

Commands: pwd, cd, mkdir, rmdir

```
pubsrv1:/tmp>pwd
/tmp
pubsrv1:/tmp>ls -as
total 82
 16 .                16 junk                16 sh5720
  2 ..              0 mysql.sock
 16 hspferdata_reserv 0 output26675
 16 hspferdata_root   0 output26935
pubsrv1:/tmp>ls -lF
total 64
drwxr-xr-x  2 reserv  other      177 Jan 24 16:22 hspferdata_reserv/
drwxr-xr-x  2 root    root       117 Feb 15 02:24 hspferdata_root/
drwx----- 2 antoulas other      238 Feb 16 00:07 junk/
srwxrwxrwx  1 mysql   mysql      0 Jan 24 16:22 mysql.sock=
-rw-r--r--  1 vfisikop doctoral  0 Jan 27 14:27 output26675
-rw-r--r--  1 vfisikop doctoral  0 Jan 27 14:29 output26935
-rw-----  1 root     root       849 Jan 24 16:22 sh5720

pubsrv1:/tmp>mkdir subdir
pubsrv1:/tmp>ls -lF
total 80
drwxr-xr-x  2 reserv  other      177 Jan 24 16:22 hspferdata_reserv/
drwxr-xr-x  2 root    root       117 Feb 15 02:24 hspferdata_root/
drwx----- 2 antoulas other      238 Feb 16 00:07 junk/
srwxrwxrwx  1 mysql   mysql      0 Jan 24 16:22 mysql.sock=
-rw-r--r--  1 vfisikop doctoral  0 Jan 27 14:27 output26675
-rw-r--r--  1 vfisikop doctoral  0 Jan 27 14:29 output26935
-rw-----  1 root     root       849 Jan 24 16:22 sh5720
drwx----- 2 antoulas other      117 Feb 16 01:04 subdir/
```

Commands: pwd, cd, mkdir, rmdir

```
pubsrv1:/tmp>pwd
pubsrv1:/tmp>cd subdir/
pubsrv1:/tmp/subdir>ls -las
total 32
 16 drwx-----  2 antoulas other      117 Feb 16 01:04 .
 16 drwxrwxrwt  6 root      sys      653 Feb 16 01:05 ..
pubsrv1:/tmp/subdir>pwd
/tmp/subdir
pubsrv1:/tmp/subdir>cd ..
pubsrv1:/tmp>rmdir subdir/
pubsrv1:/tmp>ls subdir
subdir: No such file or directory
pubsrv1:
```

Commands: `cp (-i, -r)`, `mv (-i)`, `rm (-i, -r, -f)`

- ▶ “-i”: interactive mode (asks before an action can be taken).
- ▶ “-r”: option about directories in `cp` and `rm` commands
- ▶ “-f”: force option (in removing files/directories).
- ▶ “`rm -f`” is less powerful than “`rm -i`”

Command: rm

```
pubsrv1:/tmp>cd junk/  
pubsrv1:/tmp/junk>ls  
aaa  bbbb  
pubsrv1:/tmp/junk>rm -fi bbbb  
rm: remove bbbb (yes/no)? y  
pubsrv1:/tmp/junk>ls  
aaa  
pubsrv1:/tmp/junk>rm -f aaa  
rm: remove aaa (yes/no)? n  
pubsrv1:/tmp/junk>alias rm  
rm -i  
pubsrv1:/tmp/junk>unalias rm  
pubsrv1:/tmp/junk>rm -fi aaa  
rm: remove aaa (yes/no)? n  
pubsrv1:/tmp/junk>rm -f aaa  
pubsrv1:/tmp/junk>ls  
pubsrv1:/tmp/junk>
```

Commands: more, cat

```
antoulas@sazerac:/tmp$ more .bashrc
# .bashrc file
# User specific aliases and functions

# Source definitions
if [ -f /etc/bashrc ]; then
    . /etc/bashrc
fi

alias ll='ls -l'
alias la='ls -A'
alias l='ls -CF'

PS1='$ '
antoulas@sazerac:/tmp$ cat -n .bashrc
 1  # .bashrc file
 2  # User specific aliases and functions
 3
 4  # Source definitions
 5  if [ -f /etc/bashrc ]; then
 6      . /etc/bashrc
 7  fi
 8
 9  alias ll='ls -l'
10  alias la='ls -A'
11  alias l='ls -CF'
12
13  PS1='$ '
antoulas@sazerac:/tmp$
```

