

SWEN90007 - Software Design and Architecture

Semester 2 – 2020 – Additional Learning Resource for Students

Introduction to Dynamic Web Application Development

We will prepare a fully functional work environment. Then we will learn how to create dynamic web applications project. We will build Servlet based web application using Eclipse IDE for Java EE, and Apache Tomcat server as a web container that supports Servlet technology. So, you will need:

1. Download and install **JDK 14**:
<https://www.oracle.com/java/technologies/javase-jdk14-downloads.html>
(do not download the JRE. Make sure you download the **JDK**);
2. Download and unzip Eclipse IDE for **Enterprise Java Developers [IDE 2020-06]**
(make sure you download the Enterprise Eclipse, as shown below):
<https://www.eclipse.org/downloads/packages/>

Eclipse IDE 2020-06 R Packages

Eclipse IDE for Java Developers
208 MB 683,661 DOWNLOADS
The essential tools for any Java developer, including a Java IDE, a Git client, XML Editor, Maven and Gradle integration
Windows 64-bit
Mac Cocoa 64-bit
Linux 64-bit

Eclipse IDE for Enterprise Java Developers
391 MB 571,088 DOWNLOADS
Tools for developers creating Java Enterprise and Web applications, including a Java IDE, tools for Web Services, JPA and Data Tools, JSF, Mylyn, Maven and Gradle, Git, and more.
Click [here](#) to file a bug against Eclipse Web Tools Platform.
Click [here](#) to file a bug against Eclipse Platform.
Click [here](#) to file a bug against Maven integration for web projects.
Click [here](#) to report an issue against Eclipse Wild Web Developer (incubating).
Installation of stable release of [node.js](#) is strongly recommended.
Windows 64-bit
Mac Cocoa 64-bit
Linux 64-bit

3. Download and unzip Apache Tomcat 9.0:



<https://tomcat.apache.org/download-90.cgi>

(a directory of your choice. There's no installation for Apache, just unzip the project somewhere and make sure you remember that 😊).

9.0.37

Please see the [README](#) file for packaging information. It explains what every distribution contains.

