Pre-silicon Verification Spring 2022

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A- Search files according to creation or modification date

Use the Linux find command to filter by timestamp

The operating system manages the file system and records when files have been accessed. Several timestamps are generated in the process. Linux creates timestamps for the creation, last modification, and last access of a file. Using the find command, we can filter and find these timestamps. Here is a summary of the most used search parameters:

-ctime, -cmin: Filter by creation date

c: creation

time: days

min: minutes

-mtime, -mmin Filter by modification date

m: modification

time: days

min: minutes

You need to specify the type of file you are looking for

f: archive

d: directory

find **-type f** -cmin +30

We can limit the number of days passed to a range. Again, plus and minus signs are used as modifiers:

- \+ The date is more days ago than specified
- \- The date is less days ago than specified

To find files that were creation just a 30 minutes ago, we use the search parameter “-ctime” followed by the value “30”:

find -type f -cmin -30

PC@PC /cygdrive/c/cygwin64/Practica

$ find -type f -cmin -30
./Students/Tarea/Practica1.txt
File that was created more than 30 minutes ago.

find -type f -cmin +30

PC@PC /cygdrive/c/cygwin64/Practica

$ find -type f -cmin +30
./Students/El report.txt
./Students/Practica 1.txt
./Students/Practica1.txt
./Students/Proyecto/Hardware/Lab3.txt
./Students/Proyecto/Lab4.txt
./Students/Report.txt
./Students/Tarea/Software/La practica.txt
./Students/Tarea/Software/Lab1.txt
./Students/Tarea/Software/Lab2.txt
./Students/Tarea/Software/practica1.txt
./Students/Tarea/Software/practica2.txt

As it can be seen, file "Practica1.txt" does not appear when using the command "find -type f -cmin +30" because it was created before 30 minutes

File that was created less than 5 minutes ago.

find -type f -mmin -5

PC@PC /cygdrive/c/cygwin64/Practica/Students/Tarea

$ find -type f -mmin -5
./Practica23.txt

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File that was created more than 5 minutes ago

find -type f -mmin +5

PC@PC /cygdrive/c/cygwin64/Practica/Students/Tarea

$ find -type f -mmin +5
./Practica1.txt
./Software/La practica.txt
./Software/Lab1.txt
./Software/Lab2.txt
./Software/practica1.txt
./Software/practica2.txt

As it can be seen, file "Practica23.txt" does not appear when using the command "find -type f -mmin +5" because it was modified before 5 minutes

the command **find -type f -mtime +5** searches for a document modified more than 5 days ago

the command **find -type f -ctime -2** searches for a document created less than 2 days ago

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B- Monitor File size

There are 3 ways of monitoring File Size in Linux, each one has its differences depending on how “human-readable” they are and how much information it displays.

ls -l FileName

By using this command, the system will show file or directory, size, modified date and time, file or folder name and owner of the file, and its permission. Size of each file is shown in the example below with blue numbers.

```
PC@PC  /cygdrive/c/LINUX/FILE_SIZE
$ ls -l  /cygdrive/c/LINUX/FILE_SIZE

total 85
-rwxrwx---+ 1 Administradores Ninguno  1968 May 25 00:32 FILE_SIZE_1.txt
-rwxrwx---+ 1 Administradores Ninguno 78720 May 25 00:32 FILE_SIZE_2.txt
-rwxrwx---+ 1 Administradores Ninguno   151 May 25 00:33 FILE_SIZE_3.txt
```

