# Linux Plus
for
AWS and DevOps

CLARUSWAY
WAY TO REINVENT YOURSELF

Using Filter

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Table of Contents

CLARUSWAY
WAY TO REINVENT YOURSELF

1 Filters

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Filters

Commands that are created to be used with a **pipe** are often called filters.

These filters are very small programs that do one specific thing very efficiently. They can be used as building blocks.

- Pipes ('|') send the output of one command as input of another command.
- The Filter takes input from one command, does some processing, and gives output.

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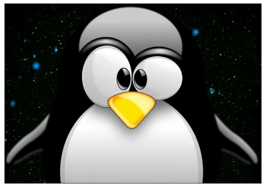
Commands

2

- cat
- tee
- grep
- cut
- tr
- wc
- sort
- uniq
- comm



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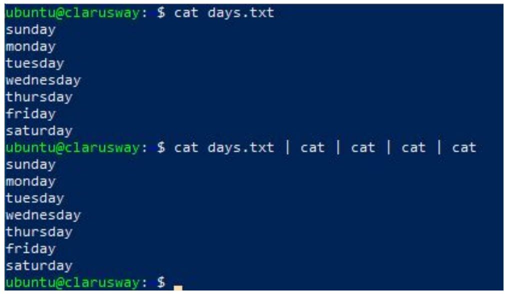
Filters Commands

cat

When between two pipes, the cat command does nothing (except putting stdin on stdout). Displays the text of the file line by line.



```
ubuntu@clarusway: $ cat days.txt
sunday
monday
tuesday
wednesday
thursday
friday
saturday
ubuntu@clarusway: $ cat days.txt | cat | cat | cat | cat
sunday
monday
tuesday
wednesday
thursday
friday
saturday
ubuntu@clarusway: $
```

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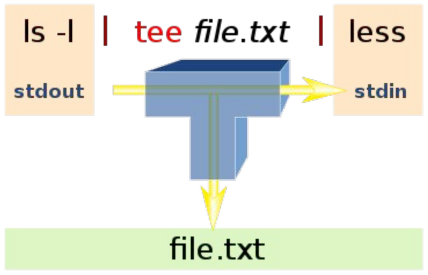
Filters Commands

tee

tee is almost the same as cat, except that it has two identical outputs.



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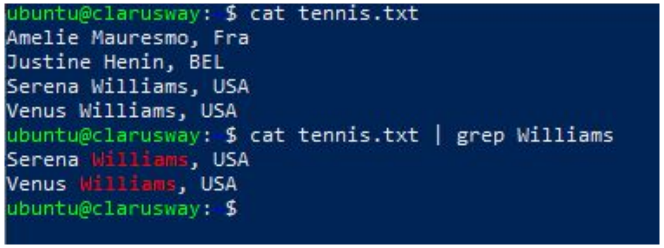
Filters Commands

grep The most common use of grep is to filter lines of text containing (or not containing) a certain string.



```
ubuntu@clarusway: $ cat tennis.txt
Amelie Mauresmo, Fra
Justine Henin, BEL
Serena Williams, USA
Venus Williams, USA
ubuntu@clarusway: $ cat tennis.txt | grep Williams
Serena Williams, USA
Venus Williams, USA
ubuntu@clarusway: $
```

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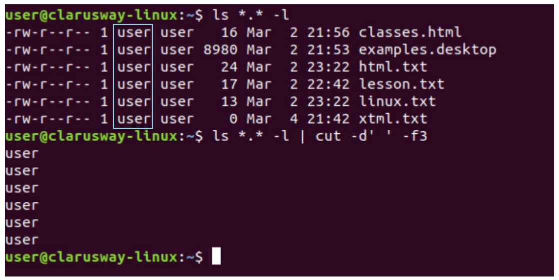
Filters Commands

cut The cut filter can select columns from files, depending on a delimiter or a count of bytes

cut -d(delimiter) -f(columnNumber) <fileName>



```
user@clarusway-linux:~$ ls *.* -l
-rw-r--r-- 1 user user   16 Mar  2 21:56 classes.html
-rw-r--r-- 1 user user 8980 Mar  2 21:53 examples.desktop
-rw-r--r-- 1 user user   24 Mar  2 23:22 html.txt
-rw-r--r-- 1 user user   17 Mar  2 22:42 lesson.txt
-rw-r--r-- 1 user user   13 Mar  2 23:22 linux.txt
-rw-r--r-- 1 user user    0 Mar  4 21:42 xtml.txt
user@clarusway-linux:~$ ls *.* -l | cut -d' ' -f3
user
user
user
user
user
user
user@clarusway-linux:~$
```

