

# Developing a Simple JavaServer Faces application

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This application will make you understand how Model (M), View (V), Controller (C) architecture is implemented in JavaServer Faces. This application will make use of UI components, Validator, Navigation and Bean component available with JSF.

This application will take a user First Name and Last Name. Later these fields will be validated by JSF and using the controller bean and Navigation rule the output will be displayed. This application will also introduce a UI component which is a submit button.

To run this tutorial, as a minimum you will be required to have installed the following prerequisite software:

- Sun JDK 6.0+ (J2SE 1.6)
  - Eclipse IDE for Java EE Developers, which is platform specific
  - Apache Geronimo Eclipse Plugin 2.1.x
  - Apache Geronimo Server 2.1.x
- Geronimo version 2.1.x, Java 1.5 runtime, and Eclipse Ganymede are used in this tutorial but other versions can be used instead (e.g., Geronimo version 2.2, Java 1.6, Eclipse Europa)

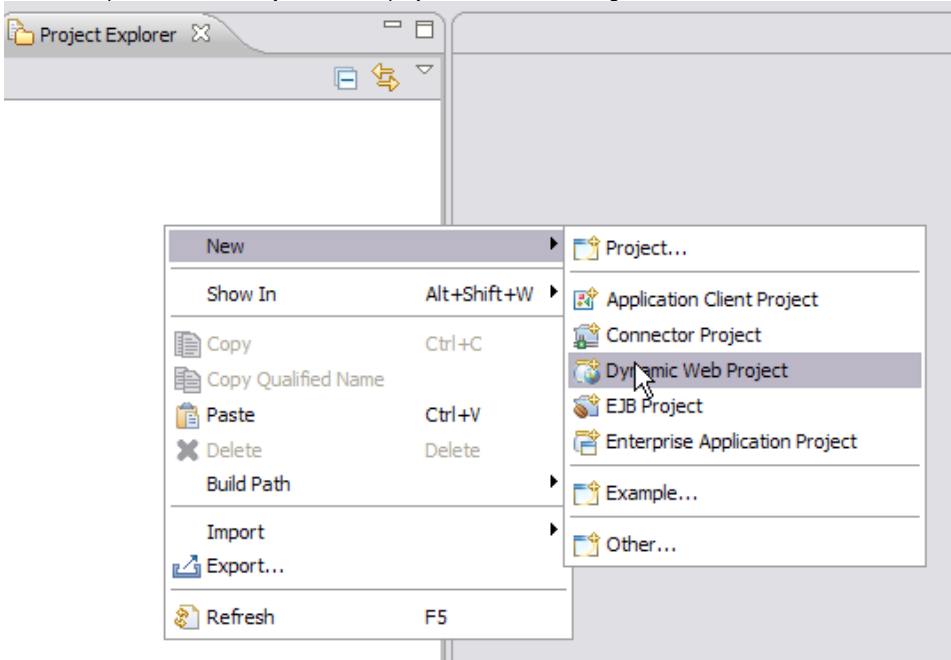
Details on installing eclipse are provided in the [Development environment](#) section. This tutorial is organized in the following sections:

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Once you have all the prerequisites installed, follow the following steps to create a project with Eclipse.

## Setting Eclipse for application development

1. Launch Eclipse and create a dynamic Web project as shown in the figure.



2. Give the fields for the Web Project as shown in the following figure.

The screenshot shows the 'Dynamic Web Project' wizard in the Eclipse IDE. The title bar reads 'Dynamic Web Project' with a subtitle 'Create a standalone Dynamic Web project or add it to a new or existing Enterprise Application.' and a small globe icon. The 'Project name' field is set to 'SimpleJSF'. Under 'Project contents', the 'Use default' checkbox is checked, and the 'Directory' is 'C:\Documents and Settings\Administrator\ag\SimpleJSF'. The 'Target Runtime' is set to 'Apache Geronimo v2.1 Runtime'. Under 'Configurations', 'Default Configuration for Apache Geronimo v2.1 Runtime' is selected. The 'EAR Membership' section has the 'Add project to an EAR' checkbox unchecked, and the 'EAR Project Name' is 'EAR'. At the bottom, there are buttons for '< Back', 'Next >', 'Finish', and 'Cancel'.

**Dynamic Web Project**  
Create a standalone Dynamic Web project or add it to a new or existing Enterprise Application.

Project name: SimpleJSF

Project contents:  
☒ Use default  
Directory: C:\Documents and Settings\Administrator\ag\SimpleJSF Browse...

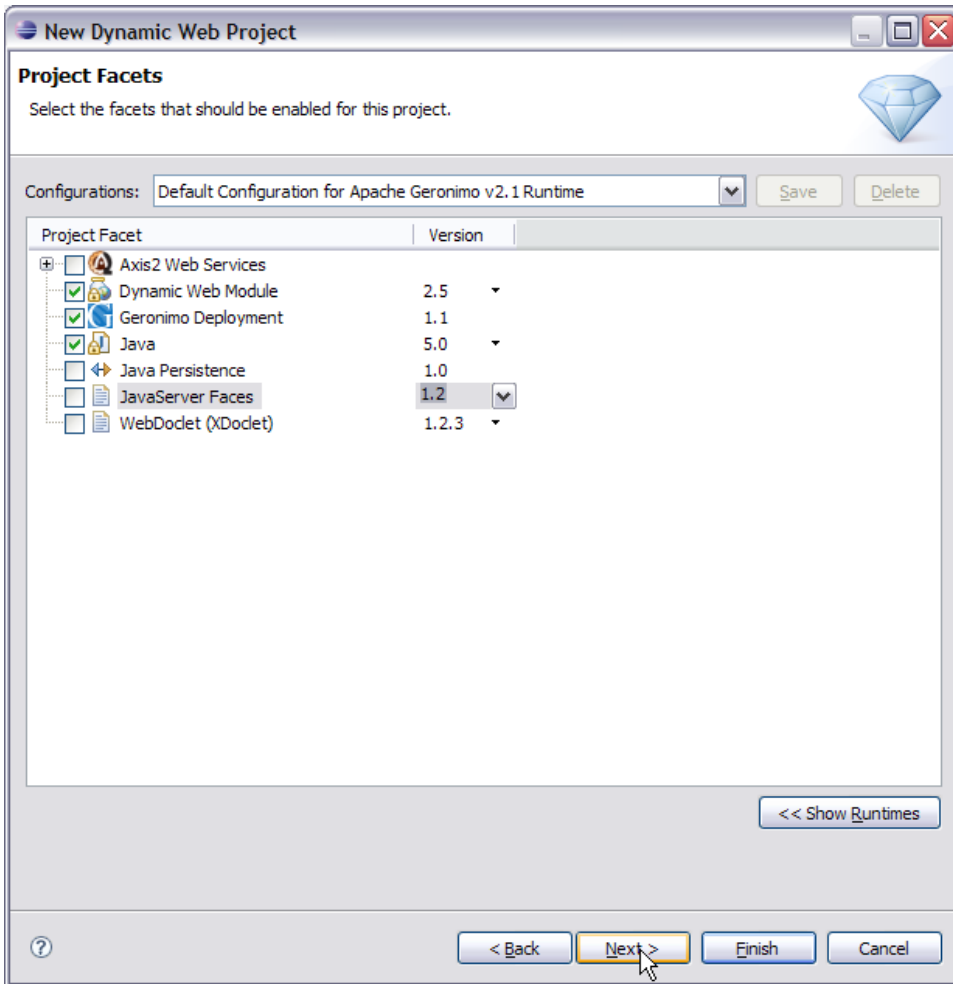
Target Runtime  
Apache Geronimo v2.1 Runtime New...

Configurations  
Default Configuration for Apache Geronimo v2.1 Runtime  
A good starting for working with Apache Geronimo v2.1 Runtime runtime. Additional facets can later be installed to add new functionality to the project.

