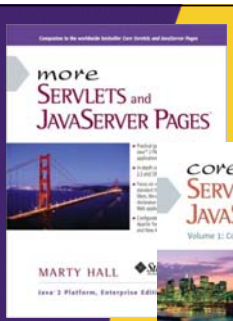
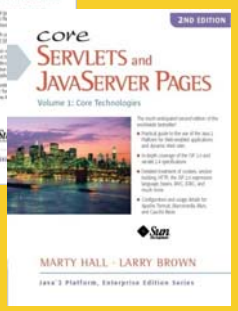
JSF 2 Composite Components
Part II – Input Components

JSF 2.2 Version

Originals of slides and source code for examples: http://www.coreservlets.com/JSF-Tutorial/jsf2/
Also see the PrimeFaces tutorial – http://www.coreservlets.com/JSF-Tutorial/primefaces/
and customized JSF2 and PrimeFaces training courses – http://courses.coreservlets.com/jsf-training.html





For live training on JSF 2, PrimeFaces, or other Java EE topics, email hall@coreservlets.com

Marty is also available for consulting and development support

Taught by the author of *Core Servlets and JSP*, this tutorial, and JSF 2.2 version of *Core JSF*. Available at public venues, or customized versions can be held on-site at your organization.

- Courses developed and taught by Marty Hall
  - JSF 2, PrimeFaces, Ajax, jQuery, Spring MVC, JSP, Android, general Java, Java 8 lambdas/streams, GWT, custom topic mix
  - Courses available in any location worldwide. Maryland/DC area companies can also choose afternoon/evening courses.
- Courses developed and taught by coreservlets.com experts (edited by Marty)
  - Hadoop, Spring, Hibernate/JPA, RESTful Web Services

Contact hall@coreservlets.com for details

Topics in This Section

- Idea
- Making basic input components
- Using the “type” attribute
- Giving components their own CSS file

Overview: Input Components

Input Components

- **Idea**
  - A composite component that will go inside h:form and be used to gather input from the user
- **Features**
  - Must be associated with a bean value
    - Use “type” attribute to enforce the type of the value
  - Often has its own style sheet
    - Load with h:outputStylesheet
  - May need to assemble final value out of submitted pieces
  - May need to call component setter methods based on attribute values
  - May have embedded Ajax behavior
  - May be built out of a rich JavaScript GUI element

Basic Input Components

Input Components: Basic Steps

- **Use JSF input element(s) in cc:implementation**
  - E.g., h:inputText, h:selectOneMenu, etc.
- **Do *not* include h:form**
  - Otherwise your component cannot be combined with other input components in a single form
- **In most cases, name the main attribute "value"**
  - To be consistent with standard input elements
  - Similarly, mimic other standard attribute names (styleClass, required, etc.)
- **Use the "type" attribute of cc:attribute to hook the element(s) to bean properties. Use fully qualified name.**
  - <cc:attribute name="value" required="true"
    type="coreservlets.Nameable"/>
- **Except for builtin types, have "type" refer to an interface**
  - For flexibility, so component can be used in many places

Example: inputName1

- **Idea**
  - Collect a first and last name
- **Code summary**
  - Use two h:inputText elements
  - Make a Nameable interface that defines getFirstName, setFirstName, getLastName, and setLastName (i.e., firstName and lastName bean properties). Have "type" refer to coreservlets.Nameable
  - Add optional properties with defaults to specify the prompts in front of the two textfields

Nameable Interface

```
package coreservlets;

public interface Nameable {
  public String getFirstName();

  public void setFirstName(String firstName);

  public String getLastName();

  public void setLastName(String lastName);
}
```


Component Outline

- **Filename: inputName1.xhtml**
  - In WebContent/resources/utils
- **Basic code**

```
<!DOCTYPE html ...>
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:h="http://xmlns.jcp.org/jsf/html"
      xmlns:cc="http://xmlns.jcp.org/jsf/composite">

<cc:interface>
    Declare value, firstNamePrompt, lastNamePrompt, required, requiredMessage
</cc:interface>
<cc:implementation>
    Make two input fields, one for first name, one for last name.
</cc:implementation>

</html>
```

Component: Interface Section

```
<cc:interface>
  <cc:attribute name="value" required="true"
                type="coreservlets.Nameable"/>
  <cc:attribute name="firstNamePrompt" required="false"
                default="First Name"/>
  <cc:attribute name="lastNamePrompt" required="false"
                default="Last Name"/>
  <cc:attribute name="required" required="false"
                default="true"/>
  <cc:attribute name="requiredMessage" required="false"
                default="Required!"/>
</cc:interface>
```


