

Java EE, Beyond the Basics Hands-On-Lab

Exercise Manual

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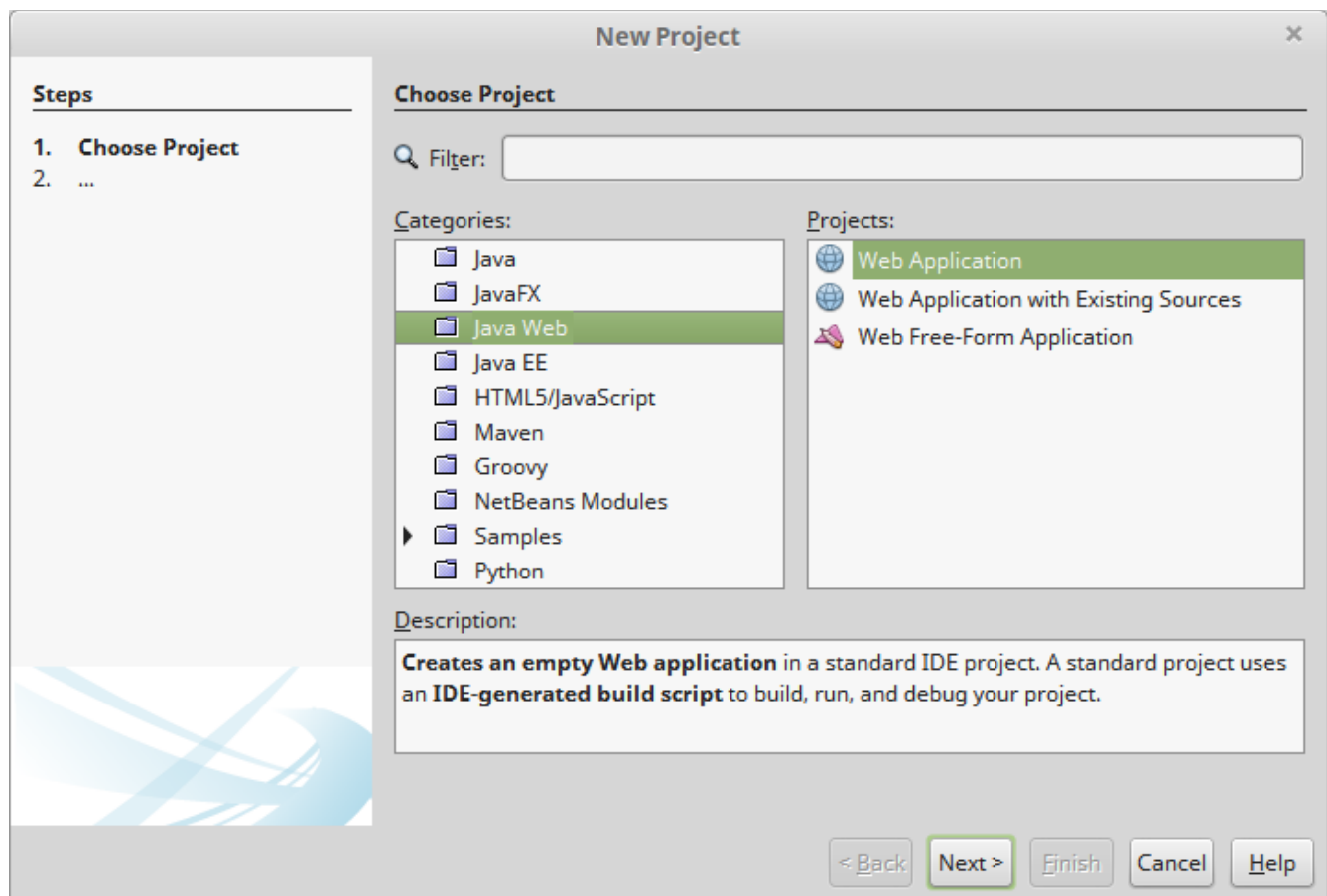
Sven Reimers
Airbus Defence and Space
@SvenNB

Exercise 1

In this exercise, we will develop a JSF application using HTML markup.

Create the project

1. Create a new Web Application Project (File | New Project)
2. Under “Categories”, select “Java Web”
3. Under “Projects” select “Web Application”



4. Click “Next”

New Web Application

Steps

1. Choose Project
- 2. Name and Location**
3. Server and Settings
4. Frameworks

Name and Location

Project Name: JSF_HTML

Project Location: /home/heffel/NetBeansProjects Browse...

Project Folder: /home/heffel/NetBeansProjects/JSF_HTML

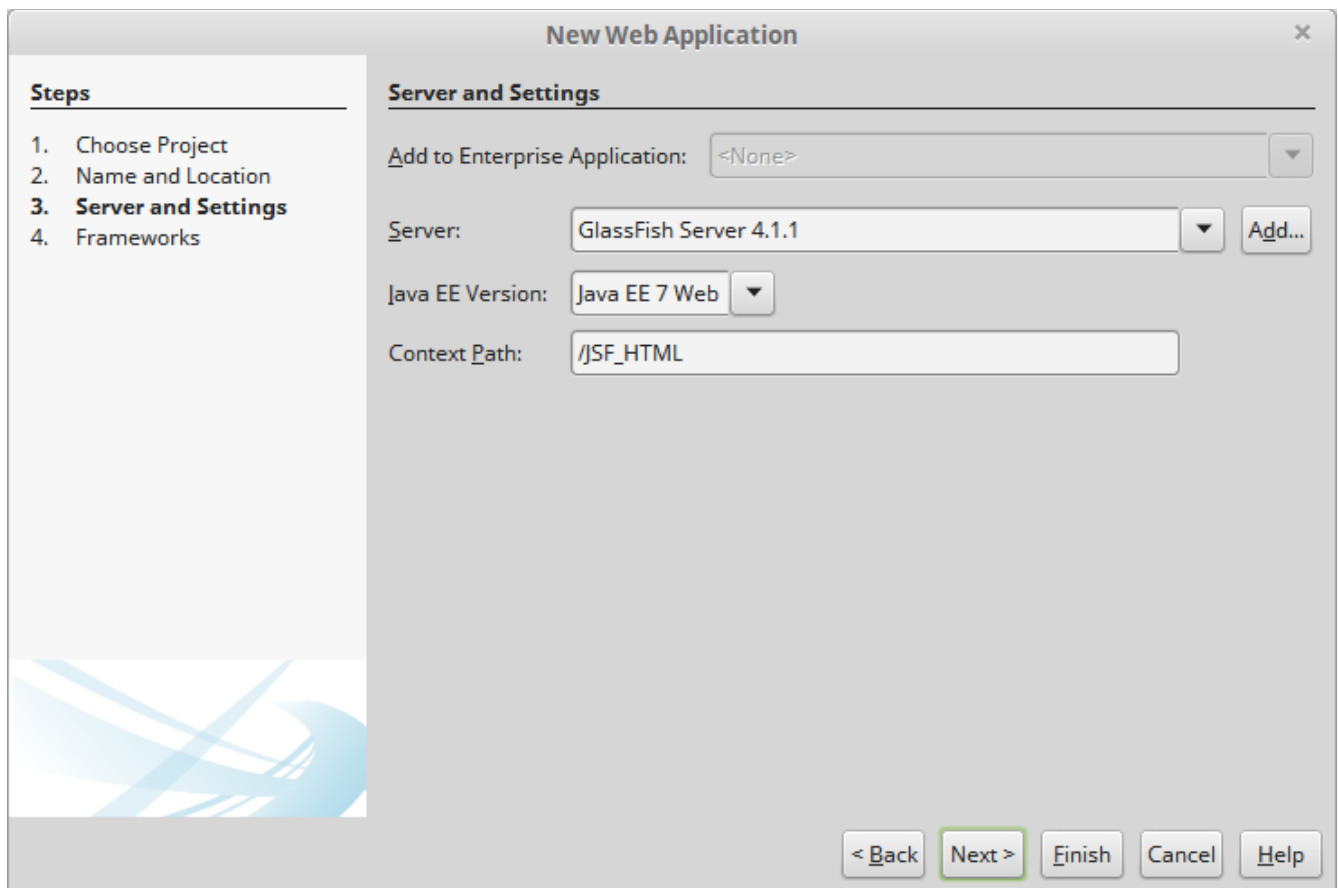
☐ Use Dedicated Folder for Storing Libraries

Libraries Folder: Browse...

Different users and projects can share the same compilation libraries (see Help for details).

< Back **Next >** Finish Cancel Help

5. Name your project “JSF_HTML” and click “Next”.



The image shows a 'New Web Application' dialog box with a 'Steps' sidebar on the left and a 'Server and Settings' main area on the right. The 'Steps' list includes 'Choose Project', 'Name and Location', 'Server and Settings' (which is bolded and underlined), and 'Frameworks'. The 'Server and Settings' area contains four fields: 'Add to Enterprise Application' (set to '<None>'), 'Server' (set to 'GlassFish Server 4.1.1'), 'Java EE Version' (set to 'Java EE 7 Web'), and 'Context Path' (set to '/JSF_HTML'). At the bottom right are five buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'. The 'Next >' button is highlighted with a green border.

