

# Using Java Servlets and JavaServer Pages with Tomcat

## Introduction

Tomcat is a web server that includes support for Java Servlets and JavaServer Pages (JSPs).

Tomcat runs separately from the normal University web pages on a service called `tomcat.dur.ac.uk`.

To use the Tomcat service you must be registered separately from the main web service.

## Getting started

In order for Tomcat to know that you want to run servlets/JSPs, you need to be registered to use Tomcat. In order to get registered, please e-mail the IT Service Desk at [itservicedesk@durham.ac.uk](mailto:itservicedesk@durham.ac.uk). You will need to justify why you need to use servlets/JSPs in your home directory. A subdirectory will be created called `tomcat` (that has appropriate ownership and permissions). (So please do not have a subdirectory of that name!).

Once you have been informed that your registration has been processed, login to an ITS Unix system (e.g the timeshare service `vega.dur.ac.uk`). You should find that your home directory now has a subdirectory called `tomcat`.

Type the following Unix commands:

```
umask 22
cd
cd tomcat
cp -pr /users/tomcat/demo/* .
```

Note: the last command ends with a star, followed by a space, followed by a full stop.

Note: the `umask` command will ensure that any files and directories that you create (during this login session) are readable by Tomcat.

Your `tomcat` directory should now contain the subdirectories: `WEB-INF`, `schoice`, `sprices` and `jpices`. The `WEB-INF` directory contains two subdirectories called `classes` and `lib`. The `schoice` directory contains an example of a servlet, the `sprices` directory contains an example of a servlet that queries a MySQL database, and the `jpices` directory contains an example of a JavaServer page that queries a

MySQL database. The `WEB-INF/classes` directory is empty whereas `WEB-INF/lib` contains the file `mysql202.jar`.

## Checking that Tomcat can access your tomcat directory

Now check that Tomcat can access your `tomcat` directory. You can do this by using a web browser with the URL:

```
http://tomcat.dur.ac.uk:8080/f.a.bloggs
```

where `f.a.bloggs` is replaced by your mailname given in lower-case. Note that you must use `tomcat.dur.ac.uk:8080`, not `www.dur.ac.uk`.

If Tomcat knows about your `tomcat` directory, accessing the above URL will cause the browser to display a listing of the files and directories that are in your `tomcat` directory.

## Servlets

In the `schoice` directory, there is a WWW page in `schoice.html`, a Java program in `schoice.java` and a "script" in the file called `source`.

Edit the file `schoice.java` changing "Your choice is" to "Your choice was".

Then, on ITS Unix, type the commands:

```
cat source
source source
```

The execution of the `source` command will first set the classpath to include not only the current directory but also a JAR file (`servlet.jar`) that has the classes for handling servlets. The execution of the `source` command then compiles the file `schoice.java` putting the file `schoice.class` into the `WEB-INF/classes` directory. Edit the file `schoice.html` changing your mailname to the lowercase form of your mailname, so as to produce something like:

```
"http://tomcat.dur.ac.uk:8080/
f.a.bloggs/servlet/schoice"
```

This file contains the HTML of a form. When someone clicks on the "Submit choice" button of the form, this action gets executed. Although this ends in:

```
/f.a.bloggs/servlet/schoice
```

it will cause the execution of the file:

```
/users/dxy3fab/tomcat/WEB-INF/  
classes/schoice.class
```

(assuming the user f.a.bloggs has the username dxy3fab).

Having made these changes, you can use a web browser to get the form displayed by using the URL:

```
http://tomcat.dur.ac.uk:8080/f.a.bloggs  
/schoice/schoice.html
```

(where f.a.bloggs is replaced by your mailname given in lower-case).

When the form gets displayed, type something (e.g., XXX) in the box, and then click on the "Submit choice" button. The Java code should then run, and display something like "Your choice was: XXX".

It is useful to get a servlet/JSP to output something different each time you change it in order for you to be certain that you are running the latest version of the servlet/JSP.

## JavaServer Pages

The jprices directory contains the files jprices.html and jprices.jsp. The jprices.jsp file contains a JavaServer page. This is a page written in a mix of elements of a markup language (e.g., HTML) and elements that cause Java code to be executed.

Edit the file jprices.jsp changing:

```
accessing the Pdc10bjc_prices database  
to:
```

```
accessing the prices database
```

Edit the file jprices.html changing your.mailname to whatever your mailname is (given in lower-case) so as to produce something like:

```
"http://tomcat.dur.ac.uk:8080/f.a.blogg  
s/jprices/jprices.jsp"
```

Having made these changes, you can get the form displayed using the URL:

```
http://tomcat.dur.ac.uk:8080/f.a.bloggs  
/jprices/jprices.html
```

(where f.a.bloggs is replaced by your mailname given in lower-case).

When the form gets displayed, type something (e.g., 3.0) in the box, and then click on the "Submit price" button. The JSP file should then be run; it should go off to the MySQL server; and then display the items of a table of a database that have a price not greater than 3.0. In order for the JSP to execute, it will need access to some driver classes, and these are in the file WEB-INF/lib/mysql202.jar. It is important to know that any JAR file in the WEB-INF/lib directory will automatically be included in the CLASSPATH when a JSP file is executed.

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## Creating your own servlets and JSPs

Any servlets and JSPs that you create must be created in or below your tomcat directory. Any .html, .class or .jsp files should be created so that anyone can read them. (However, because of the permissions that have been set on the tomcat directory, only Tomcat and the owner will be able to read the files). The easiest way of ensuring this is to type the following Unix commands each time you log in:

```
umask 22  
cd tomcat
```

## Using JAR files

If you want a servlet or a JSP to use a JAR file, put the JAR file into the WEB-INF/lib directory. As mentioned above, this directory already contains the JAR file mysql202.jar. This JAR file contains the classes needed to access a MySQL server. Suppose you now have some other JAR file that you want to be able to use with a servlet or a JSP. Suppose the file is called Fred.jar.

If you want to use this from a servlet, the file called source should contain a CLASSPATH line like:

```
setenv CLASSPATH $HOME/tomcat/WEB-  
INF/lib/Fred.jar:/users/tomcat/current/  
common/lib/servlet.jar:.
```

Note: this command line ends with a colon followed by a full stop.

If, instead, you want to use the classes of Fred.jar from a JSP, you need not do anything since Tomcat will automatically include any JAR files of your WEB-INF/lib directory in the CLASSPATH needed to compile and execute the Java program that it automatically produces from your JSP.