CHALMERS
UNIVERSITY OF TECHNOLOGY

ASSIGNMENT #2

Introduction to Linux

1. Exploring the file system

Use `df` to show information about the file system. How many file systems are mounted on the system that you are using? How large is each file system? What is the purpose of each of them?

`df` prints file sizes in KB blocks, which has become difficult to read on modern computers. Find a way to make `df` print information in a more easily understandable form. Print again the sizes of the different . Does it match what you wrote down earlier?

On many systems, an administrator will have set up file quota, i.e., a maximum number of files or amount of data you can have on a partition. Are there any quota on the computer system you are using?

Change to the root directory. Which files and directories are in the root directory? What is the purpose of each of these files/directories? Now list all files including the hidden files. What is the meaning of the files `.` and `..` ? Change to the */opt* directory. Change back to the parent directory.

Change to your home directory and answer the questions above again.

Use `file` to check the file type of *`assignment1.tar`*, *`linuxcourse`*, *`.bashrc`*, *`.Xauthority`*, and *`loremipsum`*.

2. Finding files in the file system

There are two basic commands for finding files: `locate` and `find`. What is the difference between both commands? Describe under what circumstances you would use `locate` or `find`.

Find the location of the file *`coursename`* in your home directory. Which of the two commands will you use? What happens if you use the other one?

Find the location of the file *`traceroute`*. Which of the two commands will you use? What happens if you use the other one?

Most commands are themselves files containing executable code. Find which file is executed if you run the command `less`.

Same question for `cd`. What happens here?

3. Viewing text files

We revisit here the commands `cat` and `less`. They can both be used to visualize the contents of text files. Can you read the first line of the *`loremipsum`* file?

One of the (many) useful features of `less` is that you can search inside a text file. Open the *`loremipsum`* file with `less` and search for the word "sagittis". Count (manually) the number of occurrences.

How many words and lines does the *`loremipsum`* file contain? How many paragraphs?

Extract the lines containing "sagittis" and count the number of occurrences with `wc`. Is this the same number you had counted above? Why?

Find another way to extract the number of occurrences of "sagittis" in the *`loremipsum`* file.

4. Creating and deleting files and directories

(Exercise from Dr. Garrels' textbook.)

Create a new directory in your home directory. Can you move this directory to the same level as your home directory? Why?

Copy all XPM files from */usr/share/pixmaps* to the new directory. What does XPM mean? List the files in reverse alphabetical order.

Change to your home directory. Create a new directory and copy all the files of the */etc* directory into it. Make sure that you also copy the files and directories that are in the subdirectories of */etc* (recursive copy).

Change to the new directory and make a new directory for files starting with an upper case character and one for files starting with a lower case character. Move all the files to the appropriate directories. Use as few commands as possible. Remove the remaining files.

Delete the directory and its entire content using a single command.

5. Links and inodes

Change to the *`linuxcourse`* directory you created last week. Make a hard link *`coursename2`* to the file *`coursename`*. How many file names are associated with the inode represented by these two files? Create a second hard link. Check again the number of associated file names. Now use `find` to list all file names to this inode if you knew only one of the file names. Then delete the original file *`coursename`*. Can you still read *`coursename2`*?

Now check how many file names are associated with the inode representing the directory "notes". Why are there 4 hardlinks?

Same question as above for your home directory.

Make a hardlink to *coursename2* in */tmp*. Explain what happens.

Make a symbolic link (symlink) to *coursename2* in */tmp*. Display the content of the symbolic link you just created. Now remove the file *coursename2*. Display the content of the symbolic link. Clean up the broken symbolic link in */tmp*.

6. File permissions

Look at the file permissions of the files and directories in your home directory. What do they mean?

Change the file permissions of the file *when* (which you downloaded last week) so that everyone can read and write the file. Make a copy of this file in */tmp*.

Ask a fellow classmate to login to your computer and overwrite the file with a funny message for you.

7. System specifications

(Also shamelessly copied from Dr. Garrels.)

In many Linux systems there is a */proc* file system that contains information about the system and tools to probe the system for information.

Change to the */proc* directory.

What CPU(s) is the system running on? How much RAM does it currently use? How much swap space do you have? What drivers are loaded? How many hours has the system been running? Which filesystems are known by your system?

The */etc* directory contains configuration files. Change to */etc*.

How long does the system keep the log file in which user logins are monitored? Which release are you running? Are there any issues or messages of the day? How many users are defined on your system? Don't count them, let the computer do it for you! How many groups? Where is the time zone information kept?