New Web Application

Steps

1. Choose Project
2. Name and Location
- 3. Server and Settings**
4. Frameworks

Server and Settings

Add to Enterprise Application: <None>

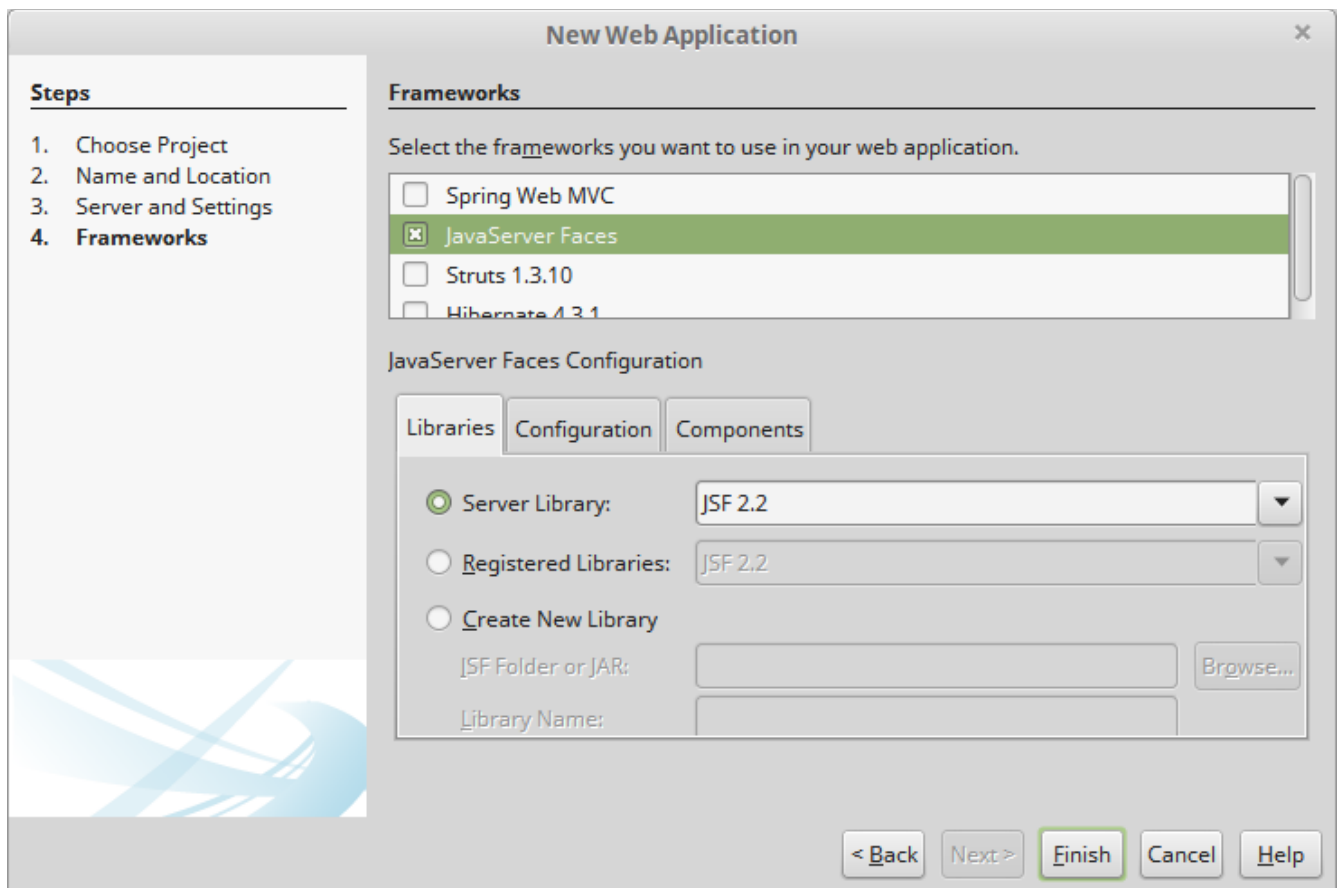
Server: GlassFish Server 4.1.1 Add...

Java EE Version: Java EE 7 Web

Context Path: /JSF_HTML

< Back Next > Finish Cancel Help

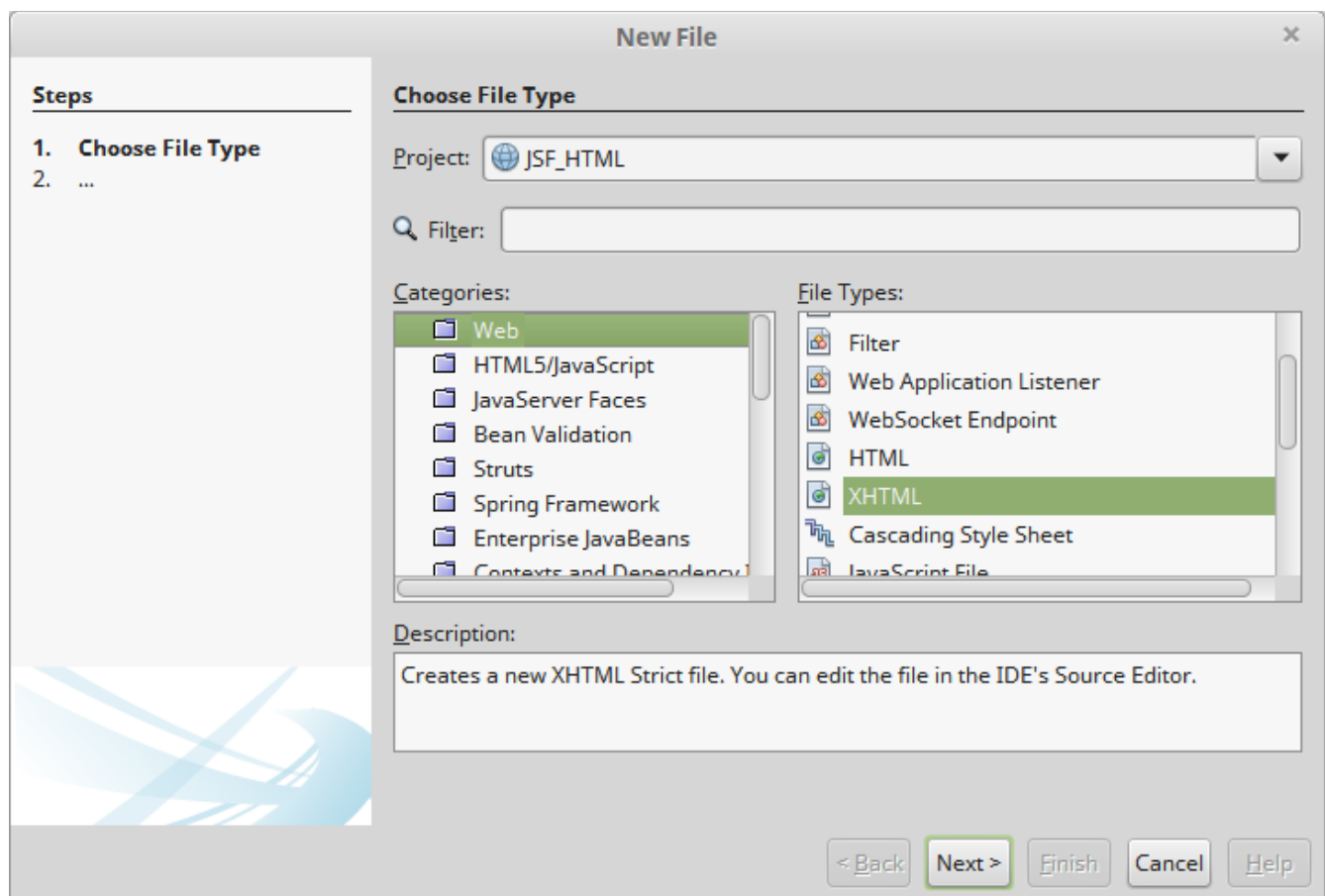
6. Accept the defaults and click “Next”.



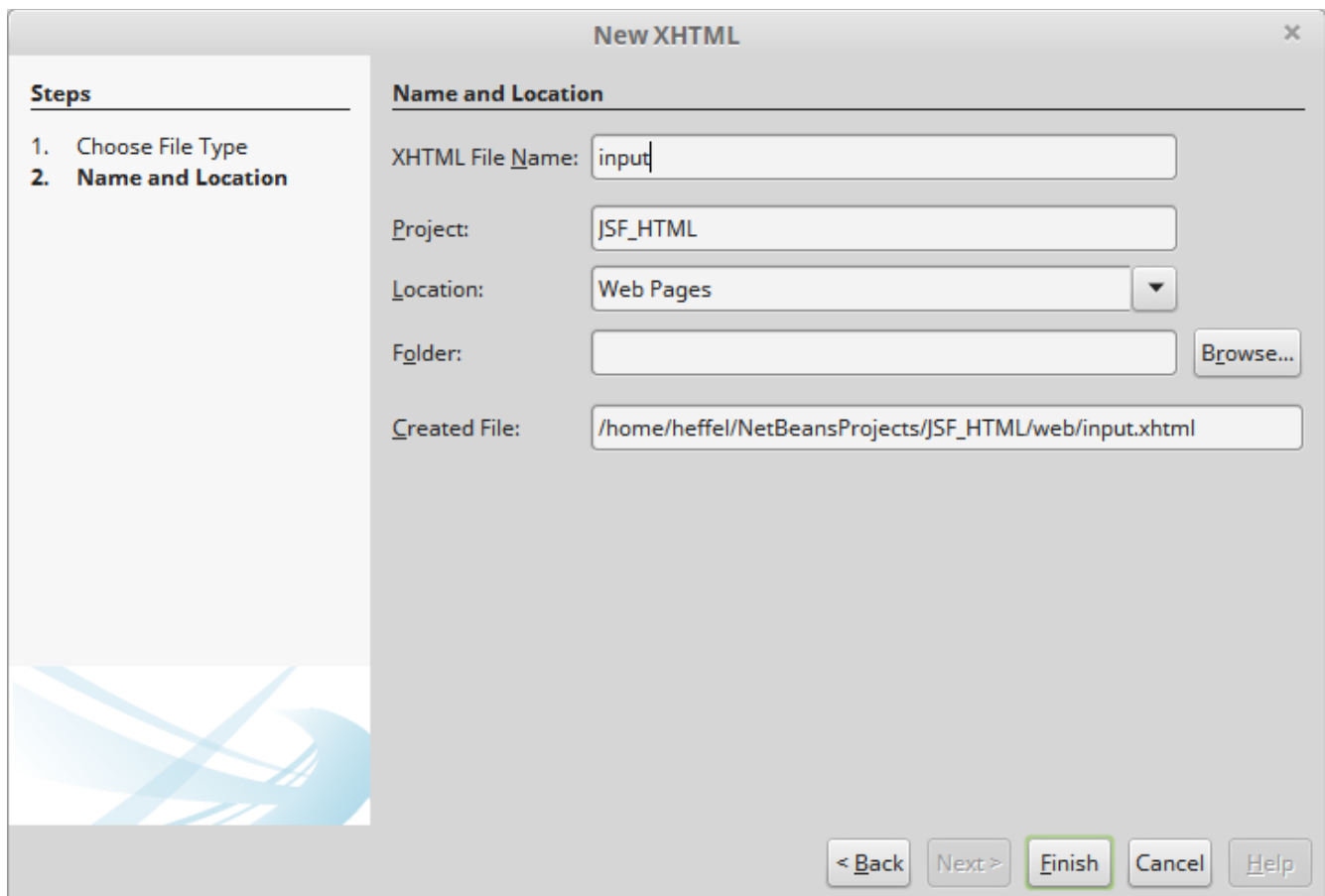
7. Select the “JavaServer Faces” framework and click “Finish”.

