

COMMON CONTROLS

Setting up the development environment

Setting up a Java development environment on
Windows

Impressum

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1 Installation

In principle a Common Controls application can be built with any Java development environment.

The companion CD contains the following software, all of it free of licence fees:

- Sun JDK (Java Development Kit) 1.5.0_04 (J2SE 5)
- the Eclipse development environment version 3.1 with additional plug-ins
- the Apache Tomcat 5.5.9 application server

1.1 Installing the Sun JDK

Common Controls runs on a JDK 1.3 or newer. Which JDK to choose should depend on the later production environment, so that no surprises arise when the application is deployed. Here we use the latest JDK from Sun, version 1.5.0_04.

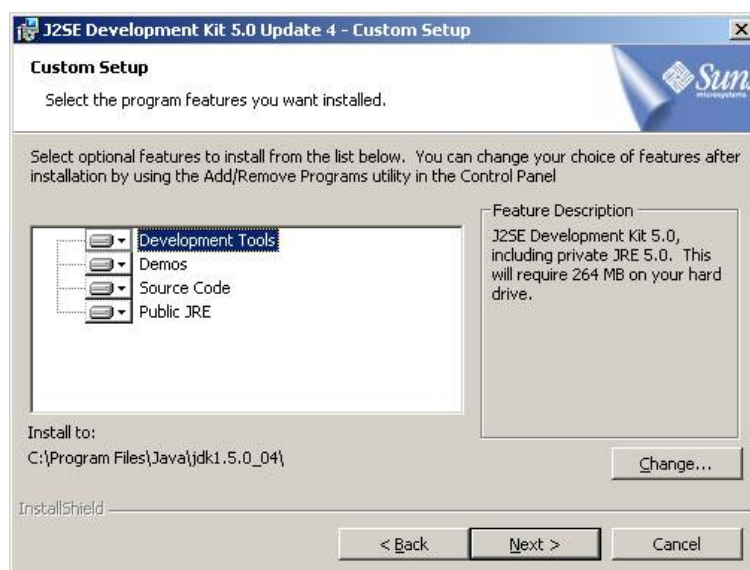
Caution: some machines already have a Java JRE (Java Runtime Environment) installed. That is not enough for developing Java programs, because the compiler is missing. Several JDKs and JREs can be installed side by side on one machine without any trouble; the environment variable %JAVA_HOME% determines which version is active.

Where to obtain the Sun JDK:

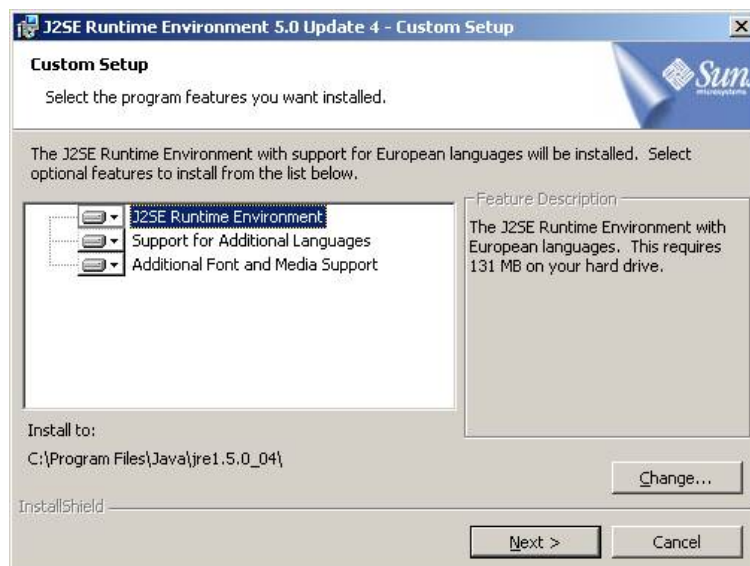
<http://java.sun.com/j2se/1.5.0/download.jsp>

To install the JDK, simply run the installer on the CD:

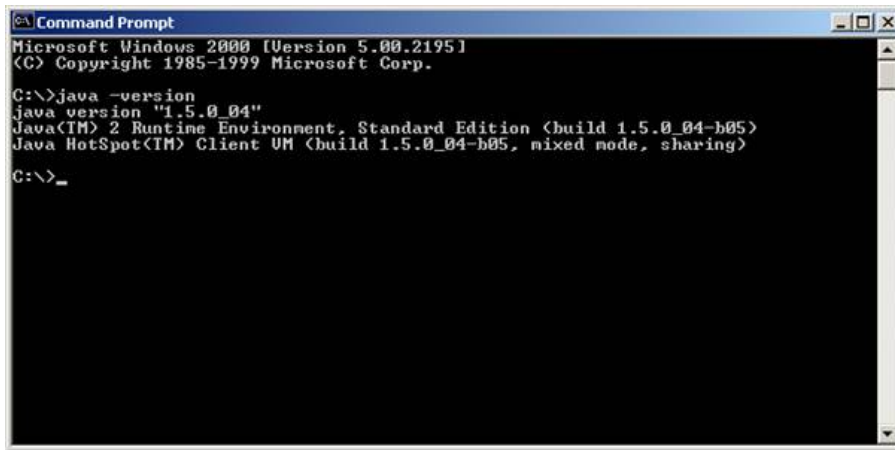
[CD-DRIVE]\software\sun\jdk 1.5.0\jdk-1_5_0_04-windows-i586-p.exe



During the installation the JRE wizard is started.



A successful installation can be verified with the command "java -version":



```
Microsoft Windows [Version 5.00.2195]
(C) Copyright 1985-1999 Microsoft Corp.

C:\>java -version
java version "1.5.0_04"
Java(TM) 2 Runtime Environment, Standard Edition (build 1.5.0_04-b05)
Java HotSpot(TM) Client VM (build 1.5.0_04-b05, mixed mode, sharing)

C:\>_
```

1.2 Installing the Tomcat application server

The Tomcat application server is the reference implementation of Sun's servlet specification. Whatever runs on Tomcat must therefore run on any other application server as well.

For development this brings the following advantages:

- a very lightweight server with tolerable start-up times
- debugging the application straight from Eclipse
- no deployment necessary — the application runs directly in Eclipse
- no licence fees

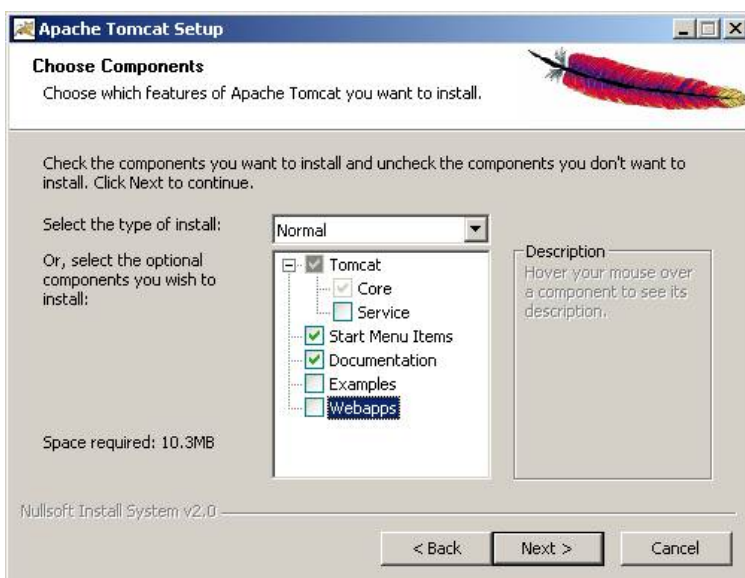
Caution: Tomcat can be installed as an NT service. On a development machine that is rather inconvenient, because the application server is meant to be started and stopped from Eclipse. It should therefore not be installed as a service.