Command: lpr, lpstat -t

```
antoulas@sazerac:/tmp$ lpstat -t
scheduler is running
system default destination: hp-LaserJet-1320-series
device for hp-LaserJet-1320-series: usb://HP/LaserJet%201320%20series
hp-LaserJet-1320-series accepting requests since Tue 12 Jan 2010 11:37:50 AM EET
printer hp-LaserJet-1320-series is idle.  enabled since Tue 12 Jan 2010 11:37:50
AM EET
antoulas@sazerac:/tmp$
antoulas@sazerac:/tmp$ lpr -Php-LaserJet-1320-series .bashrc
antoulas@sazerac:/tmp$
antoulas@sazerac:/tmp$ lpstat -t
scheduler is running
system default destination: hp-LaserJet-1320-series
device for hp-LaserJet-1320-series: usb://HP/LaserJet%201320%20series
hp-LaserJet-1320-series accepting requests since Tue 16 Feb 2010 01:50:49 AM EET
printer hp-LaserJet-1320-series is idle.  enabled since Tue 16 Feb 2010 01:50:49
AM EET
Printer is now online.
antoulas@sazerac:/tmp$
```

Text Editors for Creating ASCII Files

- ▶ `vi/vim <filename>`: edit the content of the file with name `<filename>`
 - ◇ Two modes of operations: *input* and *edit*
 - ◇ Move from input to edit with ESC button.
 - ◇ Move from edit to input mode by pressing "i"
- ▶ `www.yolinux.com/TUTORIALS/LinuxTutorialAdvanced_vi.html`
- ▶ `emacs`
- ▶ `pico`
- ▶ `ed` (ancient)
- ▶ `gedit`, `xemacs`, etc.

Commands for processing ASCII files

<code>chmod</code>	change access rights for files and catalogs
<code>more</code>	page-by-page display of file content
<code>less</code>	forward/backward display of a file content
<code>grep</code>	search for a specific symbol patterns in a file
<code>wc</code>	lexical statistics for files
<code>sort</code>	sort the lines of a text file
<code>ln</code>	created links
<code>cut</code>	display portion of lines from a file
<code>cmp</code>	compare two files
<code>diff</code>	display differences between two files
<code>head</code>	display top-k lines of a file
<code>tail</code>	display bottom-k lines of a file
<code>touch</code>	change the timestamp or create a file

