

# An Introduction to Network Programming with Java

Jan Graba

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# **An Introduction to Network Programming with Java**

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## Preface

The market in general-purpose Java texts is an exceptionally well populated one, as can be seen from just a cursory examination of the programming language section of any major bookshop. Surprisingly, the market in Java network programming texts is a much less exploited one, featuring very few texts. It is true that the better general-purpose Java texts provide *some* guidance on aspects of network programming, but this almost invariably takes the form of rather superficial coverage, often relegated to the end of the particular text and offering little more than an outline of the relevant concepts. Even those few texts that are devoted specifically to network programming in Java (and one or two are very good indeed) are rather thick tomes that are probably of greatest use as reference texts. The truth of this assertion appears to be reinforced by the absence of practical exercises from such texts.

When I began work on the first edition of this work, my declared intention was to write a more 'streamlined' work that could serve equally as the core text on an undergraduate module and as the quick, clear, 'no-nonsense' guide required by a busy IT professional. Numerous examples and associated screenshots were provided, with the examples 'stripped down' to their bare essentials in order to avoid overwhelming the reader with too much detail. There is, of course, a level of detail below which it is impossible to go without omitting some of the essentials and this led to a few examples running over multiple pages. However, a conscious effort was made to keep this to a minimum and to provide adequate program comments where this did occur.

It was gratifying to find that the first edition was well received, but the time has now come to replace it with an updated version. The changes in this second edition fall into three categories:

- language changes, largely reflecting the significant changes introduced by J2SE 5.0 (but also including one or two changes brought in by earlier versions of Java);
- the updating of support software, particularly that used for Web applications;
- new material, some related to the changes introduced by J2SE 5.0 (otherwise known as Java 5) and some extending earlier coverage.

A summary of the major elements of these changes is given below.

### Language Changes

These mostly affect the example programs and the model solutions provided on the associated Web site. However, there are occasional, passing references to some of these new features in the main body of the text where it is considered appropriate. The main language changes introduced are listed below.

- Replacement of the *BufferedReader+InputStreamReader* combination with the single *Scanner* class, with consequent eradication of the need to use the

type 'wrapper' classes to convert *String* input into numeric values (a **major** improvement on the traditional method for obtaining input).

- Associated with the above, replacement of the *BufferedReader+FileReader* combination with *Scanner+File* and that of the *PrintWriter+FileWriter* combination with *PrintWriter+File* for serial disc file I/O.
- Replacement of the cumbersome *addWindowListener(new WindowAdapter...* method for closing down GUI applications with *setDefaultCloseOperation(EXIT\_ON\_CLOSE)*. (This had been available since J2SE 1.3, but had deliberately not been included in the original text due to the earlier method being the one still used by most people at that time.)
- The formatting of numeric output (particularly decimal output) via method *printf*.
- The inclusion of **generics** in the declaration of *Vectors*, with the associated 'auto-boxing' and 'auto-unboxing' of elements.
- Introduction of the 'enhanced for' loop where appropriate.

### Updating of Support Software

- Replacement of the JSWDK Web server with Apache Tomcat.
- Replacement of the JavaBean Development Kit (BDK) with the Bean Builder for the testing of JavaBeans.
- Removal of the section on the now defunct HTMLConverter utility and updating of the example browsers to Internet Explorer 6 and Firefox 1.5.

### New Material

- Coverage of non-blocking I/O (introduced in J2SE 1.4), but retaining coverage of the more traditional blocking I/O.
- The use of JDBC with the *DataSource* interface (also introduced in J2SE 1.4), but maintaining coverage of the more traditional *DriverManager* class approach. The associated examples are no longer confined to the use of MS Access, but have been extended to include MySQL. The significant advantages to large-scale, commercial databases of using *DataSource* in preference to *DriverManager* are made clear to the reader.
- As part of good practice, the above *DataSource* technique makes use of a DAO (Data Access Object) to encapsulate access to the database, so that data manipulation code is separated from business logic.

On the CD-ROM accompanying this text may be found the executable file for installing J2SE 5.0 onto MS Windows platforms (available via free download from the Sun site, of course). In addition to this, the CD contains all example code and several media files (the latter for use with material in the final two chapters). Model solutions for end-of-chapter exercises are accessible by lecturers and other authorised individuals from the companion Web site (accessible via <http://homepage.ntlworld.com/jan.graba/javanet.html>). Finally, there is a document entitled *Java Environment Installation* that provides downloading and installation

instructions for those additional software elements for which permission for inclusion on the CD was not forthcoming. This document also contains installation instructions (and downloading instructions, which shouldn't be required) for J2SE 5.0 itself.

I sincerely hope that your programming experiences while using this text give you some of the sense of satisfaction that I have derived from writing it. Of course, along with such satisfaction comes the occasional (?) infuriating sense of frustration when things just won't work, but you wouldn't want things to be too easy ... would you?? :-)

Jan  
22nd Feb 2006

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