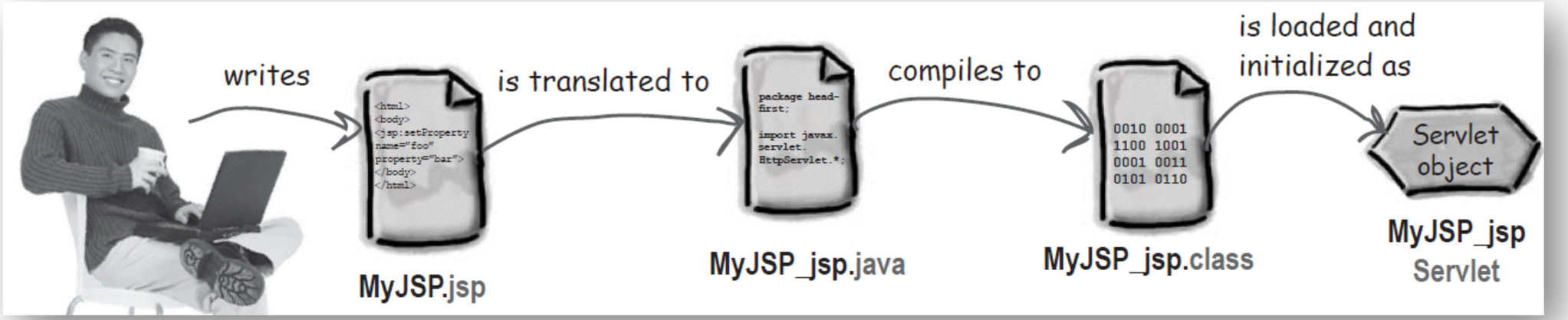
Chapter 7

Being a JSP

A JSP is a servlet



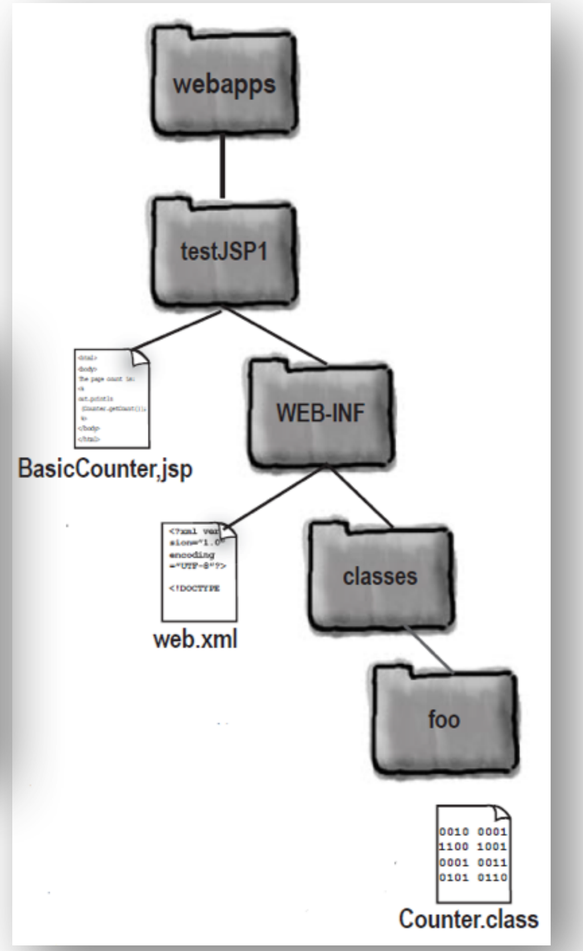
How many times I've been accessed

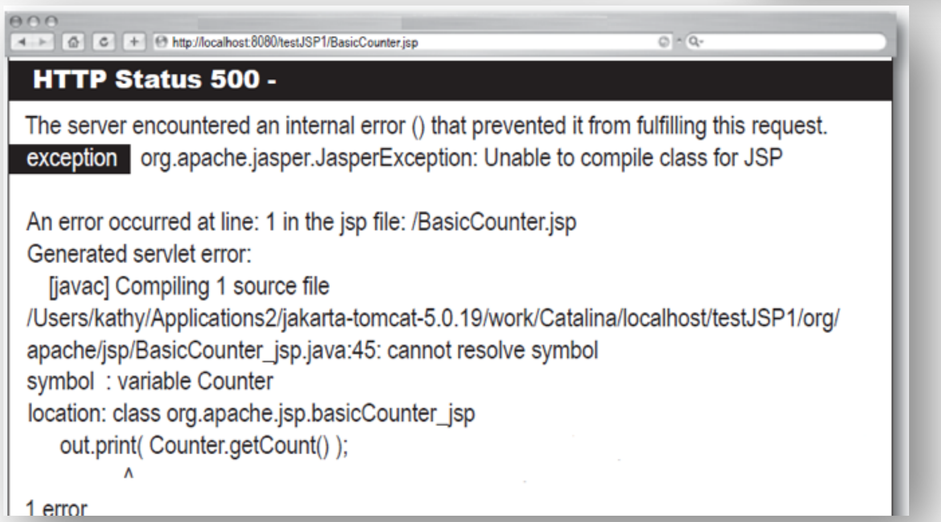
BasicCounter.jsp

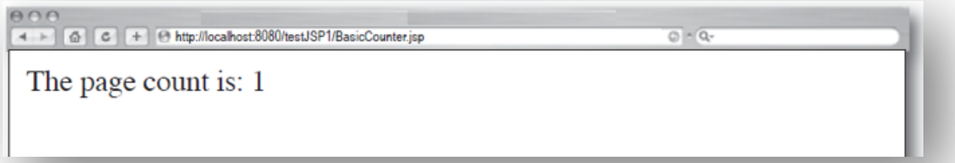
```
<html>
<body>
The page count is:
<%
   out.println(Counter.getCount());
%>
</body>
</html>
```

Counter.java

```
package foo;

public class Counter {
   private static int count;
   public static synchronized int getCount()     {
      count++;
      return count;
   }
}
```







Fully qualified class or Import

```
<% out.println(foo.Counter.getCount()); %>
```

To import a *single* package:

```
<%@ page import="foo.*" %>

<html>
<body>
The page count is:
<%
  out.println(Counter.getCount());
%>
</body>
</html>
```

To import *multiple* packages:

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

Questions

- Where each part of the JSP goes into the servlet code?
- May I ServletContext and ServletConfig?
- Type and syntax of the elements?
- Lifecycle?

Elements

- Scriptlet: <% %>
- Directive: <%@ %>
- Expression: <%= %>
- Declaration: <%! %>

Directives, Scriptlets & Expressions

***Scriptlet* code:**

```
<%@ page import="foo.*" %>
<html>
<body>
The page count is:
<% out.println(Counter.getCount()); %>
</body>
</html>
```

***Expression* code:**

```
<%@ page import="foo.*" %>
<html>
<body>
The page count is now:
<%= Counter.getCount() %>
</body>
</html>
```

```
out.print(Counter.getCount());
```

Beware!

Expressions become arguments in out.print()

```
<html>
<body>
<% int count=0; %>
The page count is now:
<%= ++count %>
</body>
</html>
```

But JSPs are servlets


```
<html><body>
<% int count=0; %>
The page count is now:
