objective:** Secure your web application with user authentication and access control.
- **Topics:**
  - Implementing basic authentication with servlets.
  - Role-based access control (user roles and permissions).

- Best practices for secure coding.

## 12. RESTful Web Services (Optional):

- **Objective:** Explore RESTful services using Servlets for API development.
- **Topics:**
  - Introduction to REST architecture.
  - Building RESTful APIs with Servlets.
  - Consuming RESTful services in Java web applications.

## 13. MVC (Model-View-Controller) Architecture:

- **Objective:** Learn the MVC pattern for structured web application development.
- **Topics:**
  - MVC fundamentals: Model, View, Controller.
  - Separation of concerns in web applications.
  - Advantages of MVC.

## 14. Deployment to Tomcat:

- **Objective:** Understand the deployment process on a Tomcat server.
- **Topics:**
  - Installing and configuring Apache Tomcat.
  - Deploying web applications to Tomcat.
  - Server configuration (e.g., server.xml and context.xml).

## 15. Project Work:

- **Objective:** Apply the learned concepts to a practical project.
- **Outcomes:** Students should complete a web application project using Servlets and JSP, demonstrating their understanding of web development concepts.

**Outcome:** By covering these topics and objectives, students will gain a solid foundation in Java web application development using Servlets, JSP, JSTL, JDBC, WAR files, and Tomcat deployment, enabling them to build dynamic and secure web applications.