Where to obtain Apache Tomcat:

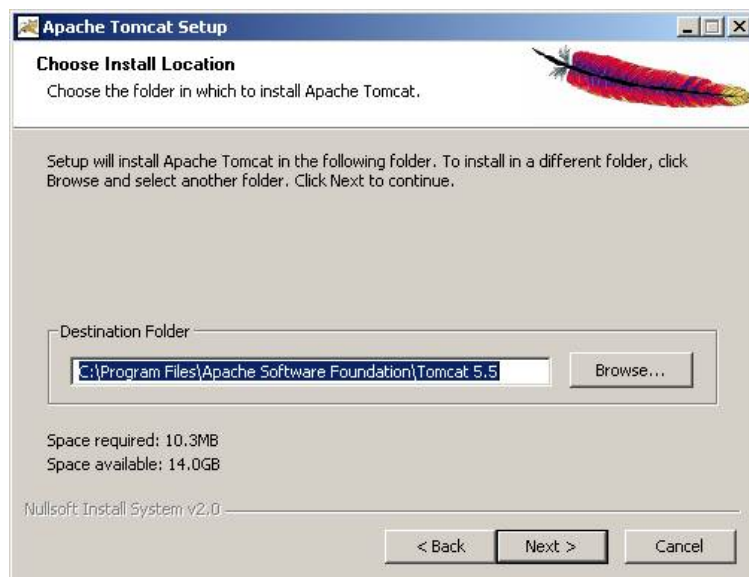
http://jakarta.apache.org/site/downloads/downloads_tomcat-5.cgi

To install Tomcat, simply run the installer on the CD:

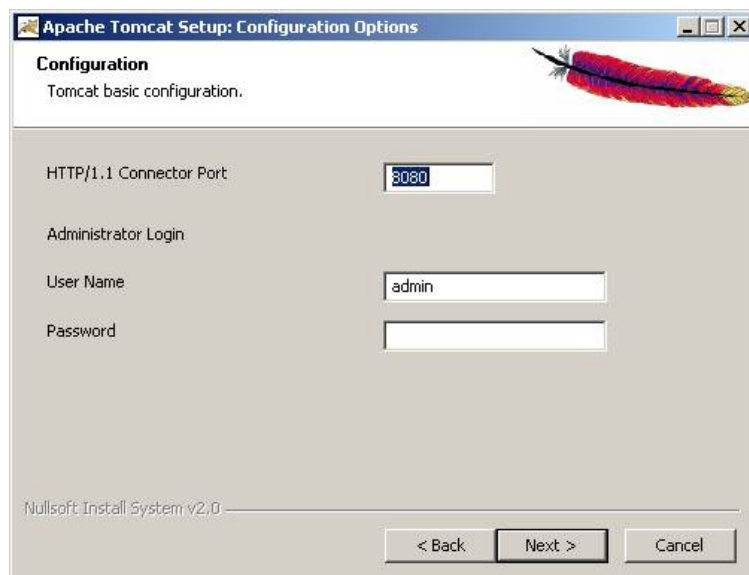
[CD-DRIVE]\software\apache\tomcat\5.5\jakarta-tomcat-5.5.9.exe



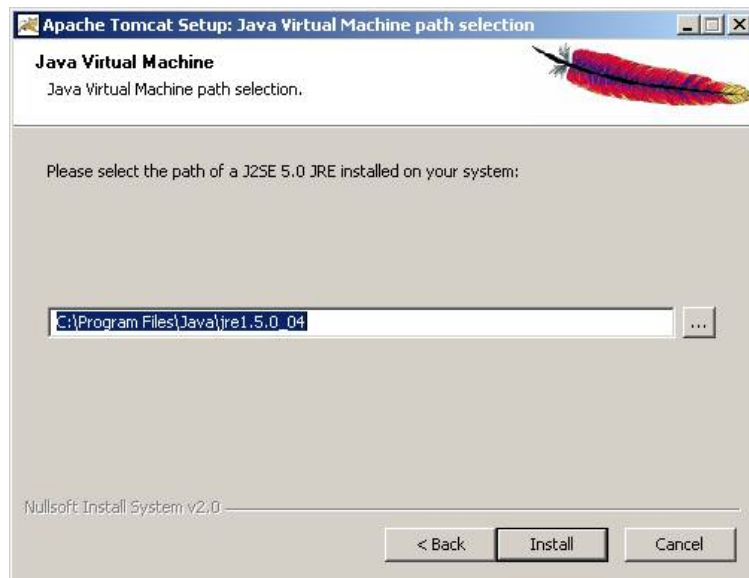
Now choose the installation directory.



Decide which port the application server is to run on, and with which user name and password the administration console can be opened.



Finally, state the JDK with which Tomcat is to run.



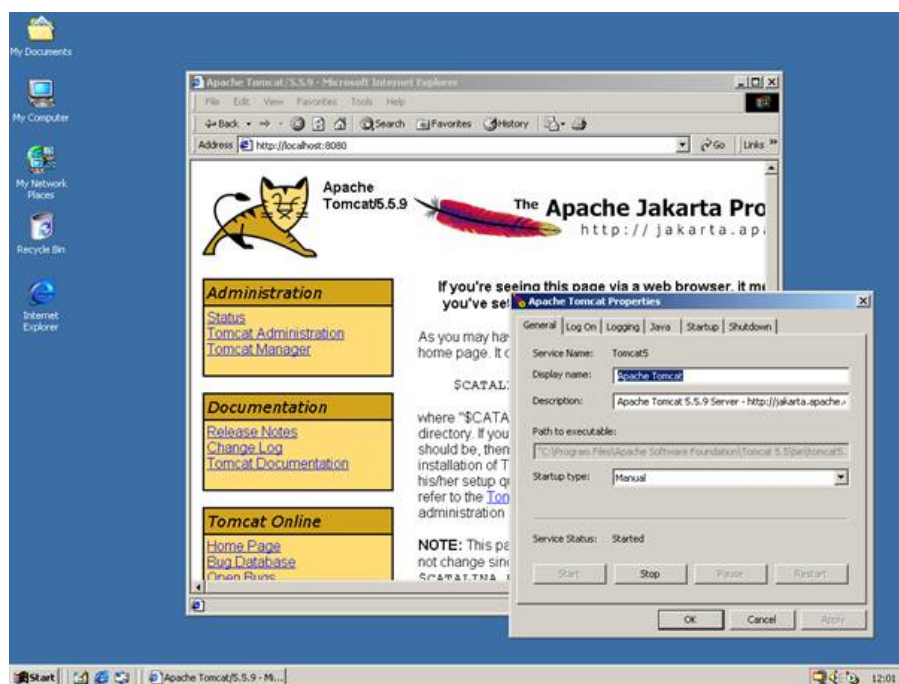
Testing that the installation succeeded:

Open a browser and enter the following URL: <http://localhost:8080>

You should then see the following page:



Now stop Tomcat again. Clicking the icon on the right of the Windows status bar opens the Tomcat status window; press the [Stop] button there.



1.3 Installing the Eclipse development environment

Eclipse is a very capable development environment, free of licence fees, developed with considerable effort mainly by IBM and now maintained by the Eclipse organisation (www.eclipse.org). It is available for all common operating systems and can be extended with a great many plug-ins.

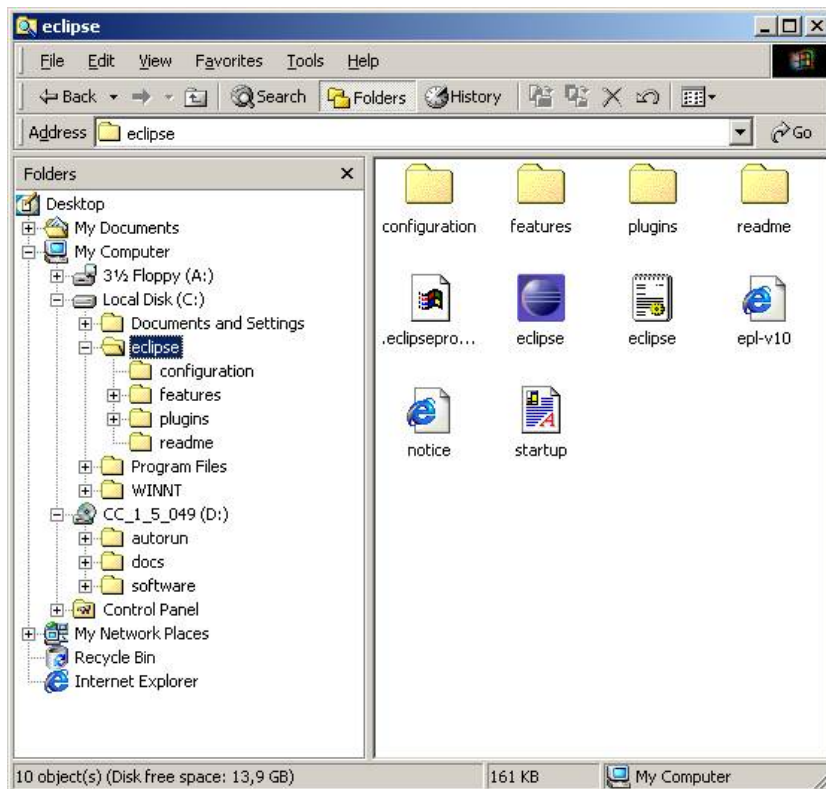
It also forms the basis of commercial products such as IBM WebSphere Application Developer and MyEclipse.