<%= ++count %>
</body></html>
```

```
public class basicCounter_jsp extends SomeSpecialHttpServlet {

  public void _jspService(HttpServletRequest request,
      HttpServletResponse response)throws java.io.IOException,
                                          ServletException {

    PrintWriter out = response.getWriter();
    response.setContentType("text/html");
    out.write("<html><body>");
    int count=0;
    out.write("The page count is now:");
    out.print( ++count );
    out.write("</body></html>");

  }
}
```

Declaration!

<%! int count=0; %>

Importing a variable

```
<html><body>
<%! int count=0; %>
The page count is now:
<%= ++count %>
</body></html>
```

```
public class basicCounter_jsp extends HttpServlet {

  int count=0;

  public void _jspService(HttpServletRequest request,
    HttpServletResponse response)throws java.io.IOException {

      PrintWriter out = response.getWriter();
      response.setContentType("text/html");
      out.write("<html><body>");
      out.write("The page count is now:");
      out.print( ++count );
      out.write("</body></html>");
  }
}
```

JSP Declatations

```
public class basicCounter_jsp extends SomeSpecialHttpServlet {

  public void _jspService(HttpServletRequest request,
      HttpServletResponse response)throws java.io.IOException,
                                          ServletException {

    PrintWriter out = response.getWriter();
    response.setContentType("text/html");
    out.write("<html><body>");
    int count=0;
    out.write("The page count is now:");
    out.print( ++count );
    out.write("</body></html>");
```

```
<html><body>
<% int count=0; %>
The page count is now:
<%= ++count %>
</body></html>
```

