

Linux Introduction

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Enabler for Life Sciences

Linux Introduction

Look up the links from Pre-course material, use Google, and ...

Learn by practice and repetition!!!

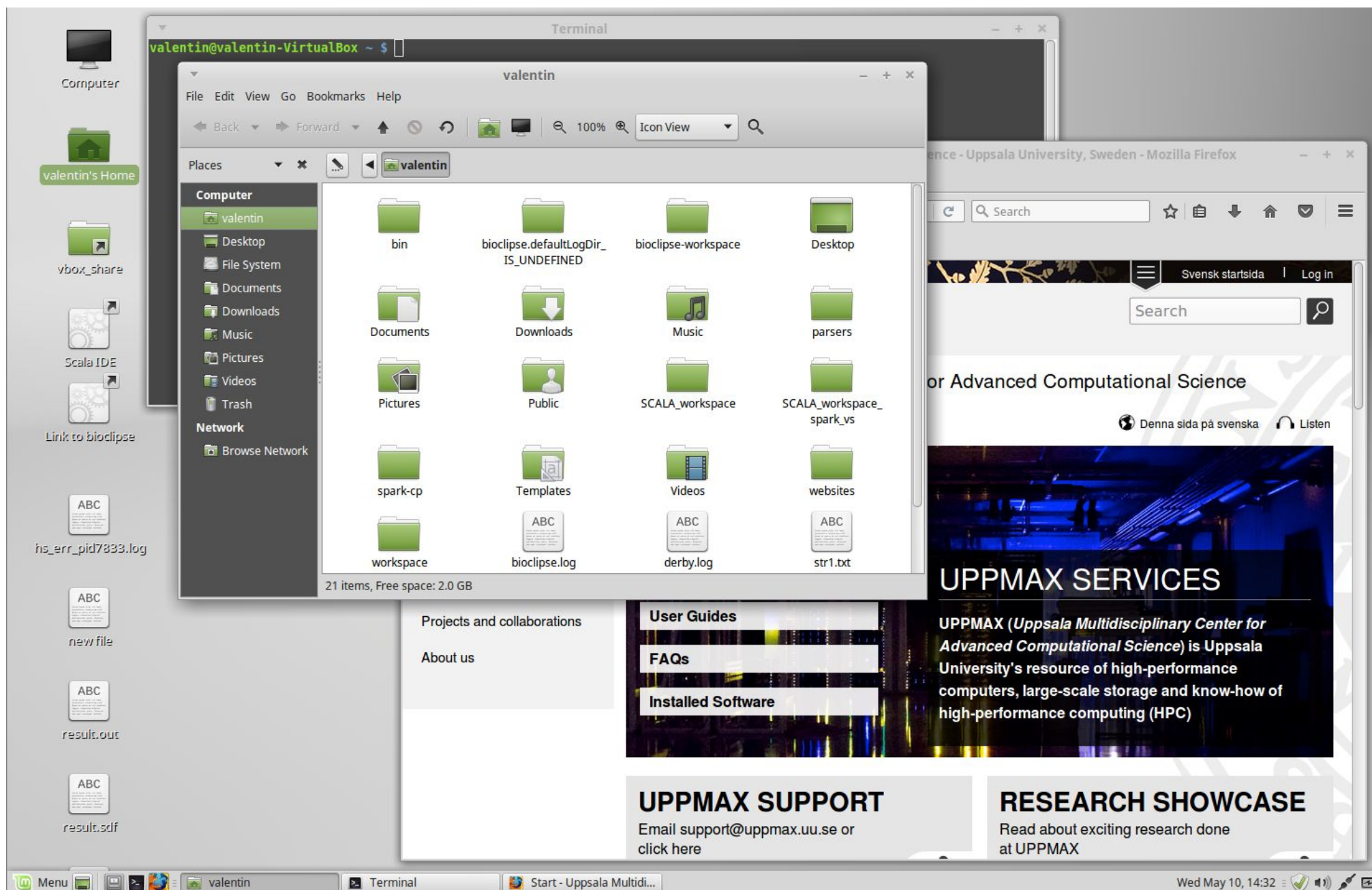
Enabler for Life Sciences

- Uppsala Multidisciplinary Center for Advanced Computational Science
 - (Uppsala supercomputer center)
- Clusters
 - Rackham
 - Bianca
 - Snowy
- Uses Linux

- Uppsala Multidisciplinary Center for Advanced Computational Science
 - (Uppsala supercomputer center)
- Clusters
 - **Rackham**
 - Bianca
 - Snowy
- Uses Linux

- Why Linux?

- A powerful command-line interface
- Built for multi-user systems.
- An enormous amount of software is freely available