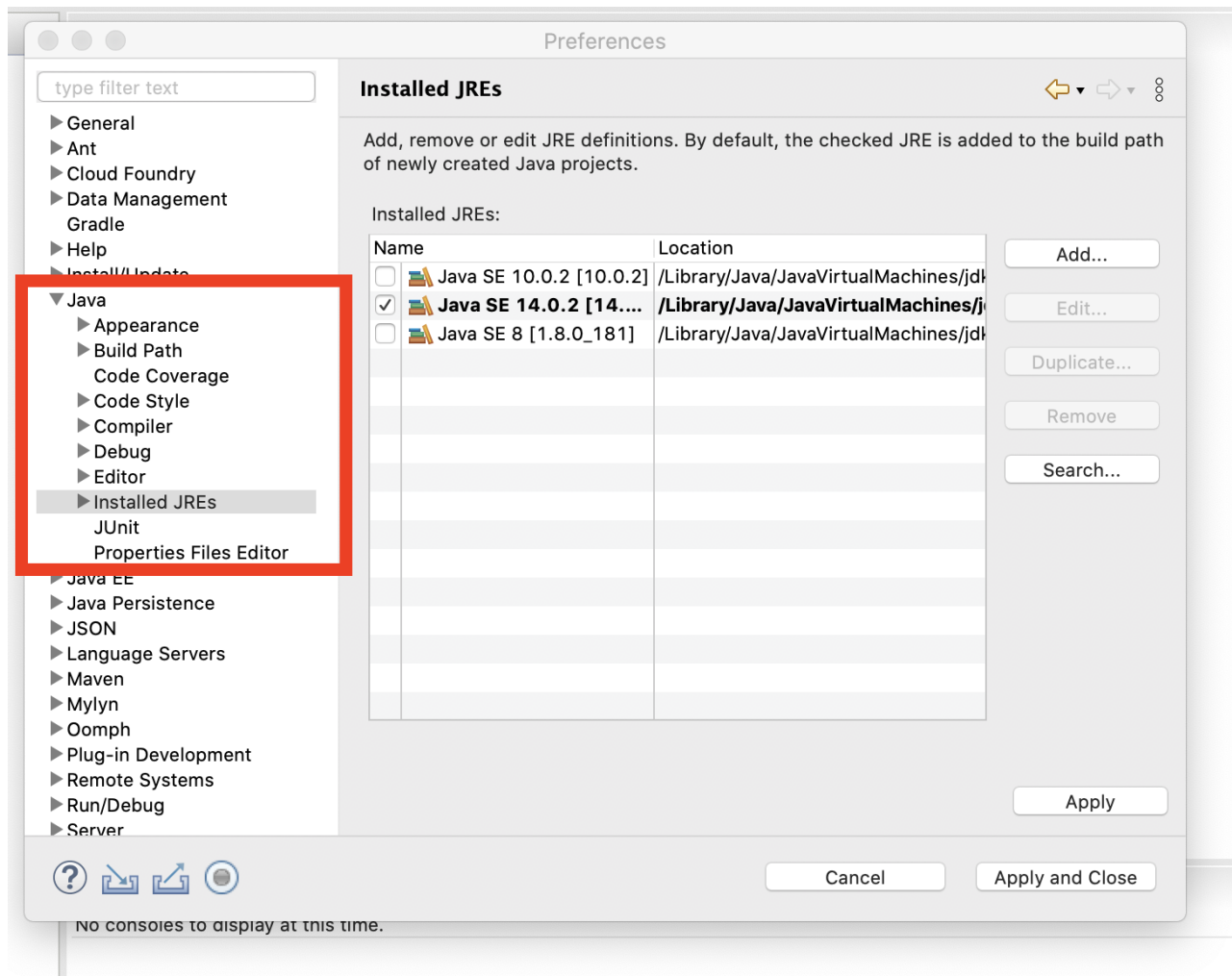
Binary Distributions

- Core:
 - [zip](#) ([pgp](#), [sha512](#))
 - [tar.gz](#) ([pgp](#), [sha512](#))
 - [32-bit Windows zip](#) ([pgp](#), [sha512](#))
 - [64-bit Windows zip](#) ([pgp](#), [sha512](#))
 - [32-bit/64-bit Windows Service Installer](#) ([pgp](#), [sha512](#))

Part 1: Setting up runtime environment:

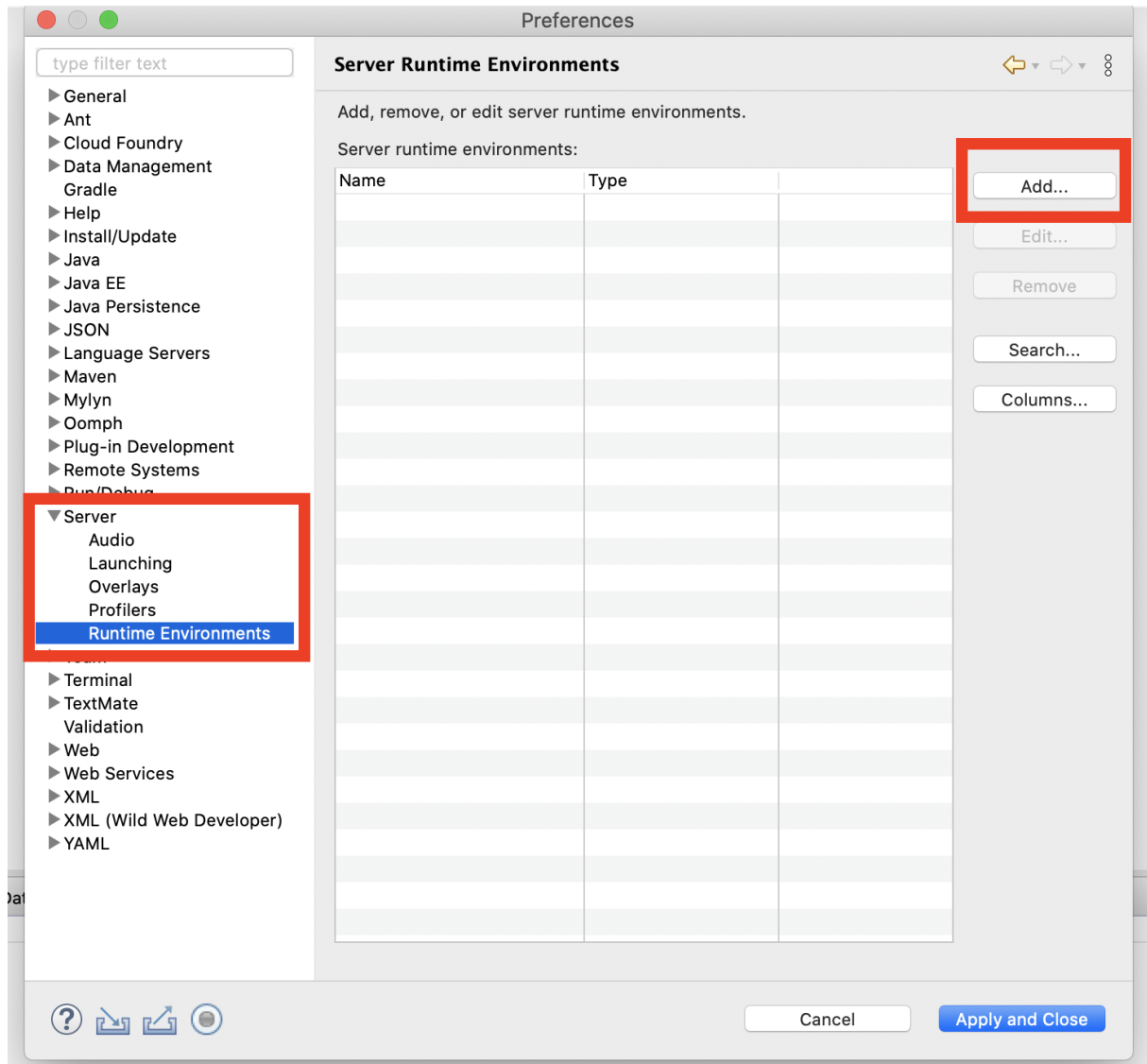
1. Configure Java JRE in Eclipse:

- In eclipse, select from the menu Window ► Preferences ► Java ► Installed JRE
- Choose **Java SE 14** as below, then click “Apply and Close”