Local Variable

```
public class basicCounter_jsp extends SomeSpecialHttpServlet {

  int count=0;

  public void _jspService(HttpServletRequest request,
    HttpServletResponse response)throws j...n {

    PrintWriter out = response.getW...
    response.setContentType("text/ht...
    out.write("<html><body>");
    out.write("The page count is now:");
    out.print( ++count );
    out.write("</body></html>");
  }
}
```

```
<html><body>
<%! int count=0; %>
The page count is now:
<%= ++count %>
</body></html>
```

Instance Variable

Importing methods & variables

```
<html>
<body>
<%! int doubleCount() {
      count = count*2;
      return count;
    }
%>
<%! int count=1; %>
The page count is now:
<%= doubleCount() %>
</body>
</html>
```

```
public class basicCounter_jsp extends HttpServlet {

  int doubleCount() {
     count = count*2;
     return count;
  }
  int count=1;

  public void _jspService(HttpServletRequest request,
    HttpServletResponse response)throws java.io.IOException {
      PrintWriter out = response.getWriter();
      response.setContentType("text/html");
      out.write("<html><body>");
      out.write("The page count is now:");
      out.print( doubleCount() );
      out.write("</body></html>");
  }
}
```

JSP lifecycle

- Look at the directives
- Create an HttpServlet subclass
- Writes
  - Import statements
  - Declaration statements
- Builds a service method _jspService()
- Combines all

Me Container, you JSP

I will
- give you the class
  - I might not show the generated Java
- look at your directives
- create an HttpServlet subclass
  - Tomcat extends: org.apache.jasper.runtime.HttpJspBase
- write any imports or declarations statements in the class file,
  - imports just below the package statement
  - declarations below the class declaration and before the service method
- build the service method _jspService()
  - called by the servlet superclass' overridden service() method, and
  - receives HttpServletRequest & HttpServletResponse.
- declare & initialize all implicit objects
- combine HTML, scriptlets & expressions into the service method

You should
- not worry on how I do the above
- Know how your elements work inside the generated servlet
  - and what jspInit(), jspDestroy & _jspService() are about

Tomcat 5 generated class

```
package org.apache.jsp;
import javax.servlet.*;
import javax.servlet.http.*;
import javax.servlet.jsp.*;

public final class BasicCounter_jsp extends org.apache.jasper.runtime.HttpJspBase
                    implements org.apache.jasper.runtime.JspSourceDependent {

   int count=0;
   private static java.util.Vector _jspx_dependants;

   public java.util.List getDependants() {
     return _jspx_dependants;
   }

   public void _jspService(HttpServletRequest request, HttpServletResponse response)
                          throws java.io.IOException, ServletException {
      JspFactory _jspxFactory = null;
      PageContext pageContext = null;
      HttpSession session = null;
      ServletContext application = null;
      ServletConfig config = null;
      JspWriter out = null;
      Object page = this;
      JspWriter _jspx_out = null;
      PageContext _jspx_page_context = null;

      try {
        _jspxFactory = JspFactory.getDefaultFactory();
        response.setContentType("text/html");
        pageContext = _jspxFactory.getPageContext(this, request, response,
                    null, true, 8192, true);
        _jspx_page_context = pageContext;
        application = pageContext.getServletContext();
        config = pageContext.getServletConfig();
        session = pageContext.getSession();
        out = pageContext.getOut();
        _jspx_out = out;
        out.write("\r<html>\r<body>\r");
        out.write("\rThe page count is now: \r");
        out.print( ++count );
        out.write("\r</body>\r</html>\r");
      } catch (Throwable t) {
         if (!(t instanceof SkipPageException)){
           out = _jspx_out;
           if (out != null && out.getBufferSize() != 0)
             out.clearBuffer();
           if (_jspx_page_context != null) _jspx_page_context.handlePageException(t);
         }
      } finally {
         if (_jspxFactory != null) _jspxFactory.releasePageContext(_jspx_page_context);
      }
   }
}
```