Where to obtain Eclipse:

<http://www.eclipse.org>

To install Eclipse, simply unpack the ZIP archive into c:\:

[CD-DRIVE]\software\eclipse\ eclipse-SDK-3.1-win32.zip



1.4 Installing the Tomcat plug-in

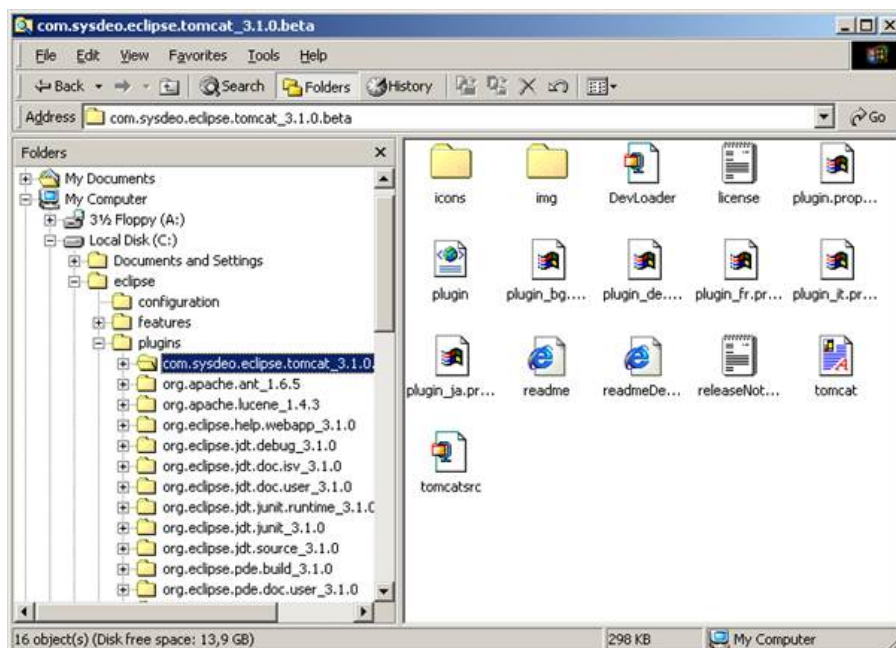
For Eclipse to work together with Tomcat, the Tomcat launcher plug-in still has to be installed.

Where to obtain the Tomcat launcher plug-in:

<http://www.sysdeo.com/eclipse/tomcatplugin>

To install the Tomcat launcher plug-in, simply unpack the ZIP archive into C:\eclipse\plugins:

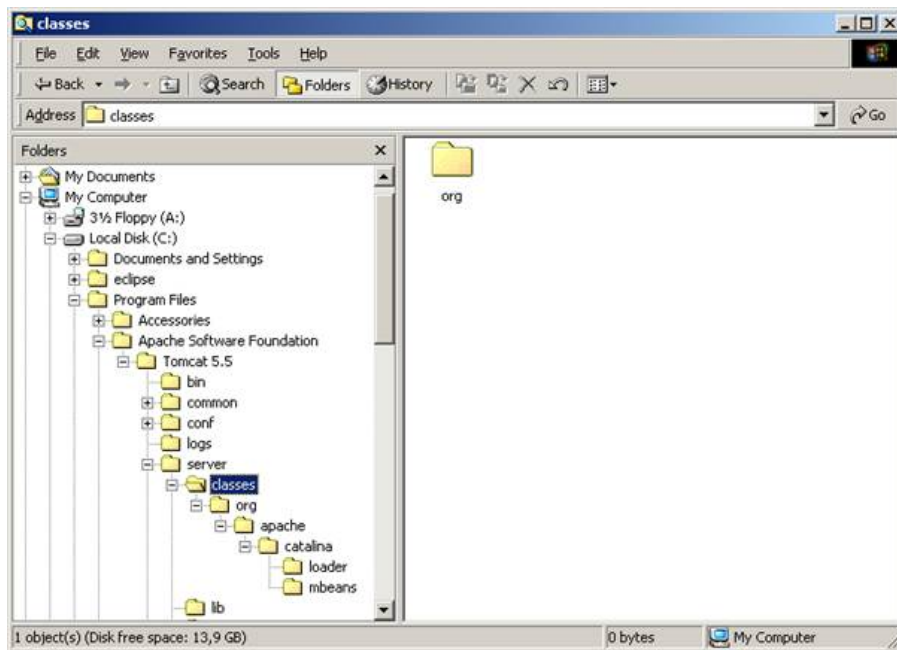
[CD-DRIVE]\software\eclipse\plugins\Sysdeo\tomcatPluginV31beta.zip



The Sysdeo plug-in in turn contains a plug-in for the Tomcat application server.

To install it, unpack the archive

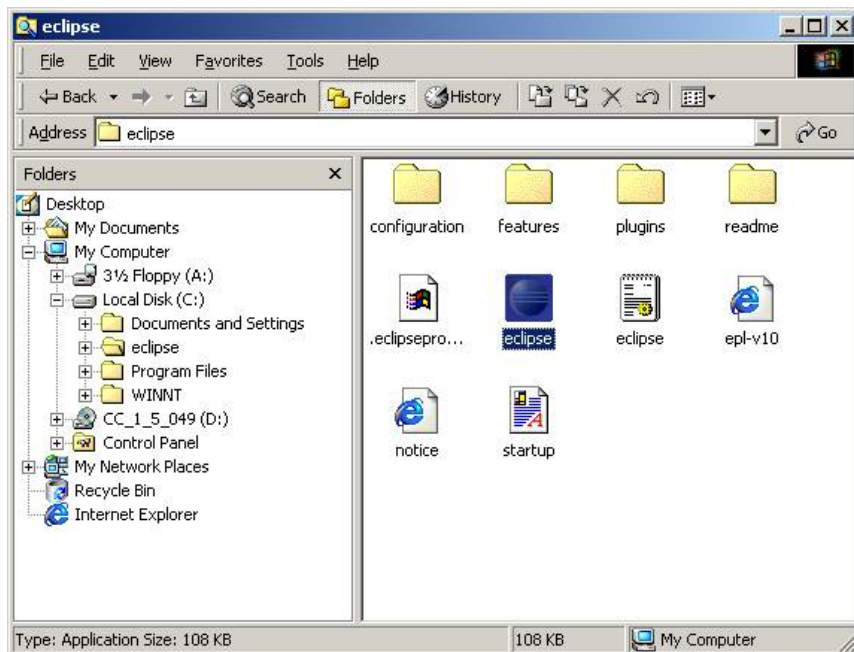
C:\eclipse\plugins\com.sysdeo.eclipse.tomcat_3.1.0.beta\DevLoader.zip into the directory C:\Program Files\Apache Software Foundation\Tomcat 5.5\server\classes



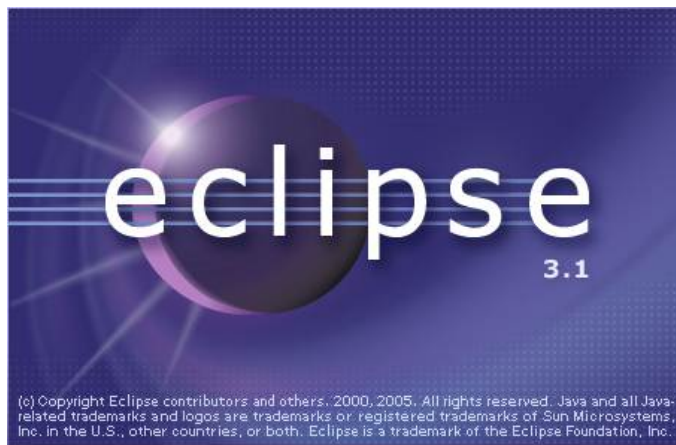
1.5 Configuration

1.5.1 Starting Eclipse

Start Eclipse by double-clicking the eclipse.exe icon.



The splash screen appears.



Next the workspace directory is chosen. Make a note of it — this is where your projects will be kept.