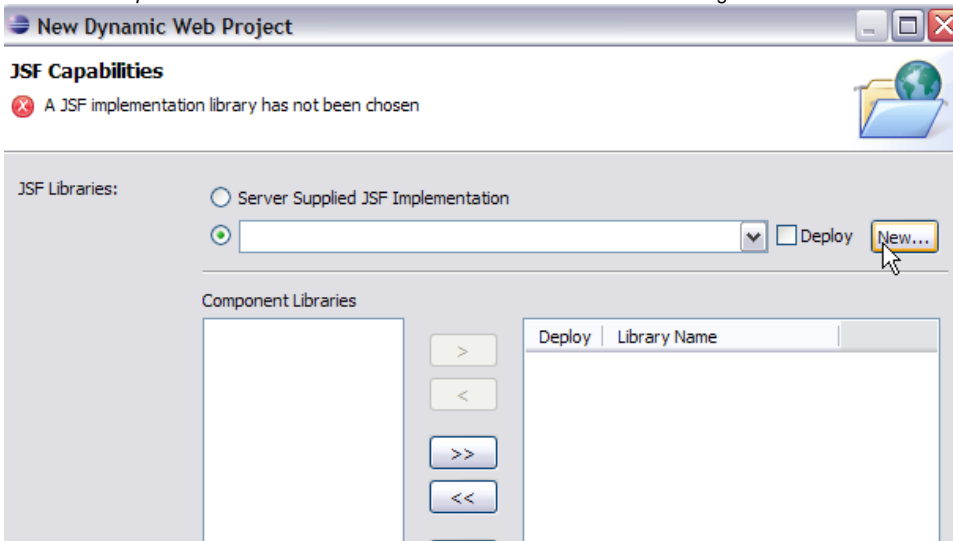
EAR Membership  
☐ Add project to an EAR  
EAR Project Name: EAR New...

? < Back Next > Finish Cancel

3. Select **Finish**.
4. Right click on the **SimpleJSF** project and select **Properties**, then select **Project Facets**.
5. Check the box for **JavaServerFaces** and under the *Version* tab select **1.2** as the version. Select the **Further configuration required...** indicator to display the *JSF Capabilities* pane.



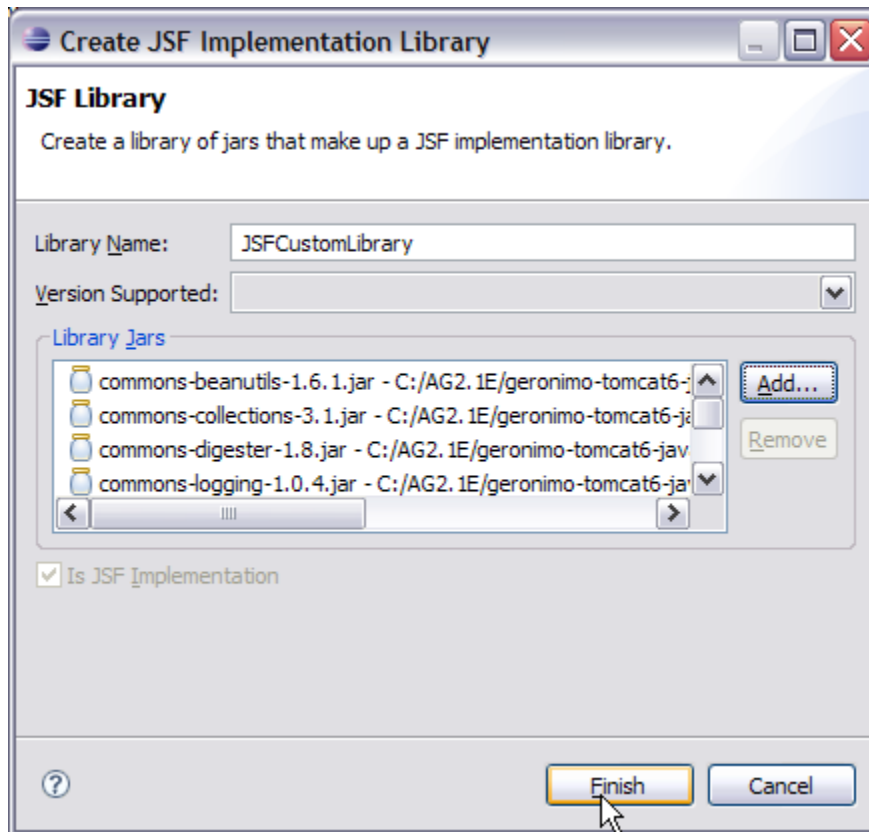
6. On the *JSF Capabilities* window check the box and select **new** as shown in the figure.



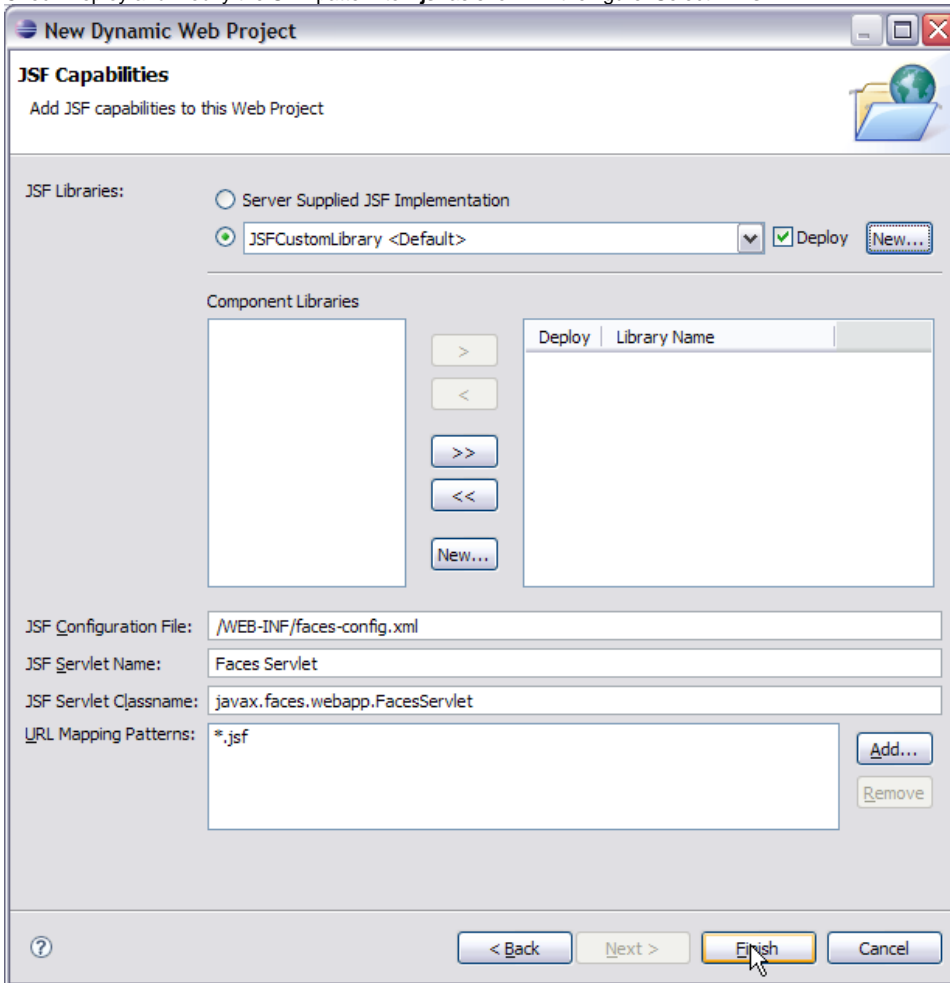
7. The next window is used to create a JSF Implementation library. Give the library name as **JSFCustomLibrary** and add the following jars. Select **Finish** once done. See the figure below:

- <GERONIMO\_HOME>\repository\commons-beanutils\commons-beanutils\1.7.0\commons-beanutils-1.7.0.jar
- <GERONIMO\_HOME>\repository\commons-collections\commons-collections\3.2\commons-collections-3.2.jar
- <GERONIMO\_HOME>\repository\commons-digester\commons-digester\1.8\commons-digester-1.8.jar
- <GERONIMO\_HOME>\repository\commons-logging\commons-logging\1.0.4\commons-logging-1.0.4.jar
- <GERONIMO\_HOME>\repository\org\apache\myfaces\core\myfaces-api\1.2.3\myfaces-api-1.2.3.jar

