JSP Tutorial

JSP technology is used to create web application just like Servlet technology. It can be thought of as an extension to Servlet because it provides more functionality than servlet such as expression language, JSTL, etc.

A JSP page consists of HTML tags and JSP tags. The JSP pages are easier to maintain than Servlet because we can separate designing and development. It provides some additional features such as Expression Language, Custom Tags, etc.

Advantages of JSP over Servlet

There are many advantages of JSP over the Servlet. They are as follows:

1) Extension to Servlet

JSP technology is the extension to Servlet technology. We can use all the features of the Servlet in JSP. In addition to, we can use implicit objects, predefined tags, expression language and Custom tags in JSP, that makes JSP development easy.

2) Easy to maintain

JSP can be easily managed because we can easily separate our business logic with presentation logic. In Servlet technology, we mix our business logic with the presentation logic.

3) Fast Development: No need to recompile and redeploy

If JSP page is modified, we don't need to recompile and redeploy the project. The Servlet code needs to be updated and recompiled if we have to change the look and feel of the application.

4) Less code than Servlet

In JSP, we can use many tags such as action tags, JSTL, custom tags, etc. that reduces the code. Moreover, we can use EL, implicit objects, etc.

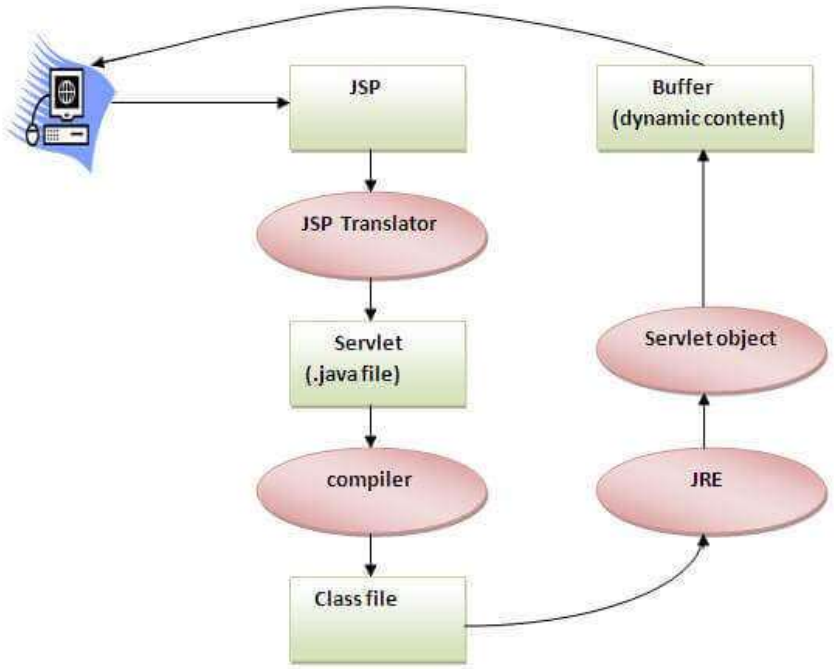
The Lifecycle of a JSP Page

The JSP pages follow these phases:

- Translation of JSP Page
- Compilation of JSP Page

- Classloading (the classloader loads class file)
- Instantiation (Object of the Generated Servlet is created).
- Initialization (the container invokes jspInit() method).
- Request processing (the container invokes _jspService() method).
- Destroy (the container invokes jspDestroy() method).

Note: jspInit(), _jspService() and jspDestroy() are the life cycle methods of JSP.



Creating a simple JSP Page

To create the first JSP page, write some HTML code as given below, and save it by .jsp extension. We have saved this file as index.jsp. Put it in a folder and paste the folder in the web-apps directory in apache tomcat to run the JSP page.

index.jsp

Let's see the simple example of JSP where we are using the scriptlet tag to put Java code in the JSP page. We will learn scriptlet tag later.

```
<html>
<body>
<% out.print(2*5); %>
</body>
</html>
```

JSP Scriptlet tag (Scripting elements)

In JSP, java code can be written inside the jsp page using the scriptlet tag. Let's see what are the scripting elements first.

JSP Scripting elements

The scripting elements provides the ability to insert java code inside the jsp. There are three types of scripting elements:

- scriptlet tag
- expression tag
- declaration tag

JSP scriptlet tag

A scriptlet tag is used to execute java source code in JSP. Syntax is as follows:

1. <% java source code %>

Example of JSP scriptlet tag

In this example, we are displaying a welcome message.

```
1. <html>
2. <body>
3. <% out.print("welcome to jsp"); %>
4. </body>
5. </html>
```

JSP expression tag

The code placed within **JSP expression tag** is *written to the output stream of the response*. So you need not write out.print() to write data. It is mainly used to print the values of variable or method.

Syntax of JSP expression tag

1. <%= statement %>

Example of JSP expression tag

In this example of jsp expression tag, we are simply displaying a welcome message.

1. <html>
2. <body>
3. <%= "welcome to jsp" %>
4. </body>
5. </html>

JSP Declaration Tag

The **JSP declaration tag** is used *to declare fields and methods*.

The code written inside the jsp declaration tag is placed outside the service() method of auto generated servlet.

So it doesn't get memory at each request.

Syntax of JSP declaration tag

The syntax of the declaration tag is as follows:

1. <%! field or method declaration %>

Difference between JSP Scriptlet tag and Declaration tag

Jsp Scriptlet Tag	Jsp Declaration Tag
The jsp scriptlet tag can only declare variables not methods.	The jsp declaration tag can declare variables as we methods.
The declaration of scriptlet tag is placed inside the _jspService() method.	The declaration of jsp declaration tag is placed ou the _jspService() method.