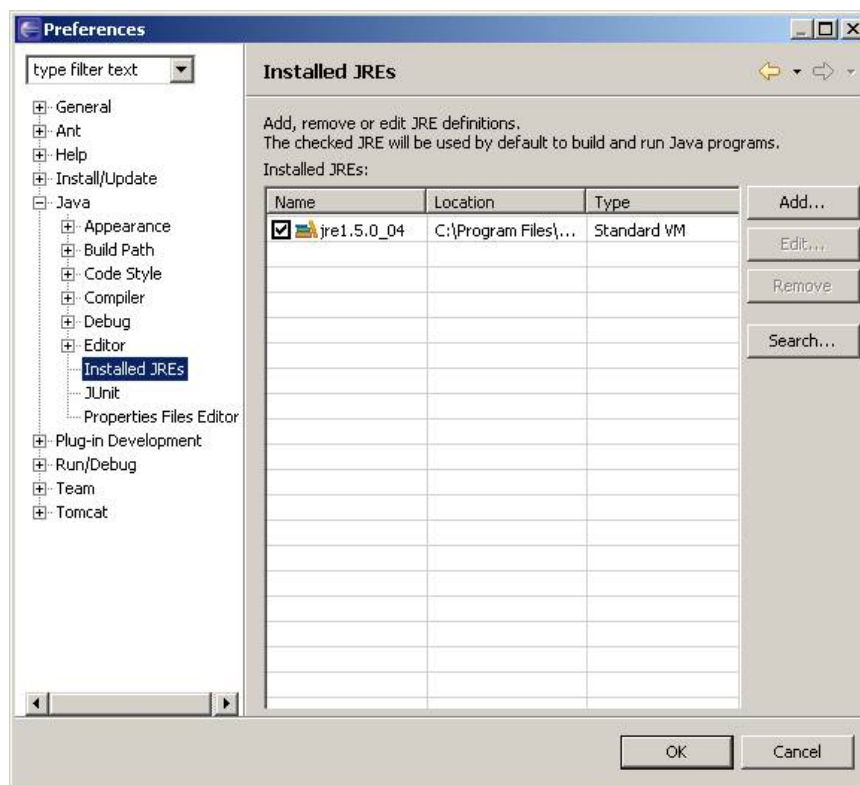


Eclipse has started.

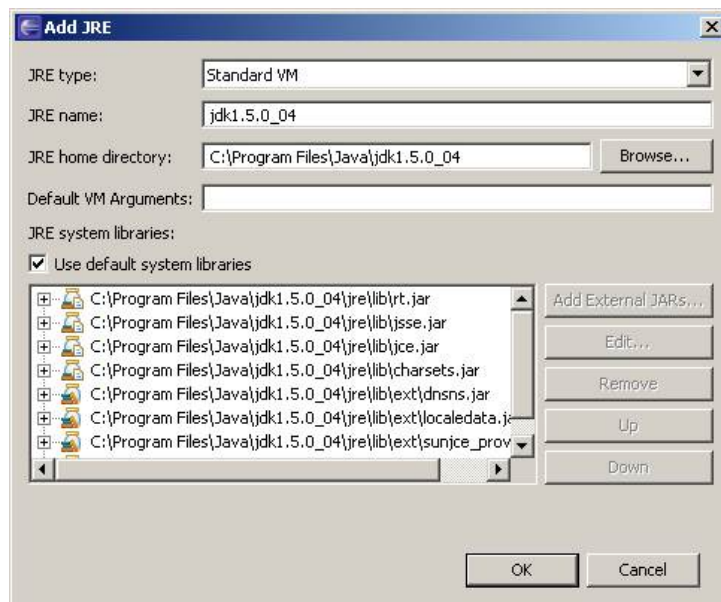


1.5.2 Setting the Java version used for development

Open the settings window via Window > Preferences...

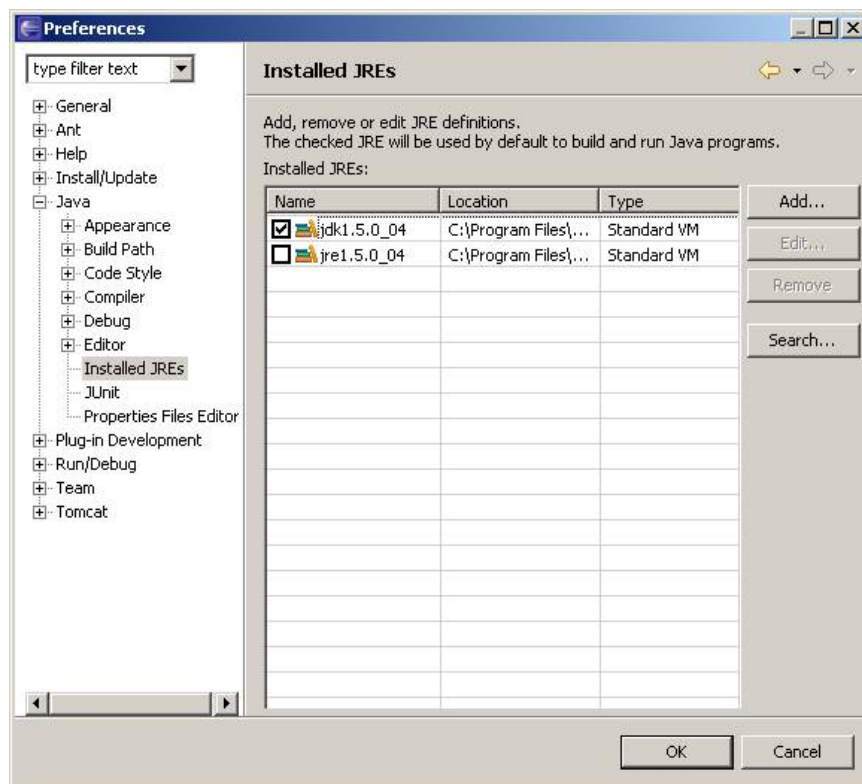


Add the JDK 1.5.0_04 installed earlier using the [Add...] button:



Confirm with [OK].

Then make that JDK the default for development by ticking the check box.



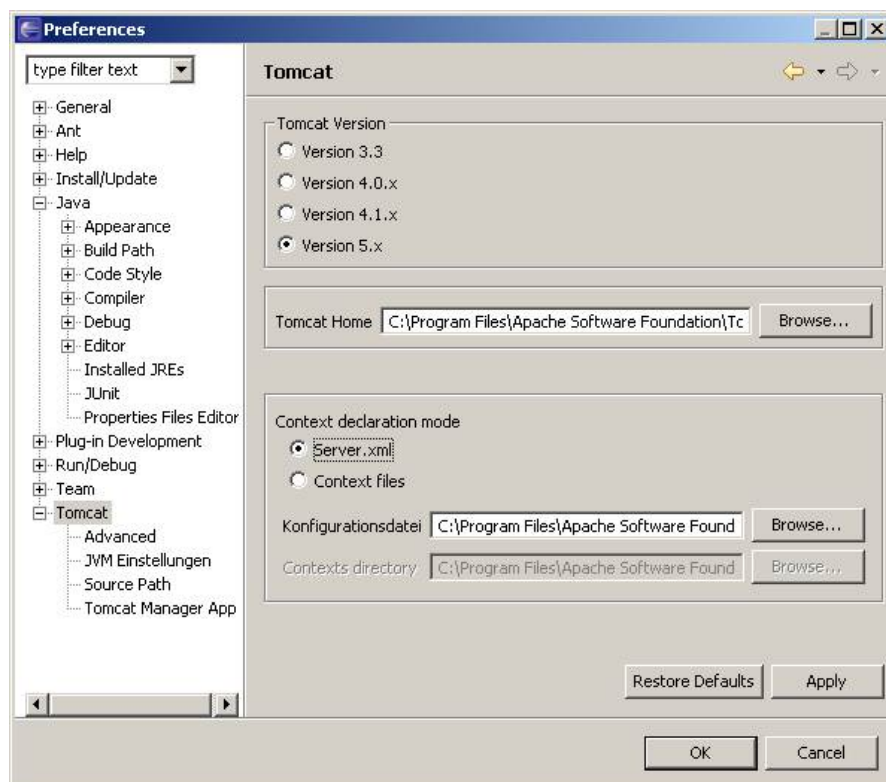
Eclipse now uses this JDK to compile the classes of a Java project.

Confirm all changes with [OK].

