Basic Linux File Management & Commands

IMPORTANT NOTES:

1. **Follow the instructions to install on your device the relevant software to allow you to log in and connect to your Virtual Machine on Monash Cloud server.**
2. **Study lecture materials at least 1 hour and prepare Question 1-4 under Lab Tasks section prior to the lab session. Prepared questions will be discussed in the lab session.**

1 Overview

The objective of this lab is to introduce the students to the basic Unix commands. UNIX-like systems are increasingly being used on personal computers, mobile phones, web servers, and many other systems. This laboratory exercise reviews some of the essential commands and capabilities that match likely needs of FIT2093 students.

2 Lab Tasks: File and Directory manipulation

Root Directory and its Subdirectories. In this lab, we will use the Ubuntu 64-bit VM on Cloud. We will learn some basic Linux file and directory manipulation commands in the command terminal, so that we can use the command terminal in future labs in this unit. A list of important unix commands is given in Table 1. For more details and examples for using these commands, refer to the Linux commands quick reference link on the week 2 Moodle lab material page.

Every file and directory in the file system has a path. Unix paths are delimited by forward slashes (`/`). e.g. A login name, Mark, has a directory as `/srv/home/mark` in the VM. After logging your VM, your directory follows the same pattern as `/srv/home/[user name]`, where `[username]` is your Monash authcate user name.

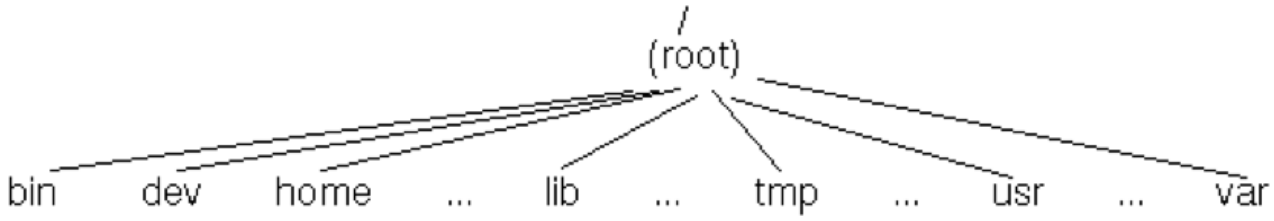

Figure 1: Unix file system hierarchy.

Special directories.

- **Root Directory (`/`):** The Top-Most directory.
- **Bin Directory (`/bin`):** Executable programs that comprise the GNU/Linux utilities.
- **Home Directory (`~`):** Current User's directory.
- **Current Directory (`.`):** The directory you're in.
- **Parent Directory (`..`):** The directory above.

Absolute paths: start with "/" i.e. the root directory.
Relative paths: start from your current directory.

`man <cmd>`	an interface to the on-line reference manuals
`whatis <cmd>`	display manual page descriptions
`<cmd> --help`	print a help message and exit
`history`	prints the last 50 commands
`grep`	print lines matching a pattern
`<cmd> > [filename]`	send the output of the command to that file
`cat [filename]`	concatenate files and print on the standard output
`mkdir`	make directories
`rmdir`	remove empty directories
`rm`	remove files or directories
`cp`	copy files and directories
`mv`	move or rename files and directories
`find`	search for files in a directory hierarchy
`locate`	find files by name
`pwd`	print name of current/working directory
`ls`	list directory contents
`cd`	change working directory
`tar`	The GNU version of the tar archiving utility

Table 1: File and Directory Manipulation Commands.

1. To poke around the Linux file system, open a Linux command terminal and take a look at the files in the root directory using the `cd /` command to change to the root directory, followed by the `ls` command to list the contents in the root directory. Experiment with variants of the `ls` command to see additional information, for example, what information does `ls -l` display, and what does `ls -a` display? (note: we will learn about the access control permissions of files in UNIX in a later lab). You should see directories with names like `/bin`, `/home`, `/lib`, and `/usr`.