Component: Implementation Section

```
<cc:implementation>
<h:panelGrid columns="3">
#{cc.attrs.firstNamePrompt}:
<h:inputText value="#{cc.attrs.value.firstName}"
             id="firstName"
             required="#{cc.attrs.required}"
             requiredMessage="#{cc.attrs.requiredMessage}"/>
<h:message for="firstName"
           style="font-weight: bold; color: red"/>
#{cc.attrs.lastNamePrompt}:
<h:inputText value="#{cc.attrs.value.lastName}"
             id="lastName"
             required="#{cc.attrs.required}"
             requiredMessage="#{cc.attrs.requiredMessage}"/>
<h:message for="lastName"
           style="font-weight: bold; color: red"/>
</h:panelGrid>
</cc:implementation>
```

Example Usage 1: Employee of Month

- **Idea**
  - Nominate employee of the month for the corporation
- **Managed Bean**
  - Implements Nameable
  - Also stores a nomination reason
- **Page that uses component**
  - Collects name and nomination reason
- **Results page**
  - Shows confirmation with first name, last name, and nomination reason

Managed Bean (First Half)

```
@ManagedBean
public class EmployeeOfMonth implements Nameable {
  private String firstName, lastName;
  private String nominationReason;

  public String getFirstName() {
    return(firstName);
  }
  public void setFirstName(String firstName) {
    this.firstName = firstName;
  }
  public String getLastName() {
    return(lastName);
  }
  public void setLastName(String lastName) {
    this.lastName = lastName;
  }
```

Managed Bean (Second Half)

```
 public String getNominationReason() {
    return(nominationReason);
  }

  public void setNominationReason(String nominationReason) {
    this.nominationReason = nominationReason;
  }

  public String recordVote() {
    storeVoteSomehow();
    return("show-employee-vote");
  }

  private void storeVoteSomehow() {
    // Nothing to see here. Move along.
  }
}
```

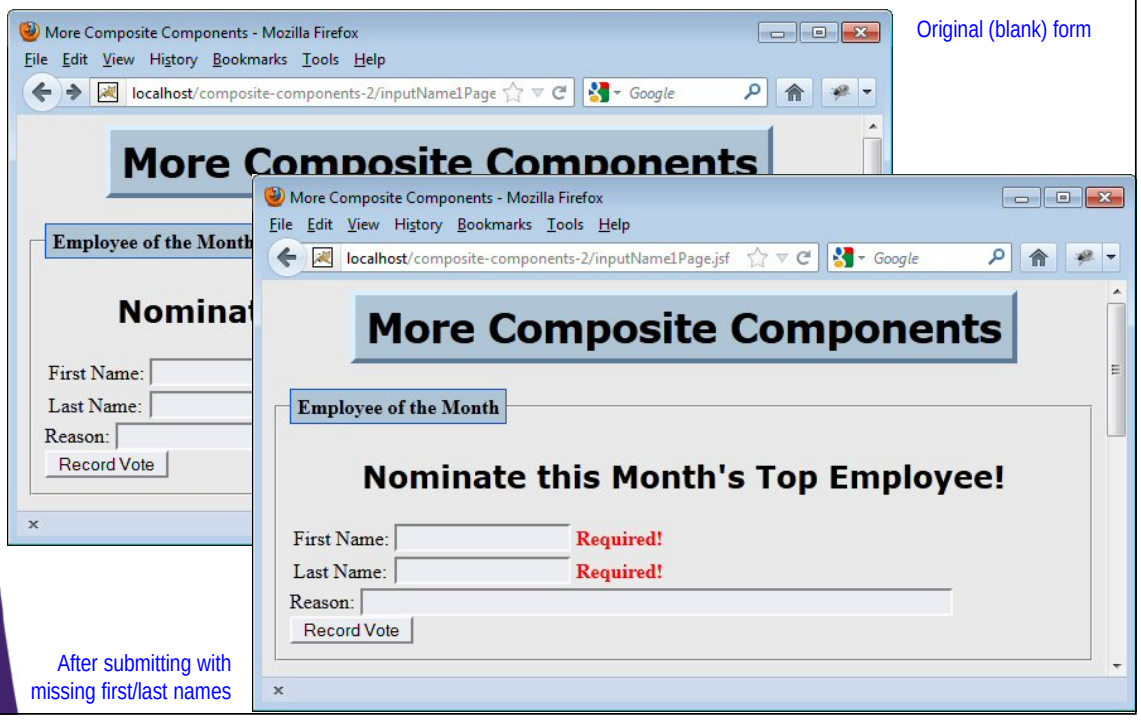

Facelets Page that Uses Component

```
...
<fieldset>
<legend>Employee of the Month</legend>
<h2>Nominate this Month's Top Employee!</h2>
<h:form>
  <utils:inputName1 value="#{employeeOfMonth}"/>
  Reason:
  <h:inputText value="#{employeeOfMonth.nominationReason}"
               size="75"/><br/>
  <h:commandButton action="#{employeeOfMonth.recordVote}"
                   value="Record Vote"/>
</h:form>
</fieldset>
...
```