- <GERONIMO\_HOME>\repository\org\apache\myfaces\core\myfaces-impl\1.2.3\myfaces-impl-1.2.3.jar



8. Check Deploy and modify the URL pattern to `*.jsf` as shown in the figure. Select **Finish**.

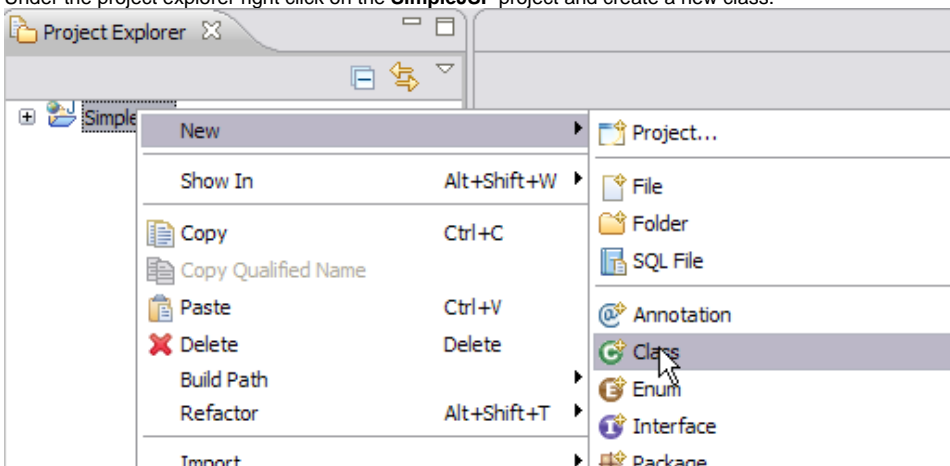


This finishes the setting up of the Eclipse IDE for application development.

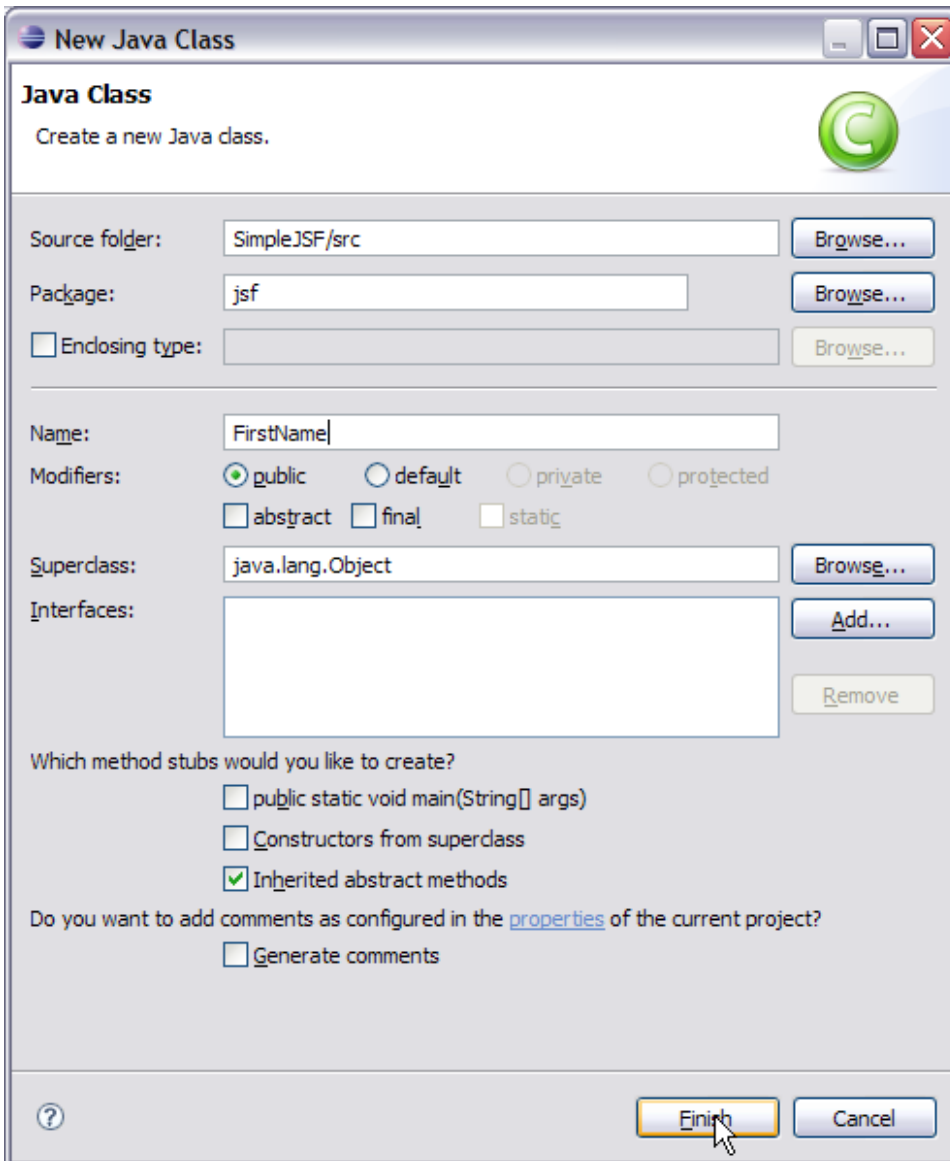
## Define and Implement the application Model (M)

The **Model** as suggested by MVC architecture handles data and logic of the application. In an enterprise application, Java Beans are used to represent collection of data and operation on that data. In JSF we use Java Beans to define the Model.

1. Under the project explorer right click on the **SimpleJSF** project and create a new class.



2. Fill the *New Java Class* form with `jsf` as the package name and `FirstName` as the bean class name. Select **Finish** once done.



3. Add the following code to the **FirstName** bean class:  

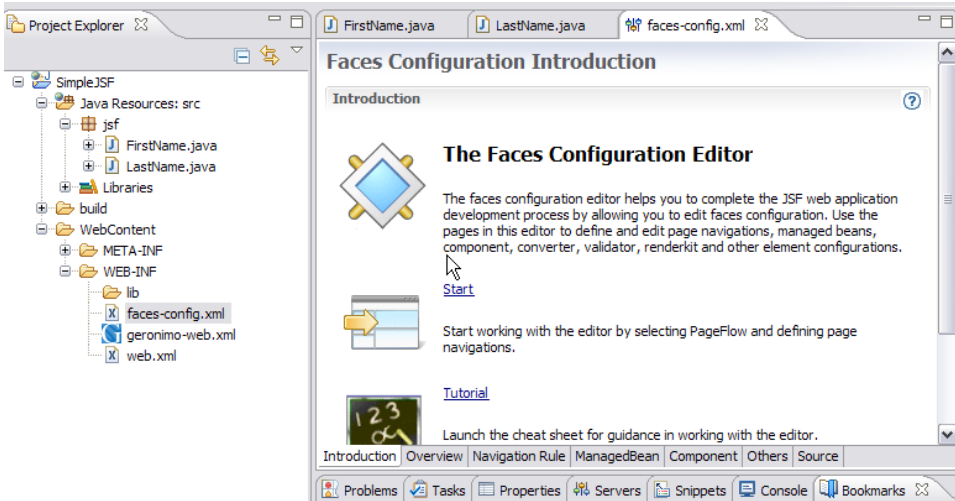
```
JAVASolidFirstName.java package jsf; public class FirstName { String username; public String getName() { return username; } public void setName(String name) { username = name; } }
```
4. Create a second Bean class **LastName** and add the following code to the class: 

```
JAVASolidLastName.java package jsf; public class LastName { String lastname; public String getLName() { return lastname; } public void setLName(String lname) { lastname = lname; } }
```

