Java Server Pages (JSP)

Lesson 04: JSP Directives

Lesson Objectives

- In this lesson, you will learn about:
  - JSP Directives
    - What is a JSP Directive?
  - JSP Page Directive
  - JSP Include Directive

What is a JSP Directive?

- Directives are messages to the JSP container.
- Instruction for the JSP engine that are processed when the JSP page is translated into servlet.
- A JSP Directive affects the overall structure of the servlet class.
- It has the form, as shown below:
  - <%@ directive {attribute = "value"}* %>
- Types of Directives in JSP 2.2:
  - page
  - Include
  - taglib

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JSP Directives:
What is a JSP Directive?
- A JSP *directive* affects the overall structure of the servlet class.
- Used to set global values such as class declarations methods to be implemented, output content type etc
- Do not produce any output to the client
- They have the scope of the entire file

- It usually has the following form: <%@ directive {attribute="value"}* %>
- There are three types of directives:
  - **page:** It allows to do things like import classes, customize the servlet super class, and the like; and
  - **include:** It allows to insert a file into the servlet class at the time the JSP file is translated into a servlet.
  - **taglib:** It is intended to let JSP authors define their own tags. This directive is explained in detail in the lesson on "Custom Tags in JSP Pages".

4.2: JSP Page Directive
The Page Directive

- The JSP page directive defines a number of page dependent properties and communicates these to the JSP container.
- JSP page directive applies to the entire JSP file and any of its static include files called as translation unit.
    - It can be used more than once in a translation unit.
    - All attributes except "import" can be used only once per translation unit.

JSP Page Directive:
- The **<%@ page %>** directive applies to an entire **JSP file** and any of its **static include files**, which together are called a **translation unit**. A static include file is a file whose content becomes part of the calling JSP file. The <%@ page %> directive does not apply to any dynamic include files.
- The **<%@ page %>** directive can be used more than once in a translation unit. However, each attribute, except import, can be used once. Since in Java programming language, the **import attribute** is similar to the **import statement**, a <%@ page %> directive with import more than once can be used in a JSP file or translation unit.
- No matter the position of <%@ page %> directive in a JSP file or included files, it applies to the entire translation unit. However, it is often good programming style to place it at the top of the JSP file.

4.2: JSP Page Directive
The Page Directive

- Syntax

```
<%@ page
{language="scriptingLanguage"}
{ extends="className" }
{ import="importList" }
{ session="true|false" }
{ buffer="none|sizekb" }
{ autoFlush="true|false" }
{ isThreadSafe="true|false" }
```

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JSP Page Directive:
Attributes of JSP Page directive:
- *language*="**java**" **:** It indicates the scripting language used in scriptlets, declarations, and expressions in the JSP file and any included files. In this release, the only allowed value is java.
- *extends*="**package.*class***" **:** It indicates the fully qualified name of the superclass of the Java class file this JSP file will be compiled to. Use this attribute cautiously, as it can limit the JSP container's ability to provide a specialized superclass that improves the quality of the compiled file.
- *import*="**{package.class | package.*}, ...**" : It indicates a comma-separated list of Java packages that the JSP file should import. The packages (and their classes) are available to scriptlets, expressions, and declarations within the JSP file. If more than one package to be imported, then specify a comma-separated list after import or use import more than once in a JSP file. The following packages are implicitly imported, so it does not need to specify them with the import attribute: java.lang.* , javax.servlet.*, javax.servlet.jsp.*, javax.servlet.http.*
Place the import attribute before the element that calls the imported class.
For example:

```
<%@ page import="java.util.*" %>
```

The import attribute is the only one that is allowed to appear multiple times.

4.2: JSP Page Directive
The Page Directive

- Syntax

> { info="info_text" }
>
> { errorPage="error_url" }
>
> { isErrorPage="true|false" }
>
> { contentType="ctinfo" }
>
> { pageEncoding="peinfo" }
>
> { isELIgnored="true|false" }

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4.2: JSP Page Directive
Demo

- Demo on:
  - exel.jsp
  - excelhtml.jsp
  - computespeed.jsp; speederror.jsp
  - index.jsp

Deploy web application **Lesson4-JSPDirectives** and show demo by executing each of the above JSP pages.

