

Advanced Exercise on Computer and Information Science B

Java Servlet/Java Server Pages

Servlet/JSP

• Servlet?

- A framework to develop an web application in Java
- Use class
- latest - Servlet 4.0 (2014/9)

• JSP?

- Embed Java logic into HTML
- Is compiled to Servlet when accessed at the first time
- Latest - JSP 2.2 (2014/9)

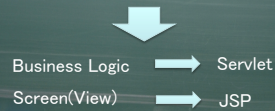
How to use Servlet

• Servlet

- Basically Java programming
 - Difficult to implement a complicated screen

• JSP

- Embed Java logic into HTML
- Write logic in necessary parts



An example of JSP

```

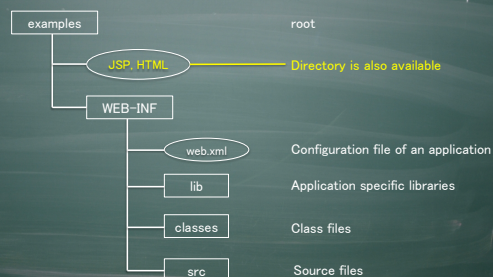
<%@ page contentType="text/html;charset=utf-8" %>

<html>
<head>
<title>Hello World!</title>
</head>
<body>
<h1>Hello World!</h1>

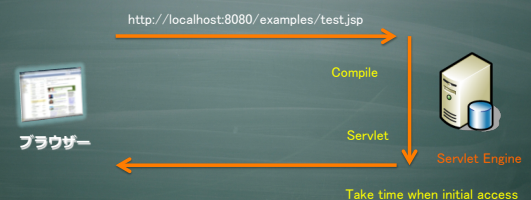
<%
    out.println(new java.util.Date());
%>

</body>
</html>
  
```

The location of JSP files



Execution process of JSP



Basis of JSP

- Directive
 - page, include, taglib
- Scripting
 - Scriptlet, expression evaluation, variable declaration
 - Method definition, comment
- Action tag
 - omit
- Implicit objects

Directive

- Description of control flow in JSP
 - **page directive**
 - include directive
 - Include jsp's defined in other files
 - taglib directive
 - Use tag libraries

page directive

Use attributes that programmers use

```
<%@ page
[ language="java" ]
[ extends="package.class" ]
[ import="{package.class | package.*}, ..." ]
[ session="true|false" ]
[ buffer="none|8kb|sizekb" ]
[ autoFlush="true|false" ]
[ isThreadSafe="true|false" ]
[ info="text" ]
[ errorPage="relativeURL" ]
[ contentType="mimeType [ ; charset=characterSet ]" |
"text/html ; charset=ISO-8859-1" ]
[ isErrorPage="true|false" ]
[ pageEncoding="characterSet | ISO-8859-1" ]
[ isELIgnored="true|false" ]
%>
```

Page directive in detail 1/4

- language
 - Specify language. Currently, only Java is permitted
- extends
 - Specify a parent class when using hierarchy
- **Import**
 - the same as Java's import. Note, the following package are available without importing
 - java.lang.*
 - javax.serv.et.*
 - javax.servlet.jsp.*
 - javax.servlet.http.*

Page directive in detail 2/4

- Session
 - Turn on/off the session. True by default
- Buffer
 - Turn on/off the buffering feature
- autoFlush
 - Turn on/off the autoFlush feature when the buffer is full. True by default

Page directive in detail 3/4

- isThreadSafe
 - Turn on/off thread safe feature. True by default
- info
 - Add any information
- **errorPage**
 - Specify a page where the request is redirect to when errors happen
- **isErrorPage**
 - Specify whether this page is for error or not. False by default.

Page directive in detail 4/4

- **contentType**
 - Specify data type and character code in JSP

appendix) page directive-import

- The followings are available

```
<%page contentType="text/html;charset=utf-8" import="java.util.Date" %>
```

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

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

```
<%page import="java.io.*" %>
```

Scripting

- **Scriptlet**
- **Evaluate expressions**
- Variable declaration
- Method declaration
- Comments

Scriptlet

- A place where Java code is written

- **<% pieces of code %>**

```
<%@ page contentType="text/html;charset=Shift_JIS" %>
<html>
<%
int sum = 0;
for (int i = 0 ; i <= 10 ; i++){
    sum = sum + i;
}
%>
Sum from 1 to 10 is

<%
out.println(sum);
%>
</body>
</html>
```

Evaluate expression

- Output the result of evaluation

- **<%= expression %>**

```
<%@ page contentType="text/html;charset=Shift_JIS" %>
<html>
<%
int sum = 0;
for (int i = 0 ; i <= 10 ; i++){
    sum = sum + i;
}
%>
!Sum from 1 to 10 is

<%= sum %>

</body>
</html>
```