The image is a composite showing a Linux environment. On the left, a terminal window displays file permissions and user information for a user named 'valentin'. The background is a blurred screenshot of a Linux desktop environment, featuring various icons like 'Downloads', 'Music', 'parsers', 'Templates', 'Videos', 'websites', 'Desktop', 'Documents', 'Downloads', 'gconf', 'gitconfig', 'gksu.lock', 'gnome', 'gnome2', 'gnome2_private', 'httrack.ini', 'ICEauthority', 'java', 'lessht', 'linuxmint', 'local', 'm2', 'macromedia', 'mozilla', 'Music', 'pam_environment', and 'parsers'. A web browser window is also visible on the right side of the desktop, displaying the 'UPPMAX SERVICES' page, which includes information about the Uppsala Multidisciplinary Center for Advanced Computational Science and links to 'User Guides', 'FAQs', and 'Installed Software'.

```

-rw-r--r-- 1 valentin valentin 51709 Oct 12 2015 str1.txt
-rw-r--r-- 1 valentin valentin 126832 Oct 12 2015 str2.txt
drwxr-xr-x 2 valentin valentin 4096 Sep 1 2015 Templates
-rw-r----- 1 valentin valentin 5 May 10 14:29 .vboxclient-clipboard.pid
-rw-r----- 1 valentin valentin 5 May 10 14:29 .vboxclient-display.pid
-rw-r----- 1 valentin valentin 5 May 10 14:29 .vboxclient-draganddrop.pid
-rw-r----- 1 valentin valentin 5 May 10 14:29 .vboxclient-seamless.pid
drwxr-xr-x 2 valentin valentin 4096 Sep 1 2015 Videos
-rw-r----- 1 valentin valentin 4798 Feb 15 2016 .viminfo
drwxr-xr-x 3 valentin valentin 4096 Jan 11 2016 websites
drwxr-xr-x 3 valentin valentin 4096 Jun 8 2016 workspace
-rw-r----- 1 valentin valentin 130 May 10 14:29 .Xauthority
-rw-r--r-- 1 valentin valentin 131 Sep 2 2015 .xinputrc
-rw-r--r-- 1 valentin valentin 3197 May 10 14:31 .xsession-errors
valentin@valentin-VirtualBox ~ $ ll
total 780
drwxr-xr-x 35 valentin valentin 4096 May 10 14:30 ./
drwxr-xr-x 3 root root 4096 Sep 1 2015 ../
drwx----- 3 valentin valentin 4096 Sep 2 2015 .adobe/
-rw-r----- 1 valentin valentin 6412 Dec 10 11:48 .bash_history
-rw-r--r-- 1 valentin valentin 220 Sep 1 2015 .bash_logout
-rw-r--r-- 1 valentin valentin 305 Feb 15 2016 .bashrc
drwxr-xr-x 8 valentin valentin 4096 Sep 2 2015 bin/
drwxr-xr-x 2 valentin valentin 4096 Nov 3 2016 bioclipse.defaultLogDir_IS_UNDEFINED/
-rw-r--r-- 1 valentin valentin 366894 Jun 15 2016 bioclipse.log
drwxr-xr-x 9 valentin valentin 4096 Nov 3 2016 bioclipse-workspace/
drwxr-xr-x 9 valentin valentin 4096 Sep 2 2015 .cache/
drwxr-xr-x 17 valentin valentin 4096 Sep 8 2015 .config/
drwx----- 3 valentin valentin 4096 Sep 1 2015 .dbus/
-rw-r--r-- 1 valentin valentin 709 Sep 2 2015 derby.log
drwxr-xr-x 2 valentin valentin 4096 Oct 12 2015 Desktop/
-rw-r----- 1 valentin valentin 2 May 10 14:29 .dmrc
drwxr-xr-x 2 valentin valentin 4096 Sep 1 2015 Documents/
drwxr-xr-x 3 valentin valentin 4096 Nov 3 2016 Downloads/
drwx----- 3 valentin valentin 4096 May 10 14:29 .gconf/
-rw-r--r-- 1 valentin valentin 74 Sep 2 2015 .gitconfig
-rw-r----- 1 valentin valentin 0 Sep 1 2015 .gksu.lock
drwx----- 3 valentin valentin 4096 Sep 1 2015 .gnome/
drwx----- 4 valentin valentin 4096 Jun 15 2016 .gnome2/
drwx----- 2 valentin valentin 4096 Sep 1 2015 .gnome2_private/
-rw-r--r-- 1 valentin valentin 37 Jan 11 2016 .httrack.ini
-rw-r--r-- 1 valentin valentin 15540 May 10 14:29 .ICEauthority
drwxr-xr-x 4 valentin valentin 4096 Sep 7 2015 .java/
-rw-r----- 1 valentin valentin 35 Sep 2 2015 .lessht
drwxr-xr-x 4 valentin valentin 4096 Sep 1 2015 .linuxmint/
drwx----- 3 valentin valentin 4096 Sep 1 2015 .local/
drwxr-xr-x 3 valentin valentin 4096 Sep 1 2015 .m2/
drwx----- 3 valentin valentin 4096 Sep 2 2015 .macromedia/
drwxr-xr-x 4 valentin valentin 4096 Sep 1 2015 .mozilla/
drwxr-xr-x 2 valentin valentin 4096 Sep 1 2015 Music/
-rw-r--r-- 1 valentin valentin 213 Sep 2 2015 .pam_environment
drwxr-xr-x 4 valentin valentin 4096 Sep 2 2015 parsers/

```

UPPMAX SERVICES

UPPMAX (Uppsala Multidisciplinary Center for Advanced Computational Science) is Uppsala University's resource of high-performance computers, large-scale storage and know-how of high-performance computing (HPC)

UPPMAX SUPPORT

Email support@uppmax.uu.se or
click here

RESEARCH SHOWCASE

Read about exciting research done
at UPPMAX

Directory tree

Name	Size	Type	Date Modified
+ annotations	--	folder	2011-05-18 15:34:34
- annovar	--	folder	2011-05-18 15:34:31
+ annovarFiles	--	folder	2011-05-18 15:34:05
+ compare	--	folder	2011-05-18 15:34:29
+ prepStat	--	folder	2011-05-18 15:34:29
+ statFiles	--	folder	2011-05-18 15:34:06
- summarizePerGene	--	folder	2011-05-18 15:34:31
- data	--	folder	2011-05-18 15:34:31
1.annovar	1.4 MB	unknown	2011-05-18 15:34:30
1.annovar.alleleFreq.pdf	895 bytes	PDF document	2011-05-18 15:34:30
1.annovar.exonic_variant_function	242.9 KB	unknown	2011-05-18 15:34:30
1.annovar.hg19_snp131_dropped	837.2 KB	unknown	2011-05-18 15:34:30
1.annovar.hg19_snp131_filtered	905.6 KB	unknown	2011-05-18 15:34:30
1.annovar.log	725 bytes	application log	2011-05-18 15:34:30
1.annovar.stat	938 bytes	unknown	2011-05-18 15:34:30
1.annovar.variant_function	2.3 MB	unknown	2011-05-18 15:34:31
1.non_sym_gene_list	94.3 KB	unknown	2011-05-18 15:34:31
1.non_sym_gene_list_not_in_dbsnp	78.8 KB	unknown	2011-05-18 15:34:31
1.stop_gain_gene_list	4.4 KB	unknown	2011-05-18 15:34:31
1.stop_gain_gene_list_not_in_dbsnp	4.3 KB	unknown	2011-05-18 15:34:31
1.sym_gene_list	51.4 KB	unknown	2011-05-18 15:34:31
1.sym_gene_list_not_in_dbsnp	34.3 KB	unknown	2011-05-18 15:34:31
test.out	2.7 MB	out document	2011-05-18 15:34:31
all.plot	500 bytes	unknown	2011-05-18 15:34:30
summary.ods	23.2 KB	OpenDocument Spreadsheet	2011-05-18 15:34:31