If the user wants to have a more understandable value on the size, the user can always **add -h** to command **ls -l** as in the next example.

```
PC@PC  /cygdrive/c/LINUX/FILE_SIZE
$ ls -lh  /cygdrive/c/LINUX/FILE_SIZE

total 85k
-rwxrwx---+ 1 Administradores Ninguno  2.0k May 25 00:32 FILE_SIZE_1.txt
-rwxrwx---+ 1 Administradores Ninguno  77k May 25 00:32 FILE_SIZE_2.txt
-rwxrwx---+ 1 Administradores Ninguno   151 May 25 00:33 FILE_SIZE_3.txt
```

du -h FileName

This command **(Disk Usage)** is the best to use for **file memory usage monitoring** in order to check the disk usage of files and directories on a machine. It provides the file size in a human-readable format as it prints just the size information in bytes (marked with blue), making the user able to see file sizes in Bytes, Kilobytes, Megabytes, Gigabytes, etc.

```
PC@PC  /cygdrive/c/LINUX/FILE_SIZE
$ du -h  /cygdrive/c/LINUX/FILE_SIZE
89k     /cygdrive/c/LINUX/FILE_SIZE

PC@PC  /cygdrive/c/LINUX/FILE_SIZE
$ du -h  /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_1.txt
4.0k    /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_1.txt

PC@PC  /cygdrive/c/LINUX/FILE_SIZE
$ du -h  /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_2.txt
80k     /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_2.txt

PC@PC  /cygdrive/c/LINUX/FILE_SIZE
$ du -h  /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_3.txt
1.0k    /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_3.txt
```

Note: It is important to take into consideration that **"du"** shows actual disk usage which can differ with the file size due to holes, and **"ls"** shows the size of the file.

stat FileName

Stat command is used to get file system-related information about files and directories, giving size information (in blue) in Byte mode.

```
PC@PC  /cygdrive/c/LINUX/FILE_SIZE

$ stat  /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_1.txt

  File: /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_1.txt

  Size: 1968            Blocks: 4          IO Block: 65536  regular file

Device: 4817ac11h/1209510929d   Inode: 5348024559227354  Links: 1
Access: (0770/-rwxrwx---)  Uid: (  544/Administradores)   Gid: (197121/ Ninguno)
Access: 2022-05-25 00:32:08.286379100 -0500
Modify: 2022-05-25 00:32:08.235741400 -0500
Change: 2022-05-25 00:32:08.290435600 -0500
 Birth: 2022-05-25 00:32:07.838624000 -0500
```

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PC@PC /cygdrive/c/LINUX/FILE_SIZE

$ stat /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_2.txt

File: /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_2.txt

Size: **78720** Blocks: 80 IO Block: 65536 regular file

Device: 4817ac11h/1209510929d Inode: 4785074605519084 Links: 1
Access: (0770/-rwxrwx---) Uid: (544/Administradores) Gid: (197121/ Ninguno)
Access: 2022-05-25 00:53:11.069119300 -0500
Modify: 2022-05-25 00:32:44.482097300 -0500
Change: 2022-05-25 00:32:44.530817800 -0500
Birth: 2022-05-25 00:32:44.108244400 -0500

PC@PC /cygdrive/c/LINUX/FILE_SIZE

$ stat /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_3.txt

File: /cygdrive/c/LINUX/FILE_SIZE/FILE_SIZE_3.txt

Size: **151** Blocks: 1 IO Block: 65536 regular file

Device: 4817ac11h/1209510929d Inode: 11258999070110348 Links: 1
Access: (0770/-rwxrwx---) Uid: (544/Administradores) Gid: (197121/ Ninguno)
Access: 2022-05-25 00:53:11.049610900 -0500
Modify: 2022-05-25 00:33:33.000605500 -0500
Change: 2022-05-25 00:33:33.059507700 -0500
Birth: 2022-05-25 00:33:32.618479900 -0500

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C- Find duplicate files

Use command "find -name or find -iname" to filter by filename to find duplicate files

-name: search for the file by name and is sensitive to uppercase letters

find -name “file_name”

An example using the command find -name in the same directory

PC@PC /cygdrive/c/cygwin64/Practica/Students

$ find -name "practica1.txt"

./Tarea/Software/practica1.txt

-iname: search for the file by name and is not sensitive to uppercase letters

find -iname “file_name”