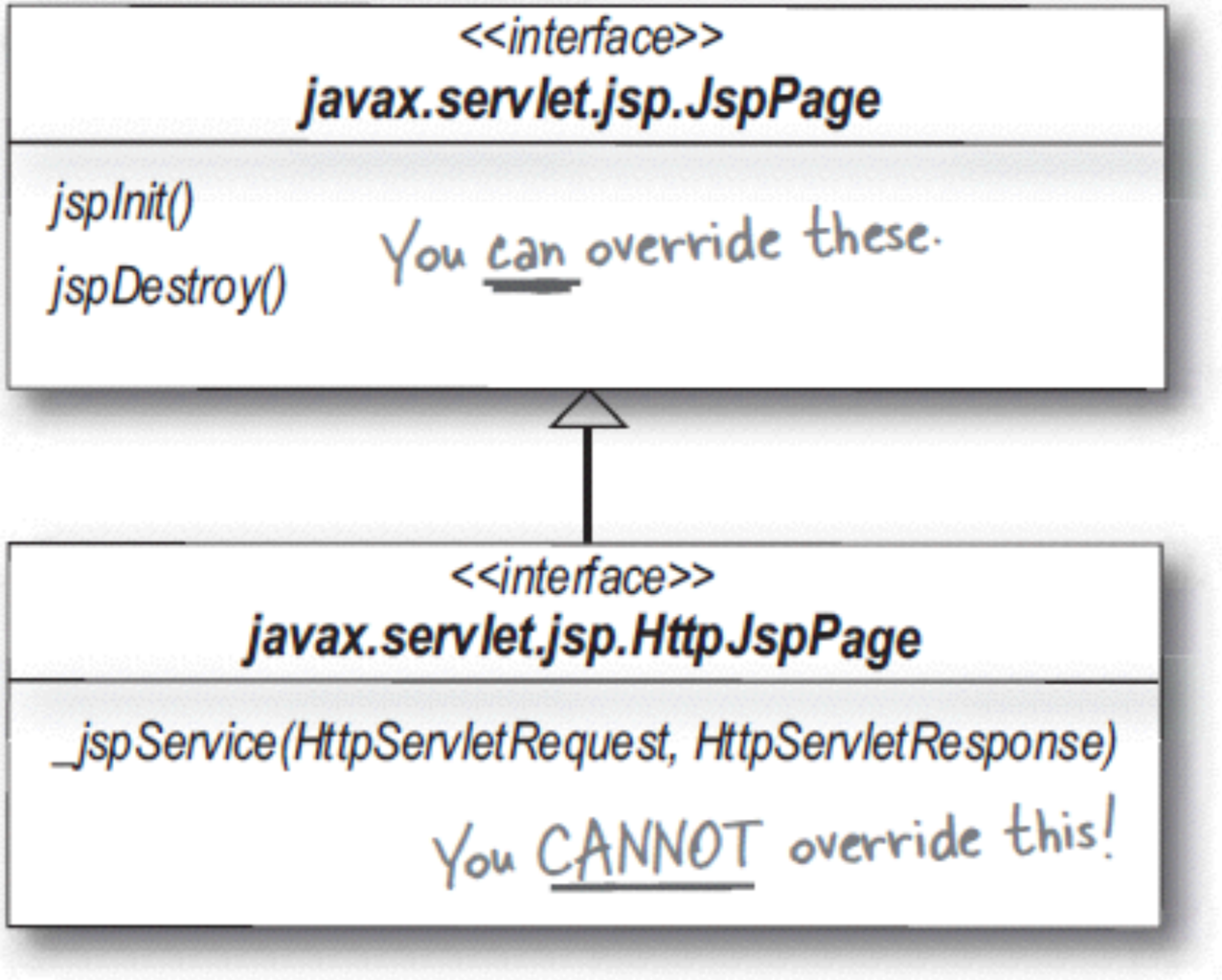
```
<html><body>
<%! int count=0; %>
The page count is now:
<%= ++count %>
</body></html>
```