JSP Implicit Objects

There are **9 jsp implicit objects**. These objects are *created by the web container* that are available to all the jsp pages.

The available implicit objects are out, request, config, session, application etc.

A list of the 9 implicit objects is given below:

Object	Type
out	JspWriter
request	HttpServletRequest
response	HttpServletResponse
config	ServletConfig
application	ServletContext
session	HttpSession
pageContext	PageContext
page	Object
exception	Throwable

1) JSP out implicit object

For writing any data to the buffer, JSP provides an implicit object named out. It is the object of JspWriter. In case of servlet you need to write:

```
1. PrintWriter out=response.getWriter();
```

JSP request implicit object

The **JSP request** is an implicit object of type HttpServletRequest i.e. created for each jsp request by the web container. It can be used to get request information such as parameter, header information, remote address, server name, server port, content type, character encoding etc.

It can also be used to set, get and remove attributes from the jsp request scope.

Let's see the simple example of request implicit object where we are printing the name of the user with welcome message.

Example of JSP request implicit object

index.html

```
<form action="welcome.jsp">
<input type="text" name="uname">
<input type="submit" value="go"><br/>
</form>
```

welcome.jsp

```
<%
String name=request.getParameter("uname");
out.print("welcome "+name);
%>
```

3) JSP response implicit object

In JSP, response is an implicit object of type HttpServletResponse. The instance of HttpServletResponse is created by the web container for each jsp request.

It can be used to add or manipulate response such as redirect response to another resource, send error etc.

Let's see the example of response implicit object where we are redirecting the response to the Google.

Example of response implicit object

index.html

```
<form action="welcome.jsp">
<input type="text" name="uname">
<input type="submit" value="go"><br/>
</form>
```

welcome.jsp

```
<%
response.sendRedirect("http://www.google.com");
%>
```

6) session implicit object

In JSP, session is an implicit object of type HttpSession.The Java developer can use this object to set,get or attribute or to get session information.

7) pageContext implicit object

In JSP, pageContext is an implicit object of type PageContext class.The pageContext object can be set,get or remove attribute from one of the following scopes:

- page
- request
- session
- application

In JSP, page scope is the default scope.

JSP directives

The **jsp directives** are messages that tells the web container how to translate a JSP page into the corresponding servlet.

There are three types of directives:

- page directive
- include directive
- taglib directive

Syntax of JSP Directive

```
<%@ directive attribute="value" %>
```

JSP page directive

The page directive defines attributes that apply to an entire JSP page.

Syntax of JSP page directive

1. <%@ page attribute="value" %>

Attributes of JSP page directive

- import
- contentType
- extends
- info
- buffer
- language
- isELIgnored
- isThreadSafe
- autoFlush
- session
- pageEncoding
- errorPage
- isErrorPage

1)import

The import attribute is used to import class,interface or all the members of a package.It is similar to keyword in java class or interface.

Example of import attribute

```
1. <html>
2. <body>
3.
4. <%@ page import="java.util.Date" %>
5. Today is: <%= new Date() %>
6.
7. </body>
```

```
8. </html>
```

2)contentType

The contentType attribute defines the MIME(Multipurpose Internet Mail Extension) type of the HTTP response.The default value is "text/html;charset=ISO-8859-1".

Example of contentType attribute

```
1. <html>
2. <body>
3.
4. <%@ page contentType=application/msword %>
5. Today is: <%= new java.util.Date() %>
6.
7. </body>
8. </html>
```

3)extends

The extends attribute defines the parent class that will be inherited by the generated servlet.It is rarely used.

4)info

This attribute simply sets the information of the JSP page which is retrieved later by using getServletInfo() method of Servlet interface.

Example of info attribute

```
1. <html>
2. <body>
3.
4. <%@ page info="composed by  %>
5. Today is: <%= new java.util.Date() %>
6.
7. </body>
8. </html>
```

The web container will create a method getServletInfo() in the resulting servlet.For example:

```
1. public String getServletInfo() {
```

```
2.    return "composed by Sonoo Jaiswal";
3.  }
```

5)buffer

The buffer attribute sets the buffer size in kilobytes to handle output generated by the JSP page.The default size of the buffer is 8Kb.

Example of buffer attribute

```
1.  <html>
2.  <body>
3.    <%@ page buffer="16kb" %>
4.  Today is: <%= new java.util.Date() %>
5.
6.  </body>
7.  </html>
```

6)language

The language attribute specifies the scripting language used in the JSP page. The default value is "java".

8)isThreadSafe

Servlet and JSP both are multithreaded.If you want to control this behaviour of JSP page, you can use isThreadSafe attribute of page directive.The value of isThreadSafe value is true.If you make it false, the web container will serialize the multiple requests, i.e. it will wait until the JSP finishes responding to a request before passing another request to it.If you make the value of isThreadSafe attribute like:

<%@ page isThreadSafe="false" %>

The web container in such a case, will generate the servlet as:

```
1.  public class SimplePage_jsp extends HttpJspBase    implements SingleThreadModel{
2.  .....
3.  }
```

9)errorPage

The errorPage attribute is used to define the error page, if exception occurs in the current page, it will be redirected to the error page.

Example of errorPage attribute

```
1. //index.jsp
2. <html>
3. <body>
4.   <%@ page errorPage="myerrorpage.jsp" %>
5.    <%= 100/0 %>
6.   </body>
7. </html>
```

10)isErrorPage

The isErrorPage attribute is used to declare that the current page is the error page.

> Note: The exception object can only be used in the error page.

Example of isErrorPage attribute

```
1. //myerrorpage.jsp
2. <html>
3. <body>
4.   <%@ page isErrorPage="true" %>
5.    Sorry an exception occured!<br/>
6. The exception is: <%= exception %>
7.   </body>
8. </html>
```