Develop the User Interface

1. Create a new XHTML file (File | New, “Web” category and “XHTML” file type).



2. Name your new file “input” (NetBeans automatically adds the .xhtml file extension).



3. Add the “jsf” namespace to the generated input.xhtml file. Your `<html>` tag should look like this:

```
<html xmlns="http://www.w3.org/1999/xhtml"
xmlns:jsf="http://xmlns.jcp.org/jsf">
```

4. Replace the generated `<div>` tag with a `<form>` tag, add a `jsf:id` attribute to the tag so that the JSF engine identifies it as a JSF form tag.

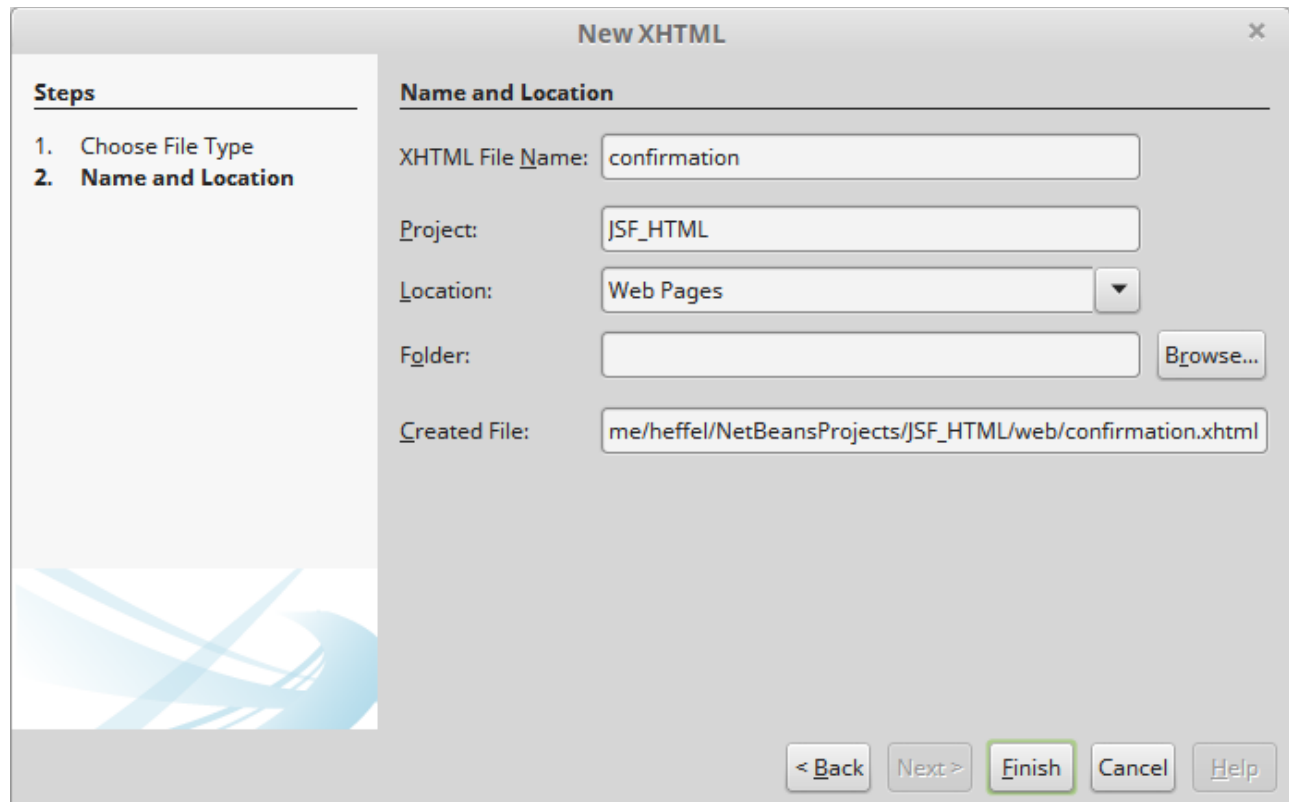
```
<form jsf:id="mainForm">
</form>
```

5. Insert the following HTML markup inside your `<form>` tag. Note that we are using standard HTML tags with JSF specific attributes.

```
<label for="firstName">First Name:</label><input type="text"
id="firstName" jsf:value="#{customer.firstName}"/><br/>
<label for="lastName">Last Name:</label><input type="text"
id="lastName" jsf:value="#{customer.lastName}"/>
<input type="submit" jsf:action="#{controller.navigate}"
```

```
value="Submit"/>
```

6. Create a new XHTML file, name it “confirmation”.



7. Replace the body of the <div> tag in the generated file with the following markup:

```
First Name: ${customer.firstName}<br/>
```