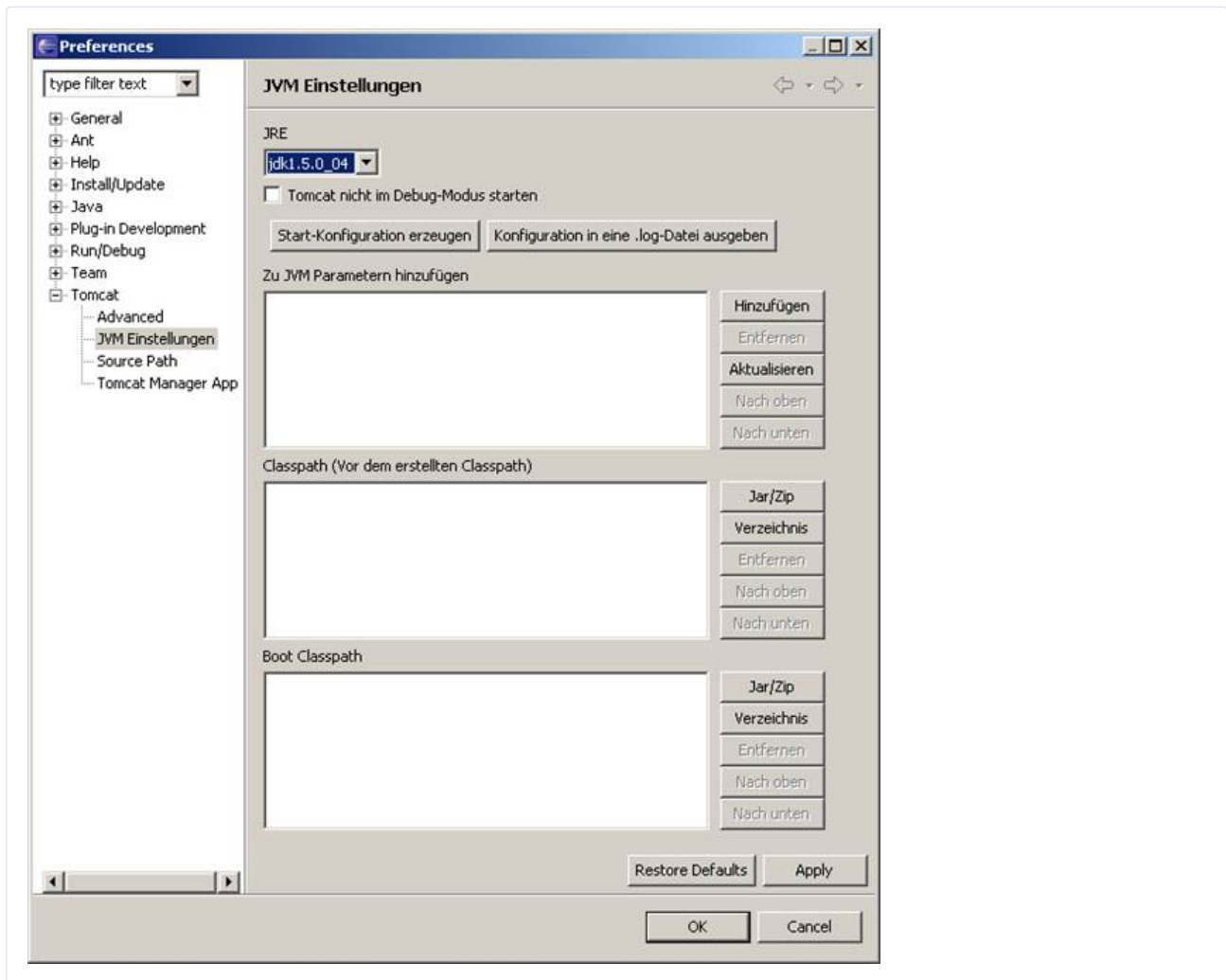
1.5.3 Configuring the Sysdeo plug-in

Open the preferences dialogue again via Window > Preferences...

Set the Tomcat version (5.x) and the Tomcat directory (c:\Program Files\Apache Software Foundation\Tomcat 5.5):



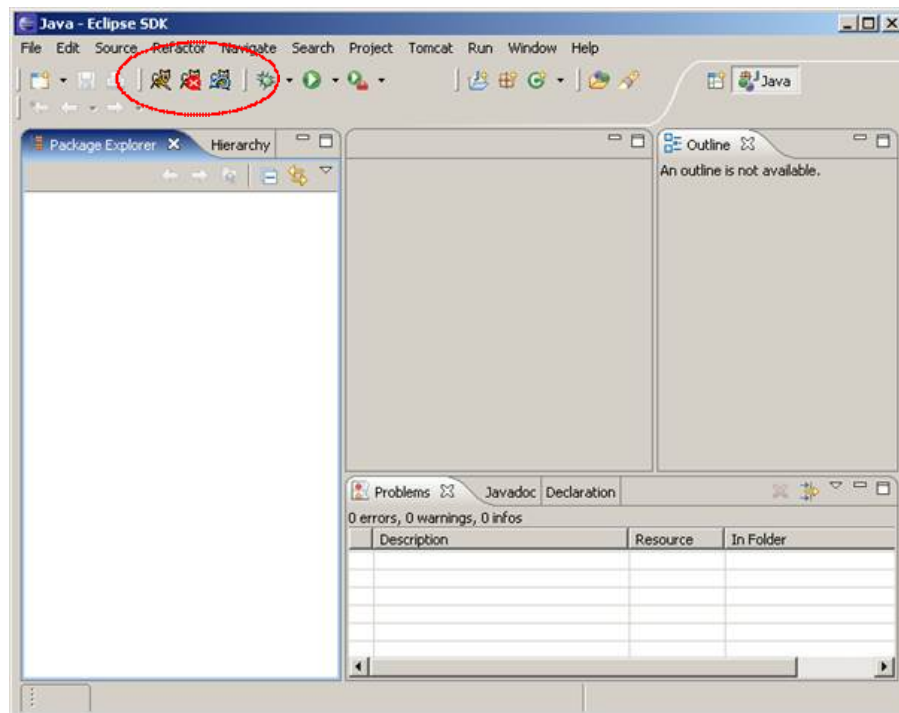
Set the JDK with which Tomcat is to be started:



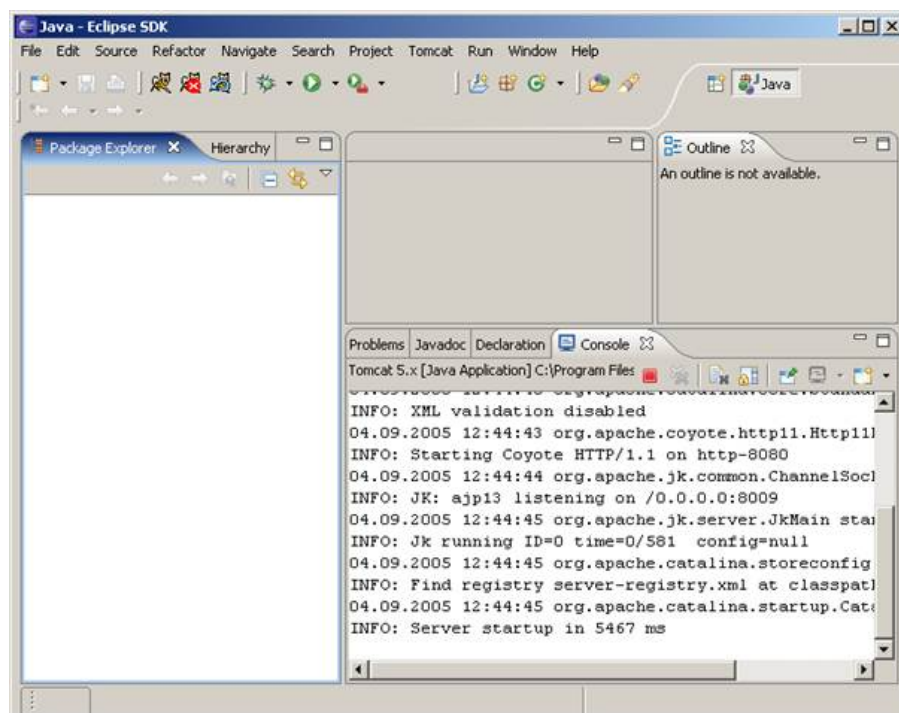
Confirm the preferences dialogue with [OK].

1.6 Testing the installation:

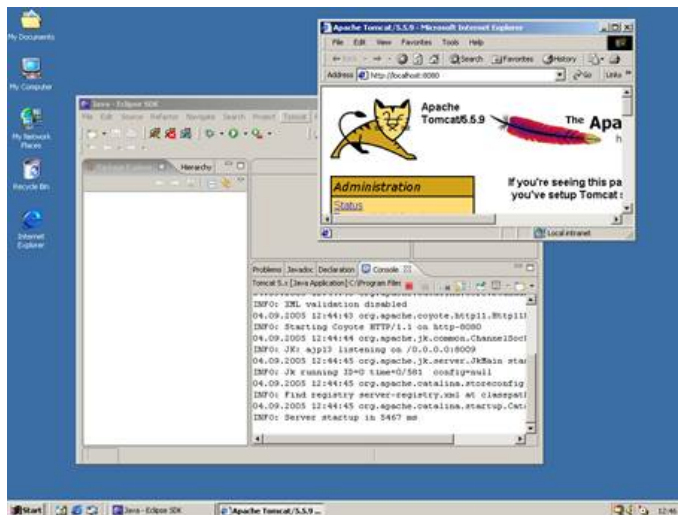
Close the "Welcome" window. You now see the Eclipse interface with the toolbar for starting the Tomcat application server.



