Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ CST Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

LAB 1: Using the Linux Command Line

Start your Linux VM and log in as cstUser1 with password cstuserpass.

In this lab, you will explore a number of basic commands that are frequently used at the Linux command line. You will be expected to use the “man” command (if your instructor hasn't demonstrated that to you, he should do so now), as well as the World Wide Web, to complete this lab.

Fill in the answers in the electronic version of this document and save it as LinuxLab1-CSTXXX (where the XXX is your CST #) and upload to DropBox.

**Working with the filesystem**

There are two big differences between the Windows and the Linux file systems. In Windows, each mounted drive has a separate drive letter. In Linux, all drives are located under the root of the file system. Also, folders in Windows are separated by backslashes; in Linux, directories are separated by forward slashes.

For example, in Linux, you may have a file named /var/tmp/linux.txt; in this example, you have a directory named var at the root of your file system, another directory named tmp within the var directory, and a file named linux.txt within that tmp directory.

1. How do you refer to the root of the Linux file system? \_\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\_\_\_\_\_\_\_

Open up the Terminal application to access the command line of Linux.

2. What is the Linux command that prints out the directory you are currently in? \_\_\_\_\_\_pwd\_\_\_\_\_\_\_\_\_

3. When you first open the Terminal application, what directory are you in? \_\_/home/cstUser1\_\_\_\_\_\_\_\_\_\_\_\_\_

4. In Ubuntu, what directory are all account home directories located in by default? \_\_\_/home\_\_\_\_\_\_\_\_\_\_\_\_

Open the GUI mode text editor Gedit (called Text Editor if you search for it) and create a file with the following contents:

* your name
* your date of birth
* the type of shoes that you are wearing
* your superpower (make one up if you don't have one)

Save this document in a file named “aboutMe.txt”.

If you do not have Gedit installed, you can run the following command in terminal:

* **sudo apt-get install gedit**

This will download the appropriate binary files for this application.

5. What Linux command is used to list the contents of a directory? \_\_\_\_ls\_\_\_\_\_\_\_\_\_\_\_

Use this command to list the contents of the directory.

6. How many files and directories are displayed when you execute this command? \_\_\_\_\_9\_\_\_\_\_\_\_\_\_\_

Many Linux commands take options. There are typically two types of options, options which are a single dash followed by a single letter (short options), and options which are two dashes followed by a word (long options).

7. What is the short option to list **all** the files in a directory? \_\_\_\_-a\_\_\_\_\_\_\_\_\_\_\_

8. What is the long option to list all the files in a directory? \_\_\_\_-- all\_\_\_\_\_\_\_\_\_\_\_

Use this option to list all the files in a directory.

9. How many files and directories are located in your directory? \_\_\_\_\_\_21\_\_\_\_\_\_\_\_\_

10. Are there any extra files that did not show up when you first listed the files? \_\_\_\_\_Yes\_\_\_\_\_\_\_\_\_\_

11. If there are extra files, what distinguishes them from the original list of files? \_They start with a period\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. What is the command to create a directory? \_\_\_\_mkdir\_\_\_\_\_\_\_\_\_\_\_

In the directory you are currently in, create a subdirectory named subdir. Without changing directories, list all of the files within that directory (use the option you identified earlier).

13. There should be two entries. What are they? \_\_\_. ..\_\_\_\_\_\_\_\_\_\_\_\_

14. Each of these entries signifies something special. What is special about each of these entries?

\_. -> current directory\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_.. -> parent directory\_\_\_\_\_\_\_\_\_\_\_\_\_

15. What command would you use to change into the subdir directory? \_\_cd subdir\_\_\_\_\_\_\_\_\_\_\_\_\_

cd /home/cstUser1/subdir

cd ~/subdir

cd $HOME/subdir

Change to the subdir directory.

16. What command would you use to change back to the parent directory? \_\_\_\_cd ..\_\_\_\_\_\_\_\_\_

Change back to your home directory

17. What command is used to move a file to another directory? \_\_\_\_\_\_mv\_\_\_\_\_\_\_\_\_

18. What command would you use to move the aboutMe.txt file to the subdir directory? \_\_mv aboutMe.txt subdir\_\_\_\_\_\_\_\_\_\_\_\_\_

Move the aboutMe.txt file to the subdir directory.

19. What command is used to rename files or directories? \_\_\_\_\_mv\_\_\_\_\_\_\_\_\_\_

Change the name of the subdir directory to PersonalInfo.

20. What command did you use? \_\_\_mv subdir PersonalInfo\_\_\_\_\_\_\_\_\_\_\_\_

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21. What is the one-character abbreviation used to refer to your account's home directory? \_\_\_\_\_~\_\_\_\_\_\_\_\_\_

22. List three unique invocations of the command that allows you to change to your account's home directory.

\_\_\_\_cd ~\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_cd $HOME\_\_\_\_\_\_\_\_\_\_

\_\_\_\_cd\_\_\_\_\_\_\_\_\_\_\_

23. What command is used to delete a directory? \_\_\_\_rm, rmdir\_\_\_\_\_\_\_\_\_\_\_

Execute the command to delete the PersonalInfo directory.

