**Directories:**

File and directory paths in UNIX use the forward slash "/"

to separate directory names in a path.

examples:

/ "root" directory

/usr directory usr (sub-directory of / "root" directory)

/usr/STRIM100 STRIM100 is a subdirectory of /usr

**Moving around the file system:**

pwd Show the "present working directory", or current directory.

cd Change current directory to your HOME directory.

cd /usr/STRIM100 Change current directory to /usr/STRIM100.

cd INIT Change current directory to INIT which is a sub-directory of the current

directory.

cd .. Change current directory to the parent directory of the current directory.

cd $STRMWORK Change current directory to the directory defined by the environment

variable 'STRMWORK'.

cd ~bob Change the current directory to the user bob's home directory (if you have permission).

**Listing directory contents:**

ls list a directory

ls -l list a directory in long ( detailed ) format

for example:

$ ls -l

drwxr-xr-x 4 cliff user 1024 Jun 18 09:40 WAITRON\_EARNINGS

-rw-r--r-- 1 cliff user 767392 Jun 6 14:28 scanlib.tar.gz

^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^

| | | | | | | | | | |

| | | | | owner group size date time name

| | | | number of links to file or directory contents

| | | permissions for world

| | permissions for members of group

| permissions for owner of file: r = read, w = write, x = execute -=no permission

type of file: - = normal file, d=directory, l = symbolic link, and others...

ls -a List the current directory including hidden files. Hidden files start

with "."

ls -ld \* List all the file and directory names in the current directory using

long format. Without the "d" option, ls would list the contents

of any sub-directory of the current. With the "d" option, ls

just lists them like regular files.

**Changing file permissions and attributes**

chmod 755 file Changes the permissions of file to be rwx for the owner, and rx for

the group and the world. (7 = rwx = 111 binary. 5 = r-x = 101 binary)

chgrp user file Makes file belong to the group user.

chown cliff file Makes cliff the owner of file.

chown -R cliff dir Makes cliff the owner of dir and everything in its directory tree.

You must be the owner of the file/directory or be root before you can do any of these things.

**Moving, renaming, and copying files:**

cp file1 file2 copy a file

mv file1 newname move or rename a file

mv file1 ~/AAA/ move file1 into sub-directory AAA in your home directory.

rm file1 [file2 ...] remove or delete a file

rm -r dir1 [dir2...] recursivly remove a directory and its contents BE CAREFUL!

mkdir dir1 [dir2...] create directories

mkdir -p dirpath create the directory dirpath, including all implied directories in the path.

rmdir dir1 [dir2...] remove an empty directory

**Viewing and editing files:**

cat filename Dump a file to the screen in ascii.

more filename Progressively dump a file to the screen: ENTER = one line down

SPACEBAR = page down q=quit

less filename Like more, but you can use Page-Up too. Not on all systems.

vi filename Edit a file using the vi editor. All UNIX systems will have vi in some form.

emacs filename Edit a file using the emacs editor. Not all systems will have emacs.

head filename Show the first few lines of a file.

head -n filename Show the first n lines of a file.

tail filename Show the last few lines of a file.

tail -n filename Show the last n lines of a file.

**Shells**

The behavior of the command line interface will differ slightly depending

on the *shell* program that is being used.

Depending on the shell used, some extra behaviors can be quite nifty.

You can find out what shell you are using by the command:

echo $SHELL

Of course you can create a file with a list of shell commands and execute it like

a program to perform a task. This is called a shell script. This is in fact the

primary purpose of most shells, not the interactive command line behavior.

**Environment variables**

You can teach your shell to remember things for later using environment variables.

For example under the bash shell:

export CASROOT=/usr/local/CAS3.0 Defines the variable CASROOT with the value

/usr/local/CAS3.0.

export LD\_LIBRARY\_PATH=$CASROOT/Linux/lib Defines the variable LD\_LIBRARY\_PATH with

the value of CASROOT with /Linux/lib appended,

or /usr/local/CAS3.0/Linux/lib

By prefixing $ to the variable name, you can evaluate it in any command:

cd $CASROOT Changes your present working directory to the value of CASROOT

echo $CASROOT Prints out the value of CASROOT, or /usr/local/CAS3.0

printenv CASROOT Does the same thing in bash and some other shells.

