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# MapleNet and Maplets under Maple 8

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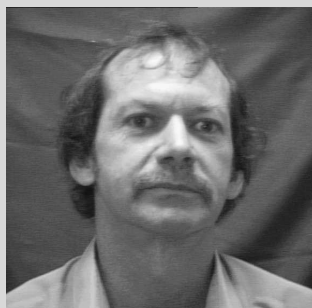
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Maplets were reviewed as a package of Maple 7 by Keady [1]. As part of a wider review of Maple 8, McCabe [2] also discusses Maplets. McCabe's review, as with Keady's [1] on Maplets in Maple 7, differs from this review in that our focus is on aspects related to MapleNet. (We also happen to think that McCabe may have been overcritical of the amount of detail needed to code Maplets. However, like him, we can also imagine future provision of higher level tools, or Maplet authoring language elements, which make the Maplet author's coding task less detailed.)

## ***Maplets and MapleNet***

As part of Maple 7, Maplets had no obvious life of their own, since one still had to start Maple before one could initiate a Maplet. The obvious pun on applet suggested that one should be able to embed a Maplet in a web page. Indeed it seemed natural that a Maplet window should spring into being via an appropriate click in a web browser window and this should initiate communication with a Maple process running on a remote server in such a way that the user could be totally unaware of what was driving it. This is the capability of Maplets in Maple 8, with MapleNet.

In fact there are two ways to embed a Maple application in a web page, with MapleNet. The first is via a java applet; in this case the Maple application may be embedded in the web page. The second is via Maplets; in this case the Maplet appears as a separate window.

## ***Requirements***

Of course, Maple 8 must be installed on the web server that serves the Maple applications; also this web server must have some specialised so-called 'MapleNet Server' java software installed. MapleNet is a new product developed by Maple (it is separate from Maple 8); see <http://www.maplesoft.com/maplenet> for details.

On the client side, the web browser must be java-enabled ie at least the Java Runtime Environment (JRE) must be installed on the client's system and the browser must be configured to use it. The JRE can be obtained free from <http://java.sun.com> (follow, for example, the J2SE links and choose to install the full Standard Development Kit (SDK) which includes JRE, which you will need anyway if you intend to develop your own MapleNet Server (discussed below), or just install the JRE component). Though it is claimed that version 1.3.1 of JRE is required, it seems that the Maplet examples tested (see Testing Examples below) would not run with this version, and that at least version 1.4.0 is required (the java applet examples appear to work fine with JRE 1.3.1 however).

On running a first Maple applet or Maplet served by a MapleNet server, a java-enabled web browser will attempt to download and install the maplenetclient.jar java archive (if it hasn't been installed already). We tried this both under Windows and under Linux/UNIX. Under Windows the jar file installed without assistance in C:\Program\_Files\Java\j2re1.4.0\lib\ext (where 1.4.0 was the version of the Java 2 SDK that had been installed). Under Linux, the Java 2 SDK was installed in /usr/java, but since this directory was only writable by root, maplenetclient.jar had to be downloaded from the <http://maplenet.maplesoft.com/pubres> site and installed, as root, in /usr/java/j2sdk1.4.0/jre/lib/ext/ "by hand" first.

To run MapleNet, one needs two further components: MapleNet Publisher and MapleNet Server. We didn't have the opportunity to install the second of these (possibly not yet publicly available?), but MapleNet Publisher is available as `publisherinstaller.jar`; both the java archive and pdf instructions for installing it are available from the <http://maplenet.maplesoft.com/pubres> site. One can already see how the java applets are going to work by installing just MapleNet Publisher: the applet loads into the page and one can even type in the boxes. However, the applet cannot do anything without a MapleNet server actually running (and one needs the MapleNet Server component software for that).

### **Testing Examples**

For the purposes of this review, Maple provided a publicly available MapleNet server accessed from <http://maplenet.maplesoft.com>. We tested the site with MS Internet Explorer 6.0 (under Windows), Netscape 6.2, Netscape 7.0 and Mozilla 1.0 (under Linux) and Netscape 4.78 (under Linux); in each case, the full Java 2 SDK was installed. With Netscape 4.78, some of the java applets failed due to the Java Virtual Machine (VM) process dying (my guess is that this is a failing of Netscape 4.78 rather than any bug in the Maple software). With Netscape 6.2, Netscape 7.0 and Mozilla 1.0 all the examples worked perfectly once `maplenetclient.jar` was installed (see above). With MS Internet Explorer 6.0 everything worked without a hitch.

At the <http://maplenet.maplesoft.com> site, there were a number of java applet and Maplet examples (under Tutorials - very simple examples, Demonstrations, Applications - two java applet examples that require a password). Each of the Tutorials and Demonstrations

examples also provide their complete code. The essential difference between a java applet running Maple and a Maplet is in the authoring; one requires knowledge of java to write an applet, but one only needs to know Maple to write a Maplet (no doubt with the loss of some flexibility).

We were particularly impressed with the Differentiation Maplet, found under Demonstrations. This truly demonstrates the strength of Maplets. Often one need only expose a student to a certain subset of Maple commands. Indeed sometimes it is undesirable to provide a student with a fully functional Maple; a fully functional Maple may be too helpful when a student is doing assignment work, for example.

Continuing on education themes, under Applications, JNetCalc is a java applet that gives a GUI interface to a selection of Maple's functions (other functions not listed are also available, if you are prepared to type them). We have had students ask for a means of pointing and clicking on Maple function names in exactly the way this applet provides.

Finally, to finish on an education theme, under Demonstrations is a java applet: Transfer Function Exercises. It consists of a quiz of two questions, and gives a taste of what might be possible if there were some AIM-like quiz authoring engine beneath it. (For information on AIM, see for example: <http://aim.shef.ac.uk/aimsourc/index.html>.)

### **References**

- [1] G Keady, *MSOR Connections*, May 2002
- [2] M McCabe, *MSOR Connections*, November 2002