24. Did the command succeed? If not, why not? \_\_\_\_No, because the directory was not empty\_\_\_\_\_\_

Move file aboutMe.txt file from the PersonalInfo directory to your home directory. Re-execute the command to delete the directory.

25. Did the command succeed this time? \_\_\_\_\_Yes\_\_\_\_\_\_\_\_\_\_

**Working with the contents of files**

The file “/etc/passwd” contains a list of the accounts on your computer.

There are (at least) three commands that list the contents of a file to the screen: **more**, **less**, and **cat**.

Read the man page for those commands and try them out on the /etc/passwd file.

26. What command line do you use to view the contents of the /etc/passwd file?

\_cat /etc/passwd

more /etc/passwd

less /etc/passwd\_\_\_\_\_\_\_\_\_\_\_\_\_\_

27. What is different between the more command and the less command?

\_\_less has more options (less is more!)

Less allows us scrool in two directions

More loads the entire file, less only loads what’s on the screen

More quits when it hits the end, less waits for you to quit (q)

More leaves the end of the file on the screen (terminal buffer), less doesn’t\_\_\_\_\_\_\_\_\_\_\_\_\_

The third command is the “cat” command. Use the cat command to view the contents of the /etc/passwd file.

28. What command line did you use to view the contents of the /etc/passwd file? \_cat /etc/passwd\_\_\_\_\_\_\_\_\_\_\_\_\_\_

29. What is different between the more command and the cat command?

\_\_\_cat puts out the entire file

More stops after each page and waits for you to ask it to move ahead\_\_\_\_\_\_\_\_\_\_\_\_

30. What command is used to display the last few lines of a file? \_\_tail\_\_\_\_\_\_\_\_\_\_\_\_\_

31. What command line is used to display the last 6 lines of the /etc/passwd file? \_

tail -6 /etc/passwd\_\_\_\_\_\_\_\_\_\_\_\_\_\_

32. What command is used to display the top few lines of a file? \_\_\_head\_\_\_\_\_\_\_\_\_\_\_\_

33. What command line is used to display the first 4 lines of the /etc/passwd file?

\_head -4 /etc/passwd\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Input and Output Redirection**

It is possible to send the output of Linux commands to files, rather than the screen. To send the output to a file, at the end of the command, you place a “>” symbol followed by the filename you want to write to.

Use the “cat” command to output your aboutMe.txt file to a file called duplicateMe.txt.

34. What command line did you use?

\_cat aboutMe.txt > duplicateMe.txt\_\_\_\_\_\_\_\_\_\_\_\_\_\_

35.What command did you just emulate?

\_cp aboutMe.txt duplicateMe.txt\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The cat command can take the names of multiple files, and it outputs those files one at a time to the screen. If you redirect the output to a file, what you've done is created a new file that is the concatenation of all the specified files – that's where the name “cat” comes from!

36. What command line would you use to concatenate the files /etc/hosts and /etc/nsswitch.conf, and place the output in a file named linux.rules in the directory /tmp?

\_cat /etc/hosts /etc/nsswitch.conf > /tmp/linux.rules\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Many Linux commands send output to the screen. Actually, in Linux terminology, they send them to what is termed “standard output” (by default, that's the screen), and the “>” allows you to “redirect” standard output to a file.

Many Linux commands also accept input from the keyboard. For example, if you don't specify a filename to the cat command, it reads from the keyboard. Well, actually it accepts input from what is called “standard input” (by default, that's the keyboard), and you can use “<” to redirect standard input from a file.

Try executing the cat command, with standard input redirected from the file aboutMe.txt.

37. What command line did you use? \_cat < aboutMe.txt\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When a command reads standard input from the keyboard, you must tell the command when you have finished entering input. You use an “end-of-file” marker, which we can send with a CTRL-D at the start of a line.

Try executing the cat command, without specifying a file, and outputting to a file named input.txt.

38. What command line did you use?

\_cat > input.txt\_\_\_\_\_\_\_\_\_\_\_\_\_\_

You can also use “>>” to append to an existing file. Execute the cat command to append the file /etc/group on to the end of your aboutMe.txt file.

39. What command line did you use?

\_cat /etc/group >> aboutMe.txt\_\_\_\_\_\_\_\_\_\_\_\_\_\_

One of the great features of Linux is that the commands are designed to do some small, simple task. If you need to do more than one thing, you can string a number of commands together, with the output of one command becoming the input to another command. To do this, you use “pipes”, which are symbolized with the “|” character. If you separate two commands by a pipe, you are telling Linux to use the standard output of the first command as the standard input of the second command.

40. What is the command to obtain a long listing of all the files in the /etc directory?

\_ls -al /etc\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Try piping the output of the previous command into the less command.

41. What command line did you use?

\_ls -al /etc | less\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Challenge question 1 (optional)**

Find a command line that will list the files in the /etc directory in decreasing order of number of lines in the file (assume they are all text files). wc, sort, maybe some others to clean it up.

42. What command line did you use?

\_wc -l /etc/\* 2>/dev/null | sort -rn | grep -v total\_\_\_

**Challenge question 2 (optional)**

Same as Challenge Question 1, but rather than listing all files, only list the top 10 files.

43. What command line did you use?

wc -l /etc/\* 2>/dev/null | sort -rn | grep -v total | head -10\_\_\_