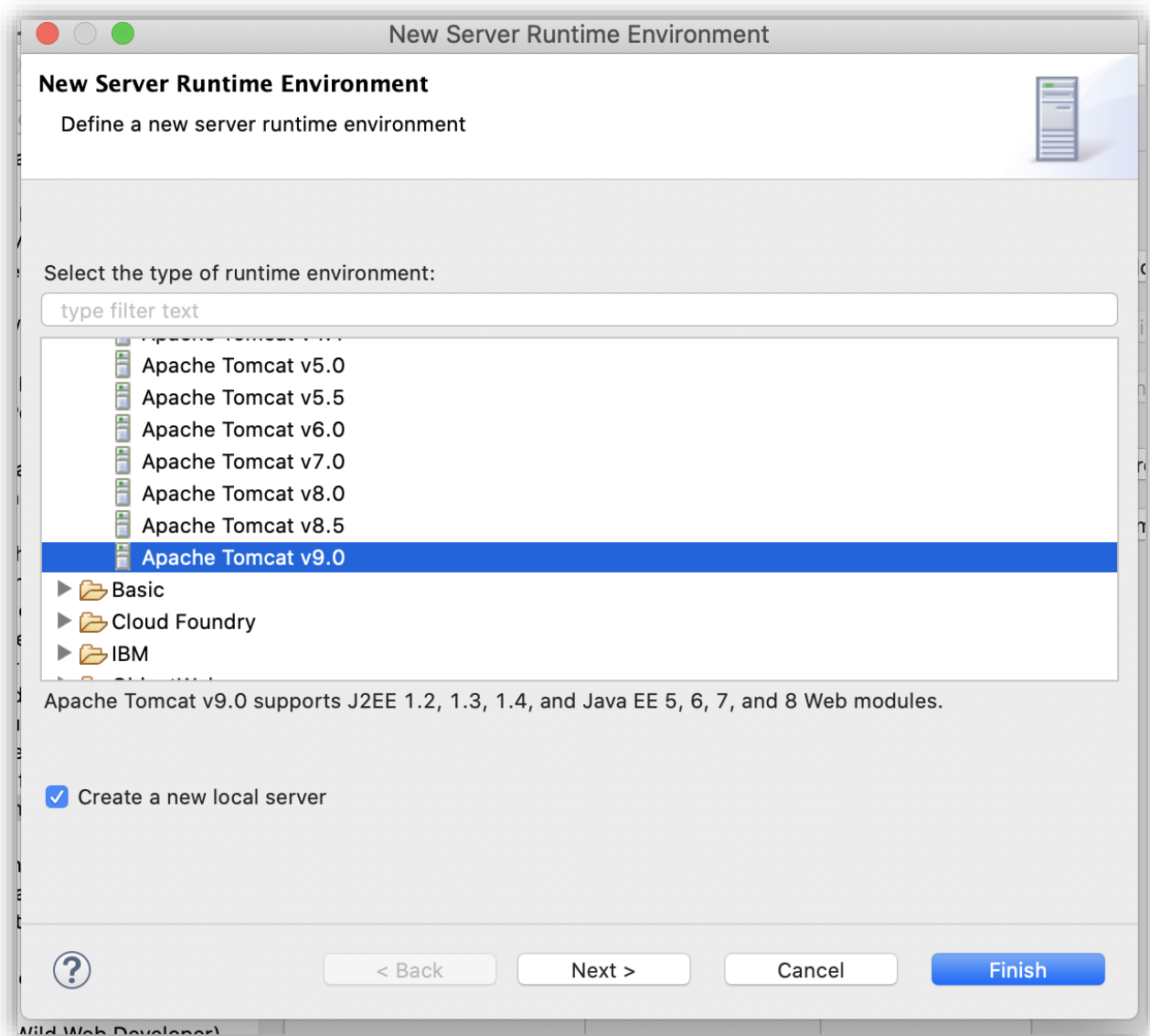


2. Configure Apache Tomcat in Eclipse:

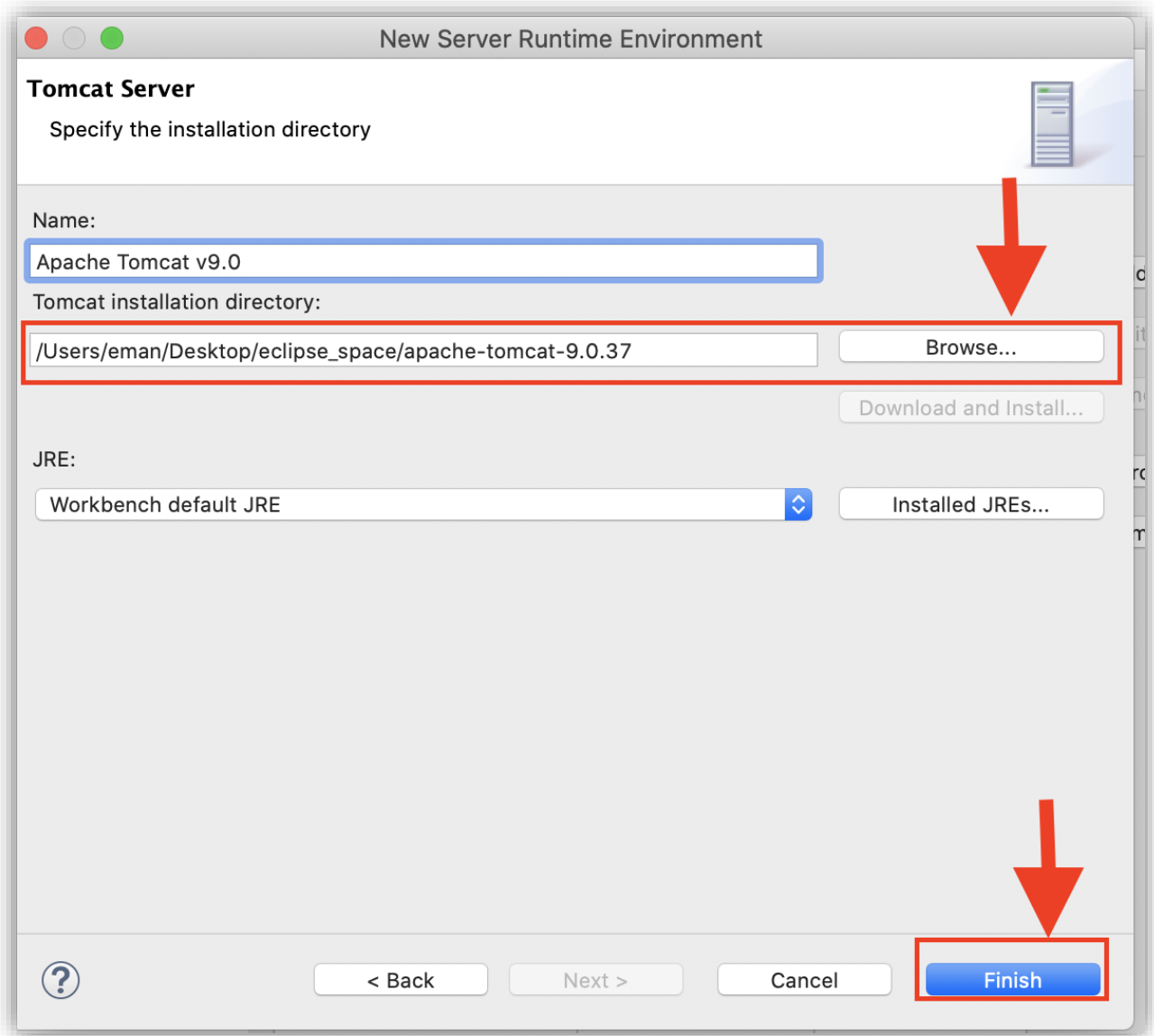
- In eclipse, select from the menu Window ▸ Preferences ▸ Server ▸ Runtime Environments.