Results Page

```
...
<fieldset>
<legend>Employee of Month</legend>
<ul>
  <li>Name: #{employeeOfMonth.firstName}
            #{employeeOfMonth.lastName}
  </li>
  <li>Reason: #{employeeOfMonth.nominationReason}</li>
</ul>
</fieldset>
...
```

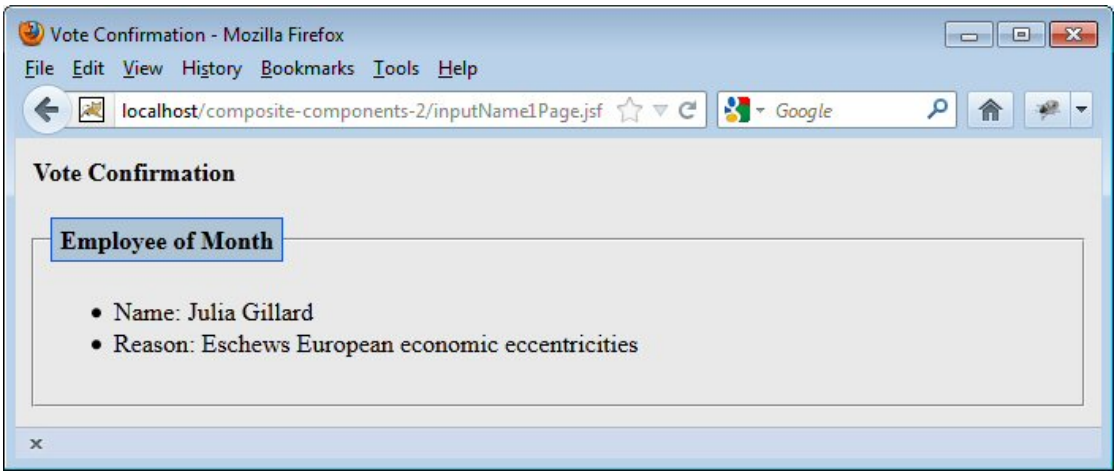

Result: Page that Uses Component



Original (blank) form

After submitting with missing first/last names

Result: Results Page



Usage 2: Write-in Ballot for US General Election (Maryland)

- **Idea**
  - Lets voters enter a name for president and vice president, and also vote on two local (state) initiatives.
- **Managed Bean**
  - Parent class: uses Person, which implements Nameable, has getters/setters for the two state propositions, has getters for the descriptions of the propositions
  - Subclass: provides descriptions of the propositions, has action controller method the verifies that president and vice president are different people
- **Page that uses component**
  - Collects president's name, vice president's name, and yes/no votes on the two propositions
- **Results page**
  - Shows confirmation for president, VP, and propositions

Parent Class of Managed Bean (Beginning)

```
public class WriteinBallot {
  private final Person president, vicePresident;
  private boolean forProp1, forProp2;
  private final String prop1Description, prop2Description;

  public WriteinBallot(String prop1Description,
                       String prop2Description) {
    this.prop1Description = prop1Description;
    this.prop2Description = prop2Description;
    forProp1 = true;
    forProp2 = true;
    president = new Person();
    vicePresident = new Person();
  }
```


Parent Class of Managed Bean (Continued)

```
  public Person getPresident() {
    return (president);
  }

  public Person getVicePresident() {
    return (vicePresident);
  }

  public boolean isForProp1() {
    return (forProp1);
  }
  public void setForProp1(boolean forProp1) {
    this.forProp1 = forProp1;
  }
  public String getProp1Description() {
    return (prop1Description);
  }
```

Parent Class of Managed Bean (Continued)

```
  public boolean isForProp2() {
    return (forProp2);
  }

  public void setForProp2(boolean forProp2) {
    this.forProp2 = forProp2;
  }

  public String getProp2Description() {
    return (prop2Description);
  }
}
```