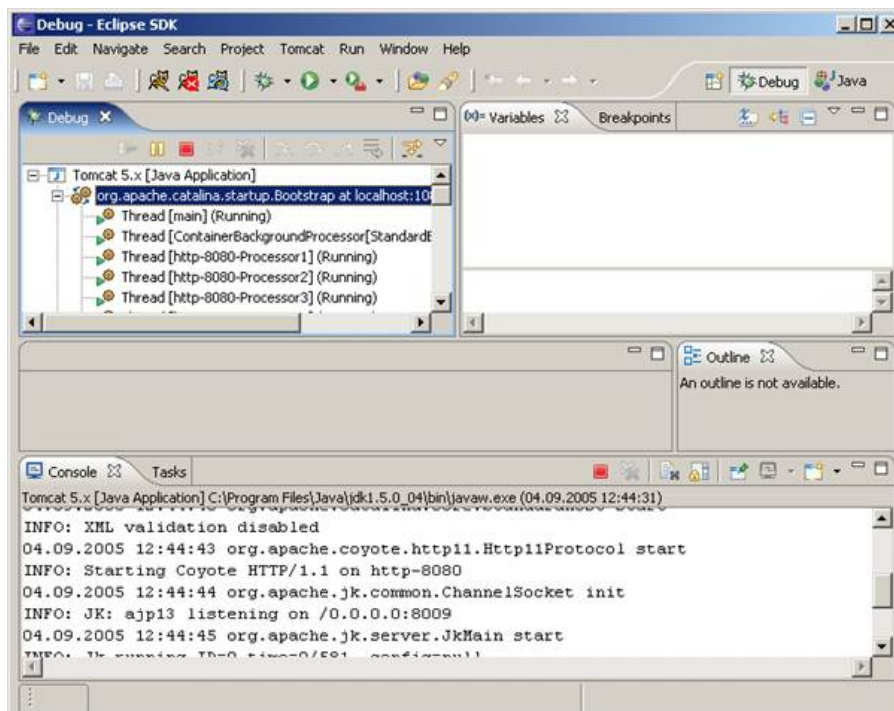
Click the “start Tomcat” button. After a while the following message should appear in the “Console” window:



If you now open a browser again and enter <http://localhost:8080>, you see the Tomcat start page.



In Eclipse, open the debug perspective via Window > Open Perspective > Debug. You now see the active processes of the running Tomcat.



Stop the Tomcat server again with the corresponding button in the toolbar. You can also terminate the process directly in the debug view using the red square.

2 Installing the Common Controls demo application

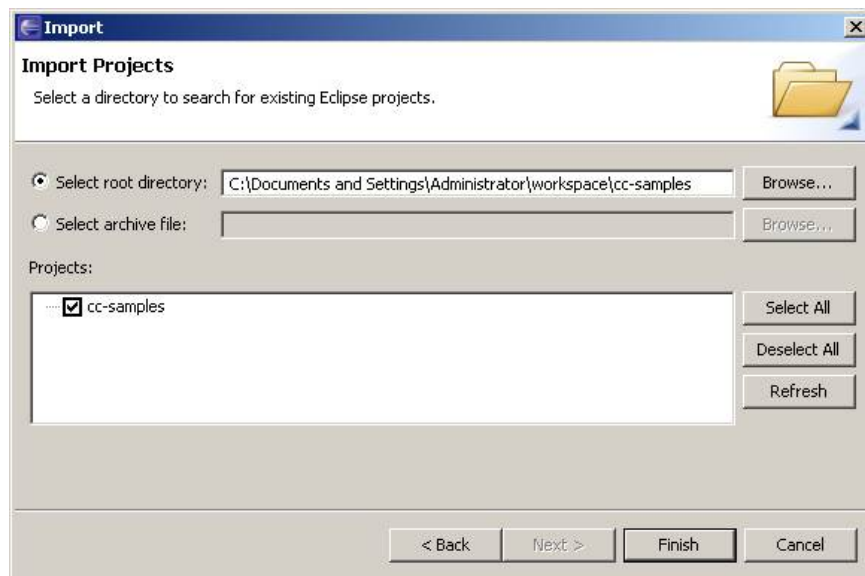
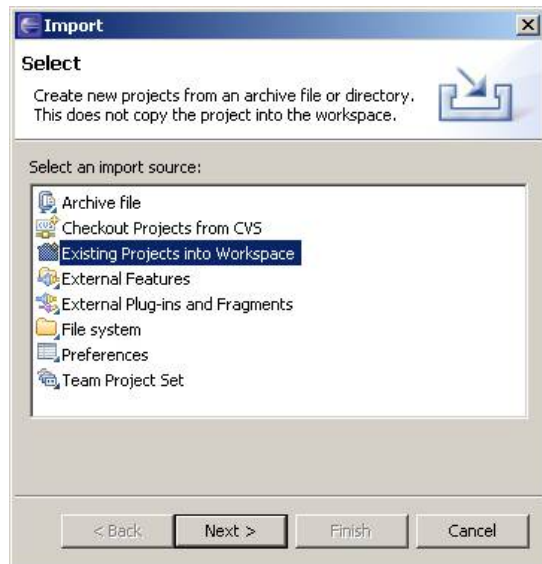
Unpack the Common Controls samples Eclipse project from

[CD-DRIVE]\software\cc-samples\cc-samples-1.5.045 for Eclipse3.1.zip

into the workspace directory you named when starting Eclipse:

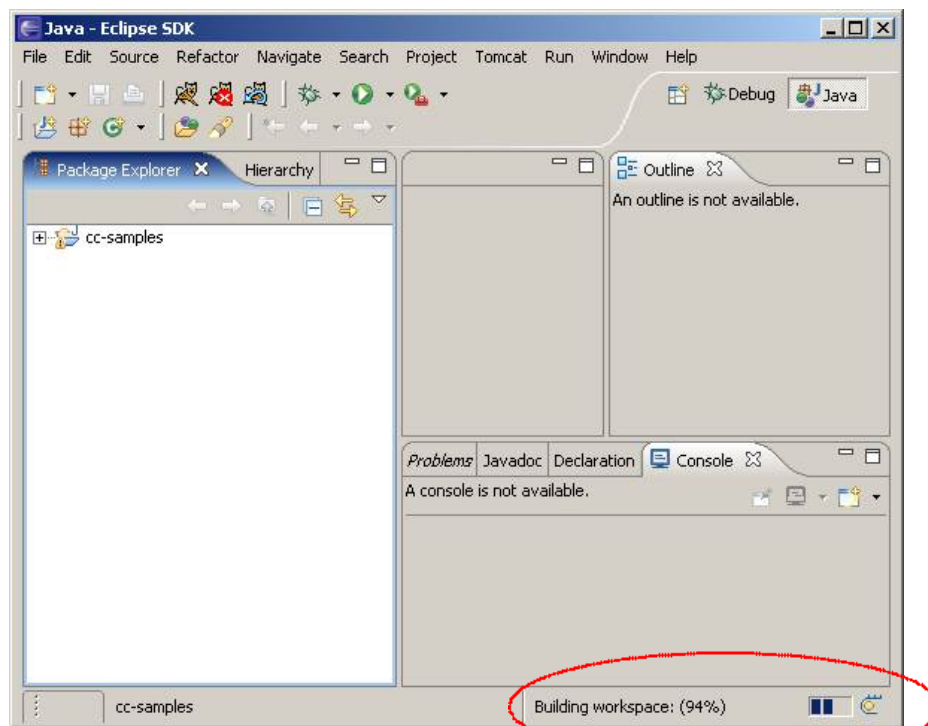
C:\Documents and Settings\[Windows User]\workspace

Now switch to the Java perspective in Eclipse and choose File > Import... from the menu.



Eclipse now imports the project into the workspace and compiles it in the background. Compiling in particular takes a little while.