- Click Add, then choose Apache Tomcat 9 as the server type.



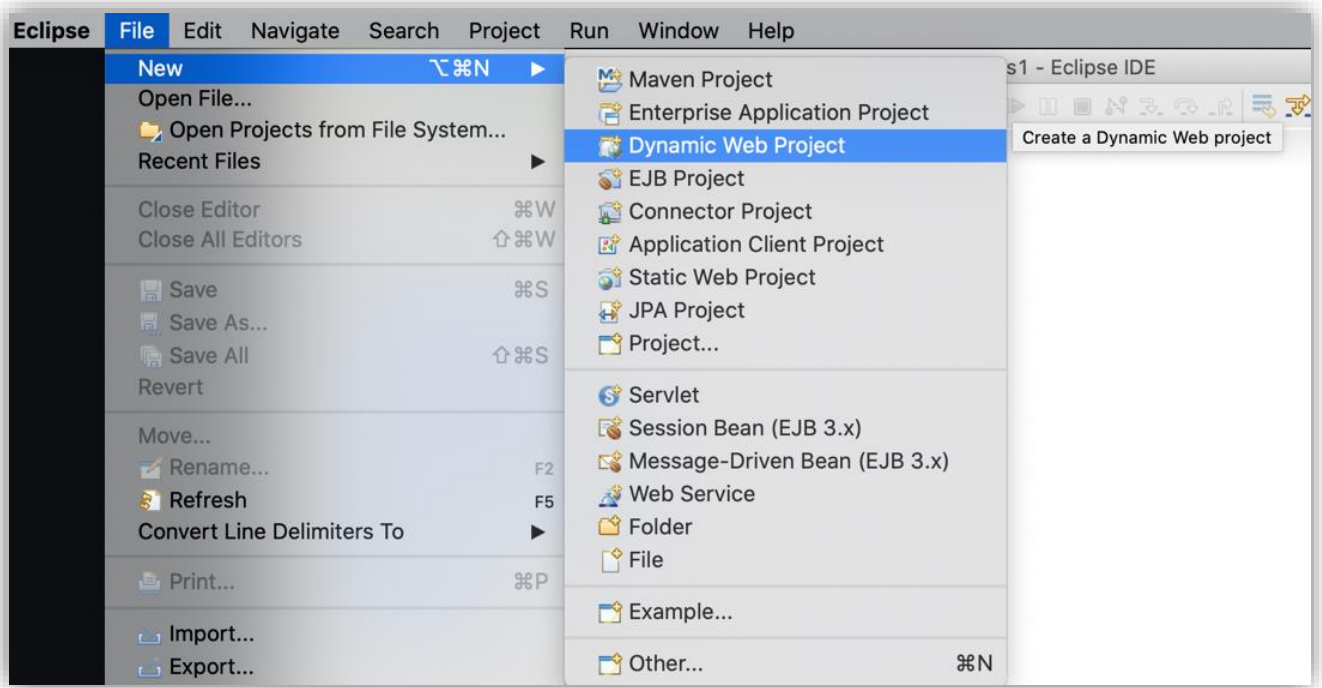
- Set **Tomcat installation directory**: (wherever you unzipped your Apache) as the path for the installation directory.