Person (Used by Parent Class)

```
public class Person implements Nameable {
  private String firstName="", lastName="";

  public Person(String firstName, String lastName) {
    this.firstName = firstName;
    this.lastName = lastName;
  }

  public Person() {}
```

Person (Continued)

```
  public String getFirstName() {
    return(firstName);
  }
  public void setFirstName(String firstName) {
    this.firstName = firstName;
  }
  public String getLastName() {
    return(lastName);
  }
  public void setLastName(String lastName) {
    this.lastName = lastName;
  }
  public String getFullName() {
    return(firstName + " " + lastName);
  }
}
```


Managed Bean (First Half)

```
@ManagedBean
public class MarylandBallot extends WriteinBallot {
  public MarylandBallot() {
    super("To require all Maryland elementary schools " +
          "to teach Java programming",
          "To have Java programming replace lacrosse " +
          "as the official state team sport");
  }
```

Managed Bean (Second Half)

```
public String checkBallot() {
   Person pres = getPresident();
   Person vp = getVicePresident();
   if (pres.getFirstName().equals(vp.getFirstName()) &&
       pres.getLastName().equals(vp.getLastName())) {
     FacesContext context = FacesContext.getCurrentInstance();
     FacesMessage errorMessage =
       new FacesMessage("Cannot vote for same person for " +
                        "President and Vice President");
     context.addMessage(null, errorMessage);
     return(null);
   } else {
     return("show-ballot-vote");
   }
 }
}
```

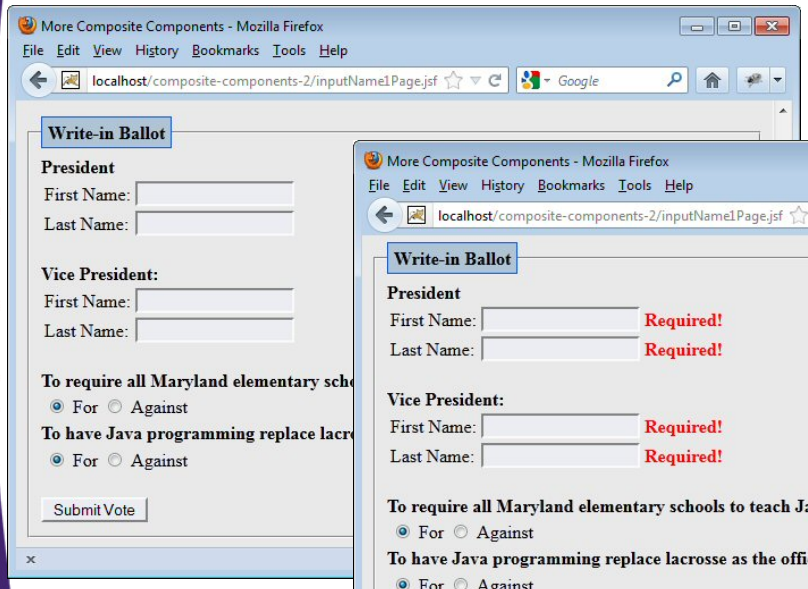

Facelets Page that Uses Component

```
...
<h:form>
  <b>President</b><br/>
  <utils:inputName1 value="#{marylandBallot.president}"/><br/>
  <b>Vice President:</b><br/>
  <utils:inputName1 value="#{marylandBallot.vicePresident}"/><br/>
  <b>#{marylandBallot.prop1Description}</b>
  <h:selectOneRadio value="#{marylandBallot.forProp1}">
    <f:selectItem itemValue="true" itemLabel="For"/>
    <f:selectItem itemValue="false" itemLabel="Against"/>
  </h:selectOneRadio>
  <b>#{marylandBallot.prop2Description}</b>
  <h:selectOneRadio value="#{marylandBallot.forProp2}">
    <f:selectItem itemValue="true" itemLabel="For"/>
    <f:selectItem itemValue="false" itemLabel="Against"/>
  </h:selectOneRadio>
  <br/>
  <h:commandButton action="#{marylandBallot.checkBallot}"
                   value="Submit Vote"/>
</h:form>...
```