Navigation Commands

- **ls** – list the content of a directory

Navigation Commands

- **ls** – list the content of a directory







```
[dahlo@kalkyl4 dir]$
```

Name	Size	Type	Date Modified
 dir		-- folder	2012-01-05 13:44:47

Navigation Commands







- **ls** – list the content of a directory

```
[dahlo@kalkyl4 dir]$ ls
anotherFile.doc  directory1  file1.txt  file2.old  secondDirectory
```

Name	Size	Type	Date Modified
 dir		-- folder	2012-01-05 13:44:47
 directory1		-- folder	2012-01-05 13:45:43
 secondDirectory		-- folder	2012-01-05 13:46:21
 anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
 file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
 file2.old	2.2 KB	backup file	2012-01-05 13:44:33

- **ls** – list the content of a directory

```
[dahlo@kalkyl4 dir]$ ls -l
total 192
-rw-r--r-- 1 dahlo uppmax 28214 Jan  5 13:44 anotherFile.doc
drwxr-xr-x 2 dahlo uppmax  4096 Jan  5 13:45 directory1
-rw-r--r-- 1 dahlo uppmax 36458 Jan  5 13:44 file1.txt
-rw-r--r-- 1 dahlo uppmax  2273 Jan  5 13:44 file2.old
drwxr-xr-x 2 dahlo uppmax  4096 Jan  5 13:46 secondDirectory
```

Name	Size	Type	Date Modified
 dir		-- folder	2012-01-05 13:44:47
 directory1		-- folder	2012-01-05 13:45:43
 secondDirectory		-- folder	2012-01-05 13:46:21
 anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
 file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
 file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Navigation Commands

- **cd – change working directory**
 - `cd <directory name> = down`
 - `cd .. = up`

```
[dahlo@kalkyl4 dir]$ cd directory1  
[dahlo@kalkyl4 directory1]$
```

Name	Size	Type	Date Modified
dir	--	folder	2012-01-05 13:44:47
directory1	--	folder	2012-01-05 13:45:43
secondDirectory	--	folder	2012-01-05 13:46:21
anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Navigation Commands

- **cd – change working directory**
 - `cd <directory name> = down`
 - `cd .. = up`

```
[dahlo@kalkyl4 dir]$ cd directory1
[dahlo@kalkyl4 directory1]$ ls -l
total 184
-rw-r--r-- 1 dahlo uppmx 56427 Jan  5 13:45 notes
-rw-r--r-- 1 dahlo uppmx 25301 Jan  5 13:45 test.txt
```

Name	Size	Type	Date Modified
dir	--	folder	2012-01-05 13:44:47
directory1	--	folder	2012-01-05 13:45:43
notes	55.1 KB	unknown	2012-01-05 13:45:43
test.txt	24.7 KB	plain text document	2012-01-05 13:45:26
secondDirectory	--	folder	2012-01-05 13:46:21
anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Navigation Commands

- **cd – change working directory**
 - `cd <directory name> = down`
 - `cd .. = up`

```
[dahlo@kalkyl4 directory1]$ cd ../secondDirectory
[dahlo@kalkyl4 secondDirectory]$ ls -l
total 252
-rw-r--r-- 1 dahlo uppmx 28214 Jan  5 13:46 bird.jpg
-rw-r--r-- 1 dahlo uppmx 112853 Jan  5 13:46 tree.jpg
```

Name	Size	Type	Date Modified
dir	--	folder	2012-01-05 13:44:47
directory1	--	folder	2012-01-05 13:45:43
secondDirectory	--	folder	2012-01-05 13:46:21
bird.jpg	27.6 KB	JPEG Image	2012-01-05 13:46:21
tree.jpg	110.2 KB	JPEG Image	2012-01-05 13:46:09
anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Navigation Commands

- **cd – change working directory**
 - `cd <directory name> = down`
 - `cd .. = up`

```
[dahlo@kalkyl4 secondDirectory]$ ls -l ../directory1/
total 184
-rw-r--r-- 1 dahlo uppmx 56427 Jan  5 13:45 notes
-rw-r--r-- 1 dahlo uppmx 25301 Jan  5 13:45 test.txt
```

Name	Size	Type	Date Modified
dir	--	folder	2012-01-05 13:44:47
directory1	--	folder	2012-01-05 13:45:43
notes	55.1 KB	unknown	2012-01-05 13:45:43
test.txt	24.7 KB	plain text document	2012-01-05 13:45:26
secondDirectory	--	folder	2012-01-05 13:46:21
anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Navigation Commands

- **pwd** – **p**rint **w**orking **d**irectory

```
[dahlo@kalkyl4 dir]$ pwd  
/home/dahlo/glob/work/testarea/temp/dir
```


Navigation Commands

- **pwd** – print working directory

```
[dahlo@kalkyl4 dir]$ pwd  
/home/dahlo/glob/work/testarea/temp/dir
```

```
[dahlo@kalkyl4 dir]$ cd directory1/
```

```
[dahlo@kalkyl4 directory1]$ pwd  
/home/dahlo/glob/work/testarea/temp/dir/directory1
```

Absolute/Relative paths

- Absolute paths
 - Starts with a /
 - Defined from the root of the file system

`/home/dahlo/documents/results.csv`

`/proj/g2019031/nobackup/`

- Absolute paths
 - Starts with a /
 - Defined from the root of the file system

`/home/dahlo/documents/results.csv`

`/proj/g2019031/nobackup/`

- Like an address
Husargatan 3, Uppsala, Sweden

- Relative paths
 - Does not start with a /
 - Relative to where you are when using it

