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
- Property *foo*
  - read property *foo*: getFoo() or isFoo()
  - set property *foo*: setFoo()

About Bean Properties

- Property naming conventions
  - 1st letter is always in lower case
  - 1st letter must be capitalized in accessor (getter) and/or mutator (setter)
- A property does not have to be a class variable
- Property types
  - read-only property: only *getter*
  - write-only property: only *setter*
  - read/write property: both

Bean Example

- BGBean.java
  - package!
Bean Tags and Attributes

- **jsp:useBean**
  - class
  - id
  - scope
    - page (default)
    - request
    - session
    - application

- **jsp:getProperty**
  - name
  - property

- **jsp:setProperty**
  - name
  - property
  - value
  - param

Bean in JSP Example

```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" />
<jsp:getProperty name="bg" property="r" />
```

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??

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:attribute name="val" trim="true"/>
<%-- request.getParameter("age") %>
</jsp:attribute>
</jsp:setProperty>
<%-- Set all properties --%>
<jsp:setProperty name="fb" property="*"/>
```

Example: Form Bean

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

  ```Expression Language
  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
Session Bean Examples

- WelcomeYou.jsp
- User bean in Heather