Command: chmod

```
antoulas@sazerac:/tmp/junk$ ls -las
total 48
  4 drwxr-xr-x  2 antoulas  antoulas  4096 2010-02-16 02:44 .
40 drwxrwxrwt 18 root      root      36864 2010-02-16 02:43 ..
  4 -rw-r--r--  1 antoulas  antoulas  184 2010-02-16 02:44 .bashrc
antoulas@sazerac:/tmp/junk$ cp .bashrc tmp1
antoulas@sazerac:/tmp/junk$ ls -l
total 4
-rw-r--r-- 1 antoulas _developer 184 2010-02-16 02:44 tmp1
antoulas@sazerac:/tmp/junk$ mkdir bin
antoulas@sazerac:/tmp/junk$ ls -l
total 8
drwxr-xr-x 2 antoulas _developer 4096 2010-02-16 02:44 bin
-rw-r--r-- 1 antoulas _developer  184 2010-02-16 02:44 tmp1
antoulas@sazerac:/tmp/junk$ chmod g-r tmp1
antoulas@sazerac:/tmp/junk$ chmod g+wx tmp1
antoulas@sazerac:/tmp/junk$ ls -l
total 8
drwxr-xr-x 2 antoulas _developer 4096 2010-02-16 02:44 bin
-rw--wxr-- 1 antoulas _developer  184 2010-02-16 02:44 tmp1
antoulas@sazerac:/tmp/junk$ chmod u-wx,g=rx,o+x tmp1
antoulas@sazerac:/tmp/junk$ ls -l
total 8
drwxr-xr-x 2 antoulas _developer 4096 2010-02-16 02:44 bin
-r--r-xr-x 1 antoulas _developer  184 2010-02-16 02:44 tmp1
antoulas@sazerac:/tmp/junk$ rm tmp1
rm: remove write-protected regular file 'tmp1'? y
```

```
antoulas@sazerac:/tmp/junk$ ls -las
total 52
 4 drwxr-xr-x  3 antoulas antoulas  4096 2010-02-16 02:46 .
40 drwxrwxrwt 18 root      root      36864 2010-02-16 02:43 ..
 4 -rw-r--r--  1 antoulas antoulas   184 2010-02-16 02:44 .bashrc
 4 drwxr-xr-x  2 antoulas antoulas  4096 2010-02-16 02:44 bin
antoulas@sazerac:/tmp/junk$ cp -r /tmp/mydir .
antoulas@sazerac:/tmp/junk$ ls -Rl
.:
total 8
drwxr-xr-x 2 antoulas _developer 4096 2010-02-16 02:44 bin
drwxr-xr-x 2 antoulas _developer 4096 2010-02-16 02:48 mydir
./bin:
total 0
./mydir:
total 8
-rwxr-xr-x 1 antoulas _developer 14 2010-02-16 02:48 A1
-rwxr-xr-x 1 antoulas _developer 20 2010-02-16 02:48 A2
antoulas@sazerac:/tmp/junk$ chmod -R 700 mydir/
antoulas@sazerac:/tmp/junk$ ls -lR mydir/
mydir/:
total 8
-rwx----- 1 antoulas _developer 14 2010-02-16 02:48 A1
-rwx----- 1 antoulas _developer 20 2010-02-16 02:48 A2
antoulas@sazerac:/tmp/junk$ ls -lasR mydir/
mydir/:
total 16
 4 drwx----- 2 antoulas _developer 4096 2010-02-16 02:48 .
 4 drwxr-xr-x  4 antoulas _developer 4096 2010-02-16 02:48 ..
 4 -rwx----- 1 antoulas _developer   14 2010-02-16 02:48 A1
 4 -rwx----- 1 antoulas _developer   20 2010-02-16 02:48 A2
antoulas@sazerac:/tmp/junk$
```

Command: less

```
antoulas@sazerac:~/set001$ less set001.tex
\documentclass []{beamer}
% Theme for beamer presentation.
\usepackage{beamerthemelined}
% \usepackage{beamerthemesplit}
% Other themes include: beamerthemebars, beamerthemelined,
%                          beamerthemetree, beamerthemetreebars

\usepackage{algorithmic}
\usepackage{listings}
\usepackage{pifont}
\usepackage{color}
\usepackage{hyperref}
\newcommand{\crossout} {\ding{55}}

\newenvironment{pk1}{%
  \begin{itemize}%
  \vspace{-\topsep}%
  \setlength\itemsep{-\parskip}%
set001.tex
```

- ◇ [return] - skip a line; [space] - get next page;
- b: display previous page; /<s>: search for pattern s;
- !<c>[return]: execute command c; h: help;
- q: exit from less

Command: grep

```
antoulas@sazerac:/var/log$
antoulas@sazerac:/var/log$ grep x86 dmesg
[ 0.000000] Transmeta GenuineTMx86
[ 0.000000] x86 PAT enabled: cpu 0, old 0x7040600070406, new 0x7010600070106
[ 0.000000] Using x86 segment limits to approximate NX protection
[ 0.004000] x86 PAT enabled: cpu 1, old 0x7040600070406, new 0x7010600070106
[ 10.148624] NVRM: loading NVIDIA UNIX x86 Kernel Module 185.18.36 Fri Aug
14 17:18:04 PDT 2009
antoulas@sazerac:/var/log$
antoulas@sazerac:/var/log$ grep -n x86 dmesg
10:[ 0.000000] Transmeta GenuineTMx86
41:[ 0.000000] x86 PAT enabled: cpu 0, old 0x7040600070406, new 0
x7010600070106
58:[ 0.000000] Using x86 segment limits to approximate NX protection
212:[ 0.004000] x86 PAT enabled: cpu 1, old 0x7040600070406, new 0
x7010600070106
737:[ 10.148624] NVRM: loading NVIDIA UNIX x86 Kernel Module 185.18.36 Fri
Aug 14 17:18:04 PDT 2009
antoulas@sazerac:/var/log$
antoulas@sazerac:/var/log$ grep -i CoOLing dmesg
[ 0.414599] processor LNXCPU:00: registered as cooling_device0
[ 0.414803] processor LNXCPU:01: registered as cooling_device1
antoulas@sazerac:/var/log$
```