Now you are ready to create your first project ^_^

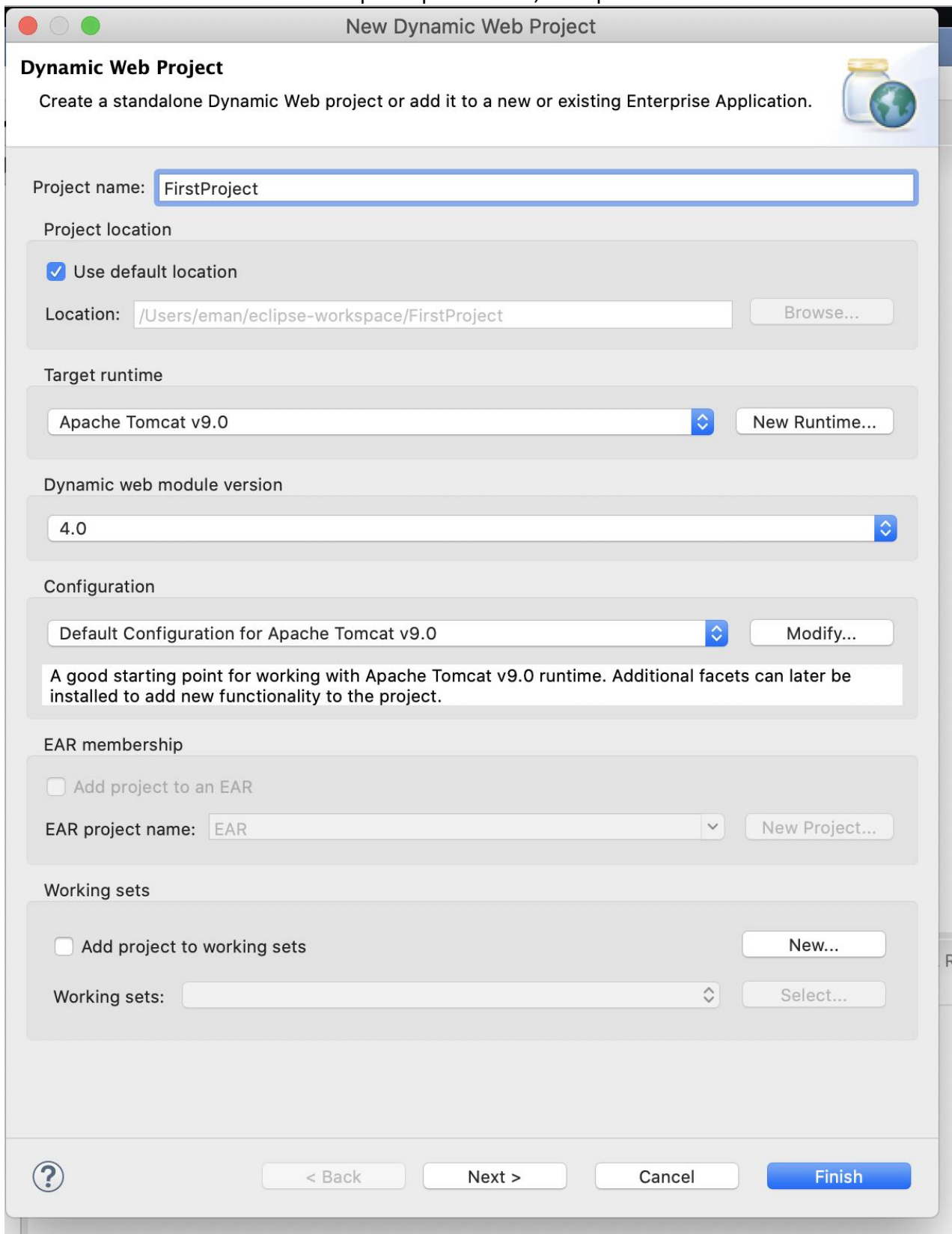
Part 2: Create a dynamic web project:

- In eclipse, click “File”, Click “New”, click “Dynamic Web Project” (if “Dynamic Web Project” does not show up in the submenu, please click the bottom “other” and choose “Dynamic Web Project” under **web** folder, and you will be able to select from “Select a Wizard”)



- Name it as “FirstProject”.
- Choose Apache Tomcat 9.0 as the runtime.

- Use default values for the required parameters, then press Next.