Variable/Method declaration

- Define and use variables and/or methods in JSP

- **<%! Variable and/or method %>**

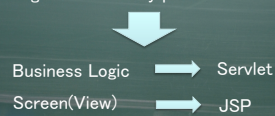
- The variables are static, meaning that variables keep values

```
<%!
int count = 0;
int getTotal(int num){
    int sum = 0;
    count++;
    for (int i = 1 ; i <= num ; i++){
        sum += i;
    }

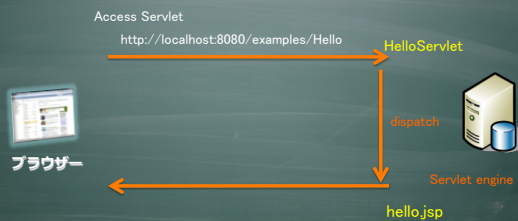
    return sum;
}
%>
```


How to use Servlet (again)

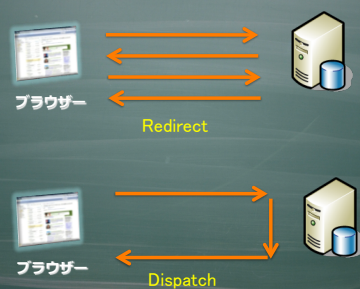
- Servlet
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Servlet together with JSP



appendix) RedirectとDispatch



A simple use of Servlet/JSP

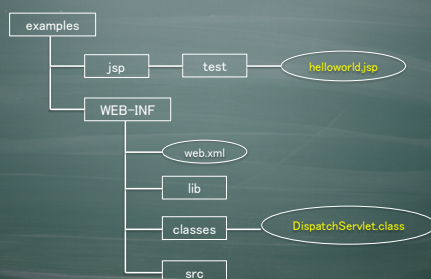
```

public class DispatchServlet extends HttpServlet {
    public void doGet(HttpServletRequest request, HttpServletResponse response)
        throws IOException, ServletException {
        RequestDispatcher dispatcher
            = request.getRequestDispatcher("/jsp/test/helloworld.jsp");
        dispatcher.forward(request, response);
    }
}
  
```

Specify URI of JSP

Execute dispatch

Deployment of Servlet/JSP



Pass a value to JSP – Servlet

- `HttpServletRequest.setAttribute(String key, Object o)`

```

public class HowAreYouServlet extends HttpServlet {
    public void doGet(HttpServletRequest request, HttpServletResponse response)
        throws IOException, ServletException {
        RequestDispatcher dispatcher
            = request.getRequestDispatcher("/jsp/test/howareyou.jsp");
        request.setAttribute("name", "Michael Jackson");
        dispatcher.forward(request, response);
    }
}
  
```

Pass a value to JSP – JSP

- `HttpServletRequest.getAttribute(String key)`

```
<%@ page contentType="text/html; charset=utf-8" %>
<%
    String name = (String)request.getAttribute("name");
%>

<html>
<head>
<title>How are you</title>
</head>
<body>
    こんにちは <%= name %> さん
</body>
</html>
```

Pass an arbitrary object to JSP

- Any Object – `OriginalObject`

```
public class OriginalObject {
    private String name;
    private int age;

    public void setName(String name) {
        this.name = name;
    }
    public String getName() {
        return name;
    }
    public void setAge(int age) {
        this.age = age;
    }
    public int getAge() {
        return age;
    }
}
```

Pass an arbitrary object to JSP

- `DispatchObjectServlet`

```
public class DispatchObjectServlet extends HttpServlet {

    public void doGet(HttpServletRequest request, HttpServletResponse response)
        throws IOException, ServletException {

        RequestDispatcher dispatcher
            = request.getRequestDispatcher("/jsp/test/myobj.jsp");

        OriginalObject myObj = new OriginalObject();
        myObj.setName("Taro");
        myObj.setAge(20);

        request.setAttribute("myobj", myObj);

        dispatcher.forward(request, response);
    }
}
```

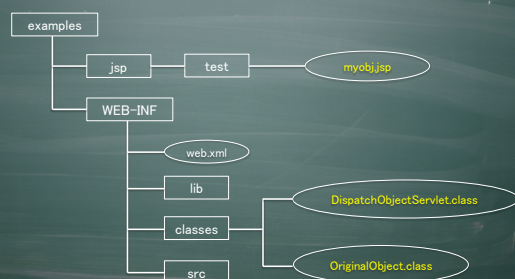
Pass an arbitrary object to JSP

- `myobj.jsp`

```
<%@ page contentType="text/html; charset=utf-8" %>
<%@ page import="jsperv.bean.*" %>
<%
    OriginalObject myobj = (OriginalObject)request.getAttribute("myobj");
%>

<html>
<head>
<title>How are you</title>
</head>
<body>
    Hello <%= myobj.getName() %><br/>
    <%= myobj.getAge() %> years old.
</body>
</html>
```

Servlet/JSP deployment



Exercise

- Implement registration application with Servlet and JSP
- Condition
 - Use POST method
 - Use Servlet-JSP
 - You can use any URL