`../documents/results.csv`

`nobackup/dahlo/linux_into/files.zip`

- Relative paths
 - Does not start with a /
 - Relative to where you are when using it









`../documents/results.csv`

`nobackup/dahlo/linux_into/files.zip`

- Like a direction
4 blocks to the right, 2nd house

Navigation Commands

- Summary
 - **ls** – list content of directory
 - **cd** – change working directory
 - **pwd** – print working directory
 - Use them to explore absolute/relative paths

Name	Size	Type	Date Modified
 dir		-- folder	2012-01-05 13:44:47
 directory1		-- folder	2012-01-05 13:45:43
 secondDirectory		-- folder	2012-01-05 13:46:21
 bird.jpg	27.6 KB	JPEG Image	2012-01-05 13:46:21
 tree.jpg	110.2 KB	JPEG Image	2012-01-05 13:46:09
 anotherFile.doc	27.6 KB	Word document	2012-01-05 13:44:47
 file1.txt	35.6 KB	plain text document	2012-01-05 13:44:15
 file2.old	2.2 KB	backup file	2012-01-05 13:44:33

Interaction Commands

cp - copy a file

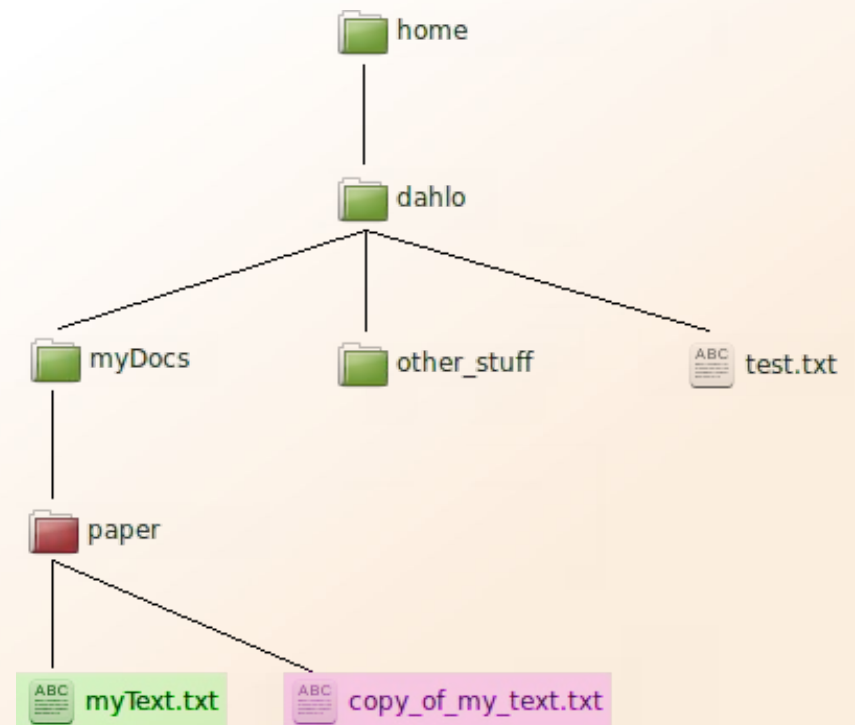
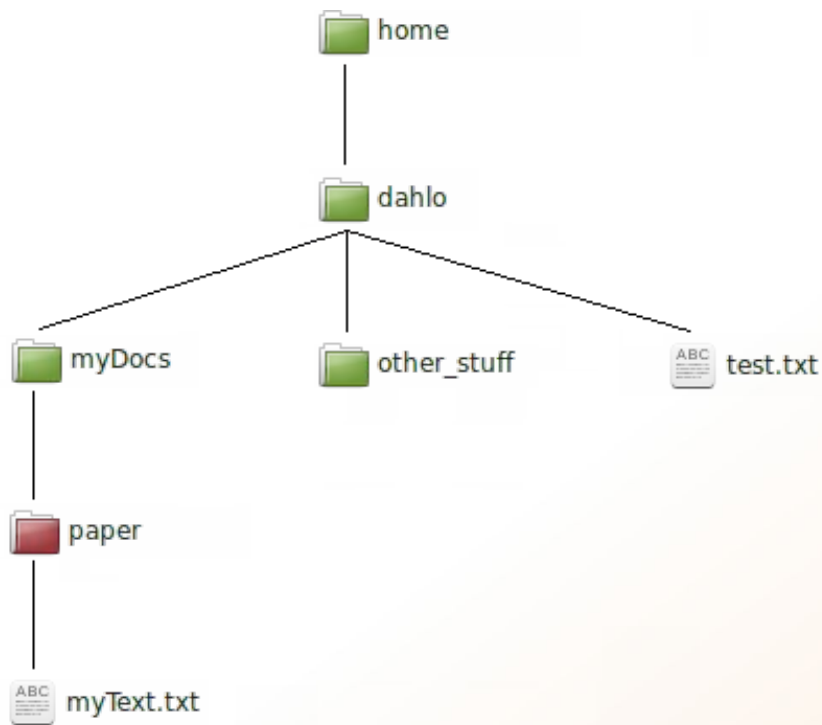
```
cp <name of original> <name of copy>
```