The screenshot shows the 'New Dynamic Web Project' dialog box in the Eclipse IDE. The dialog has a title bar with standard macOS window controls (red, yellow, green buttons) and the title 'New Dynamic Web Project'. Below the title bar, the main heading is 'Dynamic Web Project', followed by the instruction 'Create a standalone Dynamic Web project or add it to a new or existing Enterprise Application.' and a small icon of a jar and a globe. The dialog is organized into several sections, each with a label on the left. The 'Project name' section has a text field containing 'FirstProject'. The 'Project location' section has a checked checkbox for 'Use default location' and a text field showing the default path '/Users/eman/eclipse-workspace/FirstProject', with a 'Browse...' button to the right. The 'Target runtime' section has a dropdown menu set to 'Apache Tomcat v9.0' and a 'New Runtime...' button. The 'Dynamic web module version' section has a dropdown menu set to '4.0'. The 'Configuration' section has a dropdown menu set to 'Default Configuration for Apache Tomcat v9.0' and a 'Modify...' button, with a descriptive text box below stating: 'A good starting point for working with Apache Tomcat v9.0 runtime. Additional facets can later be installed to add new functionality to the project.' The 'EAR membership' section has an unchecked checkbox for 'Add project to an EAR', an 'EAR project name' text field containing 'EAR', and a 'New Project...' button. The 'Working sets' section has an unchecked checkbox for 'Add project to working sets', a 'New...' button, and a 'Working sets' dropdown menu with a 'Select...' button. At the bottom of the dialog, there is a help icon (question mark in a circle) on the left, and four buttons: '< Back', 'Next >', 'Cancel', and 'Finish' (which is highlighted in blue).

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

Project name:

Project location

☒ Use default location

Location:

Target runtime

Dynamic web module version

Configuration

A good starting point for working with Apache Tomcat v9.0 runtime. Additional facets can later be installed to add new functionality to the project.

EAR membership

☐ Add project to an EAR

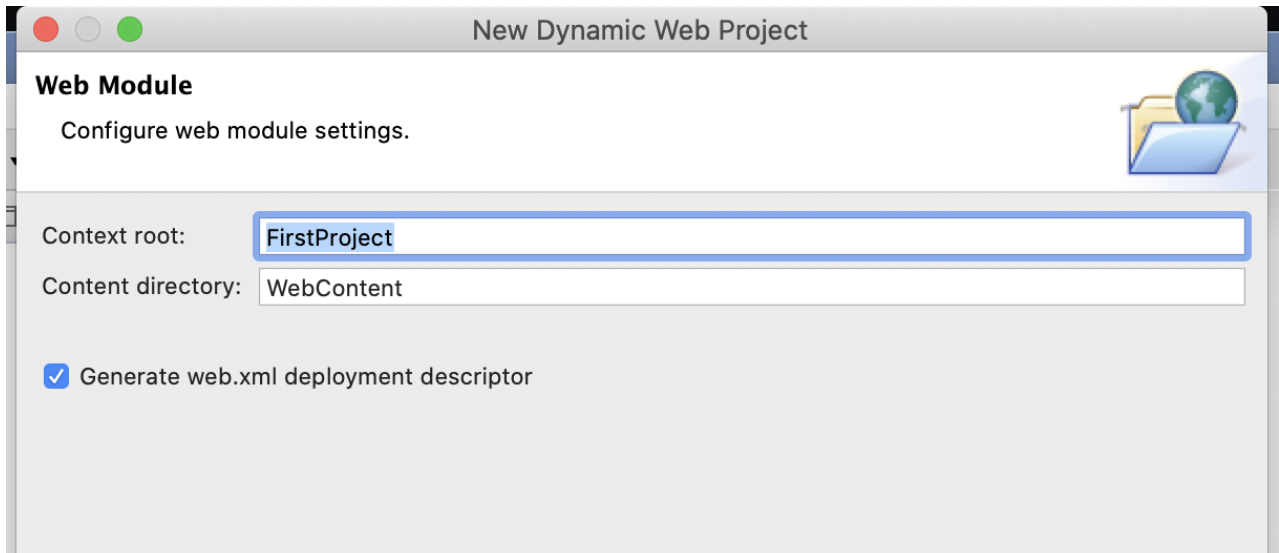
EAR project name:

Working sets

☐ Add project to working sets

Working sets:

- In the last screen “check” the “Generate web.xml deployment descriptor” before clicking “Finish”