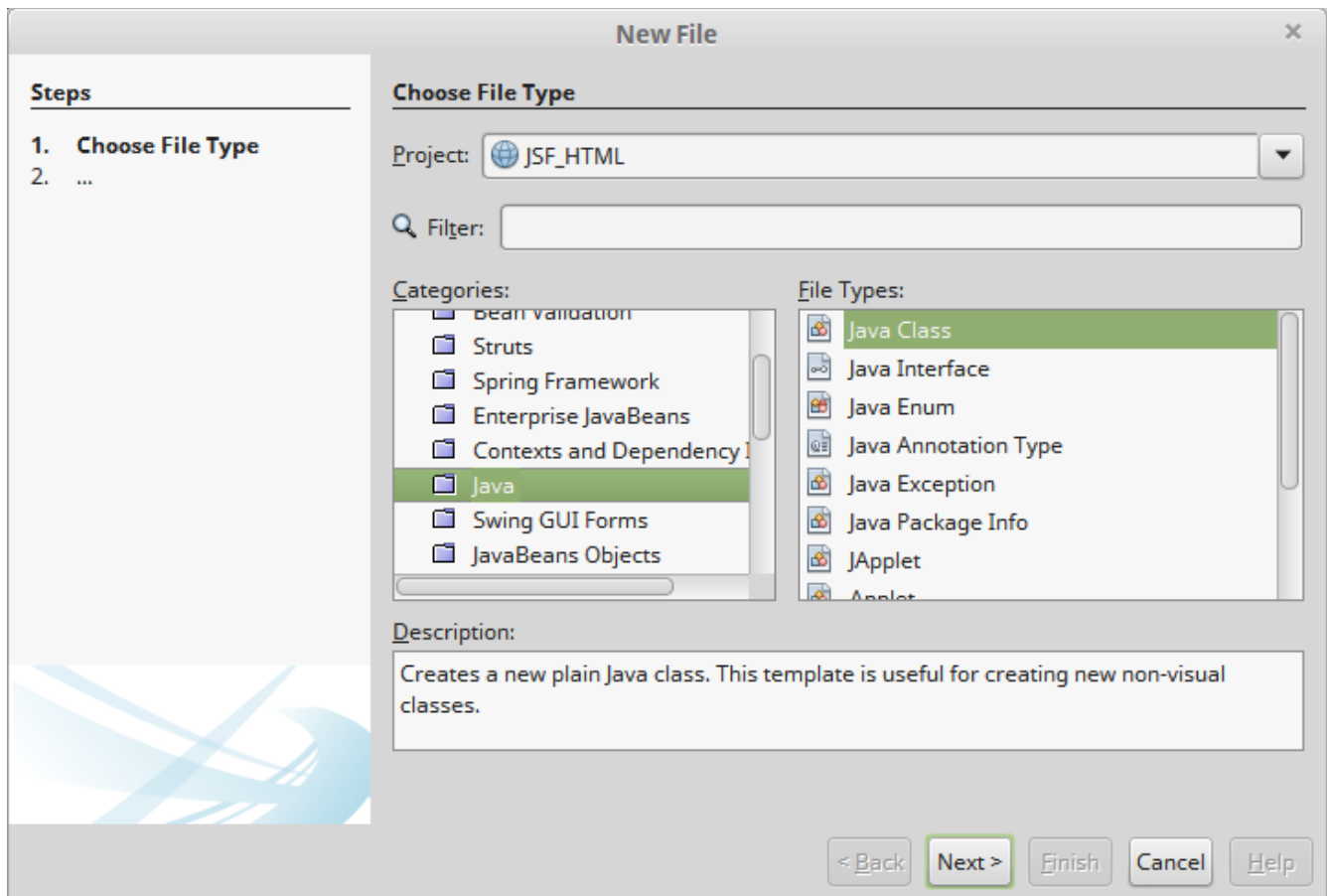
```
Last Name: ${customer.lastName}
```

Develop CDI Beans

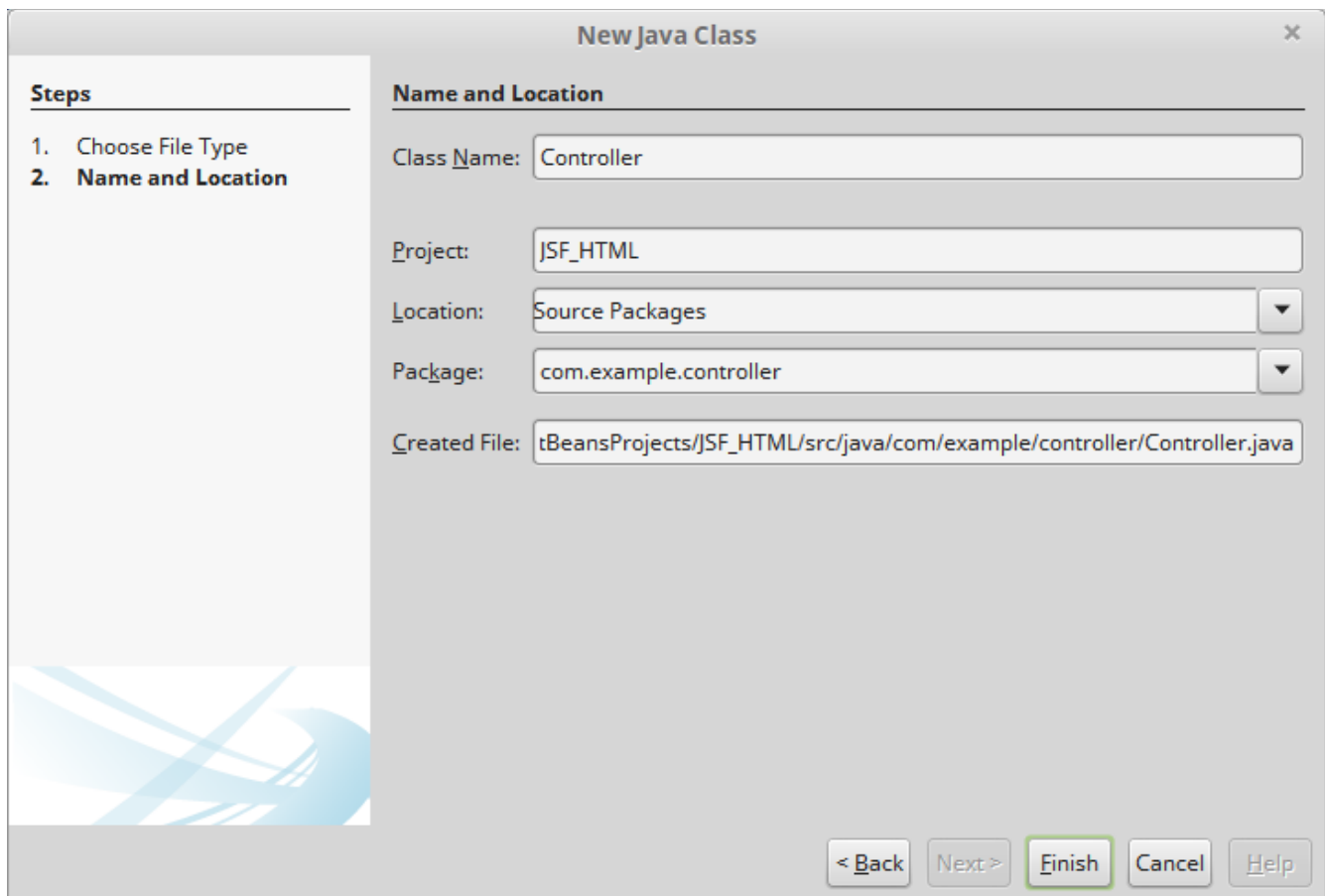
In this section, we will develop CDI beans to interact with the HTML pages we just created.

Controller class

1. Create a new Java class (File | New File..., Under “Categories”, select “Java”, under “File Types”, select “Java Class”).



Name your new class “Controller” and put it under the `com.example.controller` package, make your class implement the `java.io.Serializable` interface (Session scoped CDI managed beans should always implement `Serializable`).



2. Annotate the Controller class with the `@Named` and `@SessionScoped` annotations.
3. Add a new public method to the Controller class, name the method `navigate()`, have it return the string `"confirmation"`. Notice how this method is invoked in the `jsf:action` attribute of the submit button on the input page we created on the previous method.

Model Class

1. Create a new class (File | New File ..., "Java" Category, "Java Class" File Type).
2. Name your new class "Customer" and put it in the `com.example.model` package.
3. Annotate your customer class with the `@Model` annotation (the `@Model` annotation is a built-in CDI stereotype, it is equivalent to annotating the class with `@Named` and `@RequestScoped`).
4. Add two private String variables to the Customer class, name them `"firstName"` and `"lastName"`.
5. Add getter and setter methods for the `"firstName"` and `"lastName"` variables (hint: if using NetBeans standard keybindings, getters and setters can be generated by hitting `Alt+Ins`, then selecting "Getter and Setter...")

Run the project

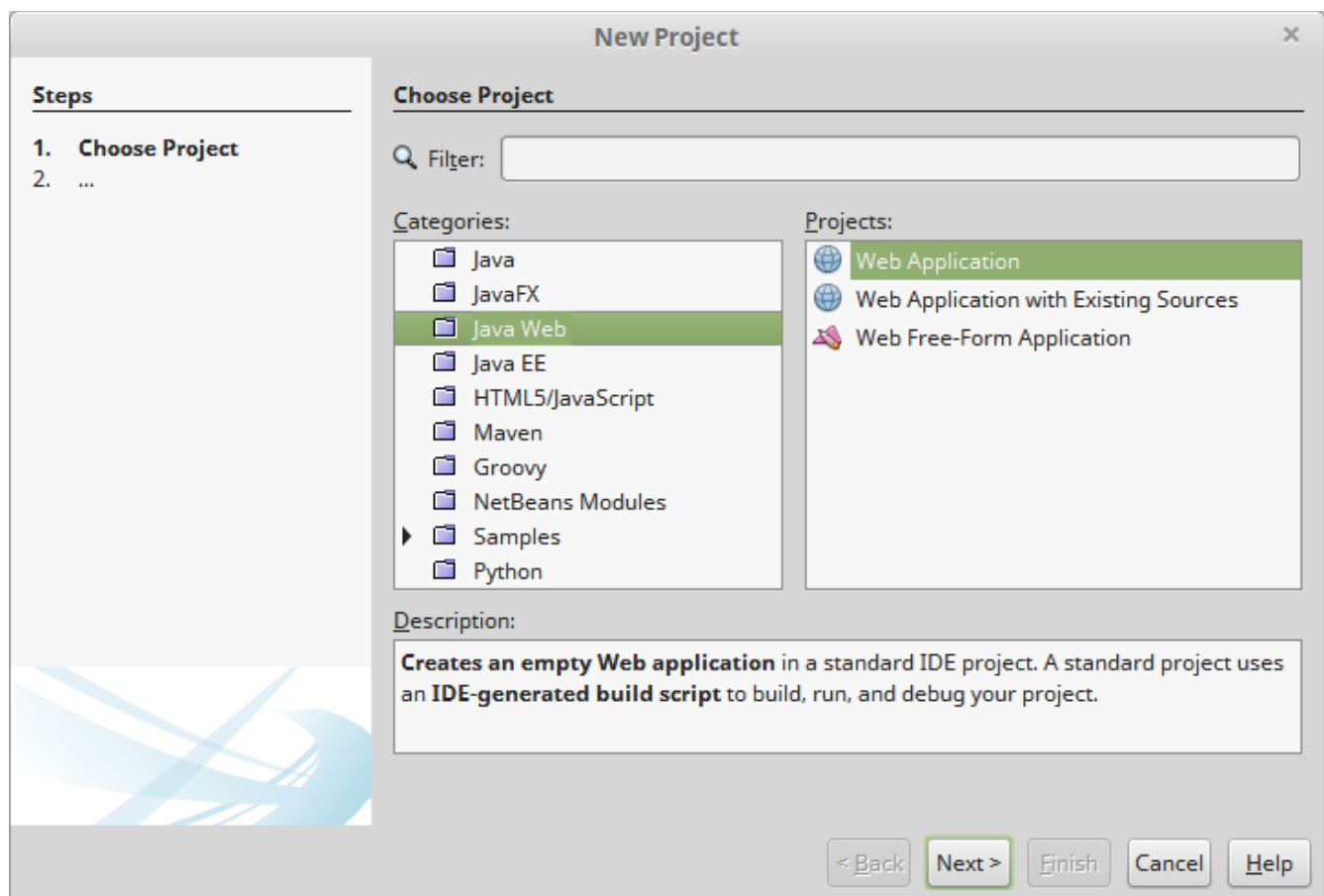
1. Right click on the project and select “Run”
2. GlassFish will automatically start, the browser will pop up and render your project's index.xhtml file automatically.
3. Replace the URL in your browser with
`http://localhost:8080/JSF_HTML/faces/input.xhtml`.
4. Enter any arbitrary values into the “First Name” and “Last Name” input fields.
5. Click on the button labeled “Submit”
6. Verify that your confirmation page displays the values you entered in the input page.

Exercise 2

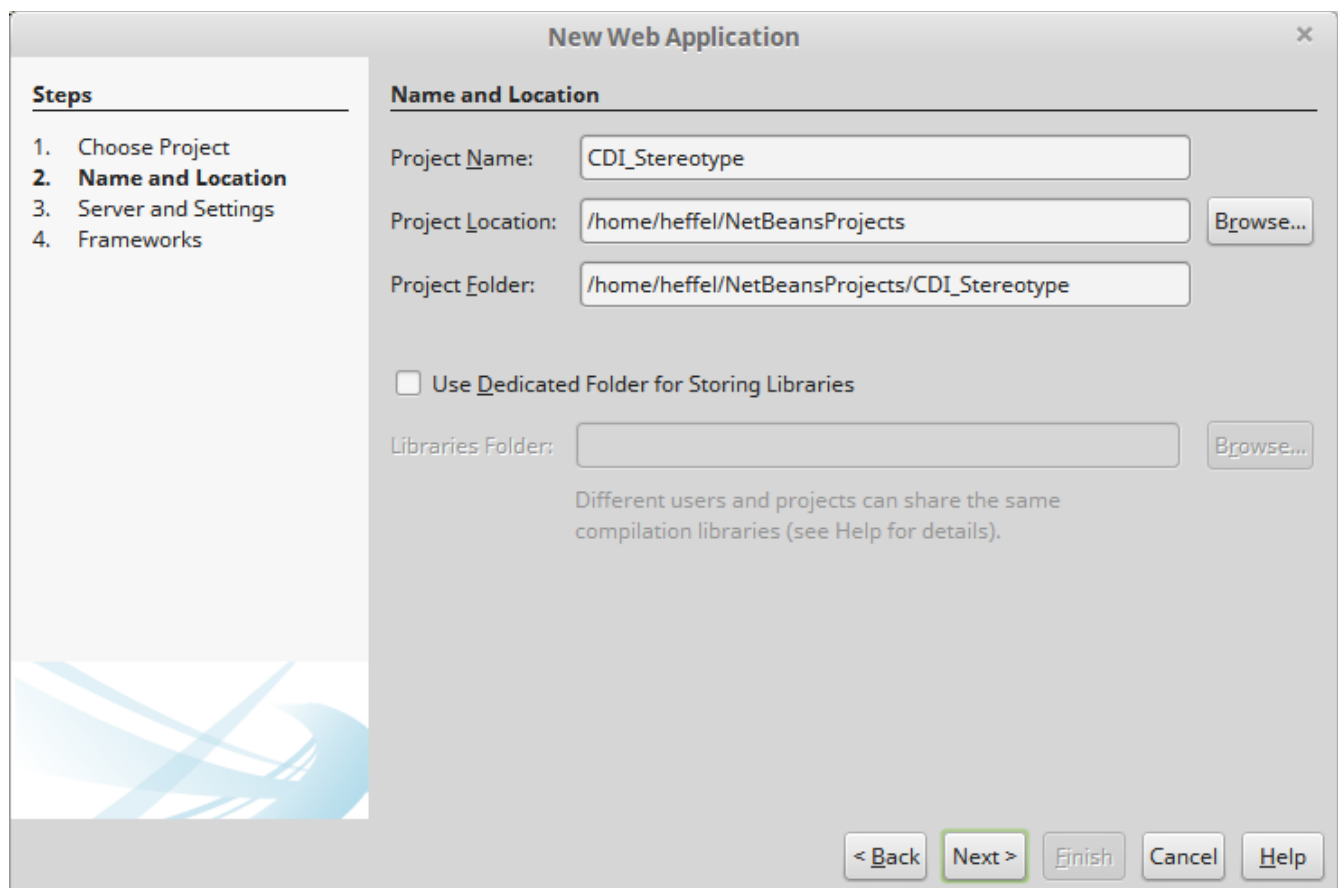
In this exercise, we will develop a CDI stereotype.

