Elementary use of SUNs

1 SUN workstations in the Mathematics Department

The Mathematics department has a number of SUN workstations located in room 105 for use by postgraduate students.

1.1 Logging on

When you arrive at a SUN workstation the screen is probably blank. Press the Return key to activate it.

Logon by entering your username at the prompt, followed by Return and then enter your password which will not be displayed. Having logged into the workstation one of two desktop environments will load, either the Common Desktop Environment or the Open Windows Desktop.

The SUNs run an *Operating System* known as Unix in which most commands are entered from the keyboard. However, both desktop environments are graphical interfaces and provide an alternative to typing some commands. For example, both desktop environments have drag and drop file managers and multiple file managers can be opened simultaneously to easy moving files between folders. Both desktops have a default text editor which can be used when programming and the C.D.E has multiple views, allowing different tasks to be separated. The choice of which desktop environment is loaded is made from the options > session menu on the login screen. Applications are run by 'right-clicking' the mouse on the background and choosing the appropriate program from the menu presented with a further right-click.

Typed commands are entered into a terminal window (C.D.E) or a command tool (Open Windows). Additional terminal windows/command tools can be created by right-clicking on the background and selecting the item from the menu. Commands typed on the keyboard and will be echoed on the screen. The `return` key must be pressed at the end of each line you type. Occasionally a key must be pressed **at the same time as** the `Control` or `Ctrl` key. This will be denoted by `Ctrl-c` for example, to tell you to press the `Control` key followed by the `c`, whilst the control key is still depressed. `Ctrl-c` can be used to terminate some processes.

All commands (including your password) are case sensitive, i.e. uppercase (capital) letters are **not** equivalent to lowercase letters.

1.2 Passwords

It is important that you do not divulge your password to anyone. Also your password must not be easy to "crack", either by looking over your shoulder, or by one of the public domain password cracking programs available. Your password should be memorable to you, but should **not** be a name or dictionary word, nor obtained from such by replacement of letters by numbers or addition of punctuation. The best passwords are a jumble of letters/numbers, obtained for example by reading down the first character of each line from a book. Passwords should be at least 6 characters long.

It is advisable to change the password you were given. To do this type the command `yppasswd` at the prompt. You will then be asked for your old password, then your new password (twice to guard against typing errors). Remember that passwords are case sensitive.

1.3 Logging off

To logoff of the SUN workstations, again, right-click on the background and select either Log out (C.D.E) or Exit (Open Windows).

2 Files and Directories

Programs and data are kept in files on the computer. Each file must have a unique name consisting of letters, numbers and full stops. Collections of files may be grouped together in directories. A simple analogy is files being kept in different draws of a filing cabinet, although on the computer directories may contain subdirectories. Directories like files have names, and like files these names should be informative, i.e. indicate what is contained in the directory/file. For example, you may create a directory called `project1` in which you may have a file `question1.f90` (all FORTRAN files must end with a "`.f`" or "`.f90`' – see the Fortran course for more details). Files beginning with a "." are hidden, i.e. they do not appear in the usual directory listing - see the `ls` command below.

Each file and directory has a *path* which indicates its position relative to either the current directory, or the highest level directory. For example, when you login you are in your *home directory* which has an absolute path `/home/sufs1/ru9/sm/username` or similar. Notice how each component (directory) of the path is separated by a "/". If the path starts with a / then the path is absolute, otherwise it is relative to the current directory. For example, your `question1` file has path `project1/question1.f` relative to your login directory, or an absolute path `/home/sufs1/ru9/sm/username/project1/question1.f`.

Your login (home) directory can be abbreviated to `~/` and someone else's to `~username/`. A "." (fullstop) on its own denotes the current directory, whilst ".."

denotes the next highest, or parent directory. For example, if you are in the directory `project1` then `question1.f` and `./question1.f` both refer to the same file, whilst `../` refers to your login directory. (Therefore `../project1/question1.f` again refers to the same file).

3 Commands

A few of the most useful UNIX commands are given below.

3.1 File commands

ls lists files in current directory

ls -l lists details of files in current directory

ls -a lists all files in current directory (including hidden files). Hidden files are those beginning with a "." – Note that . (current directory) and .. (parent directory) are also displayed.

cp *file1 file2* copy *file1* into *file2*

mv *file1 file2* rename *file1* as *file2*

rm *file* delete *file*

more *file* view *file*, press space bar to continue, q to quit.

3.2 Directory commands

mkdir *dir* make directory *dir*.

cd *dir* change current directory to *dir*.

ls *dir* lists files in *dir*

cp *file1 dir* copy *file1* into directory *dir*

mv *file1 dir* move *file1* into directory *dir*

rmdir *dir* delete *dir* if empty.

pwd prints the path name of the current directory

3.3 Process commands

ps -u *user name* list all processes belonging to *user name*.

kill -9 *PID* kill a particular process (the PID number is given by the command **ps**).