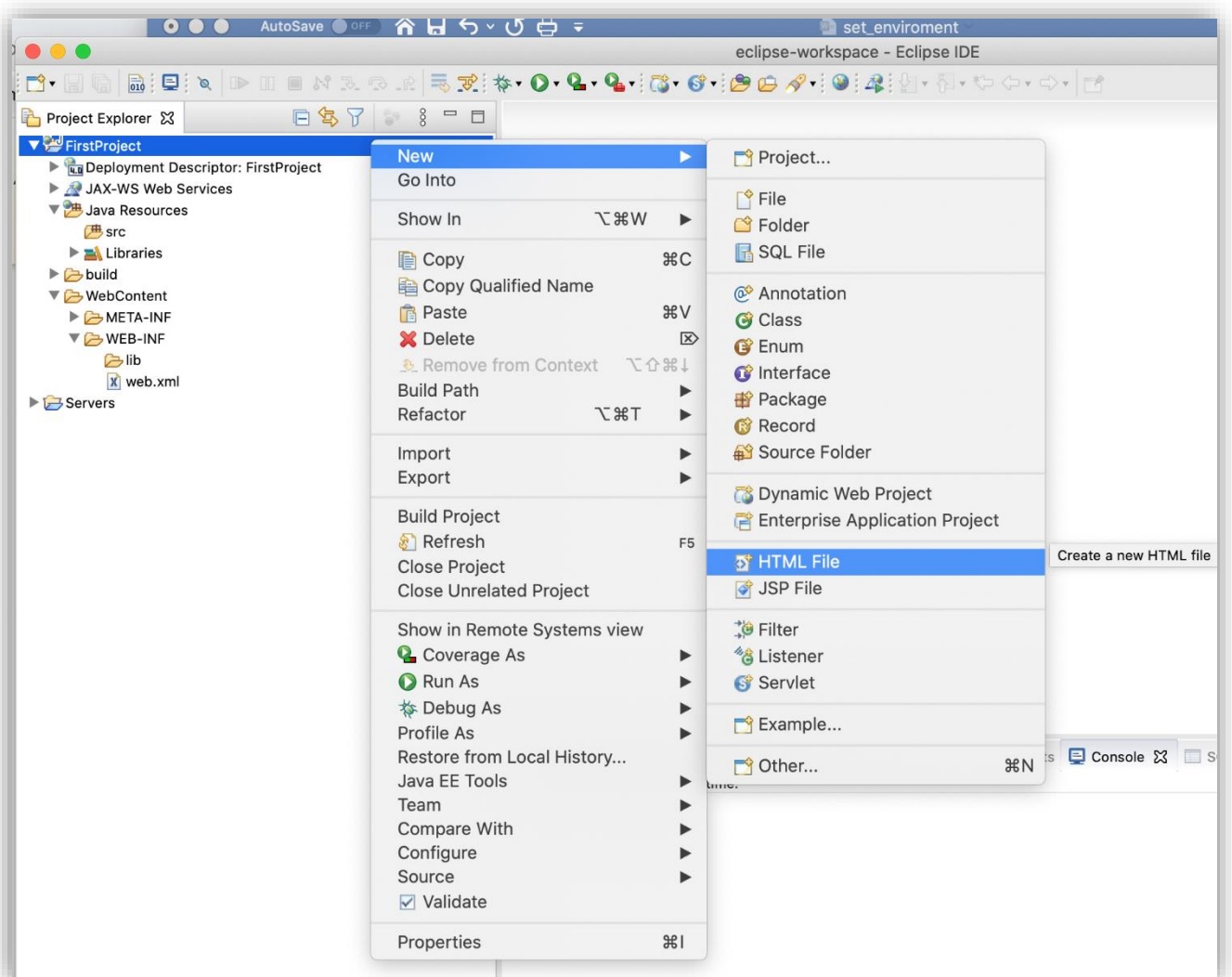
Now, a new web project is created. The project description file web.xml is created under directory *WebContent/WEB-INF/web.xml*

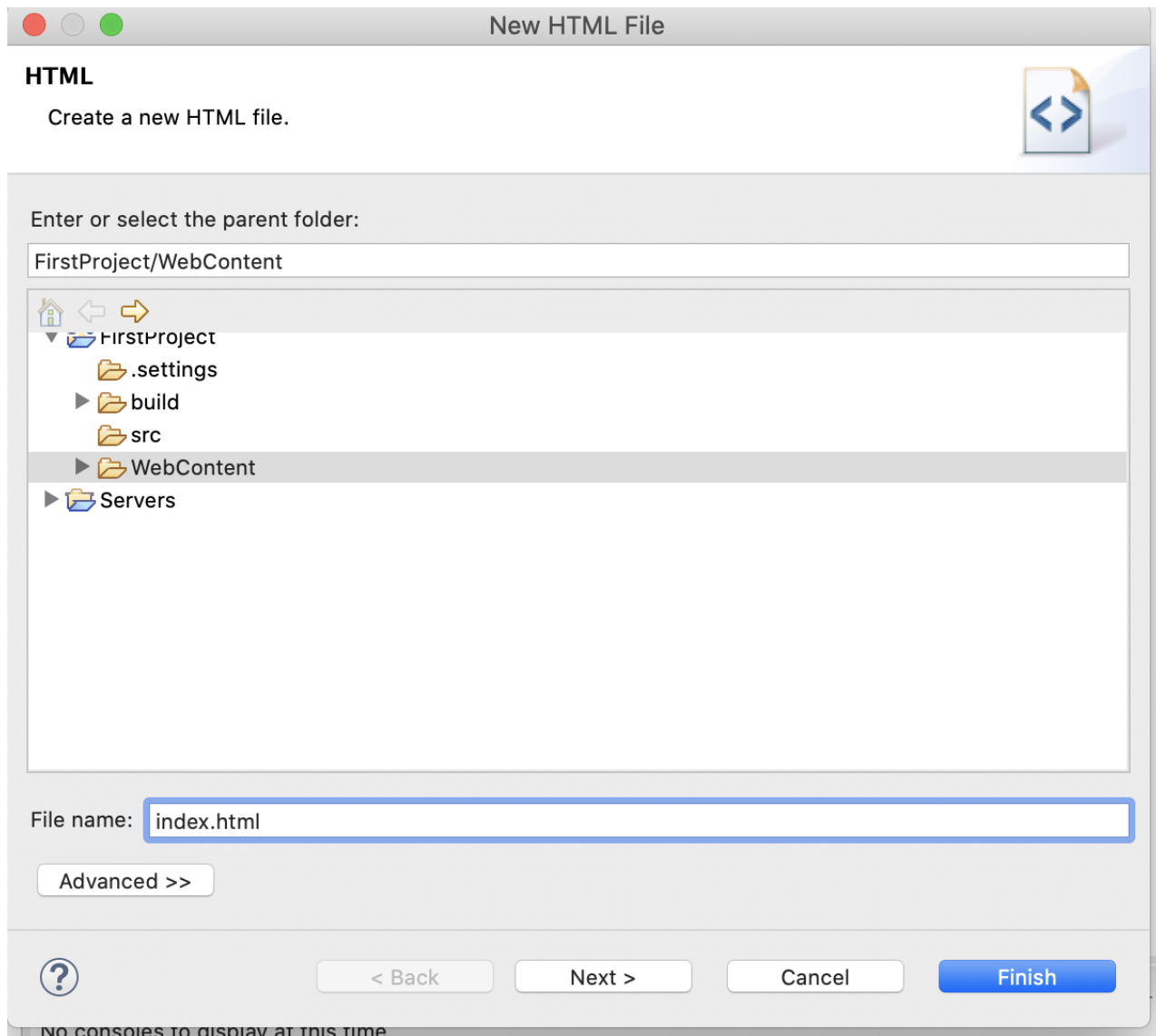
If you accidentally imported the project as a Java project, you can convert it to EE by following the steps below:

- **Step-1. Open your Java Project.**
- **Step-2. Right Click on Project -> Properties.**
- **Step-3. Click on “ Project Facets ” from left menu. Click on Convert to faceted form...**
- **Step-4. Click Dynamic Web Project and Java checkbox.**
- **Step-5. Click Apply and Ok.**

Run the project

- Create a new file `index.html`, it will be under “Web Content” folder





- Add the following to `index.html`:

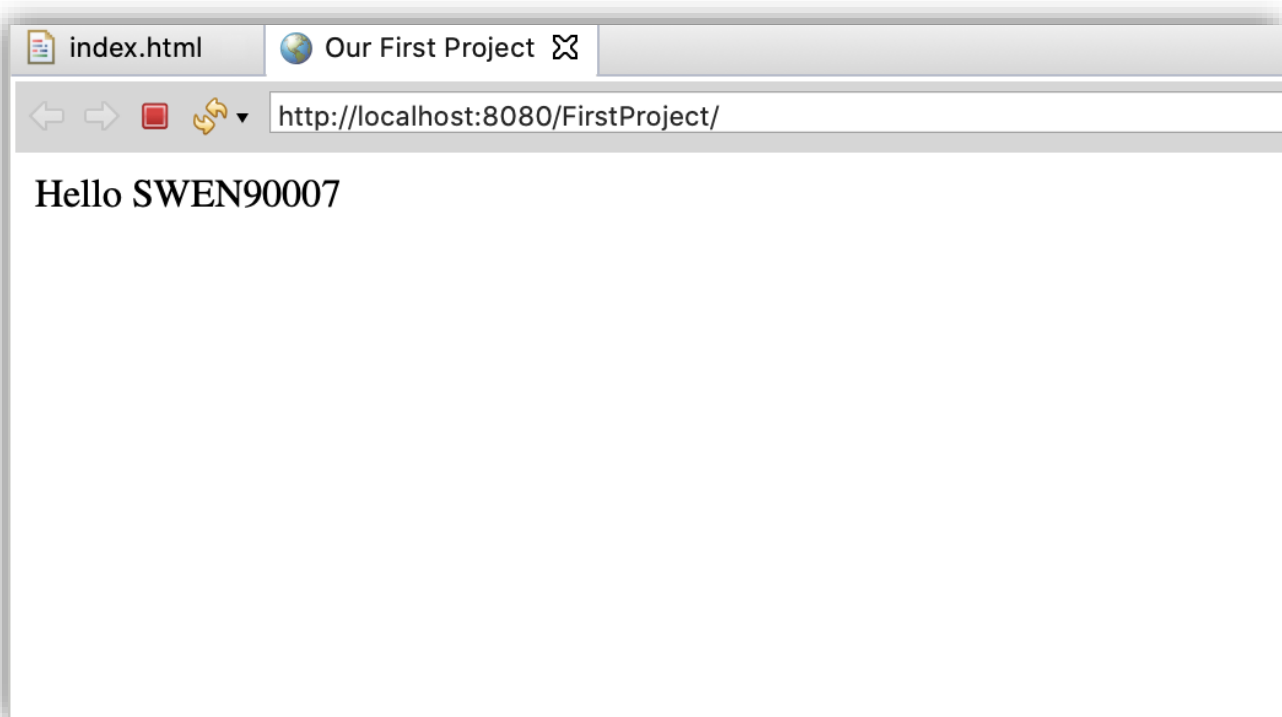
```
1 <!DOCTYPE html>
2 <html>
3 <head>
4   <meta charset="UTF-8">
5   <title>Our First Project</title>
6 </head>
7 <body>
8   Hello SWEN90007
9 </body>
10 </html>
```

- Run the project choosing “Run on Server” option and view the output on
[http://localhost:[APACHE_TOMCAT_PORT]/[Project_name]/]
[http://localhost:8080/FirstProject/]

Note: The default [APACHE TOMCAT PORT] is 8080 .

Note: If you get an error with this code, ensure that by copying and pasting you haven’t introduced new characters. This is, ISO-8859-1 should be one word, not split into separate lines. If still doesn’t work, remove [charset=ISO-8859-1]

Note: The Tomcat server can be installed separately as a service too. In that case you need to deploy the application manually to the tomcat server folder locations. We recommend you to avoid this step at this stage. Download the zip file of tomcat as advised above and extract it on to C drive (or any other drive you like) and refer to that path in settings.



Next: develop a simple Servlet based web application