Create the project

1. Create a new Web Application Project (File | New Project)
2. Under “Categories”, select “Java Web”
3. Under “Projects” select “Web Application”



4. Click “Next”

The image shows a 'New Web Application' dialog box with a sidebar on the left and a main content area on the right. The sidebar, titled 'Steps', contains a list of four steps: '1. Choose Project', '2. Name and Location' (which is bolded), '3. Server and Settings', and '4. Frameworks'. The main content area is titled 'Name and Location' and contains several input fields. The 'Project Name' field is filled with 'CDI_Stereotype'. The 'Project Location' field is filled with '/home/heffel/NetBeansProjects' and has a 'Browse...' button to its right. The 'Project Folder' field is filled with '/home/heffel/NetBeansProjects/CDI_Stereotype'. Below these fields is a checkbox labeled 'Use Dedicated Folder for Storing Libraries', which is currently unchecked. Below the checkbox is a 'Libraries Folder' field, which is empty, and a 'Browse...' button to its right. At the bottom of the dialog, there are five buttons: '< Back', 'Next >' (which is highlighted with a green border), 'Finish', 'Cancel', and 'Help'. A small note at the bottom of the main content area reads: 'Different users and projects can share the same compilation libraries (see Help for details).'

New Web Application

Steps

1. Choose Project
- 2. Name and Location**
3. Server and Settings
4. Frameworks

Name and Location

Project Name:

Project Location:

Project Folder:

☐ Use Dedicated Folder for Storing Libraries

Libraries Folder:

Different users and projects can share the same compilation libraries (see Help for details).

5. Name your project “CDI_Stereotype” and click “Next>”

New Web Application [X]

Steps

1. Choose Project
2. Name and Location
- 3. Server and Settings**
4. Frameworks

Server and Settings

Add to Enterprise Application: <None> [v]

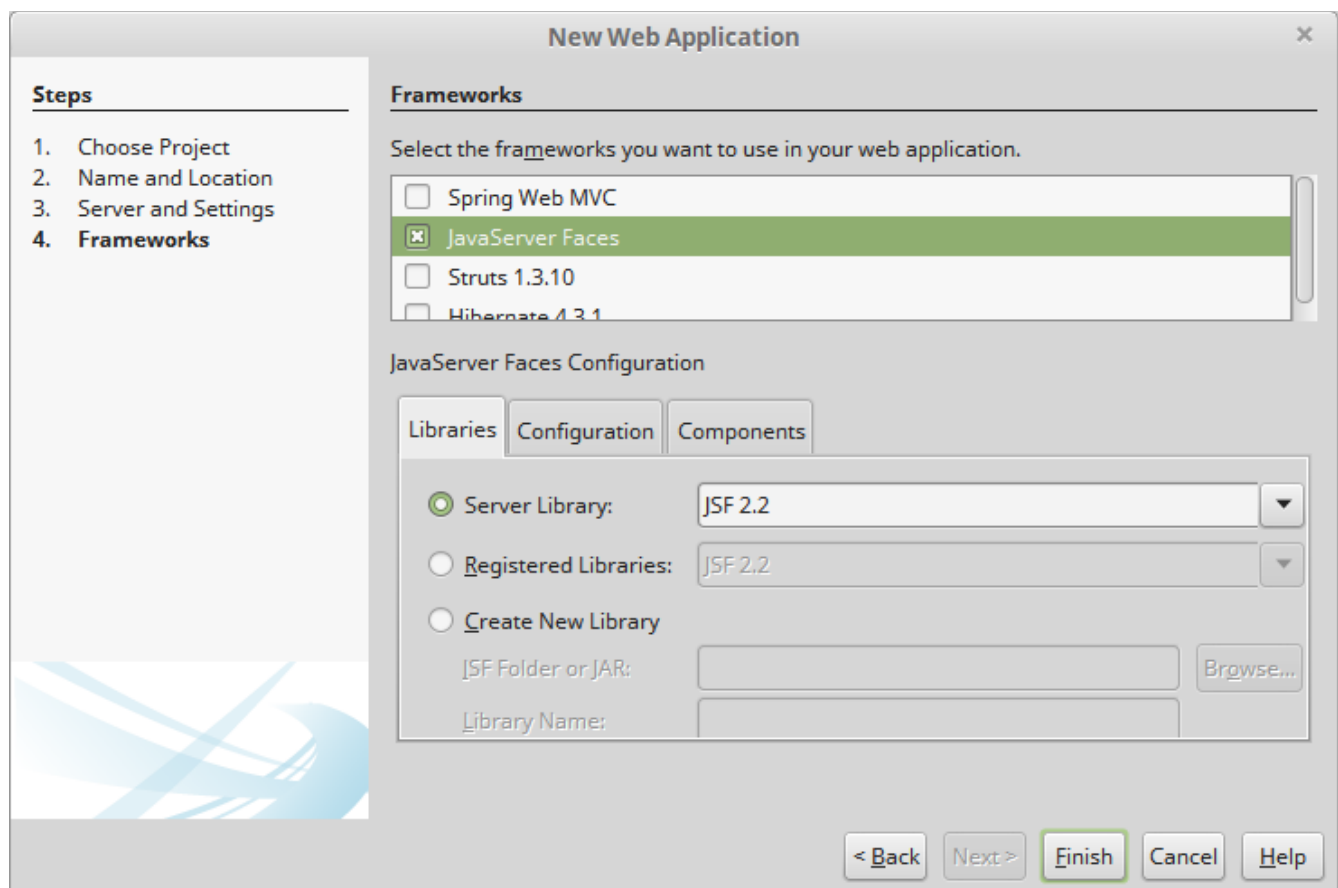
Server: GlassFish Server 4.1.1 [v] [Add...]

Java EE Version: Java EE 7 Web [v]

Context Path: /CDI_Stereotype

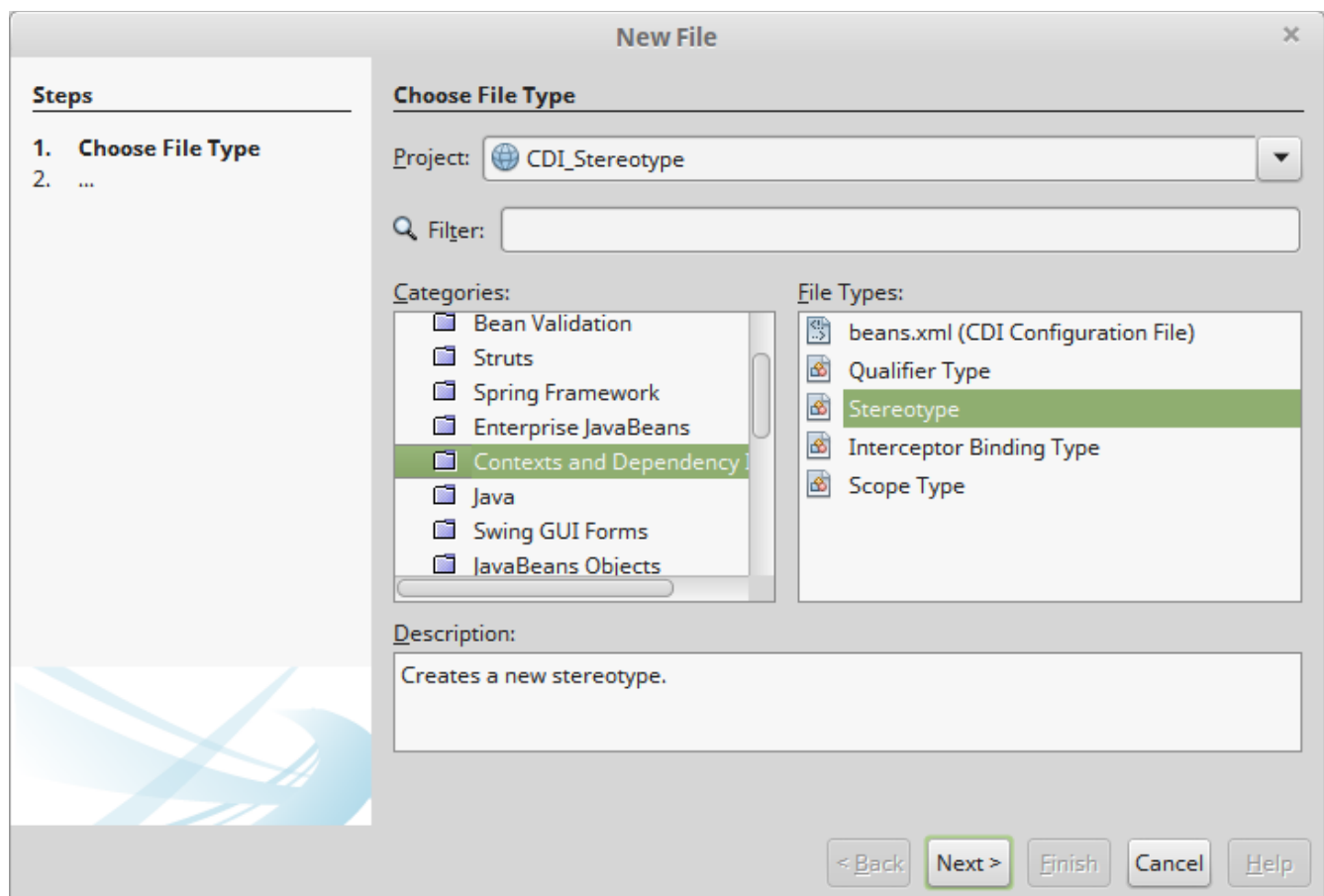
[< Back] [Next >] [Finish] [Cancel] [Help]