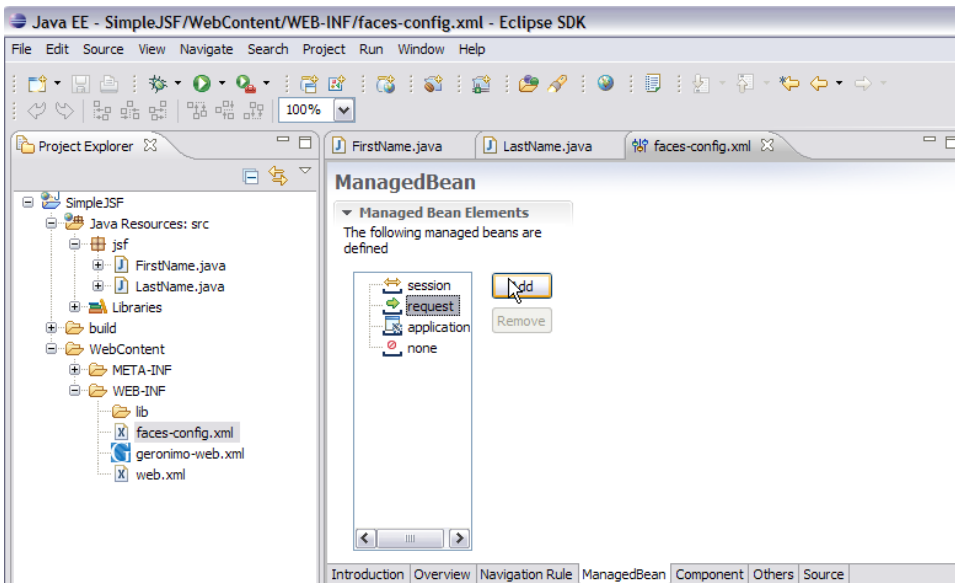
 This completes the Model definition and implementation of the bean classes.

## Define and implement Model (M) objects to Controller

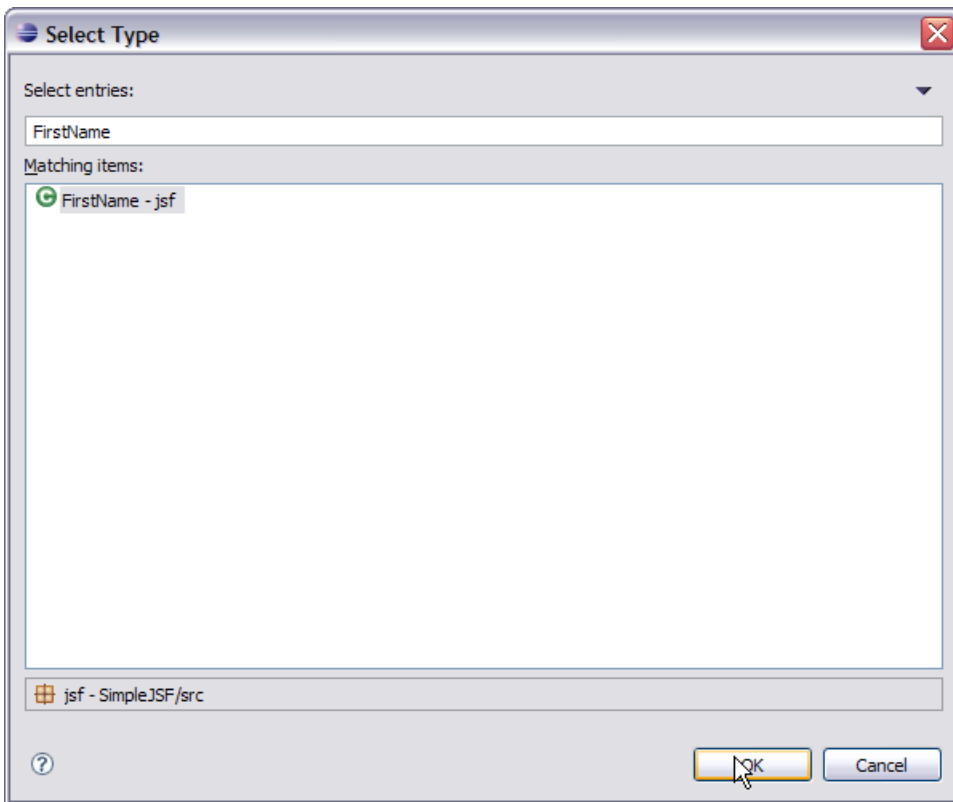
1. In a JSF application the **Controller** is implemented by a configuration file called `WebContent/WEB-INF/faces-config.xml`. Double click on the file. This will open the *Faces Configuration Editor*.



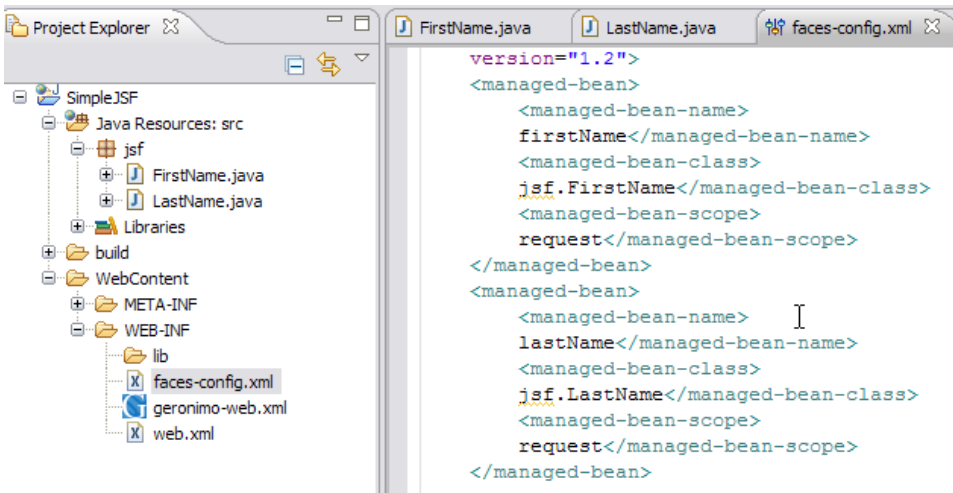
2. Select the *ManagedBean* tab in the editor. Select the **request** Managed Bean Element and select **Add**.



3. Choose the **Using an existing Java class** option, select **Browse**. Give the search element as *FirstName* and select **OK**.



4. Select **Finish** on the next window. Similarly add the other bean **LastName**. Now select the *Source* tab in the Faces configuration Editor. It displays the bean components (i.e., the Model) in the controller.