Content-Type Demo : exel.jsp & Excelhtml.jsp will display the content in excel format

Usage of Error page Demo: Execute computspeed.jsp page, if submit the form without any value or with invalid values then the NumberFormatException will be thrown which will be passed on to the error page (speederror.jsp) as it is set as an error page in the "isErrorPage" attribute of the page directive. If the valid values are entered in the textboxes speed will be displayed in the output.

Explain the error page configuration in the web.xml as given in the Demo.

4.3: JSP Include Directive
The Include Directive

- The include directive includes files at the time the JSP page is translated into a servlet.
- Syntax:

  <%@include file="relativeURL"%>

  - The included file can be an HTML file, a JSP file, a text file or a Java code file.
  - The include process is static.
  - Change in the included file will not be reflected in the JSP file in which it is included (this behavior is dependent on JSP container).

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The JSP Include Directive:
- The **<%@ include %>** directive inserts a file of text or code in a JSP file at translation time, when the JSP file is compiled. When the **<%@ include %>** directive is used, the include process is **static**.
  - A static include means that the text of the included file is added to the JSP file. The included file can be a JSP file, HTML file, or text file. If the included file is a JSP file, then its JSP elements are parsed and their results are included (along with any other text) in the JSP file.
- We can only use **include** to include static files.
  - This means that the parsed result of the included file is added to the JSP file where the <%@ include %> directive is placed.
  - Once the included file is parsed and included, processing resumes with the next line of the calling JSP file.
- A JSP container can include a mechanism for being notified if an included file changes, so the container can recompile the JSP page. However, the JSP 2.1 specification does not have a way of directing the JSP container that included files have changed.
- The included file must not contain <html>, </html>, <body>, or </body> tags. Since the entire content of the included file is added at that location in the JSP file, these tags would conflict with the same tags in the calling JSP file, causing an error.

4.3: JSP Include Directive
Example for JSP Include Directive

```
<HTML>
<HEAD> <TITLE>Include Directive </TITLE>
</HEAD>
<BODY>
<%@ include file="header.html" %>
Page Body
<!-- Part specific to this page ... -->
<%@ include file="footer.html" %>
</BODY>
</HTML>
```

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The JSP Include Directive:
Syntax for JSP Include Directive:

> <%@ include file="relativeURL" %> file="relativeURL"

• The pathname to the included file is always a relative URL. A relative URL is just the path segment of an URL, without a protocol, port, or domain name. An example is shown below:

> "error.jsp" , "/templates/onlinestore.html" , "/beans/calendar.jsp"

• If the relative URL starts with /, then the path is relative to the JSP application's context, which is a **javax.servlet.ServletContext** object that is in turn stored in the application object. If the relative URL starts with a directory or file name, then the path is relative to the JSP file.

• The example on the slide shows how we can add header and footer to our **include.jsp** page by making use of the **include** directive to include **header.html** and **footer.html**.

• Note that the include directive inserts the files at the time the page is translated. Hence, if the header and footer changes, then it needs to re-translate all the JSP pages that refer to it. If, however, the included files changed more often, then the **jsp:include** action should be used instead. This action includes the file at the time the JSP page is requested, and is discussed in the next lesson.

4.3: JSP Include Directive
Demo

- DemoJSPDirectives
  - include.jsp
  - header.html
  - footer.html

Deploy web application **Lesson4-JSPDirectives** and show demo by executing each of the above JSP pages.

The include.jsp page includes the header.html and the footer.html pages using the include directive (@ include). Invoke include.jsp page to run the demo.

Lab

- Lab 1.3

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Summary

- In this lesson, you have learnt the following concepts:
  - JSP Page Directive
  - JSP Include Directive

Summary

Review Questions

- Question 1: Directives are ___ to JSP Container.

- Question 2: Which directive helps you to import classes?

- Question 3: If you want the JSP container to send client request one at a time to the JSP page, then which attribute of the page directive will need to be set?

Review Questions

- Question 4: The default value for the buffer attribute of the page directive is ___ kb.
  Question 5: JSP include directive follows a ___ include process:
  - Option 1: static
  - Option 2: dynamic
  - Option 3: both