Interaction Commands

cp - copy a file

`cp <name of original> <name of copy>`

`cp myText.txt copy_of_my_text.txt`

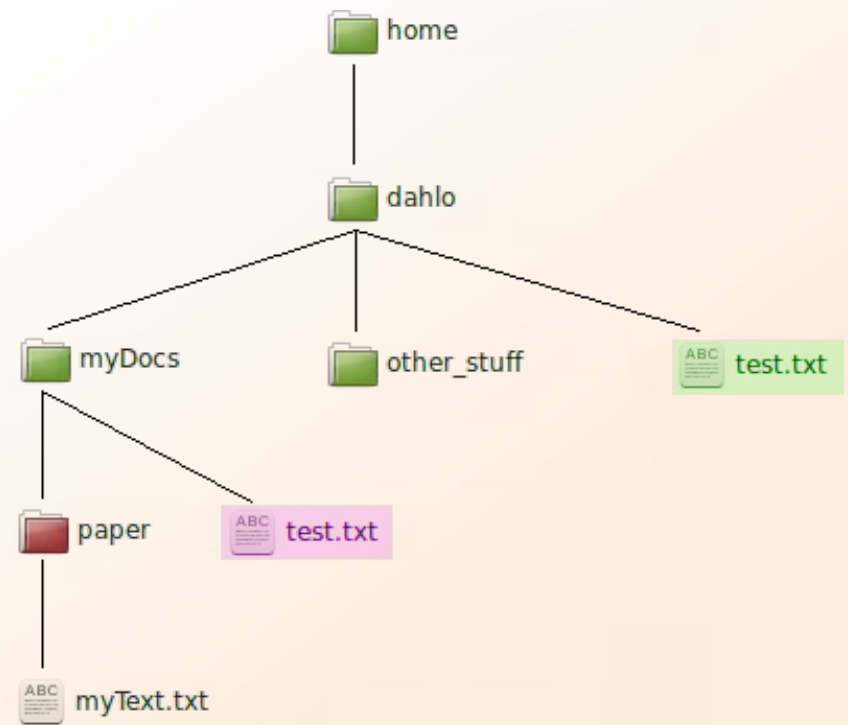
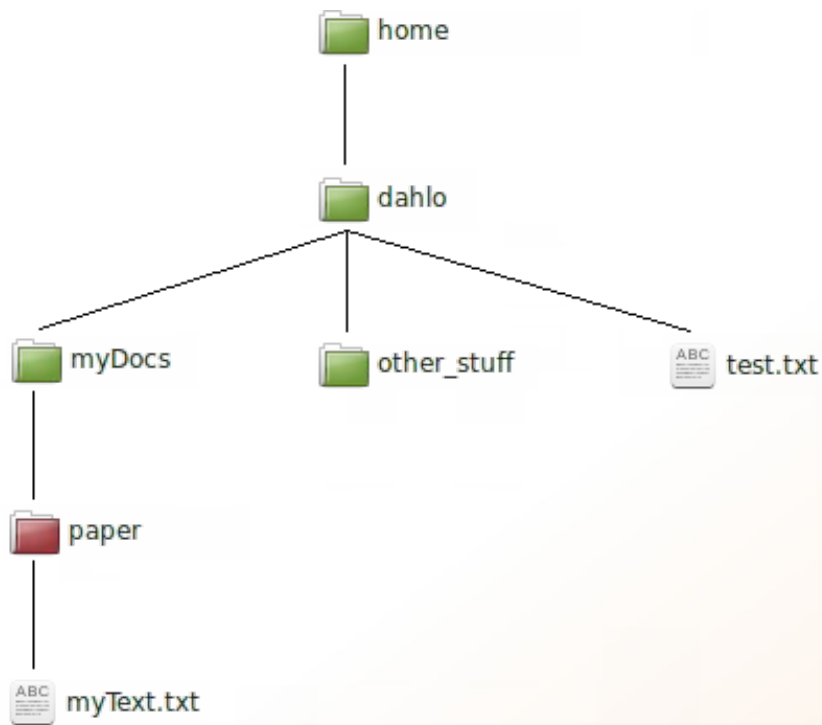


Interaction Commands

cp - copy a file

`cp <name of original> <name of copy>`

`cp /home/dahlo/test.txt ../`

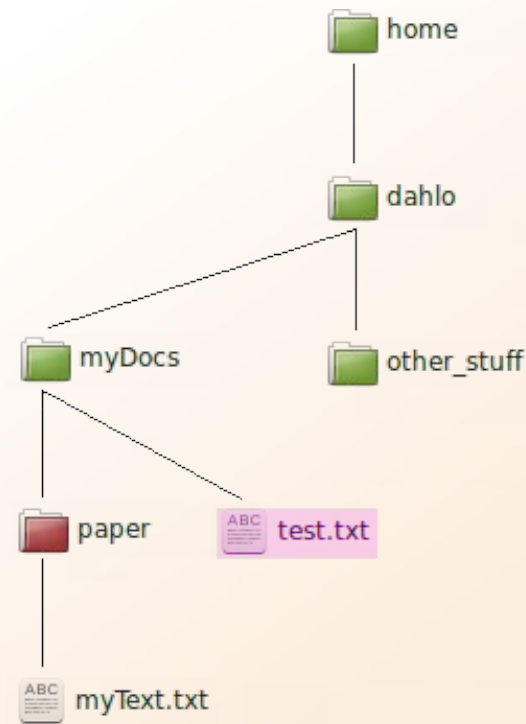
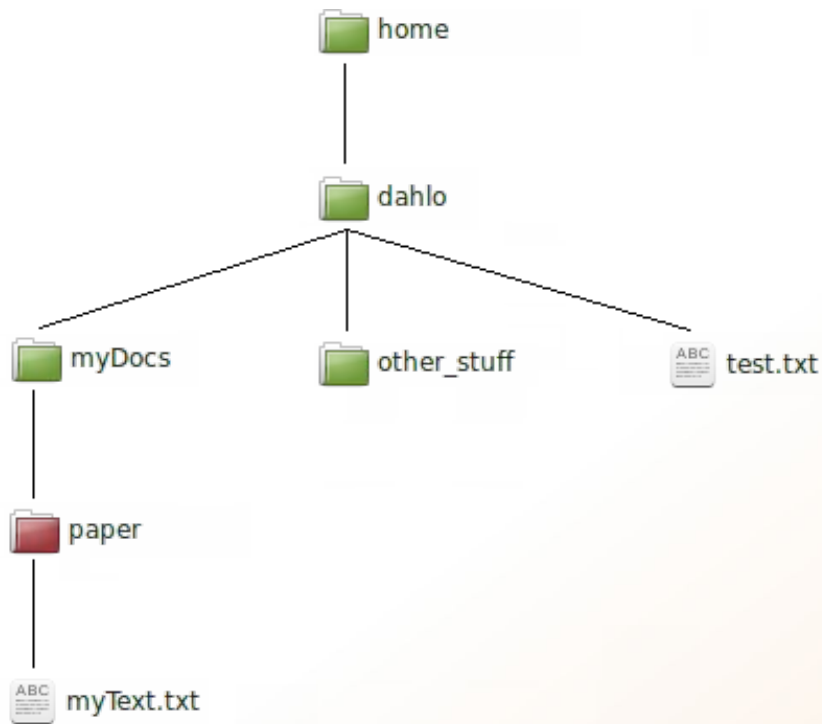