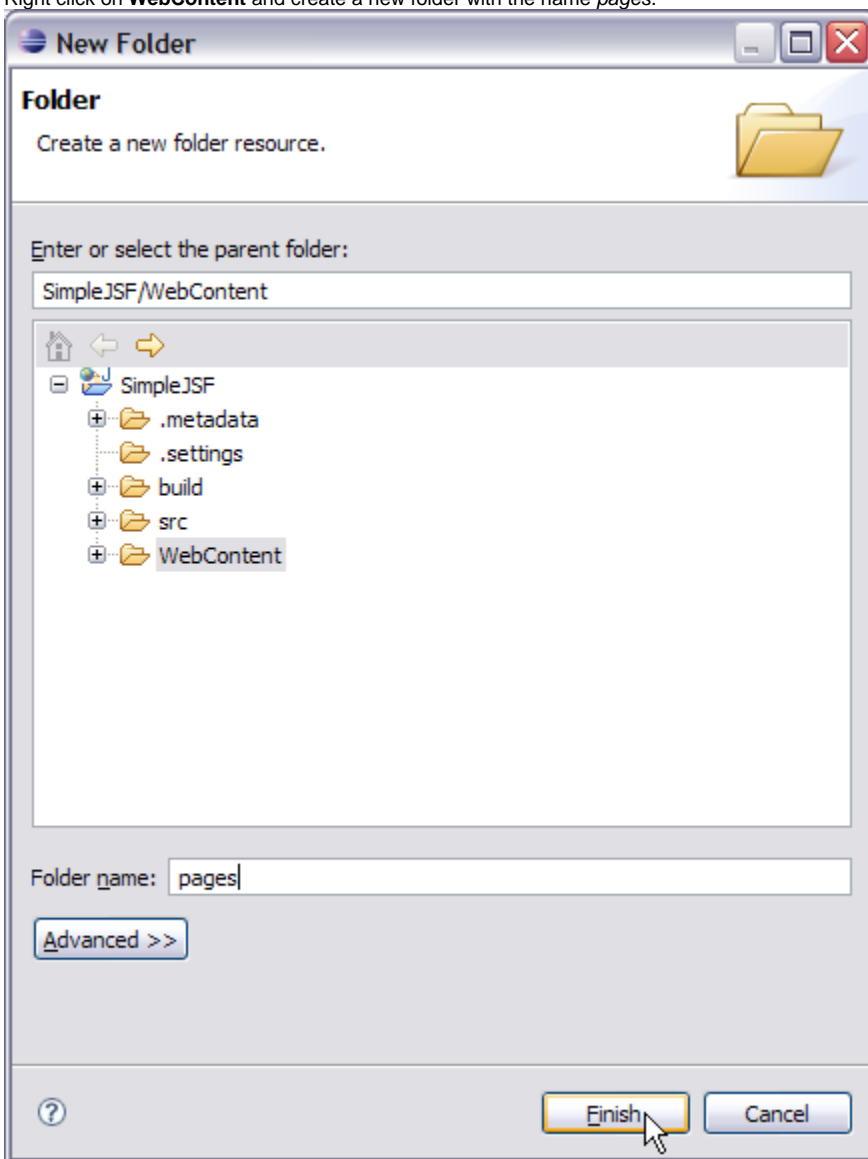


This completes the description of Model to Controller.

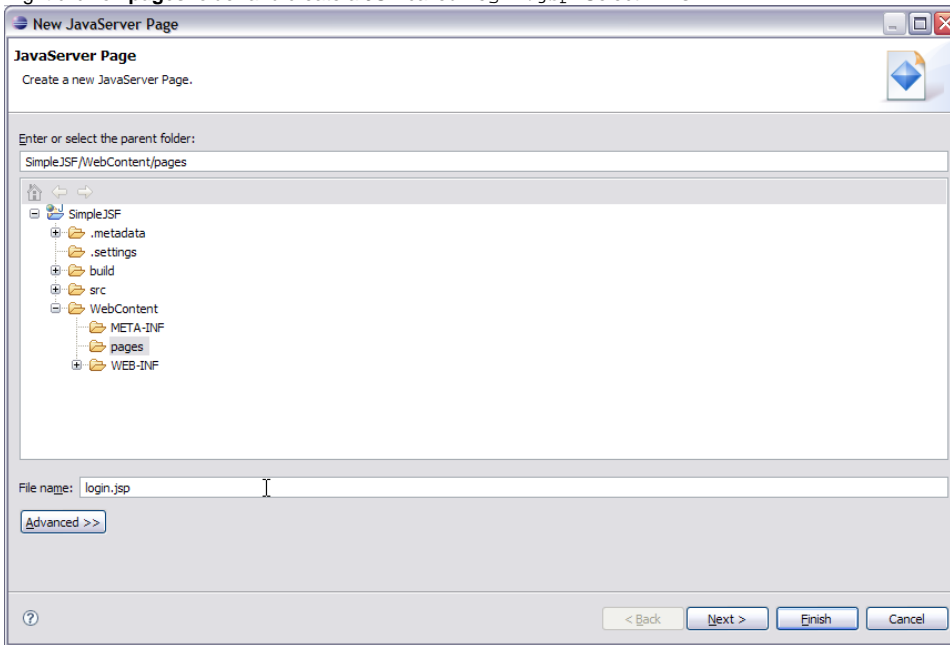
Define and implement View (V) in application



1. Right click on **WebContent** and create a new folder with the name *pages*.



2. Right click on **pages** folder and create a JSP called `login.jsp`. Select **Finish**.

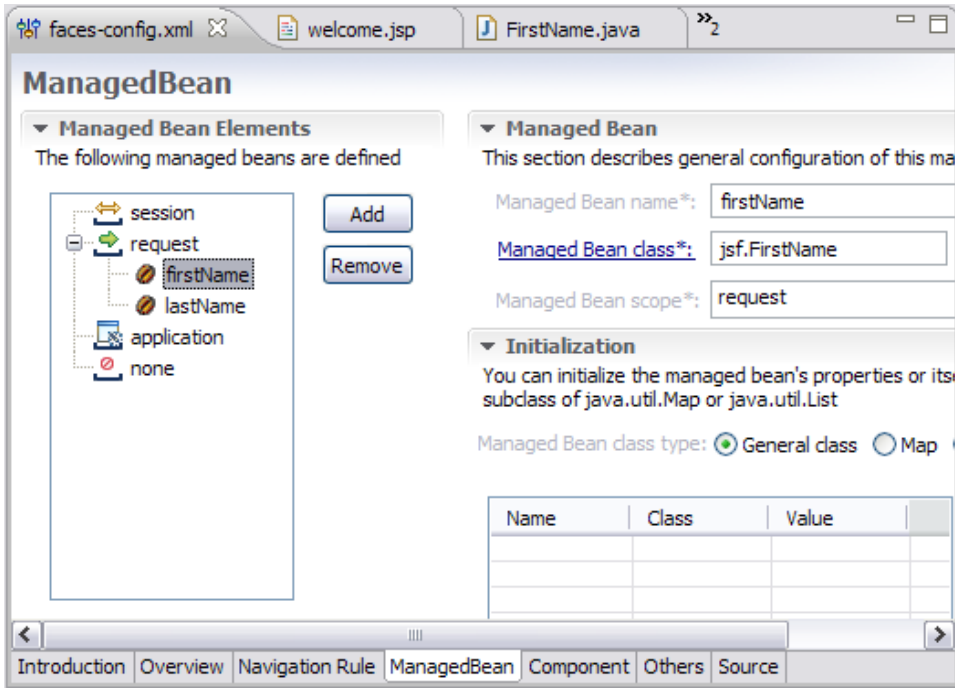


3. Similarly create another JSP page called `welcome.jsp`.

4. Now we have to include the Tag Library Descriptors (TLD) in our application. Geronimo comes packaged with the required TLD's, which can be found in:  
solidLocation of TLD `<GERONIMO_HOME>\repository\org\apache\myfaces\core\myfaces-impl\1.2.3\myfaces-impl-1.2.3.jar\META-INF\myfaces-html.tld` and `<GERONIMO_HOME>\repository\org\apache\myfaces\core\myfaces-impl\1.2.3\myfaces-impl-1.2.3.jar\META-INF\myfaces_core.tld`
5. To add these two TLD's in the application, in Eclipse under the Project Explorer right click on **WEB-INF**. Create a folder called **tld**. Copy `myfaces-html.tld` and `myfaces_core.tld` to this folder.

6. The next step is to populate `login.jsp` and `welcome.jsp` with data ActionScriptsolidlogin.jsp `<%@ taglib uri="/WEB-INF/tld/myfaces-html.tld" prefix="h" %> <%@ taglib uri="/WEB-INF/tld/myfaces_core.tld" prefix="f" %> <html> <head> <meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1"> <title>Welcome to Apache Geronimo</title> </head> <body> <f:view> <h1><h:outputText value="Welcome to Apache Geronimo" /></h1> <h:form> <h:message for="firstName" style="color: red;" /> <h:message for="lastName" style="color: red;" /> <br> <h:outputText value="Enter your first name" /> <br> <h:inputText id="firstName" value="#{firstName.name}" required="true"> <f:validateLength minimum="4" maximum="10" /> </h:inputText> <br> <h:outputText value="Enter your last name" /> <br> <h:inputText id="lastName" value="#{lastName.LName}" required="true"> <f:validateLength minimum="3" maximum="10" /> </h:inputText> <br> <h:commandButton id="submit" action="validated" value="Enter" /> </h:form> </f:view> </body> </html> ActionScriptsolidwelcome.jsp <%@ taglib uri="/WEB-INF/tld/myfaces-html.tld" prefix="h" %> <%@ taglib uri="/WEB-INF/tld/myfaces_core.tld" prefix="f" %> <%@ page language="java" contentType="text/html; charset=ISO-8859-1" pageEncoding="ISO-8859-1"%> <!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd"> <html> <head> <meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1"> <title>Welcome</title> </head> <body> <f:view> <h3><h:outputText value="You have successfully logged in: " /> <h:outputText value="#{firstName.name}" /> <h:outputText value="#{lastName.LName}" /> <h:outputText value="!" /></h3> </f:view> </body> </html> Lets now try to understand what each line of code represents.`