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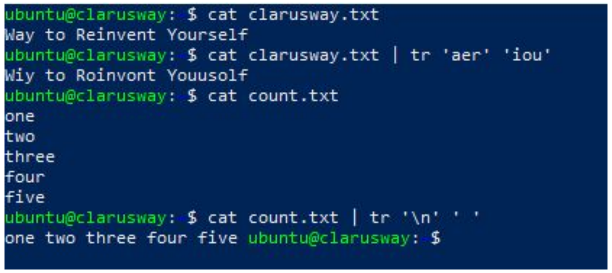
Filters Commands

tr

The command 'tr' stands for 'translate'.
It is used to translate, like from lowercase to uppercase and vice versa or new lines into spaces.



```
ubuntu@clarusway: $ cat clarusway.txt
Way to Reinvent Yourself
ubuntu@clarusway: $ cat clarusway.txt | tr 'aer' 'iou'
Wiy to Roinvont Youusolf
ubuntu@clarusway: $ cat count.txt
one
two
three
four
five
ubuntu@clarusway: $ cat count.txt | tr '\n' ' '
one two three four five ubuntu@clarusway: $
```

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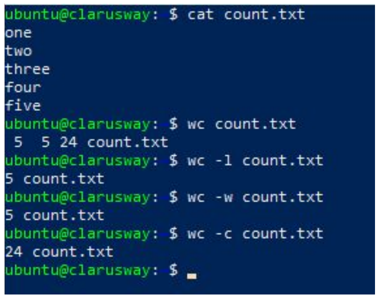
Filters Commands

wc

Counting words, lines and characters is easy with wc.

- wc **<fileName>** (Counts words, lines and characters)
- wc -l **<fileName>** (Counts only lines)
- wc -w **<fileName>** (Counts only words)
- wc -c **<fileName>** (Counts only characters)



```
ubuntu@clarusway: $ cat count.txt
one
two
three
four
five
ubuntu@clarusway: $ wc count.txt
 5  5 24 count.txt
ubuntu@clarusway: $ wc -l count.txt
5 count.txt
ubuntu@clarusway: $ wc -w count.txt
5 count.txt
ubuntu@clarusway: $ wc -c count.txt
24 count.txt
ubuntu@clarusway: $ _
```

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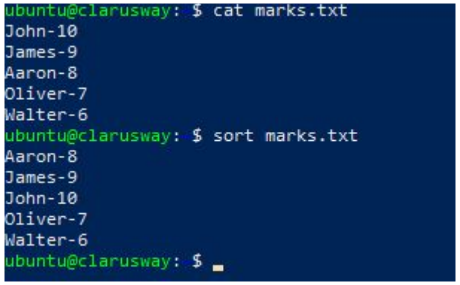
Filters Commands

sort

The sort filter will default to an alphabetical sort.

sort -r	the flag returns the results in reverse order
sort -f	the flag does case insensitive sorting



```
ubuntu@clarusway: $ cat marks.txt
John-10
James-9
Aaron-8
Oliver-7
Walter-6
ubuntu@clarusway: $ sort marks.txt
Aaron-8
James-9
John-10
Oliver-7
Walter-6
ubuntu@clarusway: $
```

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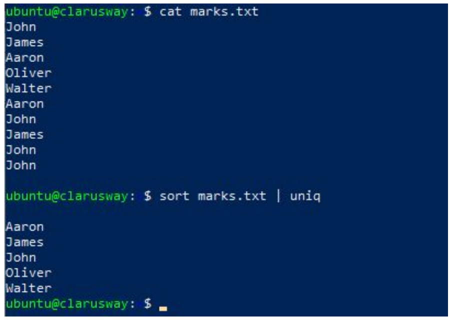
Filters Commands

uniq

With the help of uniq command you can form a **sorted list** in which every word will occur only once.



```
ubuntu@clarusway: $ cat marks.txt
John
James
Aaron
Oliver
Walter
Aaron
John
James
John
John

ubuntu@clarusway: $ sort marks.txt | uniq

Aaron
James
John
Oliver
Walter
ubuntu@clarusway: $
```