Interaction Commands

mv - move a file

`mv <name of the file> <name of the "copy">`

`mv /home/dahlo/test.txt ../../myDocs/`

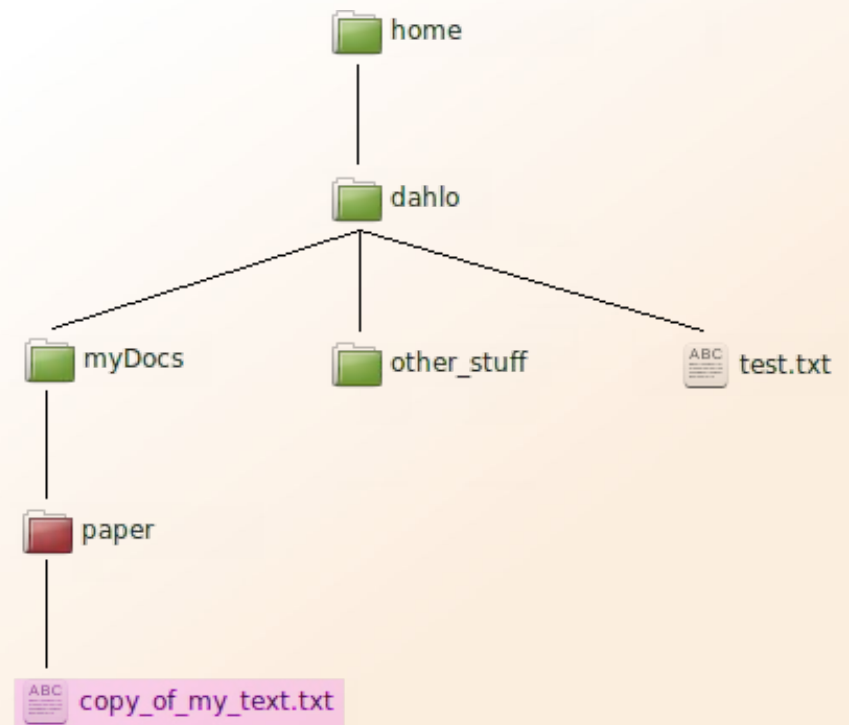
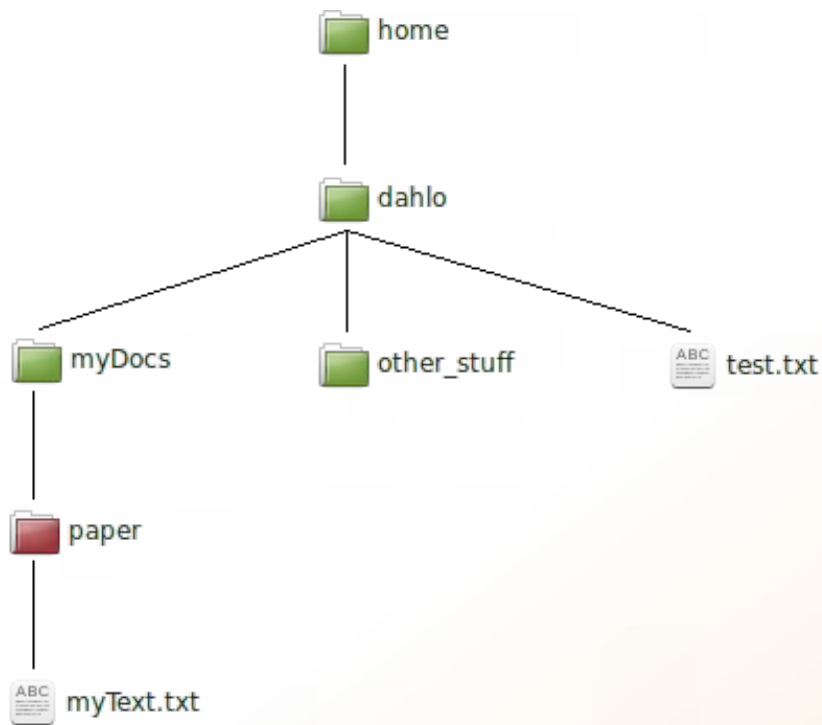


Interaction Commands

mv - rename a file

```
mv <original name> <new name>
```

```
mv myText.txt copy_of_my_text.txt
```