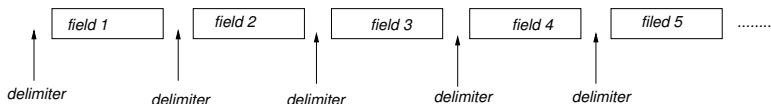
Command wc

```
antoulas@sazerac:~/set001/Samples$ ls
aaa bbbb lista Set-01.ppt zzz
antoulas@sazerac:~/set001/Samples$ wc lista
 10  30 183 lista
antoulas@sazerac:~/set001/Samples$ wc -w lista
30 lista
antoulas@sazerac:~/set001/Samples$ wc -l lista
10 lista
antoulas@sazerac:~/set001/Samples$ wc -c lista
183 lista
antoulas@sazerac:~/set001/Samples$ wc -lc lista
 10 183 lista
antoulas@sazerac:~/set001/Samples$ wc -lw lista
 10  30 lista
antoulas@sazerac:~/set001/Samples$
```

Command sort

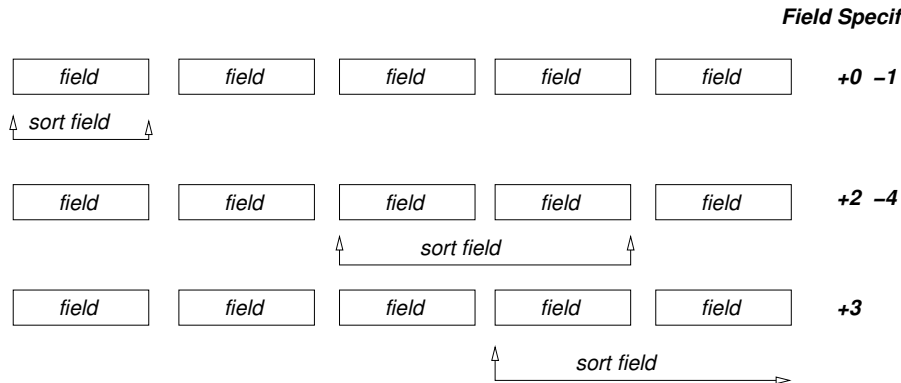
```
antoulas@sazerac:~/set001/Samples$ cat lista
john    32    london
eduardo 19    brazilia
jean    21    athens
marco   7     buenosaires
filip   23    telaviv
dennis  15    brisbane
louis   31    heraclion
dimi    34    heraclion
ji      27    washington
hyseyin 33    izmir
antoulas@sazerac:~/set001/Samples$ sort lista
dennis  15    brisbane
dimi    34    heraclion
eduardo 19    brazilia
filip   23    telaviv
hyseyin 33    izmir
jean    21    athens
ji      27    washington
john    32    london
louis   31    heraclion
marco   7     buenosaires
antoulas@sazerac:~/set001/Samples$
antoulas@sazerac:~/set001/Samples$
```

Using the Delimiters in sort



- ▶ When a field for sorting is needed: $+number_1 -number_2$
- ▶ $number_1$: specifies the number of fields to be skipped to get to the beginning of the sort field.
- ▶ $number_2$: specifies the number of fields to be skipped, relative to the beginning of the line, to get to the end of the sort key.