6. Accept the defaults and click “Next>”



7. Select the “JavaServer Faces” framework and click “Finish”.

Develop A CDI Stereotype



1. Click on “File | New | Other”, select the “Contexts and Dependency Injection” category, and “Stereotype” file type, then click “Next>”

New Stereotype

Steps

1. Choose File Type
2. Name and Location

Name and Location

Class Name: TransactionalSessionScoped

Project: CDI_Stereotype

Location: Source Packages

Package: com.example.cdi.stereotypes

Created File: e:/src/java/com/example/cdi/stereotypes/TransactionalSessionScoped.java

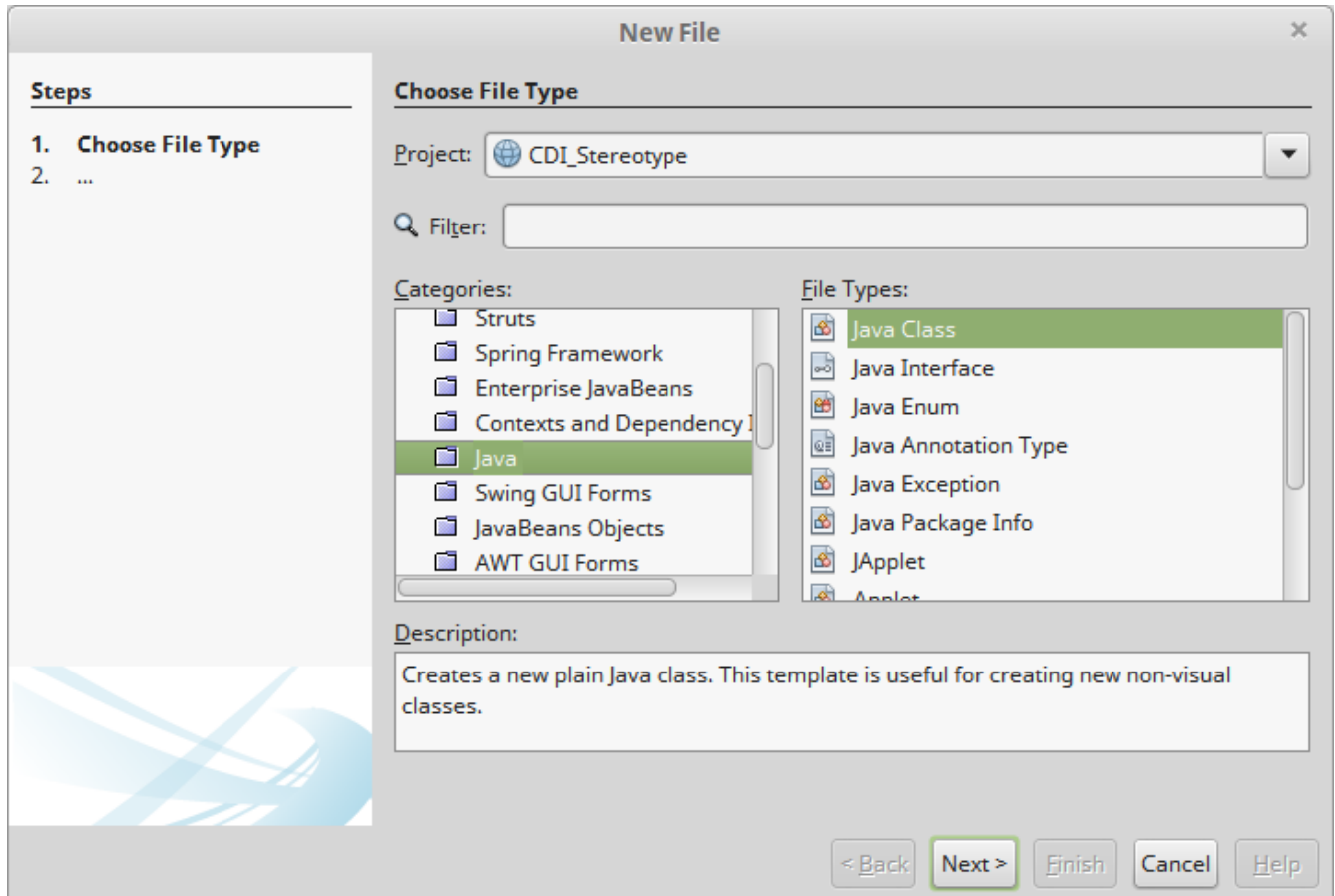
< Back Next > Finish Cancel Help

2. Enter “TransactionalSessionScoped” as the class name, and “com.example.cdi.stereotypes” as the package, click “Finish”
3. Add the `@Transactional` annotation (in package `javax.transaction.transactional`) to the generated CDI stereotype.

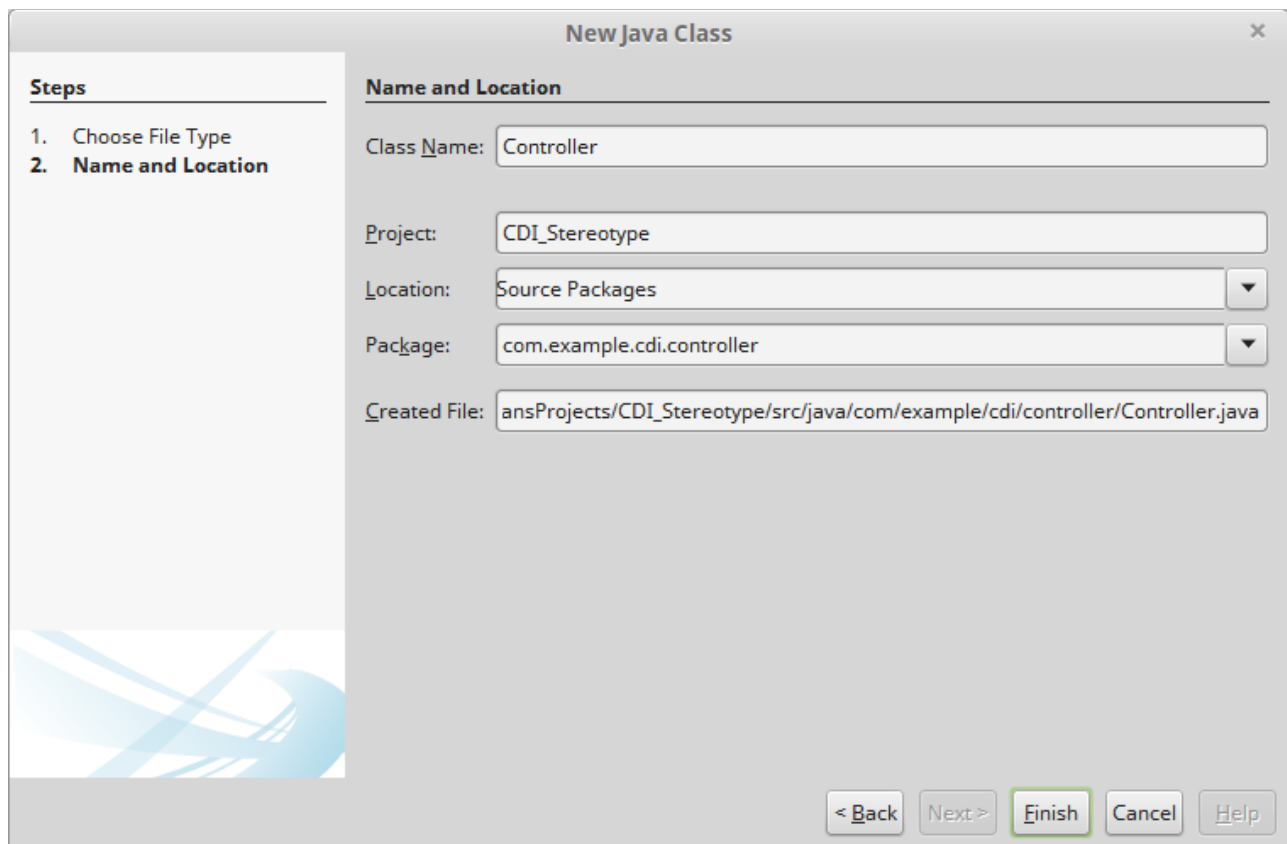
Tip: CDI Beans can take advantage of container managed transactions by annotating them with the `@Transactional` annotation.

4. Add the `@SessionScoped` annotation(in package `javax.enterprise.context`) to the generated CDI stereotype.

Develop a CDI Bean



1. Create a new Java class (File | New File., “Java” category and “Java Class” file type).



2. Name your class “Controller” and put it in package “com.example.cdi.controller”
3. Annotate your Controller class with the `@Named` and `@TransactionalSessionScoped` annotations.
4. Make your class implement the `java.io.Serializable` interface.
5. Add a boolean class level variable, name it “rollbackTransaction”
 1. initialize your “rollbackTransaction” variable to true.
6. Add a new public method to your controller class, name your method “navigate()”, and have it return a String (i.e. your method signature would be “public String navigate()”).
7. Add the following code to the body of your “navigate()” method:

```
if (rollbackTransaction) {  
    throw new RuntimeException();  
}  
  
return "confirmation";
```

Tip: Throwing a RuntimeException will force the transaction to roll back.