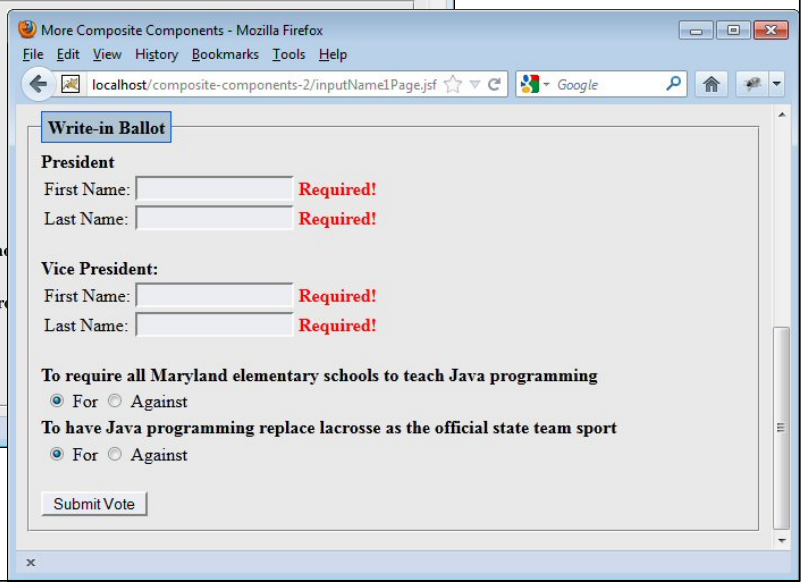
Results Page

```
...
<fieldset>
<legend>Maryland Write-in Ballot</legend>
<ul>
  <li>President:
      #{marylandBallot.president.fullName}</li>
  <li>Vice President:
      #{marylandBallot.vicePresident.fullName}</li>
  <li>Voted for Proposition 1
      (#{marylandBallot.prop1Description}):
      #{marylandBallot.forProp1}</li>
  <li>Voted for Proposition 2
      (#{marylandBallot.prop2Description}):
      #{marylandBallot.forProp2}</li>
</ul>
</fieldset>
...
```


Result: Page that Uses Component

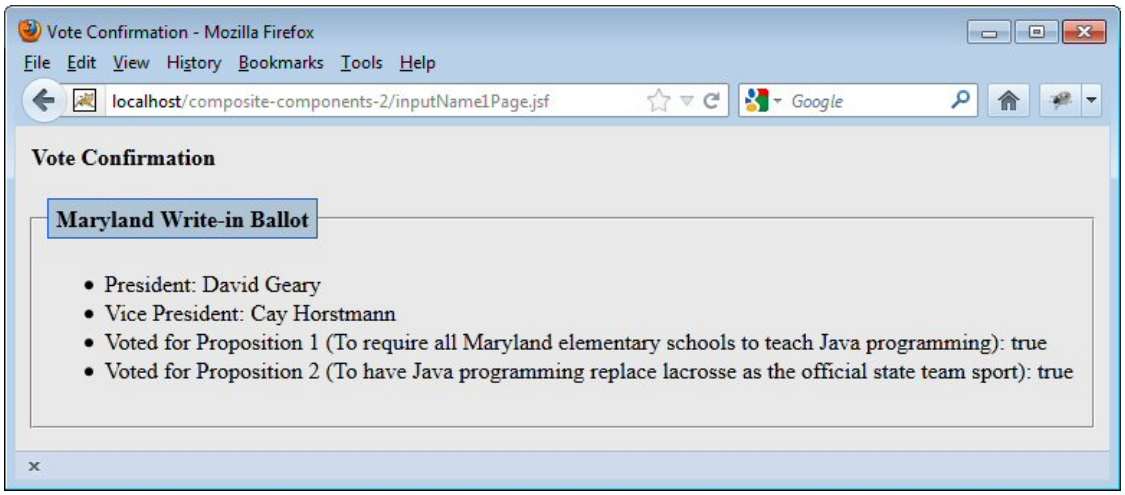


Original (blank) form



After submitting with missing first/last names

Result: Results Page



Giving Stylesheets to Components

Overview

- **Motivation**
  - CSS-based alignment is often needed by components that consist of multiple pieces
    - E.g., for name component, make table cell that holds the prompts be right-aligned, and table cell that holds the textfields be left-aligned
  - Fonts and colors should be overridable by page author
- **Basic steps**
  - Create a "css" (or similar) subfolder within your component folder (which, in turn, is inside "resources")
  - Put style sheet in that folder
  - Load the style sheet with
    <h:outputStylesheet name="stylesheet-name.css"
    library="component-folder/css"/>
    - Even though this is not in "head" section of original file, the HTML tag to load style sheet will be in head of rendered page