**Interactive History**

A feature of bash and tcsh (and sometimes others) you can use

the up-arrow keys to access your previous commands, edit

them, and re-execute them.

**Filename Completion**

A feature of bash and tcsh (and possibly others) you can use the

TAB key to complete a partially typed filename. For example if you

have a file called constantine-monks-and-willy-wonka.txt in your

directory and want to edit it you can type 'vi const', hit the TAB key,

and the shell will fill in the rest of the name for you (provided the

completion is unique).

**Bash is the way cool shell.**

Bash will even complete the name of commands and environment variables.

And if there are multiple completions, if you hit TAB twice bash will show

you all the completions. Bash is the default user shell for most Linux systems.

**Redirection:**

grep string filename > newfile Redirects the output of the above grep

command to a file 'newfile'.

grep string filename >> existfile Appends the output of the grep command

to the end of 'existfile'.

The redirection directives, > and >> can be used on the output of most commands

to direct their output to a file.

**Pipes:**

The pipe symbol "|" is used to direct the output of one command to the input

of another.

For example:

ls -l | more This commands takes the output of the long format directory list command

"ls -l" and pipes it through the more command (also known as a filter).

In this case a very long list of files can be viewed a page at a time.

du -sc \* | sort -n | tail

The command "du -sc" lists the sizes of all files and directories in the

current working directory. That is piped through "sort -n" which orders the

output from smallest to largest size. Finally, that output is piped through "tail"

which displays only the last few (which just happen to be the largest) results.

**Command Substitution**

You can use the output of one command as an input to another command in another way

called command substitution. Command substitution is invoked when by enclosing the

substituted command in backwards single quotes. For example:

cat `find . -name aaa.txt`

which will cat ( dump to the screen ) all the files named aaa.txt that exist in the current

directory or in any subdirectory tree.

**Searching for strings in files: The *grep* command**

grep string filename prints all the lines in a file that contain the string

**Searching for files : The *find* command**

find search\_path -name filename

find . -name aaa.txt Finds all the files named aaa.txt in the current directory or

any subdirectory tree.

find / -name vimrc Find all the files named 'vimrc' anywhere on the system.

find /usr/local/games -name "\*xpilot\*"

Find all files whose names contain the string 'xpilot' which

exist within the '/usr/local/games' directory tree.

**Reading and writing tapes, backups, and archives: The *tar* command**

The tar command stands for "tape archive". It is the "standard" way to read

and write archives (collections of files and whole directory trees).

Often you will find archives of stuff with names like stuff.tar, or stuff.tar.gz. This

is stuff in a tar archive, and stuff in a tar archive which has been compressed using the

gzip compression program respectivly.

Chances are that if someone gives you a tape written on a UNIX system, it will be in tar format,

and you will use tar (and your tape drive) to read it.

Likewise, if you want to write a tape to give to someone else, you should probably use

tar as well.

Tar examples:

tar xv Extracts (x) files from the default tape drive while listing (v = verbose)

the file names to the screen.

tar tv Lists the files from the default tape device without extracting them.

tar cv file1 file2

Write files 'file1' and 'file2' to the default tape device.

tar cvf archive.tar file1 [file2...]

Create a tar archive as a file "archive.tar" containing file1,

file2...etc.

tar xvf archive.tar extract from the archive file

tar cvfz archive.tar.gz dname

Create a gzip compressed tar archive containing everything in the directory

'dname'. This does not work with all versions of tar.

tar xvfz archive.tar.gz

Extract a gzip compressed tar archive. Does not work with all versions of tar.

tar cvfI archive.tar.bz2 dname

Create a bz2 compressed tar archive. Does not work with all versions of tar

**File compression: *compress*, *gzip*, and *bzip2***

The standard UNIX compression commands are compress and uncompress. Compressed files have

a suffix .Z added to their name. For example:

compress part.igs Creates a compressed file part.igs.Z

uncompress part.igs Uncompresseis part.igs from the compressed file part.igs.Z.