An example using the command find -iname in the same directory

PC@PC /cygdrive/c/cygwin64/Practica/Students

$ find -iname “practica1.txt”

./Practica1.txt

./Tarea/Practica1.txt

./Tarea/Software/practica1.txt

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To search for all files within a directory, you need to specify the directory,

find /home/usuario -name

In the following example we are located in the directory **/cygdrive/c/Jos** and we look for a document called “Practica1.txt” in the directory **/cygdrive/c/cygwin64/Practica** using -name y después usando -iname

PC@PC /cygdrive/c/Jos

$ find /cygdrive/c/cygwin64/Practica -name “Practica1.txt”

/cygdrive/c/cygwin64/Practica/Students/Practica1.txt

/cygdrive/c/cygwin64/Practica/Students/Tarea/Practica1.txt

PC@PC /cygdrive/c/Jos

$ find /cygdrive/c/cygwin64/Practica -iname “practica1.txt”

/cygdrive/c/cygwin64/Practica/Students/Practica1.txt

/cygdrive/c/cygwin64/Practica/Students/Tarea/Practica1.txt

/cygdrive/c/cygwin64/Practica/Students/Tarea/Software/practica1.txt

To find a file in the entire system, it must be searched from the root folder /

find / -name “file_name”

D- Looking for files with a specific Word in them

Grep command:

in order to search a String of characters inside a file, use grep. the main syntaxis of the command is like;

$grep String file

where string is the word that is intended to find on the specified file.
with grep it is possible to look for directories using -r.
example:
On the directory /home there are four text documents with different information in it. find the document which has the word 'pink' on it.

1. the directory /home has the following files;

```
chris@DESKTOP-8LCLCKD /home
$ ls
Student  hola.txt  hola3.txt  test1.txt  test2.txt
```

2. the structure that is used to find a word in every document in the direction is **$grep -r [WORD] [Direction]**

```
chris@DESKTOP-8LCLCKD /home
$ grep -r pink /home
/home/hola.txt:They had always called it the green river. It made sense. The riv
er was green. The river likely had a different official name, but to everyone in
 town, it was and had always been the green river. So it was with great surprise
 that on this day the green river was a fluorescent pink.
```

grep also have another options that will help to perform the searching;

- -i: Ignore uppercase vs. lowercase.
- -v: Invert match.
- -c: Output count of matching lines only.
- -l: Output matching files only.
- -n: Precede each matching line with a line number.
- -b: A historical curiosity: precede each matching line with a block number.
- -h: Output matching lines without preceding them by file names.
- -s: Suppress error messages about nonexistent or unreadable files.
- -f file: Take regexes from a file.
- -o: Output the matched parts of a matching line.

E -Sort the contents of the files according to numerical values or by alphabetical order.

- First we'll see the contents of the file.

```
PC@PC :/cesar/Lab4$ cat File.txt

Computer
Desk
Office
Meat
Arc
Chicken
Bed
```

- We can sort the contents of the file using the command ***sort***

```
PC@PC :/cesar/Lab4$ sort File.txt
Arc
Bed
Chicken
Computer
Desk
Meat
Office
```

- We can do the same with numerical values, but this time using ***sort -n***

```
PC@PC :/cesar/Lab4$ cat File2.txt
5
35
75
2
365
1
74
435
3
1

PC@PC:/cesar/Lab4$ sort -n File2.txt
1
1
2
3
5
35
74
75
365
435
```

Additional instructions.

- To sort **in reverse order**, add the **-r** option to sort, this will sort in reverse order and display the result on screen.
- To sort **text case** sensitively, add the **-f** option to sort, this will ignore case sensitivity when sorting and display the result on screen.
- To check if a file is **already sorted**, put the **-c** option to sort.
- To **sort and remove duplicates**, add the **-u** option to sort, this will write an ordered list and remove duplicates.