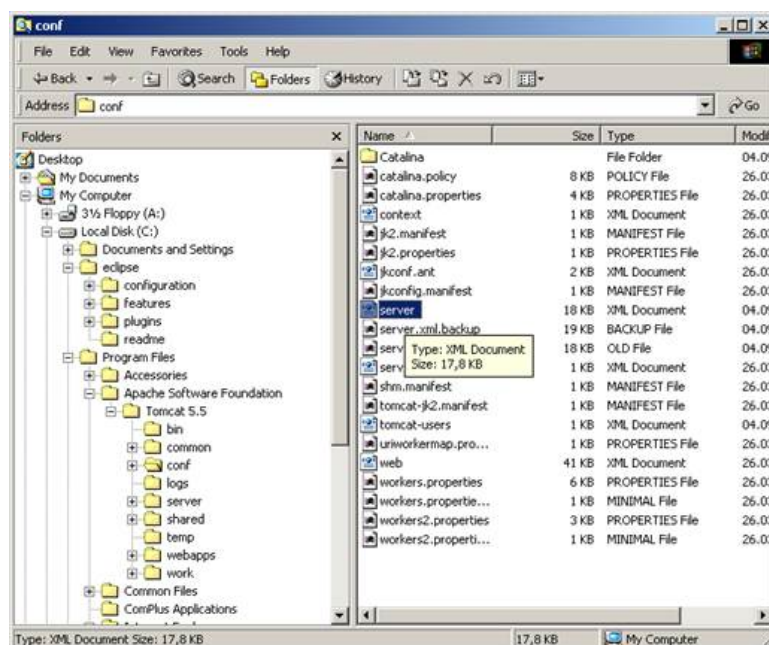
Note: if you change, delete or add files of your project directly in Windows Explorer, you can refresh the Eclipse project view from the project's context menu by choosing "Refresh". The new files then appear in the Eclipse project as well.



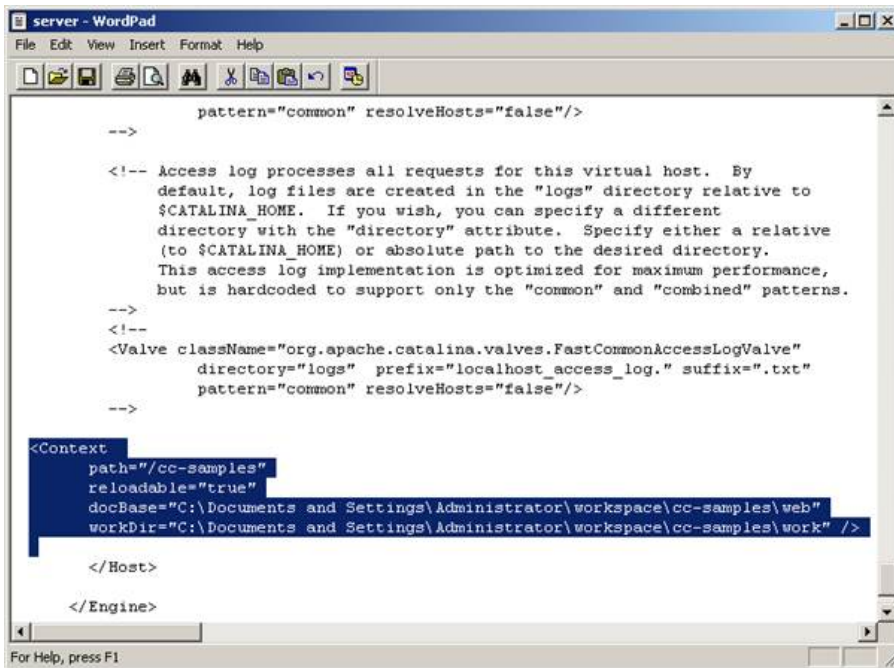
Right-click the project node and choose Tomcat Project > Update context definition from the context menu. This enters the project into the configuration file of the application server; it only has to be done once.

Background:

The project is entered as a <context> into the central server.xml configuration file of the Tomcat application server. One <context> corresponds to one web application.



The modified Tomcat configuration file server.xml



Switch back to the debug perspective and start the Tomcat application server from the toolbar.

Note: if the log shows several error messages of the form

java.sql.SQLException: Table already exists: [table name], you can simply ignore them. The demo application is trying to load a small in-memory database from SQL scripts. That database may already exist, because it is persisted in a binary stream between program runs; the tables are then already present at start-up and the SQL scripts produce this error.

The console window should now show the following output:

```

04.09.2005 13:46:45 [main] DEBUG FrontController - Initializing the application configuration
04.09.2005 13:46:47 [main] DEBUG Database - executing database script: C:\Documents and Settings\Administrator\workspace\cc-
samples\web\WEB-INF\database\appointment.sql
04.09.2005 13:46:47 [main] DEBUG Database - executing database script: C:\Documents and Settings\Administrator\workspace\cc-
samples\web\WEB-INF\database\article.sql
04.09.2005 13:46:47 [main] DEBUG Database - executing database script: C:\Documents and Settings\Administrator\workspace\cc-
samples\web\WEB-INF\database\book.sql
04.09.2005 13:46:47 [main] DEBUG Database - executing database script: C:\Documents and Settings\Administrator\workspace\cc-
samples\web\WEB-INF\database\city.sql
04.09.2005 13:46:47 [main] DEBUG Database - executing database script: C:\Documents and Settings\Administrator\workspace\cc-
samples\web\WEB-INF\database\currency.sql
04.09.2005 13:46:47 [main] DEBUG Database - executing database script: C:\Documents and Settings\Administrator\workspace\cc-
samples\web\WEB-INF\database\user.sql
04.09.2005 13:46:47 [main] DEBUG FrameworkAdapterFactory - registering framework adapter:
com.cc.sample.service.servlet.AppStrutsFrameworkAdapter@1ac13d7
04.09.2005 13:46:47 [main] INFO FrontController -

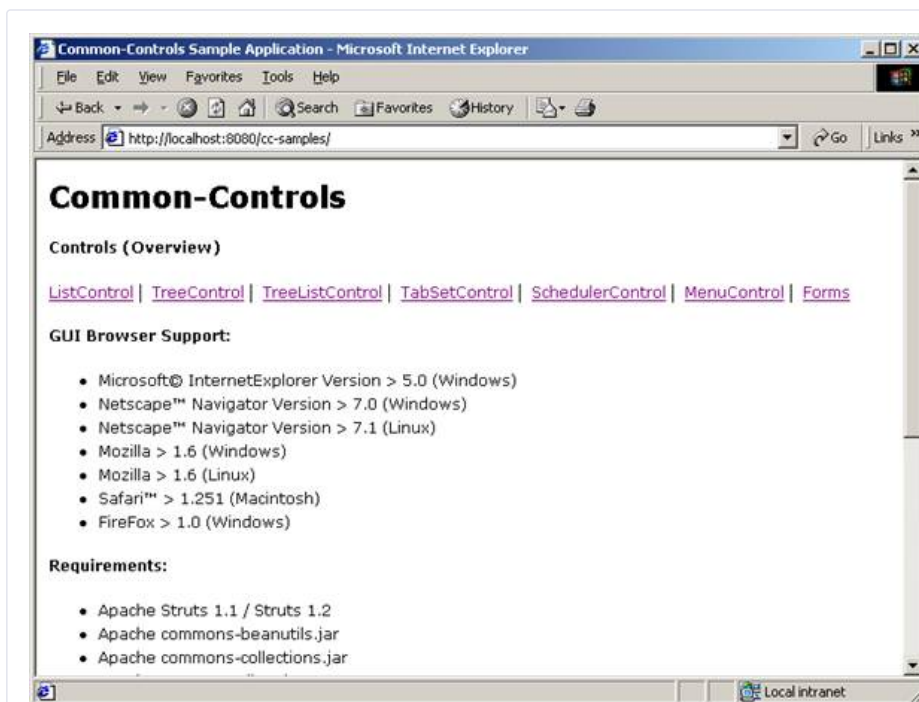
* Version Information *****
Product Name.....: common-controls-samples-ext
Product Version.....: 1.5.045
Product Build Date...: Mon Jul 18 12:04:13 CEST 2005
Product Vendor.....: SCC Informationssysteme GmbH
Product Vendor-Site...: www.scc-gmbh.com
Product Type.....: Production System
*****
04.09.2005 13:46:47 [main] INFO FrontController -