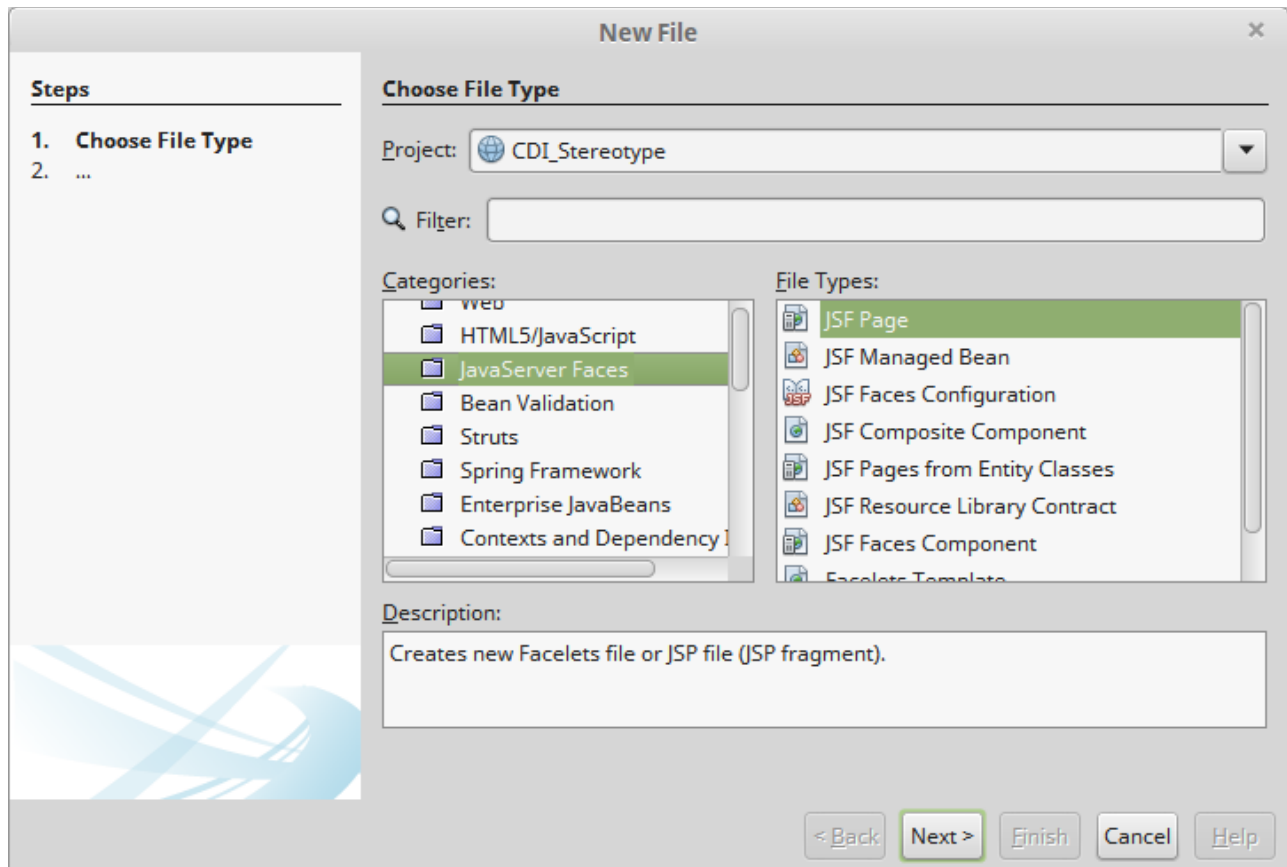
Update index.xhtml

1. Modify the body of the generated index.xhtml (automatically generated when we created the project, found under the “Web Pages” folder), to have the following markup inside its `<h:body>`

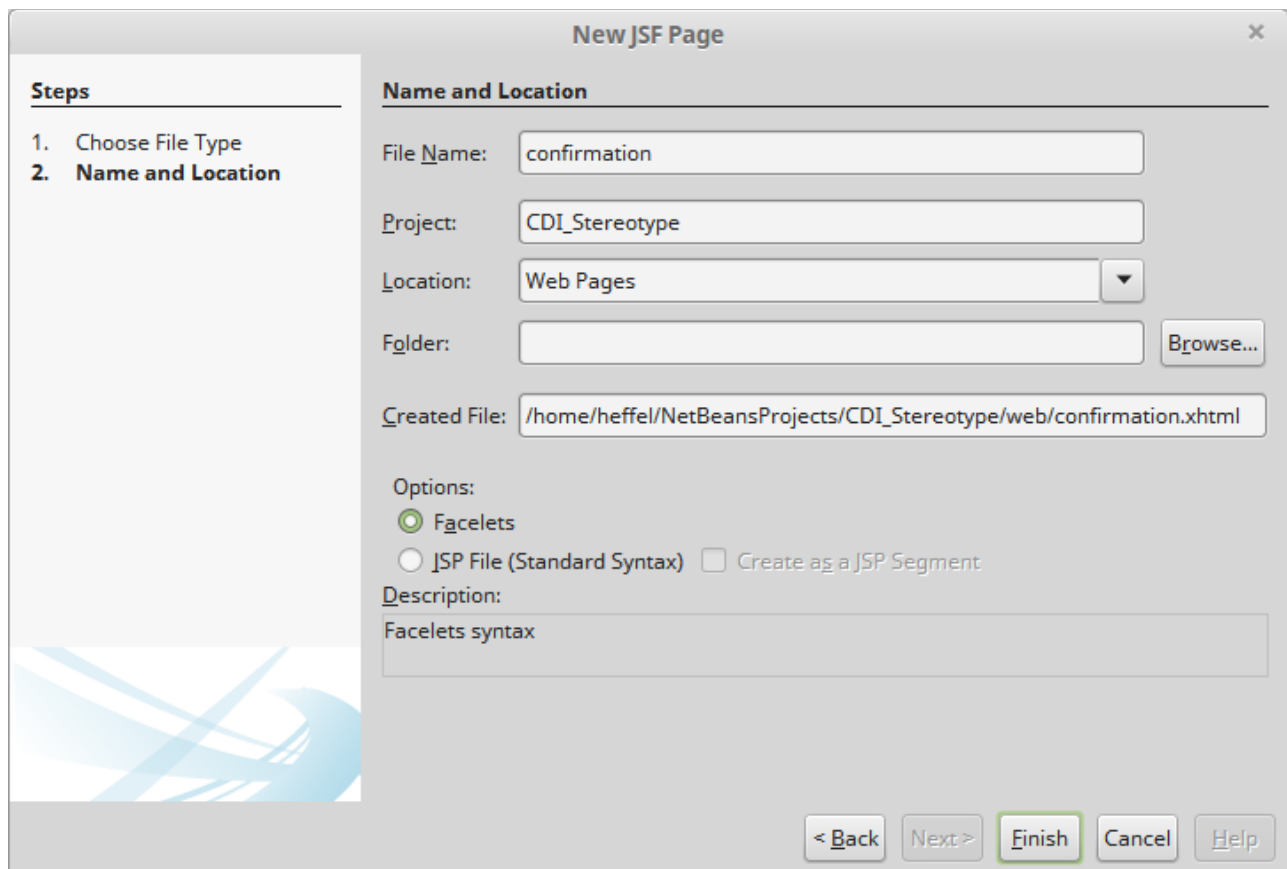
tag:

```
<h:form>
  <h:commandButton action="#{controller.navigate()}" value="Submit"/>
</h:form>
```

Develop a Confirmation Page



1. Click on “File | New File...”, select the “JavaServer Faces” category and “JSF Page” file type, click “Next>”



2. Name your file “confirmation” (NetBeans automatically adds the .xhtml file extension), accept all other defaults and click “Finish”.
3. Change the body of the `<h:body>` tag in your confirmation page as follows:

```
<h2>If you see this, the transaction didn't roll back!</h2>
```

4. Right click on the project and select “Run”
5. Click on the “Submit” button on your browser, your transaction should have rolled back due to the `RuntimeException` we are throwing in the Controller class.
6. Modify `Controller.java` so that the “`rollBackTransaction`” variable is initialized to “false”.
7. Rerun your project.
8. Click on the “Submit” button.
9. Verify that the confirmation page is displayed.