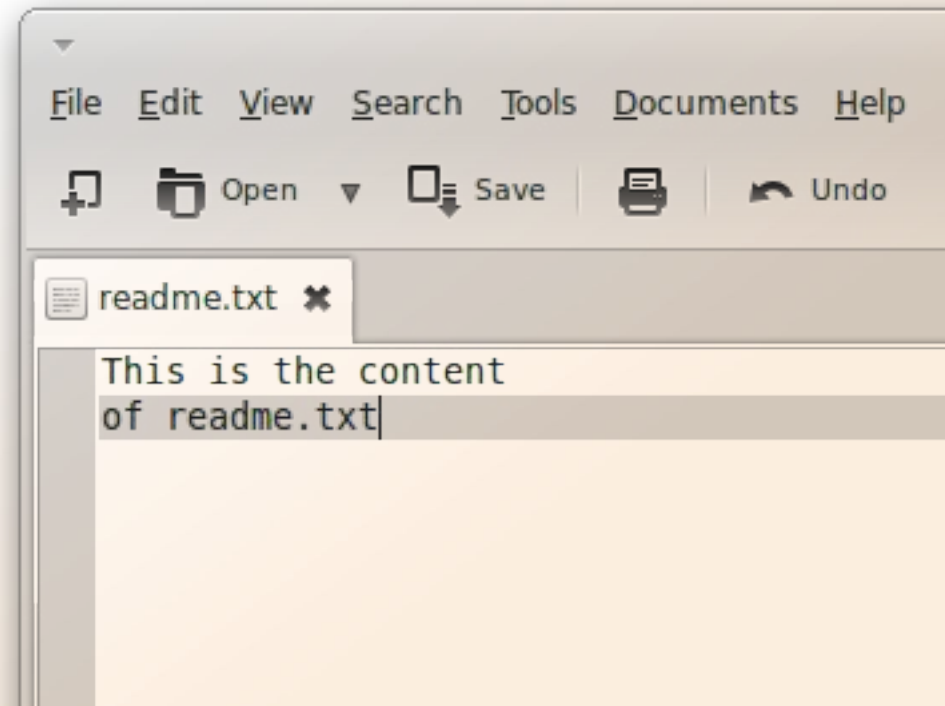


Interaction Commands

less - view content of a file

```
less <file name>
```

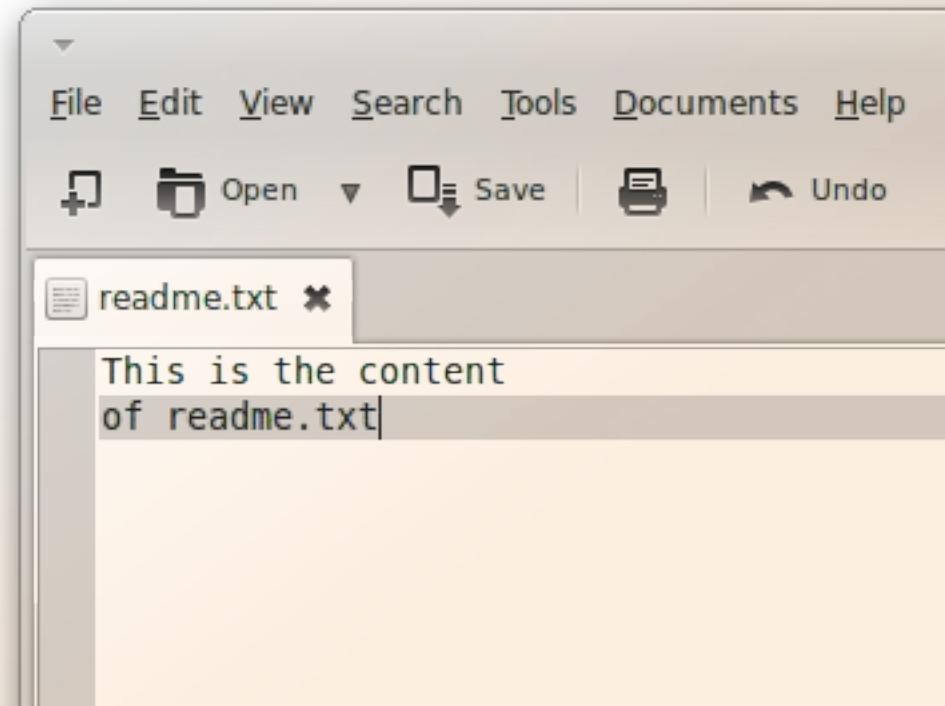
```
less readme.txt
```



less - view content of a file

```
less <file name>
```

```
less readme.txt
```



Interaction Commands

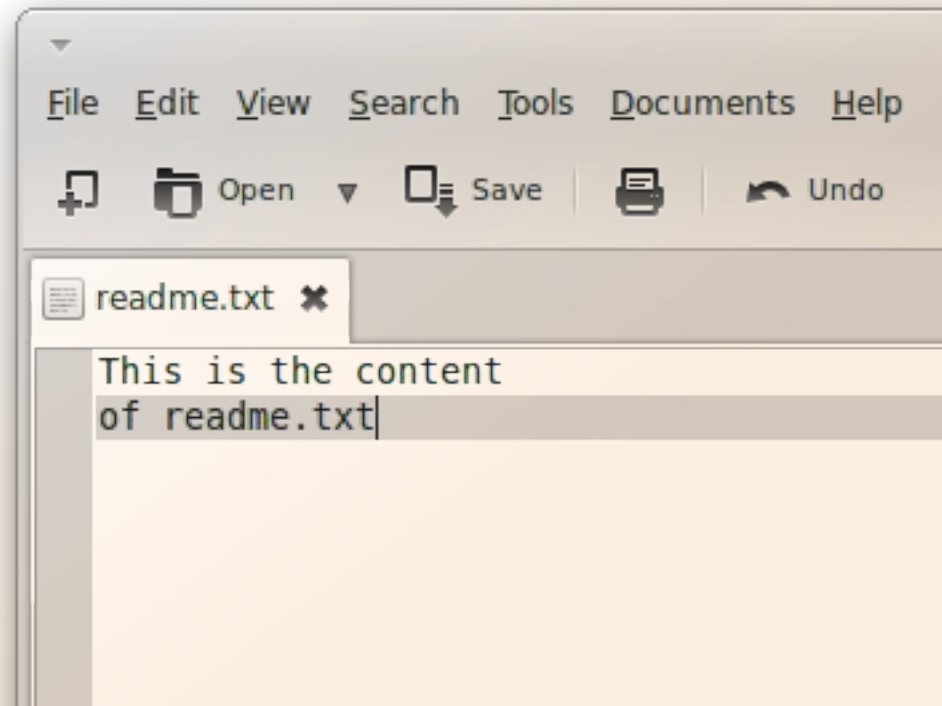
less - view content of a file

```
less <file name>
```

```
less readme.txt
```



press **Q** to exit less



head - view the first rows of a file

```
head <filename>
```

```
[dahlo@dahlo dahlo]$
```

head - view the first rows of a file

`head <filename>`

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root    0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root    0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root    0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root    0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root   36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
```

head - view the first rows of a file

`head <filename>`

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root    0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root    0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root    0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root    0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root   36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
[dahlo@dahlo dahlo]$ head test.txt
```

head - view the first rows of a file

`head <filename>`

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root    0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root    0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root    0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root    0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root   36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
[dahlo@dahlo dahlo]$ head test.txt
This file contains any messages produced by compilers while
running configure, to aid debugging if configure makes a mistake.

