| **Lab Assignment 1**<br>*Corresponding to Topic 2, "The Command Line"* | **L1** |
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## Main goals

- To get used to the command line.
- To gain basic skills with the system shell.
- To understand some of the basic tools of system administration.
- To start using Shell scripts for task automation.
- **To keep a record of all the steps followed for solving these practical activities.**

## Part 1: Command line

**1) Using the system manual** (`$ man`)**:**

**a)** Log in the system "guest" as user *test*.

**b)** Write `man man` to obtain the help page of man.

**c)** Press 'h' to obtain the "less" pager help.[1]

**d)** Exit the manual.

**e)** Enter the manual again and try:

**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 "word". Search next and previous appearances.

**IV)** Go to some specific line of the manual.

[1] Must install less if not in the system (*).

2) **Inside the user 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 `cal` (calendar) and redirect its standard output to a text file. Check if that file has been created:**

   **a)** Check the content of the new file with the corresponding command. Copy that file to the personal user directory (`$HOME`). Remember that in the shell these commands can be edited.

   **b)** Once copied, delete original file and the directory previously created. Remember that the command line can be autocompleted with the appropriate key.

   **c)** Go to the user directory (`$HOME`) and list (in extended format, –l) the directories and files included. Pipe the output to the `cat` and `tee` commands finding their differences (if they exist).

   **d)** List the 5 newest files (recently modified) in the */etc* directory.

   **e)** Find which file is the most recent one of the system.

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

   **g)** Avoid any other user accessing our personal directory.

   **h)** See how many users are in the system and check which one is yours.

   **i)** Check when and from where you last accessed the system.

   **j)** Analyze `finger` command using it with the 'test' user.

   **k)** Create a .plan file (`$HOME/.plan`), indicating some kind of personal information. Check this information with the finger command.

   **l)** Check if the 'root' user has unread mail and when he/she last accessed the system. Repeat with the 'test' user.

   **m)** Execute the VI editor. Practice with it. 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 directory (./) changing its execution permissions.

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

- **a)** Exit. Copy `/etc/passwd` file in `$HOME`.
- **b)** Edit $HOME/`passwd` file.
- **c)** Use this file to practice the main basic and advanced commands to move around a file. (hjkl and others).
- **d)** Start with a file named 'vi_test'. It must be created again.
- **e)** Write your name in the file. Save and exit.
- **f)** Open the file again and check its content.
- **g)** Add more names to the file. Move to the middle of the file and add a name upper line and another one in the lower line.
- **h)** Check combined movement (combined prefix):
  - **I)** Move 3 lines down in a single movement.
- **i)** Try to delete a character, a line and a word of the file.
- **j)** Repeat the previous step with numerical prefixes:
  - **I)** Delete until the end of a line.
  - **II)** Delete from the beginning of a line.
  - **III)** Delete two lines at a time.
  - **IV)** Delete two words at a time.
- **k)** Repeat the previous step but change instead of delete.
- **l)** Cut the first line of the file and paste it at the end of the file.

4) **Applications and commands in text mode:**
   - **a)** Compress in a .tar.gz file the `/var`. file. Place the created file in your $HOME. Check that this was done correctly uncompressing it in `/tmp`.
   - **b)** As root, look for all the files that are property of the 'test' 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) **Download the file: www.ce.unican.es/OCW/SI/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).

6) **Execute in background the command that allows seeing all the files inside a directory recursively. Do it for the root directory / and its output will be redirected to a file name 'temp'. If you need any help, remember to use the `man` command:**
   - **a)** Check if the process really exists. If it does kill it.
   - **b)** Repeat the previous steps, but executing in the foreground. Stop the process. Then move the job to foreground again. Suspend it. Move it to the background. Finally kill it.
   - **c)** Try to kill the INIT process.
   - **d)** Look for all the processes in the system for which we are owners.
   - **e)** Look for all the processes in the system for which neither us nor root are the owners.

7) **Advanced commands:**
   - **a)** List 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/OCW/SI/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. (You may need to use curly braces to make this happen).
     - **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.

## Part 2: Shell Scripting

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) **We will start this section creating 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, so 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).**

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.**