- The first two lines in `login.jsp` defines two tag libraries ActionScriptsolidCode Snippet from `login.jsp` `<%@ taglib uri="/WEB-INF/tld/myfaces-html.tld" prefix="h" %>` and `<%@ taglib uri="/WEB-INF/tld/myfaces_core.tld" prefix="f" %>` These two sets of tags are defined by JSF. The first one with the namespace "h" is used to generate html views. The second one with the namespace "f" handles the core functionalities of JSF like type conversions, validations and listeners for input from user.
  - The next few lines contains the usual html tags ActionScriptsolidCode Snippet from `login.jsp` `<html> <head> <meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1"> <title>Welcome to Apache Geronimo</title> </head> <body>`
  - The tag `<f:view>` represents the start of JSF code.
  - This line of code Represents the input tag. The `id="firstName"` and `value="#{firstName.name}"` comes from the Managed Bean. ActionScriptsolidCode Snippet from `login.jsp` `<h:inputText id="firstName" value="#{firstName.name}" required="true">`
7. Using the Faces Configuration Editor, select **firstName** bean under *Managed Bean* tab. The Managed Bean Name is **firstName**. See the figure below.



This completes the implementation of View (V) in the application. The other tags `<f:validateLength>` and `<h:commandButton>` will be explained in the next section.

## Define the Validator Component

The code `<f:validateLength minimum="4" maximum="10"/>` defines the input text length to be minimum of 4 characters and maximum of 10 characters. This is the standard validation provided by core tag libraries. Other examples of validators are **Validate Long Range** tag, **Validate Double Range** tag, and so on. JSF also provides a Validator interface which can be implemented to create custom validators.

The code `<h:message for="" style="color: red;"/>` defines the error message. When the user inputs the controller validates each of the inputs. If the inputs are invalid Controller displays the same page again with an error message for the errors. The **color:red** suggests that the error message will be displayed in red color.

## Define and implement the View navigation by Controller (C)

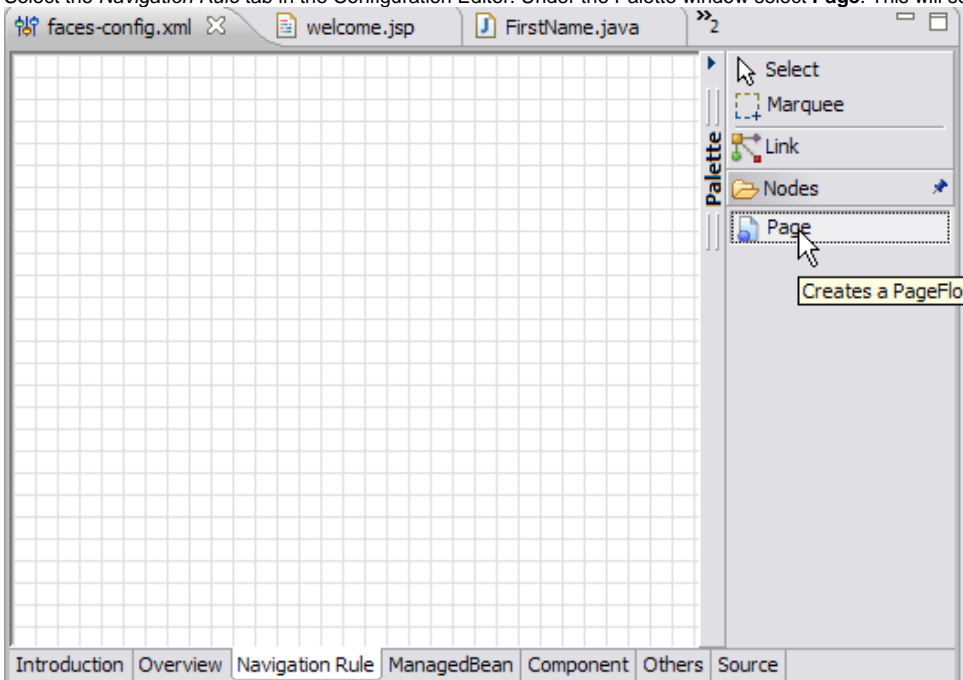
This step uses the JSP page navigation in the order of user inputs and validation by controller. If all the inputs are valid than the controller performs the action as suggested by the HTML form. This action is submitted by the HTML form as a command button.

The code in the `input.jsp` `<h:commandButton id="submit" action="validated" value="Enter" />` checks to determine if all the inputs are valid. This is the button which submits the form to controller if all inputs are valid. In this case the **commandButton** tells the controller to execute the validated action if all the inputs are valid.

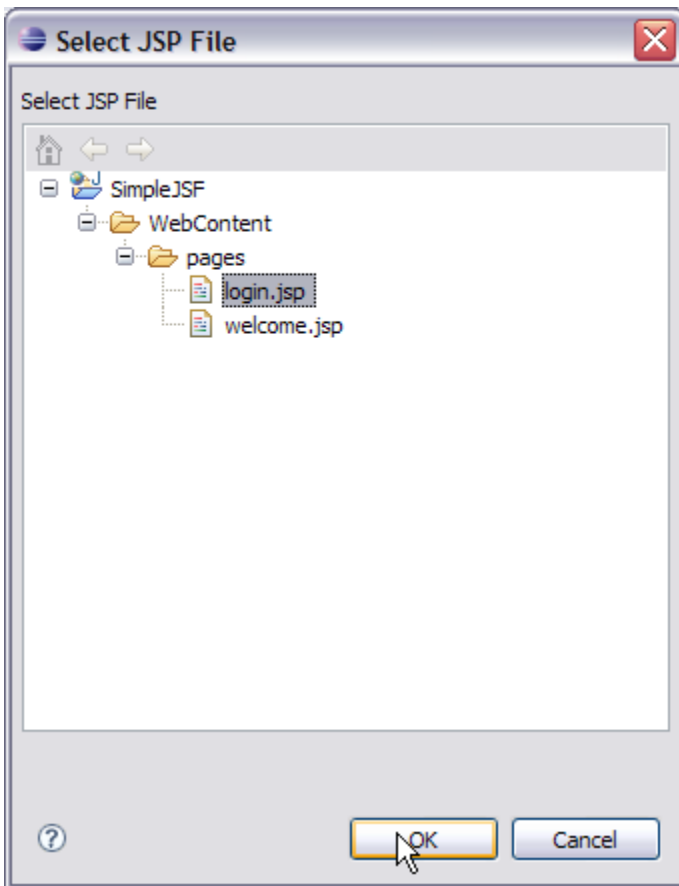
The pages navigation in a JSF application is defined by `faces-config.xml`. Follow the steps before to define the pages navigation.