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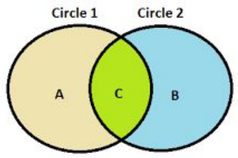
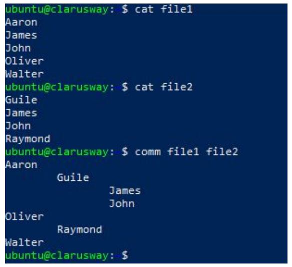
Filters Commands

comm

The 'comm' command compares two files or streams.
By default, 'comm' will always display three columns.
First column indicates non-matching items of first file, second column indicates non-matching items of second file, and third column indicates matching items of both the files.
Both the files has to be in sorted order for 'comm' command to be executed.





```
ubuntu@clarusway: $ cat file1
Aaron
James
John
Oliver
Walter
ubuntu@clarusway: $ cat file2
Guile
James
John
Raymond
ubuntu@clarusway: $ comm file1 file2
Aaron
        Guile
                James
                John
Oliver
        Raymond
Walter
ubuntu@clarusway: $
```

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Exercise 1

1. Create a file named countries.csv with the following content

```
Country,Capital,Continent
USA,Washington,North America
France,Paris,Europe
Canada,Ottawa,North America
Germany,Berlin,Europe
```

2. a. Cut only “Continent” column
   b. Remove header
   c. Sort the output
   d. List distinct values
   e. Save final output to “continents.txt” file
3. Display content of continents.txt file

Students, write your response!

Pear Deck Interactive Slide
Do not remove this bar

Using Control Operators

CLARUSWAY
WAY TO REINVENT YOURSELF

Table of Contents

CLARUSWAY
WAY TO REINVENT YOURSELF

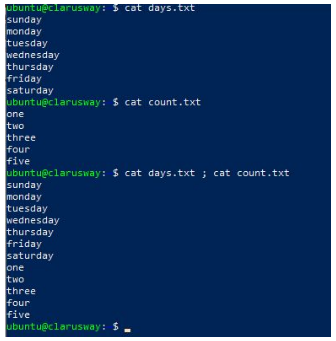
Control Operators

We put more than one command on the command line using control operators.

Control Operator	Usage
; semicolon	More than one command can be used in a single line.
& ampersand	Command ends with & and doesn't wait for the command to finish.
$? dollar question mark	Used to store exit code of the previous command.
&& double ampersand	Used as logical AND.
|| double vertical bar	Used as logical OR.
Combining && and ||	Used to write if then else structure in the command line.
# pound sign	Anything was written after # will be ignored.

Semicolon (;)

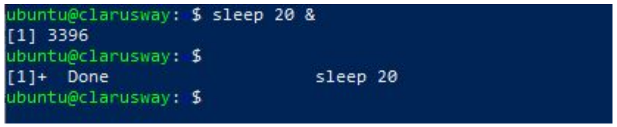
You can put two or more commands on the same line separated by a **semicolon (;)**



```
ubuntu@clarusway: $ cat days.txt
sunday
monday
tuesday
wednesday
thursday
friday
saturday
ubuntu@clarusway: $ cat count.txt
one
two
three
four
five
ubuntu@clarusway: $ cat days.txt ; cat count.txt
sunday
monday
tuesday
wednesday
thursday
friday
saturday
one
two
three
four
five
ubuntu@clarusway: $ 
```

Ampersand (&)

When a line ends with an ampersand &, the shell will not wait for the command to finish. You will get your shell prompt back, and the command is executed in background. You will get a message when this command has finished executing in background.



```
ubuntu@clarusway: $ sleep 20 &
[1] 3396
ubuntu@clarusway: $
[1]+  Done                    sleep 20
ubuntu@clarusway: $
```

- Look at the above snapshot, command **"sleep 20 &"** has displayed a message after 15 seconds.
- Meanwhile, in the shell prompt, we can write any other command.