Delimiter Examples




```
antoulas@sazerac:~/set001/Samples$ sort +0 -1 lista
dennis 15 brisbane
dimi 34 heraclion
eduardo 19 brazilia
filip 23 telaviv
hyseyin 33 izmir
jean 21 athens
ji 27 washington
john 32 london
louis 31 heraclion
marco 7 buenosaires
antoulas@sazerac:~/set001/Samples$ sort -r -u +2 -3 lista
ji 27 washington
filip 23 telaviv
john 32 london
hyseyin 33 izmir
louis 31 heraclion
marco 7 buenosaires
dennis 15 brisbane
eduardo 19 brazilia
jean 21 athens
antoulas@sazerac:~/set001/Samples$ sort -r +2 -3 lista
ji 27 washington
filip 23 telaviv
john 32 london
hyseyin 33 izmir
louis 31 heraclion
dimi 34 heraclion
marco 7 buenosaires
dennis 15 brisbane
eduardo 19 brazilia
jean 21 athens
```

```
antoulas@sazerac:~/set001/Samples$ sort -r -n +1 -2 lista
dimi      34  heraclion
hyseyin   33  izmir
john      32  london
louis     31  heraclion
ji        27  washington
filip     23  telaviv
jean      21  athens
eduardo   19  brazilia
dennis    15  brisbane
marco     7   buenosaires
antoulas@sazerac:~/set001/Samples$
antoulas@sazerac:~/set001/Samples$ sort -u +1 -4 lista
dennis    15  brisbane
eduardo   19  brazilia
jean      21  athens
filip     23  telaviv
ji        27  washington
louis     31  heraclion
john      32  london
hyseyin   33  izmir
dimi      34  heraclion
marco     7   buenosaires
antoulas@sazerac:~/set001/Samples$
```

Command touch (change timestamp or create an empty file)

```
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ ls
aaa  bbbb  lista  Set-01.ppt  zzz
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ touch
antoulas
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ ls -l
total 10464
-rwxr-xr-x 1 antoulas _developer      15 2010-02-18 08:42
  aaa
-rwxr-xr-x 1 antoulas _developer    1200 2010-02-18 08:42
  bbbb
-rwxr-xr-x 1 antoulas _developer      0 2010-02-18 12:16
  antoulas
-rwxr-xr-x 1 antoulas _developer    183 2010-02-18 08:42
  lista
-rwxr-xr-x 1 antoulas _developer 10583040 2010-02-18 08:42
  Set-01.ppt
-rwxr-xr-x 1 antoulas _developer     72 2010-02-18 08:42
  zzz
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ touch aaa
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ ls -l
total 10464
-rwxr-xr-x 1 antoulas _developer      15 2010-02-18 12:16
  aaa
-rwxr-xr-x 1 antoulas _developer    1200 2010-02-18 08:42
```