1. Launch the Faces Configuration Editor by double clicking on `faces-config.xml`

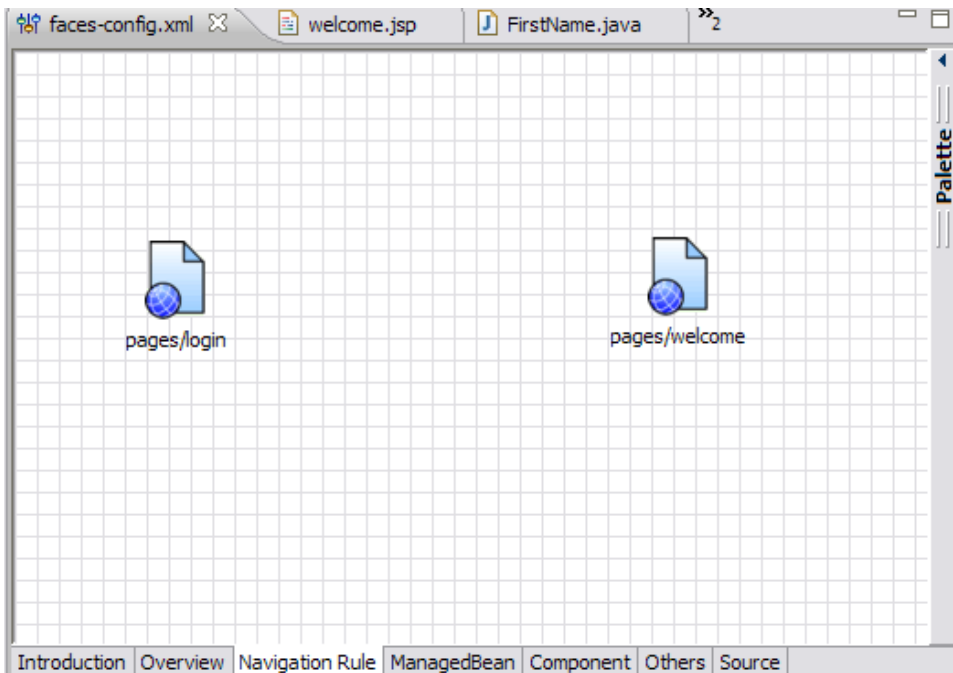
2. Select the *Navigation Rule* tab in the Configuration Editor. Under the Palette window select **Page**. This will select a **PageFlow Page** GUI object.



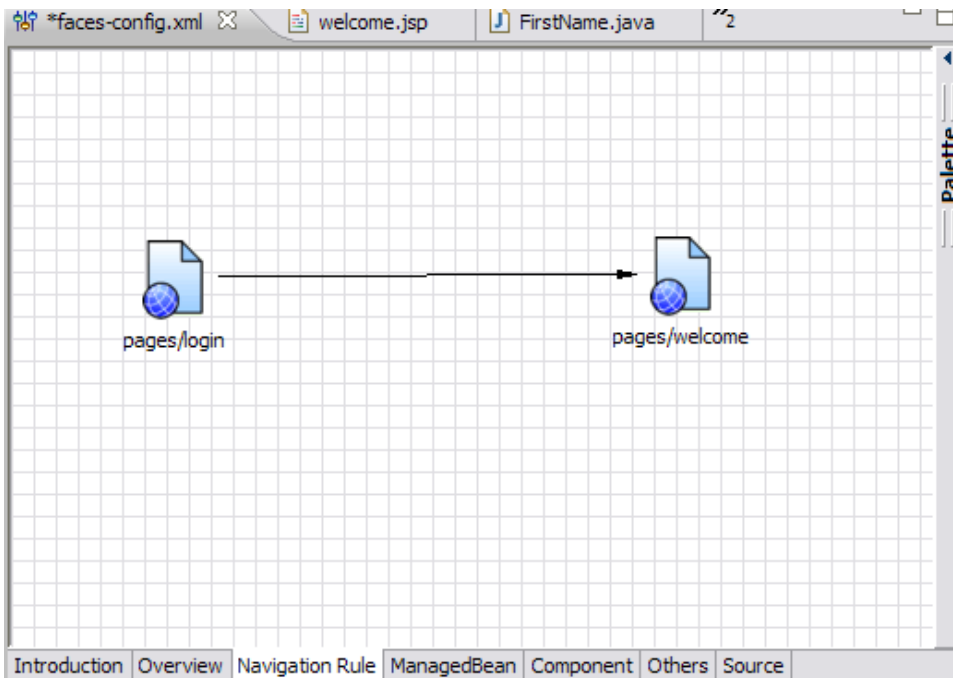
3. Drag the mouse over the Navigation Rule Window and click on the window. This will give a *Select JSP File* window. Select the `login.jsp` as shown in the figure and select **OK**.



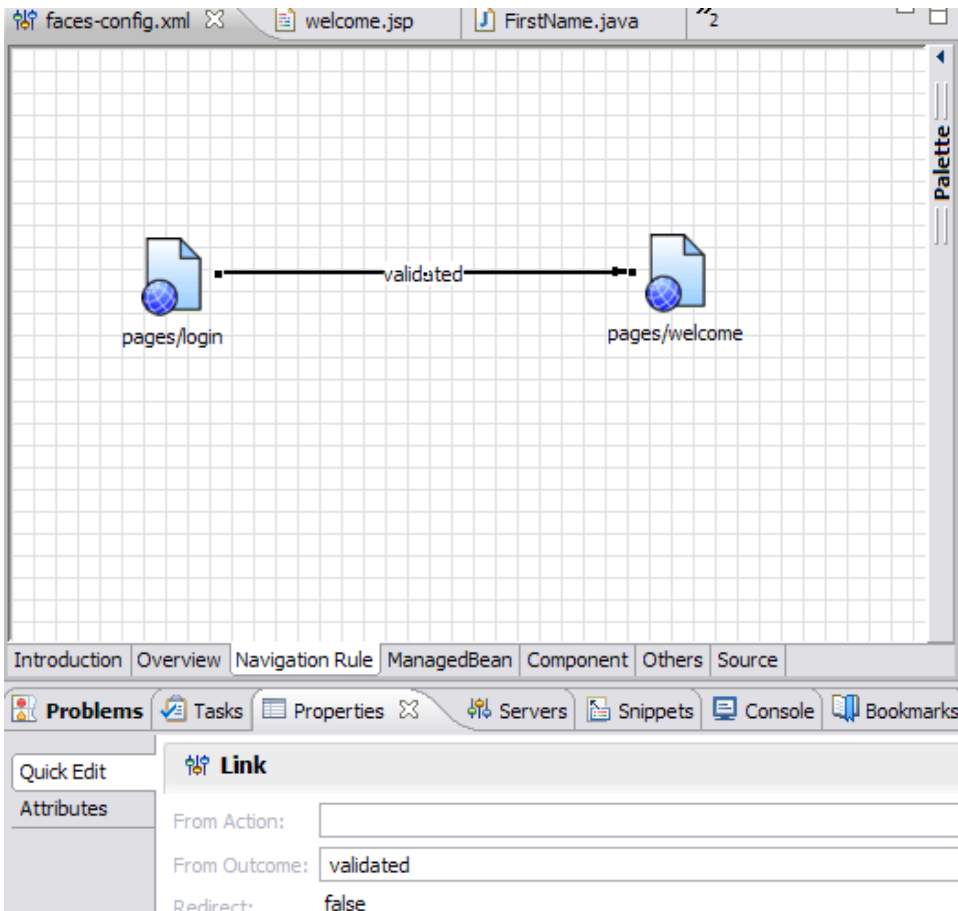
4. Similarly add the `welcome.jsp` page on the Navigation Rule window. See the figure below:



5. Select **Link** from the Palette window and join the two pages as shown in the figure:



6. Select the link between the two pages and go to properties view and set the value for *From Outcome* field as **validated**. This is because of the tag `<h:commandButton id="submit" action="validated" value="Enter" />`. Once all the inputs are valid the action taken is **validated**. See the figure.



- Once done have a look the *Source* tab in the Faces Navigation Editor. A **<navigation-rule>** tag has been introduced into the *faces-config.xml*. This rule instructs the Controller that if all the inputs are valid from a form in the */pages/login.jsp*, and the action is **validated**, then go to page */pages/welcome.jsp*.