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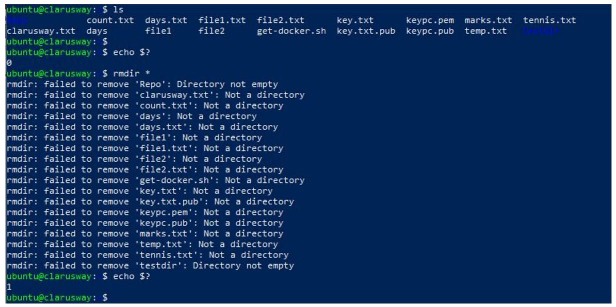
Dollar Question Mark ($?)

This control operator is used to check the status of last executed command. If status shows '0' then command was successfully executed and if shows '1' then command was a failure.



```
ubuntu@clarusway: $ ls
Repo           count.txt  days.txt  file1.txt  file2.txt      key.txt      keypc.pem  marks.txt  tennis.txt
clarusway.txt  days       file1     file2      get-docker.sh  key.txt.pub  keypc.pub  temp.txt   testdir
ubuntu@clarusway: $
ubuntu@clarusway: $ echo $?
0
ubuntu@clarusway: $ rmdir *
rmdir: failed to remove 'Repo': Directory not empty
rmdir: failed to remove 'clarusway.txt': Not a directory
rmdir: failed to remove 'count.txt': Not a directory
rmdir: failed to remove 'days': Not a directory
rmdir: failed to remove 'days.txt': Not a directory
rmdir: failed to remove 'file1': Not a directory
rmdir: failed to remove 'file1.txt': Not a directory
rmdir: failed to remove 'file2': Not a directory
rmdir: failed to remove 'file2.txt': Not a directory
rmdir: failed to remove 'get-docker.sh': Not a directory
rmdir: failed to remove 'key.txt': Not a directory
rmdir: failed to remove 'key.txt.pub': Not a directory
rmdir: failed to remove 'keypc.pem': Not a directory
rmdir: failed to remove 'keypc.pub': Not a directory
rmdir: failed to remove 'marks.txt': Not a directory
rmdir: failed to remove 'temp.txt': Not a directory
rmdir: failed to remove 'tennis.txt': Not a directory
rmdir: failed to remove 'testdir': Directory not empty
ubuntu@clarusway: $ echo $?
1
ubuntu@clarusway: $
```

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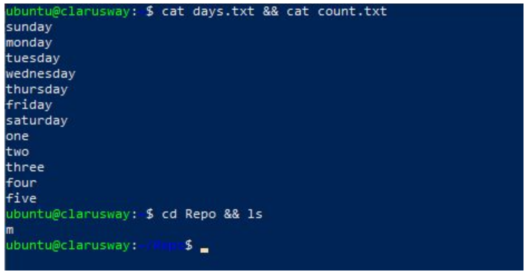
Double Ampersand (&&)

The command shell interprets the && as the logical AND. When using this command, the second command will be executed only when the first one has been successfully executed.



```
ubuntu@clarusway: $ cat days.txt && cat count.txt
sunday
monday
tuesday
wednesday
thursday
friday
saturday
one
two
three
four
five
ubuntu@clarusway: $ cd Repo && ls
m
ubuntu@clarusway:~/Repo$
```

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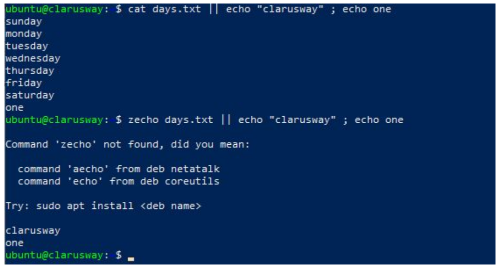
WAY TO REINVENT YOURSELF

Double Vertical Bar (||)

The command shell interprets the (||) as the logical OR. This is opposite of logical AND. Means second command will execute only when first command will be a failure.



```
ubuntu@clarusway: $ cat days.txt || echo "clarusway" ; echo one
sunday
monday
tuesday
wednesday
thursday
friday
saturday
one
ubuntu@clarusway: $ zecho days.txt || echo "clarusway" ; echo one

Command 'zecho' not found, did you mean:

  command 'aecho' from deb netatalk
  command 'echo' from deb coreutils

Try: sudo apt install <deb name>

clarusway
one
ubuntu@clarusway: $
```