Hard Links with ln

```

antoulas@sazerac:~/set001/Samples$ ln bbbb myhardlink
antoulas@sazerac:~/set001/Samples$ ls -l
total 10356
-rwxr-xr-x 1 antoulas _developer      15 2010-02-18 12:25 aaa
-rwxr-xr-x 2 antoulas _developer    1200 2010-02-18 12:27 bbbb
-rwxr-xr-x 1 antoulas _developer      0 2010-02-18 12:25 antoulas
-rwxr-xr-x 1 antoulas _developer    183 2010-02-18 12:25 lista
-rwxr-xr-x 2 antoulas _developer    1200 2010-02-18 12:27 myhardlink
-rwxr-xr-x 1 antoulas _developer 10583040 2010-02-18 12:25 Set-01.ppt
-rwxr-xr-x 1 antoulas _developer     72 2010-02-18 12:25 zzz
antoulas@sazerac:~/set001/Samples$ ls -i bbbb myhardlink
691247 bbbb 691247 myhardlink
antoulas@sazerac:~/set001/Samples$ cp bbbb eeee
antoulas@sazerac:~/set001/Samples$ ls -li bbbb myhardlink eeee
691247 -rwxr-xr-x 2 antoulas _developer 1200 2010-02-18 12:27 bbbb
691204 -rwxr-xr-x 1 antoulas _developer 1200 2010-02-18 12:34 eeee
691247 -rwxr-xr-x 2 antoulas _developer 1200 2010-02-18 12:27 myhardlink
antoulas@sazerac:~/set001/Samples$ diff bbbb myhardlink
antoulas@sazerac:~/set001/Samples$ rm bbbb
antoulas@sazerac:~/set001/Samples$ ls -l myhardlink
-rwxr-xr-x 1 antoulas _developer 1200 2010-02-18 12:27 myhardlink
antoulas@sazerac:~/set001/Samples$ cp myhardlink bbbb
antoulas@sazerac:~/set001/Samples$ ls -l
total 10360
-rwxr-xr-x 1 antoulas _developer      15 2010-02-18 12:25 aaa
-rwxr-xr-x 1 antoulas _developer    1200 2010-02-18 12:35 bbbb
-rwxr-xr-x 1 antoulas _developer      0 2010-02-18 12:25 antoulas
-rwxr-xr-x 1 antoulas _developer    1200 2010-02-18 12:34 eeee
-rwxr-xr-x 1 antoulas _developer    183 2010-02-18 12:25 lista
-rwxr-xr-x 1 antoulas _developer    1200 2010-02-18 12:27 myhardlink
-rwxr-xr-x 1 antoulas _developer 10583040 2010-02-18 12:25 Set-01.ppt
-rwxr-xr-x 1 antoulas _developer     72 2010-02-18 12:25 zzz
antoulas@sazerac:~/set001/Samples$

```

Soft links with `ln -s`

```
antoulas@sazerac:~/set001/Samples$ ls
aaa  bbbb  antoulas  eeee  lista  myhardlink  Set-01.ppt
    zzz
antoulas@sazerac:~/set001/Samples$ ln -s bbbb mysoftlink
antoulas@sazerac:~/set001/Samples$ ls -l mysoftlink
lrwxrwxrwx 1 antoulas _developer 4 2010-02-18 12:43
    mysoftlink -> bbbb
antoulas@sazerac:~/set001/Samples$ file *
aaa:          ASCII text
bbbb:         ASCII text
antoulas:     empty
eeee:         ASCII text
lista:        ASCII text
myhardlink:   ASCII text
mysoftlink:   symbolic link to 'bbbb'
Set-01.ppt:   CDF V2 Document, corrupt: Can't expand
    summary_info
zzz:          ASCII text
antoulas@sazerac:~/set001/Samples$ rm bbbb
antoulas@sazerac:~/set001/Samples$ ls
aaa  antoulas  eeee  lista  myhardlink  mysoftlink  Set-01.
    ppt      zzz
antoulas@sazerac:~/set001/Samples$ more mysoftlink
mysoftlink: No such file or directory
```

Comparison between soft/hard links

Hard Links	Soft Links
"Pointer" to the initial file	Copy of the path to the initial file
Does not apply to directories	Applies to directories
Name change of the initial file does not create any problems	Name change in the initial file creates problems
Content changes in initial file are reflected in the link as well	Content changes in initial file are reflected in the link as well
File gets purged when <i>all</i> links are deleted	Deletion of initial file affects the link (point to non-existing file)

Command cut: -f: designates column selection, -d designates delimiter

```
antoulas@sazerac:~/set001/Samples$ cat lista1
123:jim:morrison:2103456789:reading
345:peter:gabriel:4567891234:london
673:pete:garret:9602345612:sydney
133:time:machine:3452678967:moscow
231:kitrina:podilata:2138905674:athens
antoulas@sazerac:~/set001/Samples$
antoulas@sazerac:~/set001/Samples$ cut -f3,2 -d':' lista1
jim:morrison
peter:gabriel
pete:garret
time:machine
kitrina:podilata
antoulas@sazerac:~/set001/Samples$
antoulas@sazerac:~/set001/Samples$ cut -f1-3 -d':' lista1
123:jim:morrison
345:peter:gabriel
673:pete:garret
133:time:machine
231:kitrina:podilata
antoulas@sazerac:~/set001/Samples$
```