Example

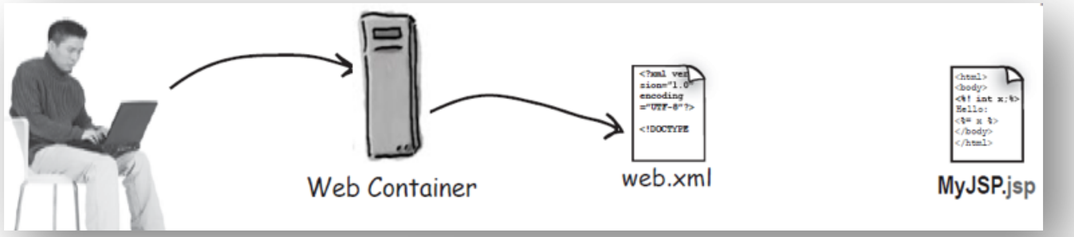
API and implicit objects

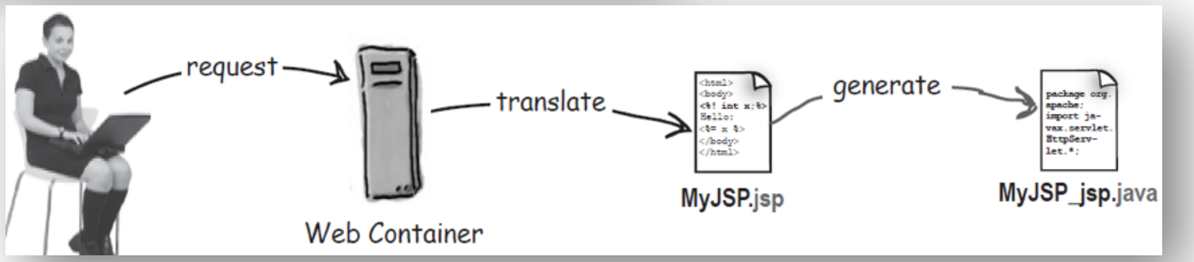
JspWriter	_____	out
HttpServletRequest	_____	request
HttpServletResponse	_____	response
HttpSession	_____	session
ServletContext	_____	application
ServletConfig	_____	config
JspException	_____	exception
PageContext	_____	pageContext
Object	_____	page

