CHALMERS
UNIVERSITY OF TECHNOLOGY

ASSIGNMENT #4

Introduction to Linux

1. Vi

Run `vimtutor` and do lessons 1 to 4. Save the result as a new file with file name *`vimtutorresult`*.

(Work no longer than 30 minutes on this question today; continue this question at home if necessary.)

2. I/O redirection

(Some exercises adapted from "Introduction of Linux" by Dr. M. Garrels, chapter 5.)

1) Create a file *`linuxcourselog`* and display the file with `tail -f linuxcourselog`. Open a second terminal and now echo text to the *`linuxcourselog`* file. Observe what happens. (This is used often to display log files live.)

2) Run the following commands and determine standard output and standard error:

```
grep root /etc/passwd /etc/nofiles
cat nonexistingfile
file /sbin/ifconfig
```

3) Predict what will happen if you do

```
>time ; date >>time ; cat <time
```

Test your prediction. What is the difference with simply running `date`?

4) Print a list of processes that are running under your user credentials. Print a list of processes run by other users.

5) Run `exec 9>somefile 1>&9`. Then run `ls –la`. What happens? Restore output to the terminal with `exec &>/dev/tty`.

3. Regular expressions

(From “Bash Guide for Beginners” by Dr. M. Garrels, chapter 4.)

1) Display a list of all the users on your system who log in with the Bash shell as default.

2) Display all lines in the `/etc/group` file *starting* with the string “daemon”.

3) Display all the lines from the same file that don't start with the string “daemon”.

4) Display localhost information from the `/etc/hosts` file, display the line number(s) matching the search string, and count the number of occurrences of the string.

5). Display the list of subdirectories in `/usr/share/doc`. How many README files do these subdirectories contain? (Don't count anything in the form of "README.a_string".)

6) Make a list of files (no directories) in your home directory that were changed today, using `grep`.

7) Can you find an alternative for `wc -l`, using `grep`? Test on the `loremipsum` file.

8) Display the configuration files (no directories) in `/etc` that contain numbers in their names.

(The last question would probably be easier to do with `awk`.)

4. sed

(Adapted from “Bash Guide for Beginners” by Dr. M. Garrels, chapter 5.)

You must use `sed` in the following exercises; and you may not use `grep`:

1) Make a long listing of the directory `/usr/share/pixmaps` and write the result to a file. Now, using a single `sed` command, filter out the .xpm files and the .png files simultaneously. Print also a list of all files except the .xpm files and the .png files.

2) Make a list of files in `/usr/bin` that have the letter "v" as the second character. Save the result to a temporary file. Delete the first 2 lines of this file. Try the same with the letter “r”. What is the problem now?

3) Make a file with content “The quick brown fox jumps over the lazy dog.” Substitute “lazy” by “brown”. Then make the brown fox a yellow fox.

4) The Romans have adopted Swedish spelling rules! In the new spelling, “sagittis” must be written “saggittis”. Fix the `loremipsum` file.

5) In the `loremipsum` file, replace all uppercase characters by the corresponding lowercase characters. Then replace all instances of “ut” at the beginning of a sentence to “Ut”.

5. awk

(Adapted from “Bash Guide for Beginners” by Dr. M. Garrels, chapter 6.)

1) For the first exercise, assume you have a file with lines in the following form:

```
Username:Firstname:Lastname:Telephone number
```

Make an `awk` script that converts such a line to an LDAP record in this format:

```
dn: uid=Username, dc=example, dc=com
cn: Firstname Lastname
sn: Lastname
telephoneNumber: Telephone number
```

Create a file containing a couple of test records and check.

2) Print a list of all running processes with a resident set size larger than 10000 kilobytes.

3) Print the total number of bytes used by all files in your home directory.

4) Make a list of files in `/usr/bin` that have the letter "r" as the second character.