3.4 Network commands

rusers list logged-in users.

rlogin *host name* remotely login into the workstation *host name*.

3.5 Command options

Many commands have various options which are denoted by `-`*letter* after the command name, e.g. in the `ls` example above. Information about the UNIX commands and options is held on the SUNs as an on-line help system, known as the man pages. For example to find out more about the `ls` command type `man ls` . If "–More–" appears at the bottom of the screen press the space bar to see the next page or type `q` to quit.

4 Printing files

To obtain a printout of a text file use the `lpr` command. For example to print a file `question1.f90` type `lpr -Pmps1 question1.f90` The output will appear on the printer in room 105. Use `mps3` instead of `mps1` for it to appear in room 316.

5 Installed software

Much of the software available on the SUNs is initiated from the command prompt. To ensure that all the standard software is available the command `configure -c sm` should be entered. This will configure your `.login` file. Having configured your `.login` file you are required to logout and log back in again, in order that any changes are registered.

5.1 Using FORTRAN on the SUNs

FORTRAN programs must be stored in files ending with a "`.f`" or "`.f90`" e.g. the sample program could be stored in a file called `saver.f90`. Apart from this the name does not matter, but it is advisable that it should describe the program's function.

To compile a FORTRAN program the command is `f90`. Its simplest form (using `saver.f90` as the file containing the FORTRAN to be compiled) is

```
f90 saver.f90
```

If there are no compilation errors this produces a file `a.out` and the program can be run (executed) simply by typing `a.out`

There are various *options* which can be added to the `f90` command. Each option is indicated by *–letter(s)*, perhaps followed by another filename. Some useful options are

- `-ansi` warns of deviations from the ANSI standard.
- `-C` checks constant array bounds.
- `-o filename` puts executable program into `filename` instead of `a.out`.
- `-u` tells compiler to report all undeclared variables.

So the sample program might be compiled by

```
f90 -ansi -C -u -o saver saver.f90
```

N.B. the first occurrence of `saver` does not have the "`.f90`" since it is indicating that the executable program be placed in the file `saver` and can be run by just typing `saver`.

A program need only be compiled if you make changes to it, if the executable is deleted or overwritten. However executable programs are large compared to the FORTRAN file so please only keep one at a time.

5.2 Web browsers and E-mail

The latest version of Netscape Communicator is loaded by typing `www`. University E-mail accounts can then be accessed using Messenger, found in the Communicator menu. If you try to run more than one copy of Netscape the error message 'Netscape has detected a lock file' will be displayed. Similarly if Netscape crashes a lock file is left in the .netscape folder and should be deleted. E-mail can also be read using the text-based program pine. Pine is loaded by typing `pine` at the command prompt. In addition, E-mail can be read off campus using Web-mail by pointing a browser at the address `http://www.mail.reading.ac.uk`

5.3 MatLab

The current version of MatLab, MatLab 6, is loaded by typing `matlab`. MatLab 6 has a java front-end in which m-files can be edited and debugged. The front-end can be frustratingly slow on the older SUN machines and therefore starting

MatLab with out it is an option. To start MatLab with out the front-end type `matlab -nojvm`. Older versions of MatLab are also available including MatLab 5.3 (`matlab53`). All versions of MatLab should be exited by either typing `quit` or through the front-end menu. Any MatLab processes that are not exited in this manner, or crash, persist, taking up licenses. Dead process should be killed using the `ps/kill` procedure outlined in section 3.3.

5.4 Mathematica

The current version of Mathematica is loaded by typing `mathematica`. Again, a version without the graphical front-end is available by typing `math`.

5.5 Postscript, PDF and DVI files

Postscript, PDF and DVI files can be viewed by double-clicking on the file in the file manager. In addition, typing `ghostview` loads a postscript viewer, and typing `xdvi` a DVI viewer.

5.6 Microsoft Office, Excel, ...

The Microsoft suite of programs is not available on the SUNs. Microsoft word documents can be viewed on the SUNs but not edited. To view a word document double click on the file in the file manager. The PCs can be used to print documents to files (print to file option in the print menu) and the `.prn` files can then be sent to the printers using the `lpr` command.

6 Further information

The IT Services produces a number of guides to various aspects of computing, including the SUNs, which are available from the ITS web site `http://www.rdg.ac.uk/ITS` Specific queries can be E-mailed to ITS at `its-help@reading.ac.uk` Each query receives a ticket number for future reference. Alternatively, ITS can be contacted by phone on x6262.

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