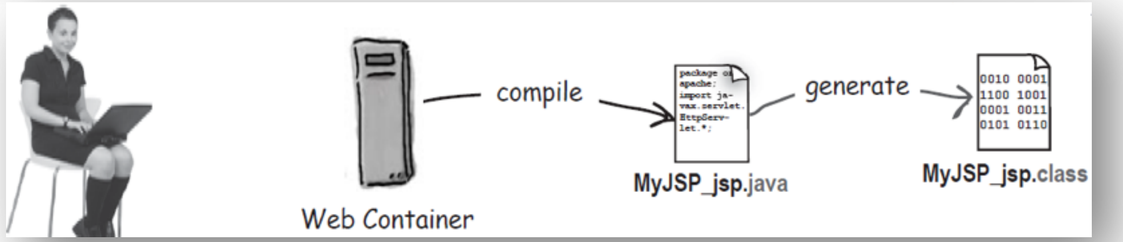
API and the generated servlet

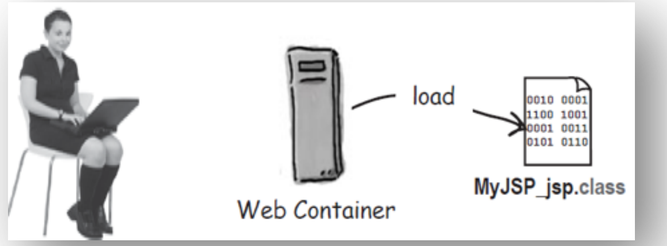


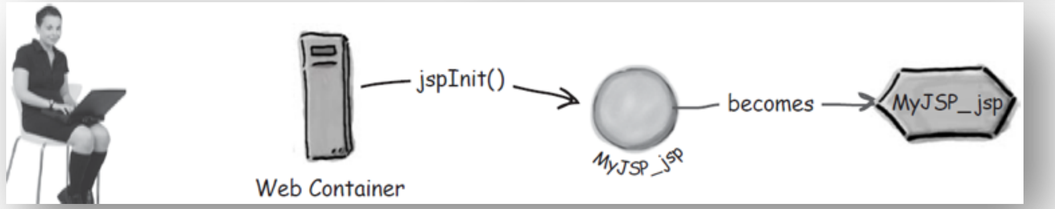
Lifecycle of a JSP

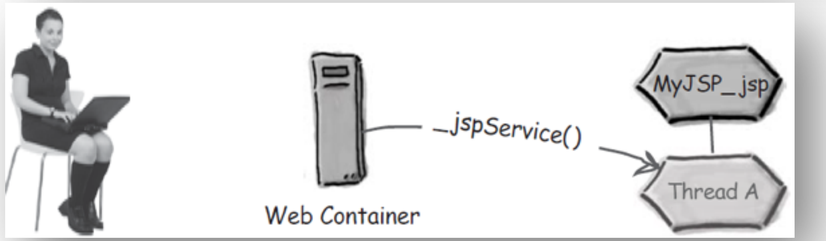












Initializing your servlet JSP

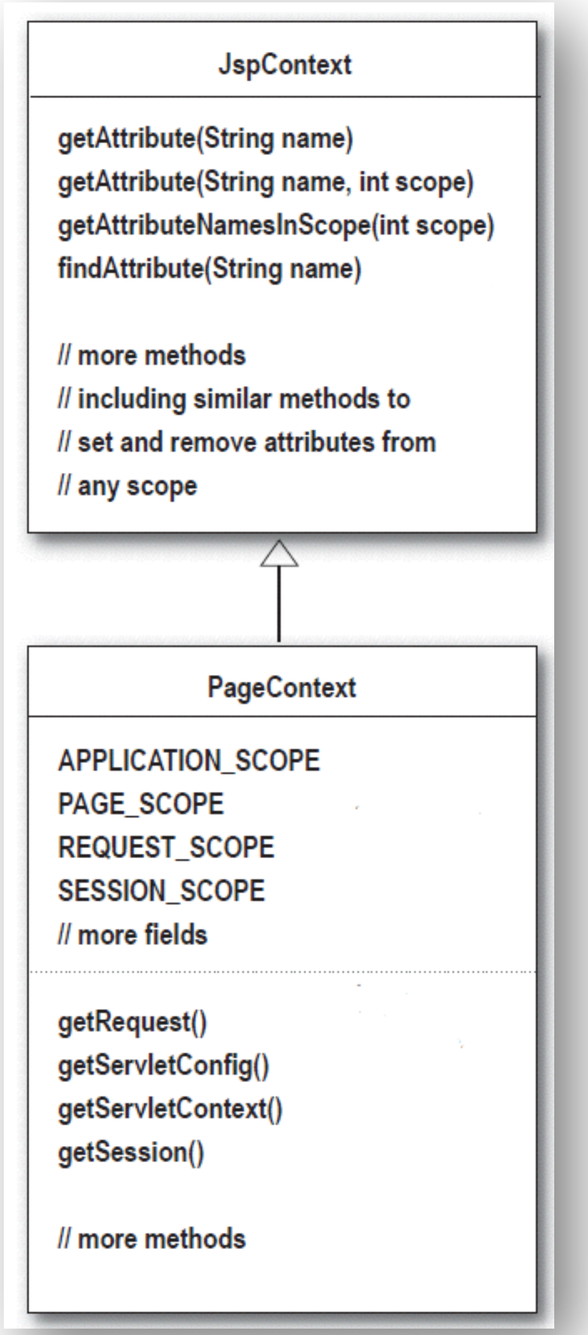
```
<web-app ...>
  <servlet>
    <servlet-name>MyTestInit</servlet-name>
    <jsp-file>/TestInit.jsp</jsp-file>
    <init-param>
      <param-name>email</param-name>
      <param-value>ikickedbutt@wickedlysmart.com</param-value>
    </init-param>
  </servlet>
  <servlet-mapping>
    <servlet-name>MyTestInit</servlet-name>
    <url-pattern>/TestInif.jsp</url-pattern>
  </servlet-mapping>
</web-app>
```

Overwrite using declaration

```
<%!
  public void jspInit() {

    ServletConfig sConfig = getServletConfig();

    String emailAddr = sConfig.getInitParameter("email");

    ServletContext ctx = getServletContext();

    ctx.setAttribute("mail", emailAddr);
  }
%>
```

Attributes in a JSP

	In a servlet	In a JSP (using implicit objects)
Application	**getServletContext()**.setAttribute(“foo”, barObj);	**application**.setAttribute(“foo”, barObj);
Request	**request**.setAttribute(“foo”, barObj);	**request**.setAttribute(“foo”, barObj);
Session	**request.getSession()**.setAttribute(“foo”, barObj);	**session**.setAttribute(“foo”, barObj);
Page	Does not apply!	**pageContext**.setAttribute(“foo”, barObj);



Setting a *page*-scoped attribute

```
<% Float one = new Float(42.5); %>
<% pageContext.setAttribute("foo", one); %>
```

Getting a *page*-scoped attribute

```
<%= pageContext.getAttribute("foo") %>
```

