Language Processors – Induction

Note: Read this through *before* logging in.

These sheets introduce you to the Linux/Unix Java programming environment to be used on the module by getting you to compile and run a program. You will be expected to be able to copy and manipulate program files and directories or web locations named in lab sheets, and compile and run the programs, and then to modify them and compile and run them. If you are not familiar with the Linux labs you should also get a copy of any *Computing Services* documentation available.

The Linux environment

Logging in

Linux/Unix labs contain PCs running Linux. If you see a screensaver or a blank screen, you can jiggle the mouse or hit a key to get the machine's attention.

Logging Out

Always remember to log out when you have finished working at a machine. To logout from a Linux machine, press the K button at the left of the control panel at the bottom of the screen, and select Logout from the menu.

If you leave a machine without logging out you are putting your own work at risk.

Working with the KDE windowing system under Linux

Each computer is attached by a network to several file systems. Under Linux, the fact that there are multiple file systems is something you don't normally have to think about. All the available systems just appear as different directories (folders) in a large 'tree' of directories. (The tree is upside-down with its root at the top. The Root Directory is called "/".)

You need to become proficient at examining the contents of directories (folders), and in copying and moving directories and files around the file systems. We will use the words 'directory' and 'folder' to mean the same thing.

> **Please note**: click *once*, not twice. If you are a Windows user you will be used to double-clicking to make things happen. In KDE you only click once. If you double click you may find you have done something (like launching an application) twice. Don't worry, it's not usually fatal.

You will notice that KDE has a Windows-like 'taskbar' (the control panel) at the bottom of the screen with a K button on the bottom-left – as on Windows, clicking on this reveals a menu that launches applications etc.

Your CSD and SOI home directories

When logged in as a Linux user you have a *home directory*. This is a place in the file system which belongs to you: the place where you can create, modify and delete files and folders. When you start the file manager (the button labelled with a small house icon on the control panel is the easiest way to start it), your home directory is the one it will display. You can also get the file manager to take you to your home directory at any time simply by clicking on the home icon on the task bar at the top. Use the file manager to go to your home directory now. Does it contain any files? Does it contain any hidden files? (Hint: look on the View menu.)

A slight complication (and a big advantage!) for you as a student in the School of Informatics, is that you have *two* computing accounts: one provided by the Computing Services Department (CSD) and one provided by the School of Informatics (SOI). These two accounts give you access to two distinct home directories on two distinct file systems. When you are logged in to CSD machines

as in the Unix labs you are using your CSD account and your home directory is (naturally) your CSD home directory.

Although the two home directories are distinct, they are not completely isolated from each other. From the CSD Linux machines your SOI home directory is available as `/soi/homes/`<USER>, where <USER> is your login-name. This gives you access to a substantial amount of file space in addition to your CSD quota. Of course you can choose to do all your work there if you wish. Use the file manager to go to your SOI home directory now. Does it contain any files? Does it contain any hidden files?

Shells, and your directories

You will need to be able to fire up and use a Unix shell window – this is on the K menu, and is also one of the icons on the taskbar (the one with a terminal screen on it, marked with a shell).

Fire one up now and then type the command '`ls`' inside the window. You will see listed the contents of your CSD home directory. You can change to your SOI home directory with the command:

```
cd /soi/homes/<USER>
```

You will find it very useful to learn about how to move around and see the directory hierarchy using the commands `cd` and `ls`.

Browsers and Web pages

On the Linux machines there are two main ways to browse web pages: (1) using the file manager, (2) using Mozilla or one of the other Web browsers. Here we will focus on using the file manager but if you would prefer to use Mozilla you can.

To view a web page in the file manager you can type the url into the box along the top (you can usually leave off the `http://` part: the file manager will put that bit in for you). Since urls are often very long and typing them is very boring, you will want to bookmark any page that you frequently visit. Then you can visit the page next time by simply clicking on the bookmark. To add and use bookmarks in the file manager, use the Bookmarks menu at the top.

Java environment and programming

The Java environment we will use is Suns JDK (Java Development Kit, now also known as the SDK), which can be considered to be the reference Java environment, and provides (amongst other things) a compiler, interpreter and debugger. These are not integrated into a closed environment, so you need to use at least the Unix file system as above, and a Unix editor to be able to create and modify programs (see below), and learn the compiler and other commands.

Getting some Java files to work with

Fire up a Unix shell window, move using the '`cd`' command to where you want to work in the filesystem, and type the command:

```
cp -R /soi/sw/courses/daveb/javatest ./Shapes
```

This makes a complete copy of a simple Java program and associated files in current working directory in a new directory called `Shapes`. Now do:

```
cd Shapes
ls
```

and you will see the Java files.

Compiling and running Java programs on Unix

To use Java, in a shell window you must add module '`java`' (this gives access to the Java JDK (also known as SDK) and some local Java libraries):

```
module add java
```

To use School of Informatics specific software you need to add the module '`soi`':

```
module add soi
```

These can be combined into one command:

```
module add java soi
```

The Java compilation command is '`javac`', which will compile single or multiple '`.java`' files:

```
javac Scene.java
```

or, to compile all Java source files in the current directory,

```
javac *.java
```

(remember you must be in the directory containing these files and the '`cd`' command is used to change directories). *Your first compilation will take a long time; subsequent ones take much less time.*

The command '`java`' executes a Java program; you give it a class name as an argument (so typically you use the name of the class containing your `main()`):

```
java ScalableScene
```

When you run a program like this, any error or other messages will appear in the window from which you issued the `java` command.

Remember that the `Ctrl-C` command typed in a shell window will kill off any program that you have started from that shell window (often written `^C` – press the `Ctrl` and `C` keys at the same time).

Now compile and run a Java program (eg the one copied above, or one of your own).

Editing programs

Linux/Unix has a variety of program and text editors available. Those who are experienced Linux/Unix users will wish to use what they're familiar with, probably `emacs` or `vi`. I suggest others use `kate`, which does syntax colouring and is set up for Java and other program editing. This is available as command `kate` from a Unix shell window (do `kate &` or `kate [filename]`), or from the K menu as Editor.

I suggest you now simply modify some trivial aspects of one of your programs and make sure you can save and recompile and run it.

And, finally, where is my `U:` drive stuff?

Your CSD XP PC (CADDI) `U:` drive is accessible as the folder `My Documents` from your home directory on the CSD Unix systems. You can also, however, use the FTP system to transfer files between the CSD XP PC (CADDI) and the Unix systems (either to your CSD Unix home directory or to your SOI home directory).