   `ls -l` displays a 'long listing' showing access rights for the files (to be discussed in a later lab) as well as time and date and size information. `ls -a` lists 'hidden' files (not shown on the basic `ls` command) whose name starts with a dot (`.`).

2. There is an archive file with the filename `poems.tar.gz` on the `/srv/fit2093files/fit2093lab` , which contains a collection of poems by different writers. Use the change directory command `cd` to change your current directory to that directory and copy the file `poems.tar.gz` from `/srv/fit2093files/fit2093lab` to `/srv/home/[username]`. Then, list its contents to verify that it contains the file `poems.tar.gz`. Then run the command `tar -xzvf poems.tar.gz` to extract the contents of this archive file to your home directory.

   - To change to the desired directory, use the command `cd ~` or `cd /srv/home/[username]`.
   - To copy the file from server to the desired folder, use the command
     `cp /srv/fit2093files/fit2093lab/poems.tar.gz ~`
     or `cp /srv/fit2093files/fit2093lab/poems.tar.gz /srv/home/[username]`.
   - To extract the file, type `tar -xzvf poems.tar.gz`, as stated in the task. The options are: `x` to extract, `z` for type `gz` or Gnu Zip, `v` for verbose, and `f [filename]` to specify the filename of the archive. Check this with `man tar` or `tar --help`.

3. The archive file extracted in the previous task should have created a directory called `/home/[username]/poems`. Change your current directory to the latter. What command can you use to display the path of your current directory to verify that? Perform the operations in the following tasks from this `poems` directory.

   To change to the poems directory, use `cd /home/[username]/poems`. To display the path of the current directory, use `pwd`.

4. Poems by both *Angelou* and *Neruda* are in the same directory. Create a separate directory for Neruda and move all his poems to the new directory. Rename the original directory as *Angelou*. (Hints: Auto-complete function: Try clicking "Tab" after keying first few characters of the folder name).

   To create a new directory named Neruda issue the command `mkdir Neruda` while the current directory is `/srv/home/[username]/poems`, the file and directory names are case-sensitive. To move the files starting with Neruda issue `mv "Angelou and Neruda "/Neruda* Neruda/` and to rename the folder issue `mv "Angelou and Neruda /" Angelou`. You can use the auto-complete (tab) feature of command line to enter the folder names for the above commands. Given there are spaces in the folder names if you are typing the complete name you must use double quotes.

5. There is only one poem by *Blake*. Move that poem to Others directory and delete the directory *Blake*.

   To move all the files under `Blake` folder issue `mv Blake/* Other/` and to remove Blake directory issue `rmdir Blake`, if you get the error that directory is not empty issue `ls -la Blake/`, the output may look as follows:

```
total 24
drwxr-xr-x 2 [username] allposixstaff 4096 Feb 24 10:24  .
drwxr-xr-x 9 [username] allposixstaff 4096 Feb 24 10:23  ..
-rw-r--r-- 1 [username] allposixstaff  213 Mar 25  2017 '._Blake - A Poison Tree.txt'
-rw-r--r-- 1 [username] allposixstaff  120 Mar  1  2018  ._.DS_Store
-rw-r--r-- 1 [username] allposixstaff 6148 Mar  1  2018  .DS_Store
```


   To delete the files inside Blake folder issue (be careful with this command as it can wipe out the entire system if used incorrectly)
   `rm -rf Blake/.*`
   Now you should be able to remove the directory using `rmdir Blake`.

6. Create a text file called `blank.txt` using the `gedit` text editor and add some text to the file.

   Use `gedit blank.txt` to run the editor and create and edit/add text to the file, then save it before quitting from `gedit`.

7. Use `cat` command to display the contents of the file.

   `cat blank.txt`

3 Further Exploration

1. The Linux command `ln` can create a symbolic (soft) link to a target file or folder, similar to the "shortcut" in Windows operating system. Learn how to use `ln` to create a symbolic link by using the proper options and try it by yourself in the VM.

   Use `ln -s [target] [link name]` to create a symbolic link `[link name]` to the target `[target]`.