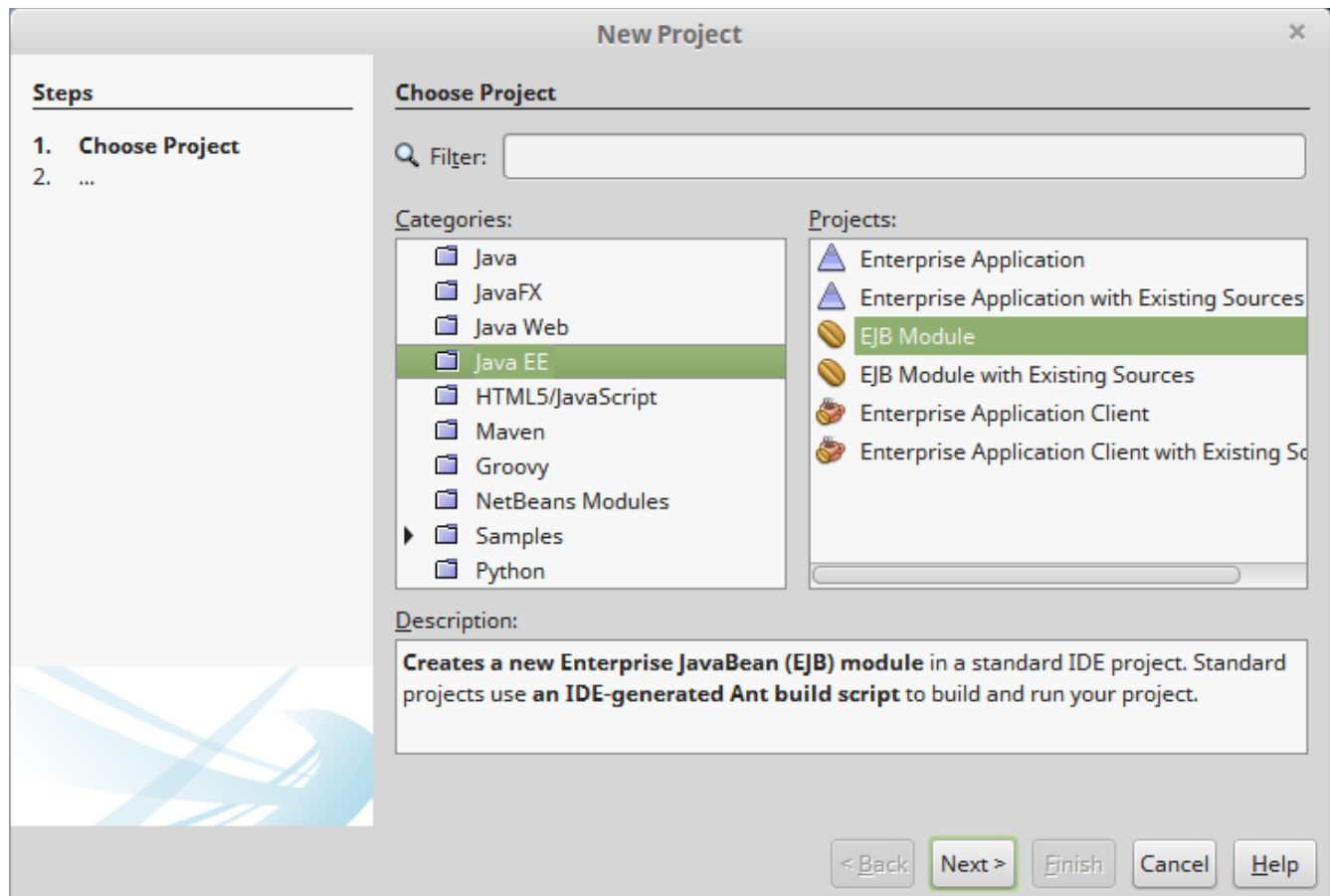
Exercise 3

In this exercise, we will develop an EJB taking advantage of the EJB timer service.

Create the project

1. Create a new EJB Module Project (File | New Project)
2. Under “Categories”, select “Java EE”

3. Under “Projects” select “EJB Module”



4. Click “Next>”

New EJB Module [X]

Steps

1. Choose Project
- 2. Name and Location**
3. Server and Settings

Name and Location

Project Name:

Project Location:

Project Folder:

☐ Use Dedicated Folder for Storing Libraries

Libraries Folder:

Different users and projects can share the same compilation libraries (see Help for details).

< Back **Next >** Finish Cancel Help

5. Name your project “EJB_Timer_Service”, click “Next>”

New EJB Module [X]

Steps

1. Choose Project
2. Name and Location
- 3. Server and Settings**

Server and Settings

Add to Enterprise Application: ▼

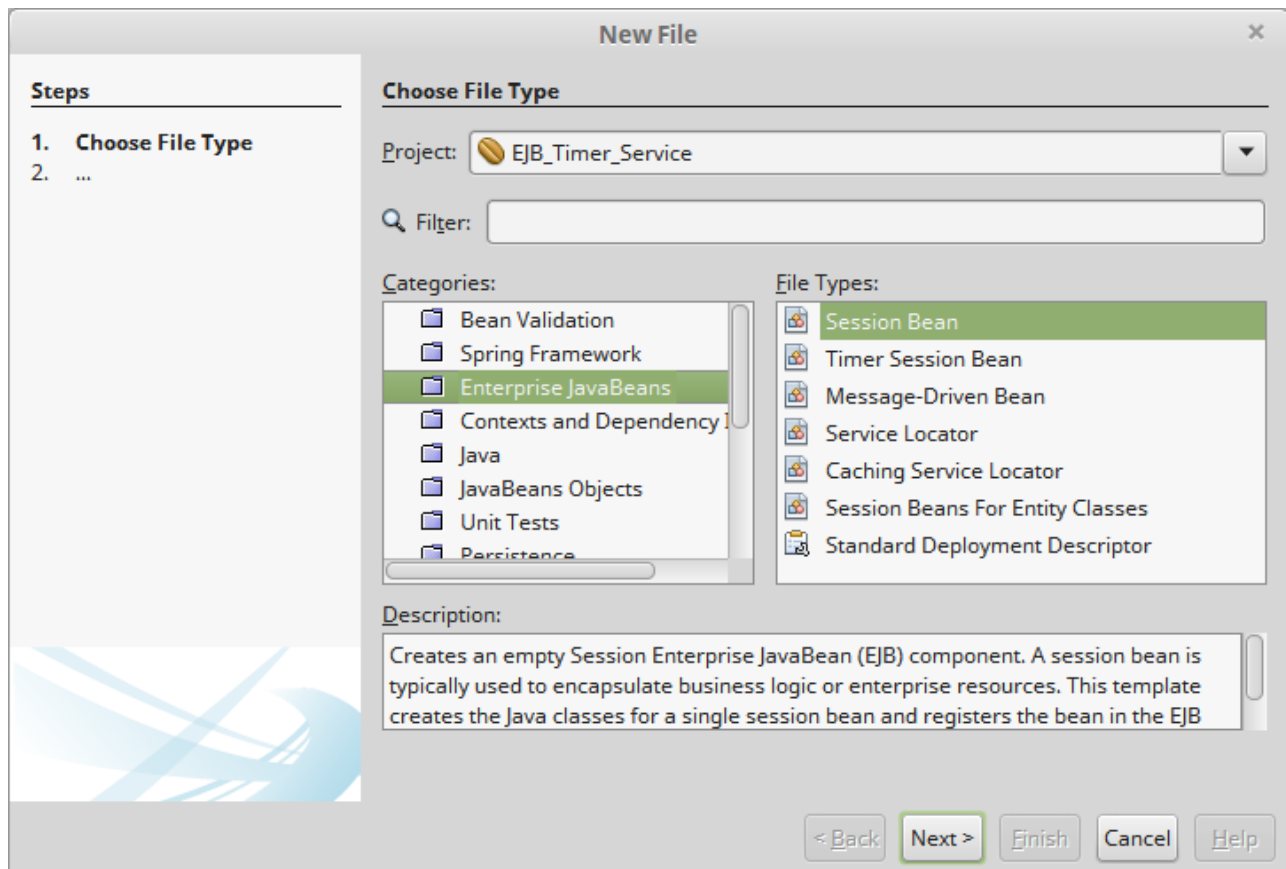
Server: ▼

Java EE Version: ▼

< Back Next > **Finish** Cancel Help

6. Accept the defaults and click “Finish”.

Develop a Session Bean



1. Click on “File | New File...”, select the “Enterprise JavaBeans” category, and “Session Bean” file type, then click “Next>”

New Session Bean

Steps

1. Choose File Type
2. Name and Location

Name and Location

EJB Name:

Project:

Location:

Package:

Session Type:

☒ Stateless

☐ Stateful

☐ Singleton

Create Interface:

☐ Local

☐ Remote

< Back Next > **Finish** Cancel Help

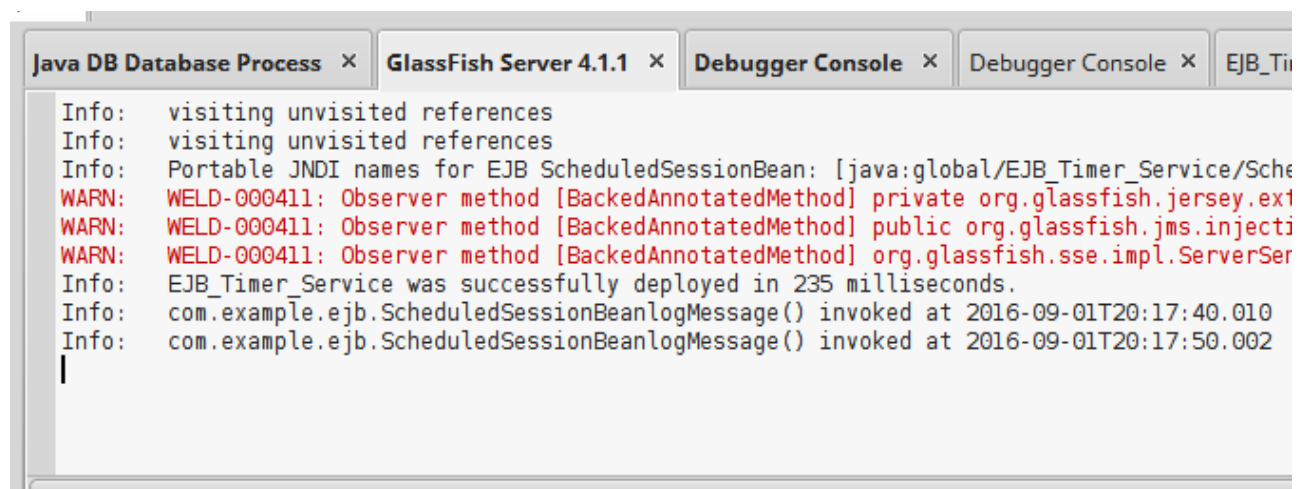
2. Name your EJB “ScheduledSessionBean”, put it in package “com.example.ejb”, accept all other defaults and click “Finish”.
3. Add a private static final variable of type `java.util.Logger` to the generated EJB (hint: alt+ins, then select “Logger” to generate this variable). Name your variable “LOG”.
4. Add a public void method named `logMessage()`, enter the following code in the body of the method:

```
LOG.log(Level.INFO, this.getClass().getCanonicalName() +  
"logMessage() invoked at " + LocalDateTime.now());
```


Hit ctrl+shift+I to add missing imports.
5. Annotate your `logMessage()` method with the `@Schedule` annotation as follows:

```
@Schedule(hour = "*", minute = "*", second = "*/10")
```


This annotation will tell the application server to invoke our `logMessage()` method every 10 seconds.
6. Deploy your project (right click on the project, select “Run”).



7. Watch the server output and make sure you see the output from our logMessage() method every 10 seconds.