Note the .Z is not required.

Another common compression utility is gzip (and gunzip). These are the GNU compress and

uncompress utilities. gzip usually gives better compression than standard compress,

but may not be installed on all systems. The suffix for gzipped files is .gz

gzip part.igs Creates a compressed file part.igs.gz

gunzip part.igs Extracts the original file from part.igs.gz

The bzip2 utility has (in general) even better compression than gzip, but at the cost of longer

times to compress and uncompress the files. It is not as common a utility as gzip, but is

becoming more generally available.

bzip2 part.igs Create a compressed Iges file part.igs.bz2

bunzip2 part.igs.bz2 Uncompress the compressed iges file.

**Looking for help: The *man* and *apropos* commands**

Most of the commands have a manual page which give sometimes useful, often more or less

detailed, sometimes cryptic and unfathomable discriptions of their usage. Some say they

are called man pages because they are only for real men.

Example:

man ls Shows the manual page for the ls command

You can search through the man pages using *apropos*

Example:

apropos build Shows a list of all the man pages whose discriptions contain the word "build"

Do a ***man apropos*** for detailed help on apropos.

**Basics of the  *vi* editor**

Opening a file

vi filename

Creating text

Edit modes: These keys enter editing modes and type in the text

of your document.

i Insert before current cursor position

I Insert at beginning of current line

a Insert (append) after current cursor position

A Append to end of line

r Replace 1 character

R Replace mode

<ESC> Terminate insertion or overwrite mode

Deletion of text

x Delete single character

dd Delete current line and put in buffer

ndd Delete n lines (n is a number) and put them in buffer

J Attaches the next line to the end of the current line (deletes carriage return).

Oops

u Undo last command

cut and paste

yy Yank current line into buffer

nyy Yank n lines into buffer

p Put the contents of the buffer after the current line

P Put the contents of the buffer before the current line

cursor positioning

^d Page down

^u Page up

:n Position cursor at line n

:$ Position cursor at end of file

^g Display current line number

h,j,k,l Left,Down,Up, and Right respectivly. Your arrow keys should also work if

if your keyboard mappings are anywhere near sane.

string substitution

:n1,n2:s/string1/string2/[g] Substitute string2 for string1 on lines

n1 to n2. If g is included (meaning global),

all instances of string1 on each line

are substituted. If g is not included,

only the first instance per matching line is

substituted.

^ matches start of line

. matches any single character

$ matches end of line

These and other "special characters" (like the forward slash) can be "escaped" with \

i.e to match the string "/usr/STRIM100/SOFT" say "\/usr\/STRIM100\/SOFT"

Examples:

:1,$:s/dog/cat/g Substitute 'cat' for 'dog', every instance

for the entire file - lines 1 to $ (end of file)

:23,25:/frog/bird/ Substitute 'bird' for 'frog' on lines

23 through 25. Only the first instance

on each line is substituted.

Saving and quitting and other "ex" commands

These commands are all prefixed by pressing colon (:) and then entered in the lower

left corner of the window. They are called "ex" commands because they are commands

of the ***ex*** text editor - the precursor line editor to the screen editor

vi. You cannot enter an "ex" command when you are in an edit mode (typing text onto the screen)

Press <ESC> to exit from an editing mode.

:w Write the current file.

:w new.file Write the file to the name 'new.file'.

:w! existing.file Overwrite an existing file with the file currently being edited.

:wq Write the file and quit.

:q Quit.

:q! Quit with no changes.

:e filename Open the file 'filename' for editing.

:set number Turns on line numbering

:set nonumber Turns off line numbering