The screenshot shows the Source tab in the Faces Navigation Editor. The XML code is as follows:

```
<managed-bean-scope>
  request</managed-bean-scope>
</managed-bean>
<navigation-rule>
  <display-name>
    pages/login</display-name>
  <from-view-id>
    /pages/login.jsp</from-view-id>
  <navigation-case>
    <from-outcome>
      validated</from-outcome>
    <to-view-id>
      /pages/welcome.jsp</to-view-id>
    </navigation-case>
  </navigation-rule>
</faces-config>
```

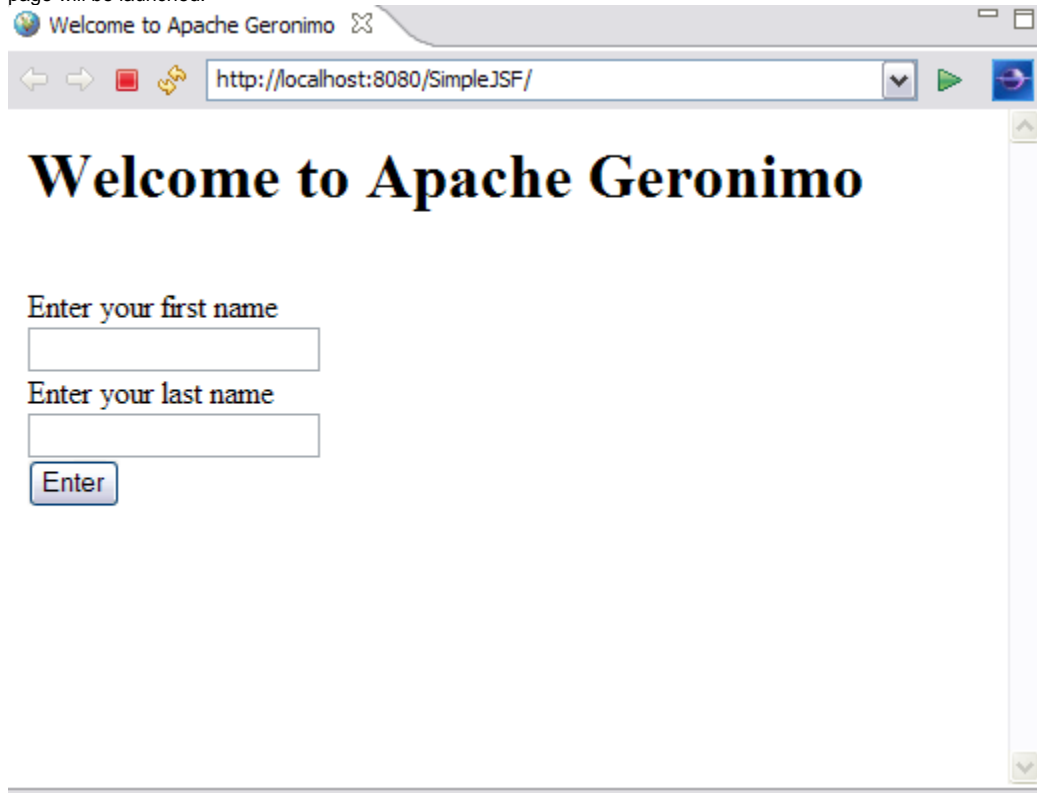
Below the code, there are tabs for 'Introduction', 'Overview', 'Navigation Rule', 'ManagedBean', 'Component', 'Others', and 'Source'. The 'Source' tab is active.

- Now lets add a *index.jsp* under **WebContent** as follows: `ActionScriptsolidindex.jsp <%@ page language="java" contentType="text/html; charset=ISO-8859-1" pageEncoding="ISO-8859-1"%> <!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org`

/TR/html4/loose.dtd"> <html> <body> <jsp:forward page="/pages/login.jsf" /> </body> </html> What is the `login.jsf` in the **forward path** tag. If you look at the `web.xml`, `*.jsf` is used as the URL pattern to suggest that forwarded page be taken care by Java Server Faces Servlet. This completes the Application Development process. The next step is to deploy and test the application.

## Deploy and Test the application

Right click on the project **SimpleJSF** and select **Run As -> Run On Server**. This will deploy the sample on the Apache Geronimo Server and a Login page will be launched.



The screenshot shows a web browser window with the title "Welcome to Apache Geronimo". The address bar displays "http://localhost:8080/SimpleJSF/". The main content area features the heading "Welcome to Apache Geronimo" in a large, bold, serif font. Below the heading, there is a form with two text input fields. The first field is labeled "Enter your first name" and the second is labeled "Enter your last name". Below these fields is a button labeled "Enter".

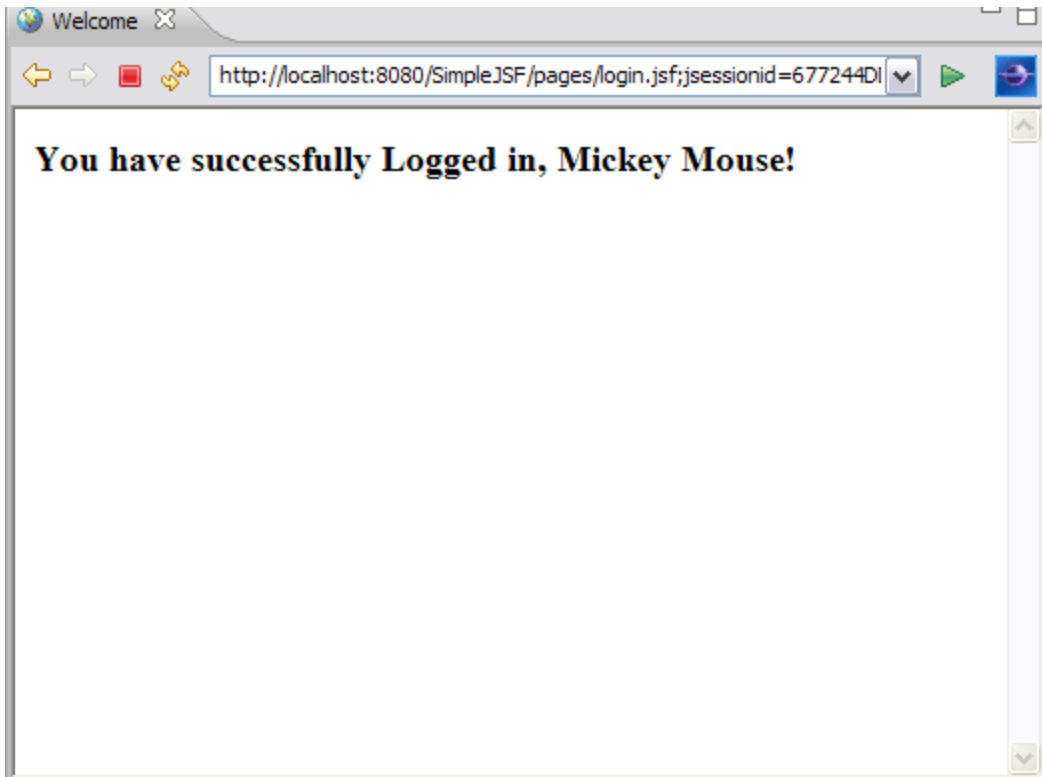
Lets give some sample inputs:

**Sample Input #1:**

**First Name:** Mickey

**Last Name:** Mouse

Both the First Name as well as Last Name fulfills the validation rules, so this form will be submitted to controller and according to the navigation rule controller will launch a `welcome.jsp` page.



**Sample Input #2:**

**First Name:** Mic

**Last Name:** Mouse

First Name should be minimum of length=4 but in this case First Name is of length=3. In this case validation will fail and an error message will be generated by controller for First Name field.



**Sample Input #3:**

**First Name:** Mickey

**Last Name:** Mo



Last Name should be minimum of length=3 but in this case Last Name is of length=2. In this case validation will fail and an error message will be generated by controller for Last Name field.



The screenshot shows a web browser window with the title "Welcome to Apache Geronimo". The address bar displays the URL "http://localhost:8080/SimpleJSF/pages/login.jsf;jsessionid=677244DI". The main content area features a large heading "Welcome to Apache Geronimo". Below the heading, a red error message is displayed: "j\_id\_jsp\_2032568016\_2:lastName: Validation Error: Value is less than allowable minimum of '3'". The form contains two input fields: "Enter your first name" with the value "Mickey" and "Enter your last name" with the value "Mo". An "Enter" button is located below the last name field, with a mouse cursor hovering over it.

Welcome to Apache Geronimo

j\_id\_jsp\_2032568016\_2:lastName: Validation Error: Value is less than allowable minimum of '3'

Enter your first name

Mickey

Enter your last name

Mo

Enter