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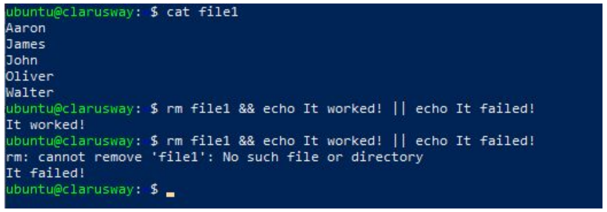
Combining && and ||

You can use this logical AND and logical OR to write an if-then-else structure on the command line. This example uses echo to display whether the rm command was successful.



```
ubuntu@clarusway:~$ cat file1
Aaron
James
John
Oliver
Walter
ubuntu@clarusway:~$ rm file1 && echo It worked! || echo It failed!
It worked!
ubuntu@clarusway:~$ rm file1 && echo It worked! || echo It failed!
rm: cannot remove 'file1': No such file or directory
It failed!
ubuntu@clarusway:~$ _
```

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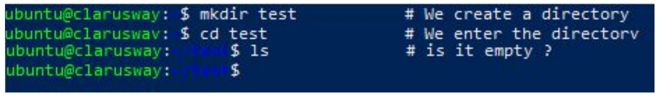
Pound Sign (#)

Everything written after a pound sign (#) is ignored by the shell. This is useful to write a shell comment but has no influence on the command execution or shell expansion.



```
ubuntu@clarusway:~$ mkdir test            # We create a directory
ubuntu@claruswav:~$ cd test               # We enter the directorv
ubuntu@clarusway:~/test$ ls               # is it empty ?
ubuntu@clarusway:~/test$
```

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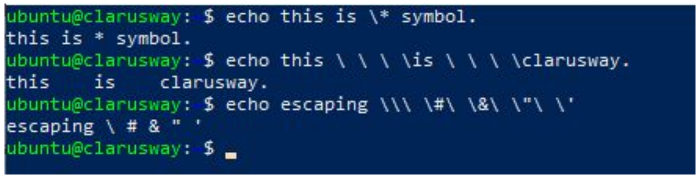
Escaping Special Characters (\)

Escaping characters are used to enable the use of control characters in the shell expansion but without interpreting it by the shell.



```
ubuntu@clarusway: $ echo this is \* symbol.
this is * symbol.
ubuntu@clarusway: $ echo this \ \ \ \is \ \ \ \clarusway.
this    is    clarusway.
ubuntu@clarusway: $ echo escaping \\\ \#\ \&\ \"\ \'
escaping \ # & " '
ubuntu@clarusway: $ _
```

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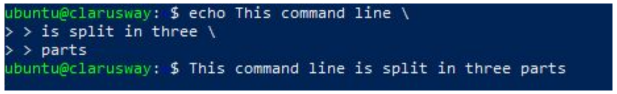
End of Line Backslash (\)

Lines ending in a backslash are continued on the next line. The shell does not interpret the newline character and will wait on shell expansion and execution of the command line until a newline without backslash is encountered.



```
ubuntu@clarusway: $ echo This command line \
> > is split in three \
> > parts
ubuntu@clarusway: $ This command line is split in three parts
```

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Kahoot!

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Exercise

1. a. Search for “clarusway.txt” in the current directory
   b. If it exists display its content
   c. If it does not exist print message “Too early!”
2. Create a file named “clarusway.txt” that contains “Congratulations”
3. Repeat Step 1

Students, write your response!

Exercises

```
ls -l | cut -d’ ‘ -f3
ls -l | tee output.txt | cut -d’ ‘ -f3
ls -l | cut -d’ ‘ -f3 | tee output.txt

cat file.txt | tr ‘a’ ‘W’
cat file.txt | tr ‘a’ ‘W’ | file.txt

cat /etc/passwd | cut -d’ ‘ -f1 | wc -l

cat tennis_players.txt | sort
cat tennis_players.txt | sort -r

info ls | tee ls_exp.txt
cat /etc/passwd | cut -d’ ‘ -f3 | uniq | wc -l
```

Homework

diff	diff (1) diff (1p)	- compare files line by line - compare two files

https://www.geeksforgeeks.org/diff-command-linux-examples/#:~:text=diff%20stands%20for%20difference.,make%20the%20two%20files%20identical.

https://www.linuxtechi.com/diff-command-examples-linux/

THANKS!

Any questions?