Component Outline

- **Filename: inputName2.xhtml**
  - In WebContent/resources/utils
- **Basic code**

```
<!DOCTYPE html ...>
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:h="http://xmlns.jcp.org/jsf/html"
      xmlns:cc="http://xmlns.jcp.org/jsf/composite">

<cc:interface>
    Declare value, firstNamePrompt, lastNamePrompt, required, requiredMessage, errorStyleClass
</cc:interface>
<cc:implementation>
    Make two input fields, one for first name, one for last name. Align with CSS. CSS for errors.
</cc:implementation>

</html>
```

Component: Interface Section

```
<cc:interface>
  <cc:attribute name="value" required="true"
                type="coreservlets.Nameable"/>
  <cc:attribute name="firstNamePrompt" required="false"
                default="First Name"/>
  <cc:attribute name="lastNamePrompt" required="false"
                default="Last Name"/>
  <cc:attribute name="required" required="false"
                default="true"/>
  <cc:attribute name="requiredMessage" required="false"
                default="Required!"/>
  <cc:attribute name="errorStyleClass" required="false"
                default="name-error"/>
</cc:interface>
```


Component: Implementation Section (First Half)

```
<cc:implementation>
<h:outputStylesheet name="utils-styles.css"
                    library="utils/css"/>
<h:panelGrid columns="3" styleClass="formTable">
#{cc.attrs.firstNamePrompt}:
<h:inputText value="#{cc.attrs.value.firstName}"
             id="firstName"
             required="#{cc.attrs.required}"
             requiredMessage="#{cc.attrs.requiredMessage}"/>
<h:message for="firstName"
           styleClass="#{cc.attrs.errorStyleClass}"/>
```

Component: Implementation Section (Second Half)

```
#{cc.attrs.lastNamePrompt}:
<h:inputText value="#{cc.attrs.value.lastName}"
             id="lastName"
             required="#{cc.attrs.required}"
             requiredMessage="#{cc.attrs.requiredMessage}"/>
<h:message for="lastName"
           styleClass="#{cc.attrs.errorStyleClass}"/>
</h:panelGrid></cc:implementation>
```

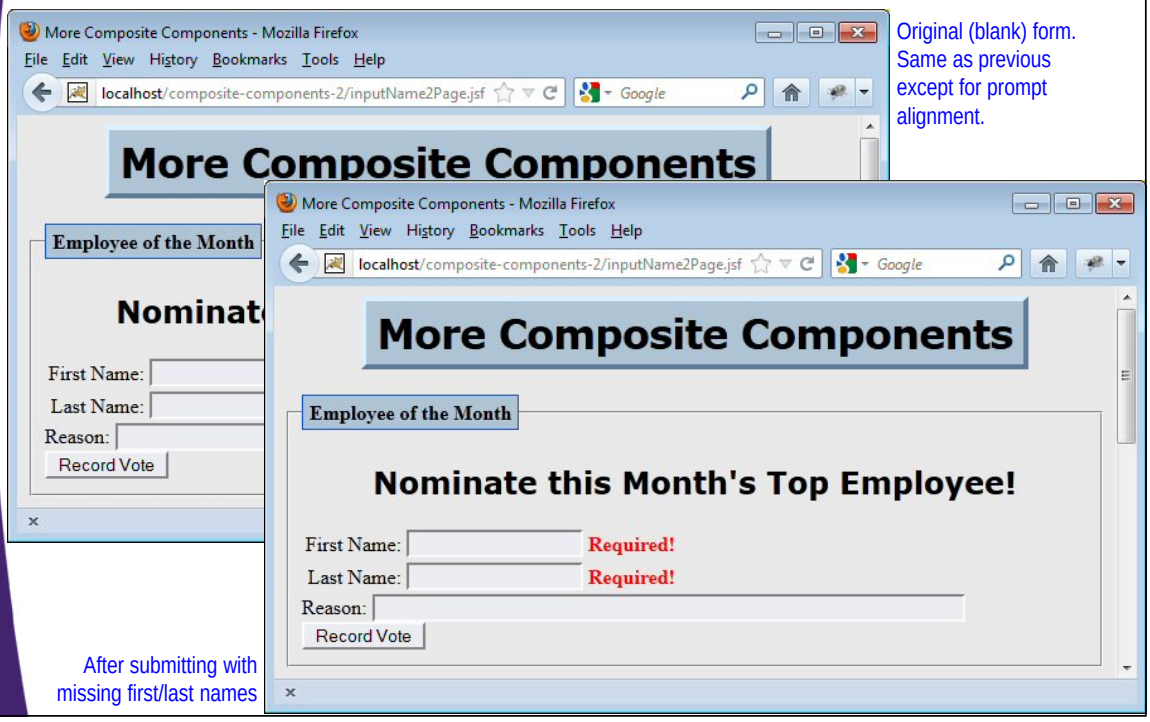

Examples: Employee of Month and Maryland Ballot

- **CSS**
  - R-aligns the prompts
  - Makes error messages bold and red by default, but can be overridden by passing in errorStyleClass
- **Managed beans**
  - Reused from previous examples without changes
- **Page that uses component**
  - Mostly same as previous examples, but optionally supplies an errorStyleClass
- **Results pages**
  - Reused from previous examples without changes

