CS320 Web and Internet Programming
Java Beans

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Problems with Scripting Elements

- Mixing presentation and processing
  - hard to debug
  - hard to maintain
- No clean and easy way to reuse code

Solution – separate out Java code
- Bean
- Custom taglib

Java Beans

- Initially designed for GUI builders
- Beans support
  - Introspection
  - Customization
  - Events
  - Properties
  - Persistence

Java Beans for Dummies

- A zero-argument constructor
- No public class variables
- Properties
  - Properties are defined by getter and/or setter, e.g. getFoo() and setFoo()
  - Properties != Class variables

About Bean Properties

- Property naming conventions
  - 1st letter is always in lower case
  - 1st letter must be capitalized in getter (accessor) and/or setter (mutator)
- Property types
  - read-only property: only getter
  - write-only property: only setter
  - read/write property: both

Bean and JSP

Bean

\(<jsp:getProperty>\)
\(EL\)
\(<jsp:useBean>\)

JSP

\(<jsp:setProperty>\)
\(<c:set>\)
Bean Tags and Attributes
- `<jsp:useBean>`
  - `class`
  - `id`
  - `scope` (e.g., page, request, session, application)
- `<jsp:getProperty>`
  - `name`
  - `property` (e.g., r, g, b)
- `<jsp:setProperty>`
  - `name`
  - `property`
  - `value`
  - `param`

Bean in JSP Example
- `BGBean.java`
- `BGColor2.jsp`

```jsp
<jsp:useBean id="bg" class="cs320.stu31.BGBean" />
<jsp:setProperty name="bg" property="r" value="255" />
<jsp:setProperty name="bg" property="r" param="r" />
<jsp:setProperty name="bg" property="r" />
```

A Few More Ways to `setProperty`
```jsp
<%-- Use JSP expression for the value attribute --%>
<jsp:setProperty name="fb" property="fname"
  value='<%= request.getParameter("fname") %>'/>
<%-- Use Jsp:attribute for value attribute --%>
<jsp:setProperty name="fb" property="age">
  <jsp:attribute name="value" trim="true">
    <%= request.getParameter("age") %>
  </jsp:attribute>
</jsp:setProperty>
<%-- Set all properties --%>
<jsp:setProperty name="fb" property="*"/>
```

More About `<jsp:setProperty>`
- Note the auto-conversion from parameter string to property type
  - e.g., "255" → 255
- What if auto-conversion fails??
- What if a parameter is not specified??

Example: Form Bean
- Set all properties
- And an easier way to "get property":

First name: ${fb.fname}
Last name: ${fb.lname}

Scopes and Data Sharing
- `page scope` – data is valid within current page
  - include
- `request scope` – data is valid throughout the processing of the request
  - forward
- `session scope` – data is valid throughout the session
  - redirect, multiple separate requests
- `application scope` – data is valid throughout the life cycle of the web application