Using the pageContext to set a *session*-scoped attribute

```
<% Float two = new Float(22.4); %>
<% pageContext.setAttribute("foo", two, PageContext.SESSION_SCOPE); %>
```

Using the pageContext to get a *session*-scoped attribute

```
<%= pageContext.getAttribute("foo", PageContext.SESSION_SCOPE) %>
```

(Which is identical to: `<%= session.getAttribute("foo") %>`)

Using the pageContext to get an *application*-scoped attribute

```
Email is:
<%= pageContext.getAttribute("mail", PageContext.APPLICATION_SCOPE) %>
```

Within a JSP, the code above is identical to:

```
Email is:
<%= application.getAttribute("mail") %>
```

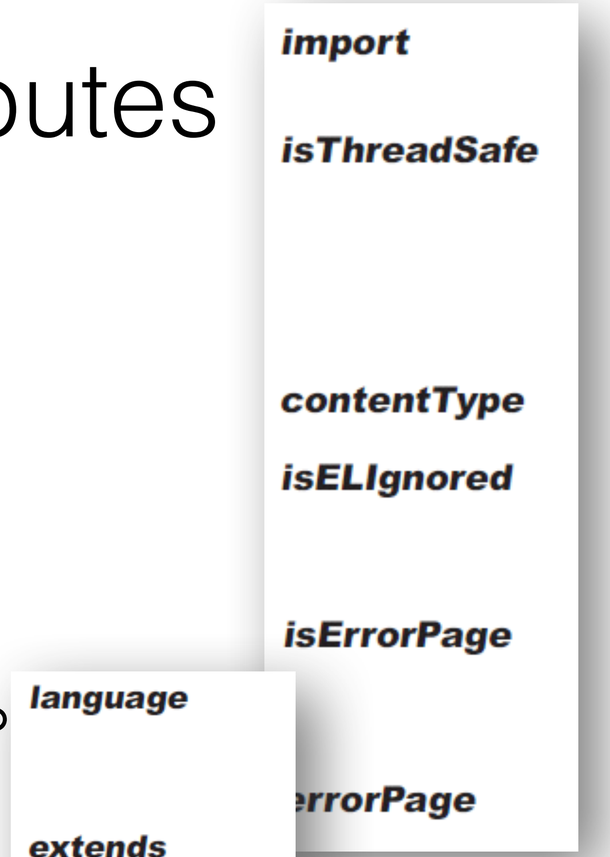
Using the pageContext to find an attribute when you don't *know* the scope

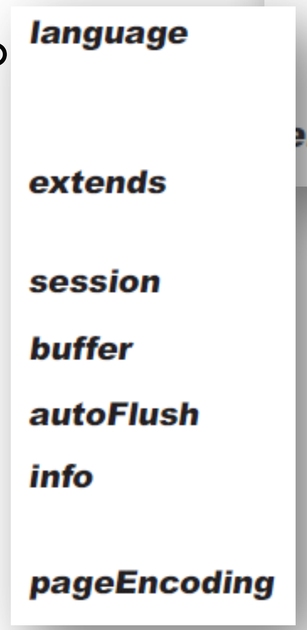
```
<%= pageContext.findAttribute("foo") %>
```

Using PageContext

Other (page) directives & attributes

<%@ page import=”foo.*” session=”false” %>
<%@ taglib tagdir=”/WEB-INF/tags/cool” prefix=”cool” %
<%@ include file=”wickedHeader.html” %>





EL (Expression Language)

- Web page designers shouldn't have to know Java.
- Java code in a JSP is hard to change and maintain.

This EL expression:

```
Please contact: ${applicationScope.mail}
```

Is the same as this Java expression:

```
Please contact: <%= application.getAttribute("mail") %>
```

We have a choice

```
<web-app ...>
 ...
  <jsp-config>
     <jsp-property-group>
     <url-pattern>*.jsp</url-pattern>
     <scripting-invalid>
        true
      </scripting-invalid>
    </jsp-property-group>
  </jsp-config>
 ...
</web-app>
```

```
<web-app ...>
 ...
  <jsp-config>
     <jsp-property-group>
     <url-pattern>*.jsp</url-pattern>
     <el-ignored>
        true
      </el-ignored>
    </jsp-property-group>
  </jsp-config>
 ...
</web-app>
```

One last word: Actions (details later)

Standard Action:

```
<jsp:include page="wickedFooter.jsp" />
```

Other Action:

```
<c:set var="rate" value="32" />
```