Employee of Month: Facelets Page that Uses Component

```
...
<h2>Nominate this Month's Top Employee!</h2>
<h:form>
  <utils:inputName2 value="#{employeeOfMonth}"/>
  Reason:
  <h:inputText value="#{employeeOfMonth.nominationReason}"
               size="75"/><br/>
  <h:commandButton action="#{employeeOfMonth.recordVote}"
                   value="Record Vote"/>
</h:form>
...
```

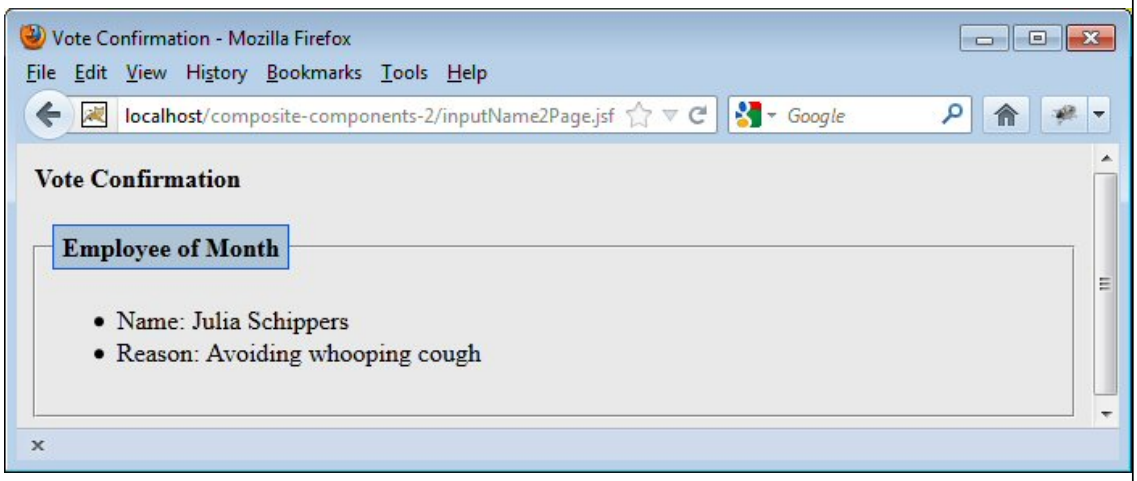

Result: Employee of Month (Input Form)



Original (blank) form. Same as previous except for prompt alignment.

After submitting with missing first/last names

Result: Employee of Month (Results Page)



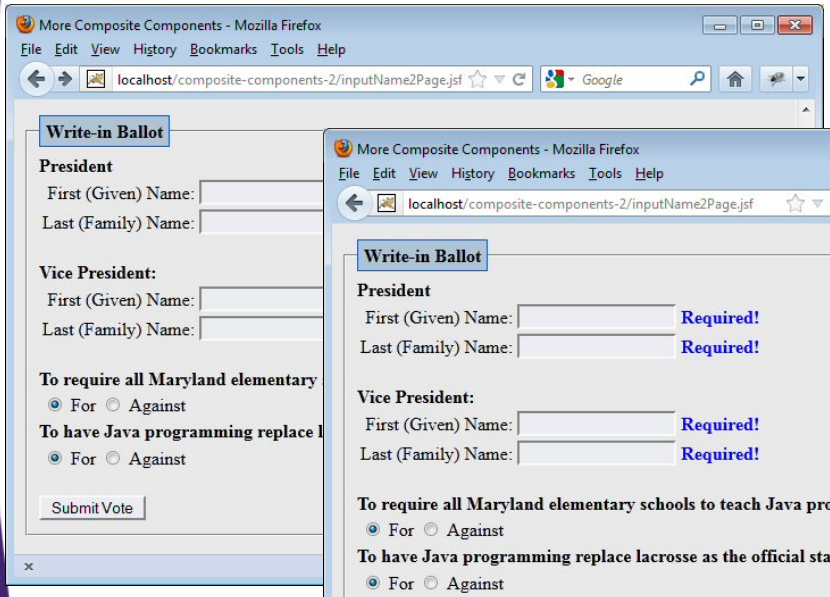
Write-in Ballot: Facelets Page that Uses Component (1st Half)

```
...
<h:form>
  <b>President</b><br/>
  <utils:inputName2 value="#{marylandBallot.president}"
                    firstNamePrompt="First (Given) Name"
                    lastNamePrompt="Last (Family) Name"
                    errorStyleClass="blue-error"/><br/>
  <b>Vice President:</b><br/>
  <utils:inputName2 value="#{marylandBallot.vicePresident}"
                    firstNamePrompt="First (Given) Name"
                    lastNamePrompt="Last (Family) Name"
                    errorStyleClass="blue-error"/><br/>
```