```

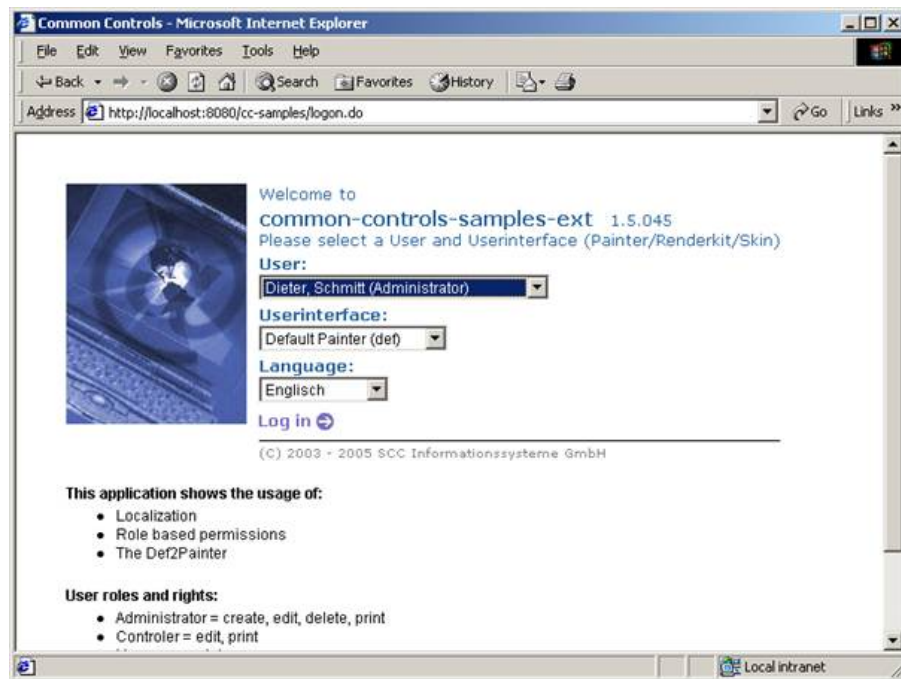
* System Properties *****

awt.toolkit.....: sun.awt.windows.WToolkit
catalina.base.....: C:\Program Files\Apache Software Foundation\Tomcat 5.5
catalina.home.....: C:\Program Files\Apache Software Foundation\Tomcat 5.5
catalina.useNaming.....: true
common.loader.....:
\${catalina.home}/common/classes,\${catalina.home}/common/i18n/*.jar,\${catalina.home}/common/endorsed/*.jar,\${catalina.home}/common/lib/*.jar
file.encoding.....: Cp1252
file.encoding.pkg.....: sun.io
file.separator.....: \
java.awt.graphicsenv.....: sun.awt.Win32GraphicsEnvironment
java.awt.printerjob.....: sun.awt.windows.WPrinterJob
java.class.path.....: C:\Program Files\Apache Software Foundation\Tomcat 5.5\bin\bootstrap.jar;C:\Program Files\Java\jdk1.5.0_04\lib\tools.jar
java.class.version.....: 49.0
java.endorsed.dirs.....: C:\Program Files\Apache Software Foundation\Tomcat 5.5\common\endorsed
java.ext.dirs.....: C:\Program Files\Java\jdk1.5.0_04\jre\lib\ext
java.home.....: C:\Program Files\Java\jdk1.5.0_04\jre
java.io.tmpdir.....: C:\Program Files\Apache Software Foundation\Tomcat 5.5\temp
java.library.path.....: C:\Program
etc.

Open the application in a browser at <http://localhost:8080/cc-samples/>:



Pick one of the hyperlinks:



Watch the log in the console window while you click your way through the application: every debug message of the application appears there. The application and the Common Controls themselves use Log4j, a logging system that is both simple and powerful.

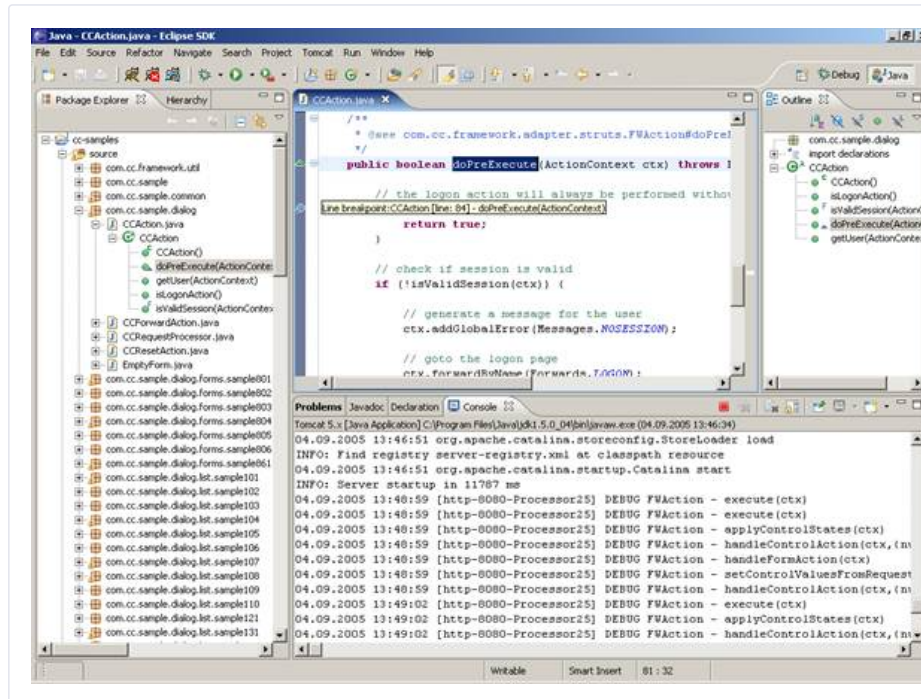
3 Debugging

To demonstrate how the debug mode of Eclipse works together with the Tomcat server, we now set a breakpoint at a central place in the application:

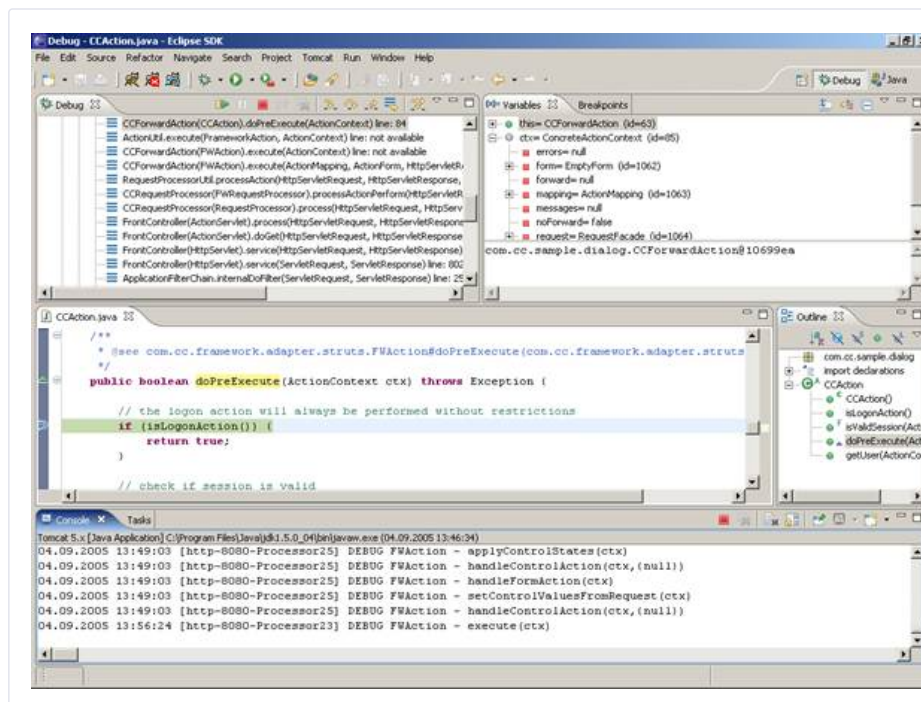
Switch to the Java perspective and select the Java file

cc-samples\source\com.cc.sample.dialog\CCAction.java in the package explorer.

Double-click the method doPreExecute(). In the source window, double-click in the margin in front of line 84. This sets a breakpoint, marked by a dot.



When you now perform an action in the application, Eclipse automatically switches to the debug perspective and stops at the breakpoint.



In the selected thread you can now step through the code and watch the variables.

It is even possible to debug the JSP pages.

4 The JSP compiler

On first request, the JSP engine of Tomcat turns the JSP pages into Java servlets (as Java source code) and then compiles them into class files — which is why a JSP container always needs a Java compiler.

This happens in the directory `cc-samples\work`, outside the control of Eclipse. To see the compiled files in Eclipse, choose “Refresh” from the project's context menu now and again so that the project view is brought back in line with the directory on disk.