Commands: cmp, diff, head, tail

```
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ ls lista*
lista lista1 lista2 lista3
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ cmp lista lista3
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ diff lista lista2
4c4
< marco 7      buenosaires
---
> marco 97     buenosaires
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ head lista2
john      32    london
eduardo  19    brazilia
jean      21    athens
marco     97    buenosaires
filip     23    telaviv
dennis    15    brisbane
louis     31    heraclion
dimi      34    heraclion
ji        27    washington
hyseyin   33    izmir
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ head -3 lista2
john      32    london
eduardo  19    brazilia
jean      21    athens
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$ tail -3 lista2
dimi      34    heraclion
ji        27    washington
hyseyin   33    izmir
antoulas@sazerac:/media/2CD3-FD08/set001/Samples$
```


Commands echo, whoami, hostname, lpq/lpstat -t, lprm

```
antoulas@sazerac:~/set001/Samples$ echo this is a test for k24
this is a test for k24
antoulas@sazerac:~/set001/Samples$ echo -n this is a test for k24
this is a test for k24antoulas@sazerac:~/set001/Samples$
antoulas@sazerac:~/set001/Samples$ whoami
antoulas
antoulas@sazerac:~/set001/Samples$ hostname
sazerac
antoulas@sazerac:~/set001/Samples$ lpr Set-01.ps
antoulas@sazerac:~/set001/Samples$ lpq
hp-LaserJet-1320-series is ready and printing
Rank   Owner      Job      File(s)                Total Size
1st    antoulas  143     Set-01                  12930048 bytes
antoulas@sazerac:~/set001/Samples$ lprm -Php-LaserJet-1320-series 143
antoulas@sazerac:~/set001/Samples$ lpq
hp-LaserJet-1320-series is ready and printing
Rank   Owner      Job      File(s)                Total Size
antoulas@sazerac:~/set001/Samples$ lpstat -t
scheduler is running
system default destination: hp-LaserJet-1320-series
device for hp-LaserJet-1320-series: usb://HP/LaserJet%201320%20series
hp-LaserJet-1320-series accepting requests since Fri 19 Feb 2010 01:03:52 PM EET
printer hp-LaserJet-1320-series is idle.  enabled since Fri 19 Feb 2010 01:03:52
PM EET
Printer is now online.
antoulas@sazerac:~/set001/Samples$
```

Shells (`cs``sh`, `tc``sh`, `ba``sh`, `ko``r``n``sh`, etc.)

- ▶ Once “connected” to a `tty` in `LINUX` you are provided with a default `bash` shell.
- ▶ `logout` severs the authenticated session the user maintains.
- ▶ `exit` or `control-d` disconnect terminates the shell session.
- ▶ You can go to `csh` or `tcsh` by simply typing `tcsh` or `csh`.
- ▶ Once a shell is initiated, some file (e.g. `~/ .cshrc`) is executed.
- ▶ As soon as a user logs into a system, the commands in file `.login` are executed.
- ▶ Once a user logouts from the system the shell commands in file `.logout` are executed.

Shell (input/output)

Every shell has three predefined I/O means of communicating with the user:

- ▶ *stdin*: standard input (often the keyboard)
- ▶ *stdout*: standard output (often the screen)
- ▶ *stderr*: standard error (often the screen)
- ▶ file descriptors for the above files are 0, 1, 2 respectively.

For a number of system programs including `cat`, `lpr`, `grep`, `wc`, `sort`, `head`, `tail` etc., the file parameters are optional:

```
antoulas@sazerac:~/set001/Samples$ wc
this is a test - this is only
a test, this is a test
this is only a test
this is a
test
only
bye
{control-d}
   7      25     100
antoulas@sazerac:~/set001/Samples$
```

csH redirection

- Redirection of the *stdin*:

```
antoulas@sazerac:~/set001$  
antoulas@sazerac:~/set001$ csh  
%  
%  
% grep clio lista  
louis 31 heraclion  
dimi 34 heraclion  
% grep clio < lista  
louis 31 heraclion  
dimi 34 heraclion  
% grep bra < lista > out1  
% cat out1  
eduardo 19 brazilia
```