Grado en Ingeniería Informática	Laboratorio – **Práctica 1**	**SI**
Sistemas Informáticos	Curso 2024/25	

Introduction to UNIX/Linux administration (the shell)

Main goals

- Get use to the command line
- Gain basic skills with the system shell
- Understand some of the basic tools of system administration
- Start using Shell scripts for task automation.
- **Keep record of all the steps followed to solve these practices**

Command line

1) Using the system manual (`$ man`)[1]
   a) Write `man man` to obtain the help page of man.
   b) Press 'h' to obtain the "less" pager help.
   c) Exit the manual
   d) Enter the manual again and try[2]:
      i) Go to the beginning/end of the page
      ii) Move up and down one line and one screen
      iii) Look for a string, for example "uno". Search next and previous appearances. How many lines contain the mentioned string?
      iv) Go to some specific line of the manual.

2) Inside the superuser $HOME directory, create one directory named SI. Go inside it and check the absolute PATH of where it is (there is a correct command for this). Use the command `timedatectl` and redirect its standard output to a text file. Check if that file has been created.
   a) Go to the user directory (`$HOME`) create two new files named file1 and file2, redirecting the stdout of timedatectl and date commands, respectively. Read the manual of `cat` and `tee` commands and find the way to create three files (named file3-5) whose content corresponds to the combination of file1 and file2 (the three files have the same content).
   b) Create an alias (named lc) for the list command in extended format, including hidden files, temporary ordered from oldest (up) to newest (down). Make this alias permanent for the alumno user. Check if your alias works and is permanent.

[1] If you know the command, man is always a Good starting point looking for help. Get used to employ it.
[2] Practice with less shortcuts, useful when looking for particular info inside a man page.

c) List the 5 newest files (recently modified) in the `/etc` directory.

d) Find which file is the most recent inside the `/var` directory (and subdirectories)[3].

e) Change the permission of the previously created file so that only you can access it in read and write mode.

f) Open a new text terminal in tty3 as superuser.

g) See how many users are in the system and check which one is yours.[4]

h) Check when was the last time you access the system and from where.

i) Execute the vi editor. Practice with it[5]. Create a new file and write in it the following lines:

```
echo -n Date:
date | cut -f1,3,2,6 -d" "
echo -n I am:" "
whoami | cut -f1 -d " "
```

This file will be a "shell script" and it might be executed in two ways: either through a Shell or directly (./) changing its execution permissions.

3) Open *vi* with no file. What does it show?

a) Start with a file named 'vi_test'. which contains following 2 lines, save and exit.

Hello, This is my vi test file

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b) Edit file "vi_test" to modify previous content. Change content on first line by deleting unwanted characters and then inserting desired texts. Then go to last line and insert new text at the last line.

Hello, This is my second practice

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And I am one of course students

c) Search all occurrences of word "course" in file "vi_test". Replace all occurrences of word "course" with word "Laboratory", save to new file name "vi_test2". Check that content of file "vi_test1" and "vi_test2" are different.

d) Edit file "vi_test2", move to the last line and delete it (one command for each action). Then copy the remaining 2 lines and paste it 4 times at the end of the file. Save but don't exit vi. Now "vi test2" will contain following content:

Hello, This is my second practice

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Hello, This is my second practice

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Hello, This is my second practice

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[3] This task is maybe the hardest of this document and cannot be done with "ls", look for another command suitable to **find** files… If you look for a solution in Google and it works, try at least to understand what you are executing.

[4] This could be a good point to practice your Google skills…

[5] There is a cheatsheet available at Moodle, take a look at it to work with vi.

Hello, This is my second practice

SI, System Administration course, Computers Grade, University of Cantabria.

Hello, This is my second practice

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e) Move to Line 7 of file "vi_test2" (single command) and delete last 4 lines of file (single command). Now undo the last modification.

f) Check combined movement (combined prefix)

   i) Move 3 lines down in a single movement

g) Cut the first line of the file and paste it at the end of the file.

h) copy the first three lines to a new file called vi_test_reduced (making use of vi).