Write-in Ballot: Facelets Page that Uses Component (2nd Half)

```
  <b>#{marylandBallot.prop1Description}</b>
  <h:selectOneRadio value="#{marylandBallot.forProp1}">
    <f:selectItem itemValue="true" itemLabel="For"/>
    <f:selectItem itemValue="false" itemLabel="Against"/>
  </h:selectOneRadio>
  <b>#{marylandBallot.prop2Description}</b>
  <h:selectOneRadio value="#{marylandBallot.forProp2}">
    <f:selectItem itemValue="true" itemLabel="For"/>
    <f:selectItem itemValue="false" itemLabel="Against"/>
  </h:selectOneRadio>
  <br/>
  <h:commandButton action="#{marylandBallot.checkBallot}"
                   value="Submit Vote"/>
</h:form>
...
```

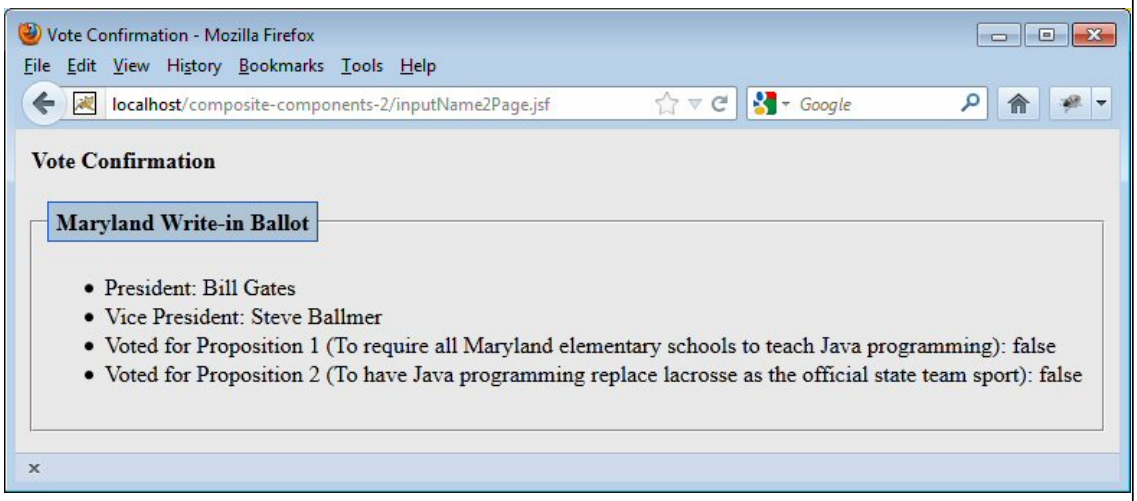

Result: Write-in Ballot (Input Form)



Original (blank) form. Same as previous except for prompt alignment.

After submitting with missing first/last names. Same as previous except for style of error messages.

Result: Write-in Ballot (Results Page)



Wrap-Up

Summary

- **Associate input element with bean value**
  - Use “type” attribute to enforce the type of the value
  - Except for builtin types, use interface, not class, for the value
- **Use style sheets**
  - Load with h:outputStylesheet
  - Often used for alignment
  - For fonts and colors, let page author override your styles

Questions?

More info:
http://www.coreservlets.com/JSF-Tutorial/jsf2/ – JSF 2.2 tutorial
http://www.coreservlets.com/JSF-Tutorial/primefaces/ – PrimeFaces tutorial
http://courses.coreservlets.com/jsf-training.html – Customized JSF and PrimeFaces training courses
http://coreservlets.com/ – JSF 2, PrimeFaces, Java 7 or 8, Ajax, jQuery, Hadoop, RESTful Web Services, Android, HTML5, Spring, Hibernate, Servlets, JSP, GWT, and other Java EE training