4) Applications and commands in text mode:

   a) Compress in a .tar.gz file the `/var`. directory[6]. Place the created file in your $HOME. Check that this was done correctly uncompressing it in `/tmp`.

   b) As root, look for all the regular files property of the 'alumno' user in the system (/) and list them in extended way. Do all this in the same command.

   c) As root again, show the last 30 lines of the `/var/log/syslog` file.

5) Advanced commands:

   a) List (extended) the content of /etc/ directory and redirect stdout to a file called contetc.txt

   b) Perform the following tasks:

      i) Create a reduced version of contetc.txt file, containing the following info for each line: [file/dir name] [size] [owner]

      ii) Sort the contents of the new file according to the field [name] and write result to file alphasorted.txt. Repeat the process in reverse order (antialphasorted.txt)

      iii) Now sort contents according to the field [size] (numsorted.txt)

      iv) Finally, create a new file containing the first three characters of each file/directory name.

   c) Download the text file www.ce.unican.es/SI/LabFiles/AboutWeb.txt

   d) Perform the following modifications (through command line, do not use vi)

      i) Lines with <article> and </article> should be deleted.

      ii) Replace <title> with Title:, and replace </title> with nothing.

      iii) Replace all <para> and </para> tags with the null string. If the resulting line is empty, delete the line. (Just do it using 2 commands.)

      iv) Replace all <emphasis> and </emphasis> tags with asterisks.

      v) Replace the word web with Web everywhere.

      vi) Replace lines starting with <listing> by ---begin listing

      vii) Replace lines starting with </listing> by ---end listing

[6] System manual (man) for tar command is not Good. Look for information online.

6) Download the file www.ce.unican.es/SI/LabFiles/grepdata.txt
   a) Once you have the file, write a series of grep statements that do the following:
      i) Print all lines that contain a phone number with an extension (the letter x or X followed by four digits).
      ii) Print all lines that begin with three digits followed by a blank.
      iii) Print all lines that contain a date. Hint: this is a very simple pattern. It does not have to work for any year before 2000.
      iv) Print all lines containing a vowel (a, e, i, o, or u) followed by a single character followed by the same vowel again. Thus, it will find “eve” or “adam” but not “vera”. Hint: \(and \)
      v) Print all lines that do not begin with a capital S.
   b) Write grep statements that use command-line options along with the pattern to do the following:
      i) Print all lines that contain CA in either uppercase or lowercase.
      ii) Print all lines that contain an email address (they have an @ in them), preceded by the line number.
      iii) Print all lines that do not contain the word Sep. (including the period).

Shell Scripting[7]

1. Write a Shell script called lsdirs.sh, which lists just the directories in the current directory.
2. Write a Shell script called see.sh taking a filename name as argument which uses ‘ls’ if the file is a directory and ‘more’ if not.
3. Write a script that asks the user to type a Word and then tells the user how long that Word is.
4. Write a script that asks the user to type a Word and checks if that is an available user command or not.
5. Create a shell script able to create a directory named “trial”, cd into it and then create 100 files named fich<num>.txt (where num is a number between 0 and 99).
6. Extend your script, making that the content of each file created corresponds to the n-th line of ls command manual (fich57.txt has the 57th line of ‘man ls’)
7. Create a script able to change the extension of all .txt files to .t
8. Create a script which takes an undefined number of parameters [0-9] and removes the file corresponding to the sum of all parameters. Example: borra.sh 1 3 5 6 2 removes the file fich17.txt (1+3+5+6+2=17)

[7] Terminal multiplexing (tmux)is a useful tool for shell scripting. Get used to divide your screen into two panels, edit your file with vi in one of them and run your script in the other one.

9. Write a Shell script called sorter.sh that sorts the /etc/passwd file content using one of the following id as the key; Username, UID or GID. The identifier must be passed by command line.
10. Suppose that you want to write the same letter to many people (but personalized addressing). Write a file with all the desired recipients (one per line). Create a template textfile which has NAME wherever you want the person's name to appear. Create a mailmerge script that produces a personalized letter for each person in the list.