It was created by PSNC DRMAA for SLURM configure 1.0.5, which was
generated by GNU Autoconf 2.67.  Invocation command line was

 $ ./configure --with-slurm-inc=/usr/include/slurm --with-slurm-lib=/usr/lib64/slurm --prefix=/bubo/sw/apps/build/slurm
-drmma/1.0.5

## ----- ##
## Platform. ##
[dahlo@dahlo dahlo]$
```


head - view the first rows of a file

head -n <nr of lines> <filename>

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root 0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root 0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root 0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root 0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root 36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
[dahlo@dahlo dahlo]$ head -n 3 test.txt
This file contains any messages produced by compilers while
running configure, to aid debugging if configure makes a mistake.

[dahlo@dahlo dahlo]$
```

tail - view the last rows of a file

`tail <filename>`

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root    0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root    0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root    0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root    0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root   36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
[dahlo@dahlo dahlo]$ tail test.txt
#define HAVE_STRCASECMP 1
#define HAVE_STRCHR 1
#define HAVE_STRDUP 1
#define HAVE_STRERROR 1
#define HAVE_STRNDUP 1
#define HAVE_STRSTR 1
#define HAVE_STRTOL 1
#define HAVE_VASPRINTF 1

configure: exit 0
[dahlo@dahlo dahlo]$
```

tail - view the last n rows of a file

`tail -n <nr of lines> <filename>`

```
[dahlo@dahlo dahlo]$ ls -l
total 57
drwxrwxrwx 1 root root 4096 2012-09-14 10:16 .
drwxrwxrwx 1 root root 0 2012-01-17 08:28 ..
drwxrwxrwx 1 root root 0 2012-01-28 21:41 glob
drwxrwxrwx 1 root root 0 2012-08-22 17:06 myDocs
drwxrwxrwx 1 root root 0 2012-01-29 01:10 other stuff
-rwxrwxrwx 1 root root 36 2012-09-13 15:16 readme.txt
-rwxrwxrwx 1 root root 53027 2012-09-12 10:31 test.txt
[dahlo@dahlo dahlo]$
[dahlo@dahlo dahlo]$ tail -n 3 test.txt
#define HAVE_VASPRINTF 1

configure: exit 0
[dahlo@dahlo dahlo]$
```

nano - edit content of a file

```
nano <file name>
```

```
nano readme.txt
```

Interaction Commands

nano - edit content of a file

```
nano <file name>
```

```
nano readme.txt
```

^ = ctrl

```
GNU nano 2.2.6      File: readme.txt
```

```
This is the content  
of readme.txt
```

```
[ Read 3 lines ]
```

```
^G Get Help    ^O WriteOut    ^R Read File   ^Y Prev Page   ^K Cut Text    ^C Cur Pos  
^X Exit        ^J Justify     ^W Where Is    ^V Next Page   ^U UnCut Text  ^T To Spell
```

rm - remove a file

There is no trash bin in CLI! Gone is gone..

```
rm <file name>
```

Ex.

```
rm readme.txt
```

```
rm ../../../../file1.txt
```

```
rm /home/dahlo/test.txt
```

*

```
[dahlo@dahlo dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root    0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root    0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo dir]$
```

*

```
[dahlo@dahlo dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root    0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root    0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo dir]$
[dahlo@dahlo dir]$ ls -l *.txt
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
[dahlo@dahlo dir]$
```


*

```
[dahlo@dahlo dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root 0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root 2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root 0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo dir]$
[dahlo@dahlo dir]$ ls -l *.txt
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
[dahlo@dahlo dir]$
[dahlo@dahlo dir]$ ls -l file*
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root 2273 2012-01-05 13:44 file2.old
[dahlo@dahlo dir]$
```

*

Works with most Linux commands

Ex:

```
cp *.txt directory1/
```

*

Works with most Linux commands

Ex:

```
rm *.tmp
```

TAB COMPLETION

(try to) never type a path or filename without it!

TAB COMPLETION

(try to) never type a path or filename without it!

```
[dahlo@dahlo-linux dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root    0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root    0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo-linux dir]$ nano fi
```

TAB COMPLETION

(try to) never type a path or filename without it!

```
[dahlo@dahlo-linux dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root    0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root    0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo-linux dir]$ nano file
```

TAB COMPLETION

(try to) never type a path or filename without it!

```
[dahlo@dahlo-linux dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root    0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root    0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo-linux dir]$ nano file
file1.txt file2.old
[dahlo@dahlo-linux dir]$ nano file
```

TAB COMPLETION

(try to) never type a path or filename without it!

```
[dahlo@dahlo-linux dir]$ ls -l
total 68
-rwxrwxrwx 1 root root 28214 2012-01-05 13:44 anotherFile.doc
drwxrwxrwx 1 root root    0 2012-01-17 08:28 directory1
-rwxrwxrwx 1 root root 36458 2012-01-05 13:44 file1.txt
-rwxrwxrwx 1 root root  2273 2012-01-05 13:44 file2.old
drwxrwxrwx 1 root root    0 2012-01-17 08:28 secondDirectory
[dahlo@dahlo-linux dir]$ nano file
file1.txt  file2.old
[dahlo@dahlo-linux dir]$ nano file1.txt
```


Good to Know Commands

top - how much is the computer working?

top

```
top - 21:27:48 up 37 days, 7:34, 2 users, load average: 6.38, 6.09, 6.03
Tasks: 278 total, 4 running, 274 sleeping, 0 stopped, 0 zombie
Cpu(s): 73.5%us, 1.5%sy, 0.0%ni, 24.3%id, 0.6%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 24598372k total, 17703556k used, 6894816k free, 83596k buffers
Swap: 25165816k total, 29704k used, 25136112k free, 15403636k cached
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
5751	zhibing	20	0	1531m	45m	9492	S	100.0	0.2	679:58.20	invaperco
5755	zhibing	20	0	1531m	43m	9492	S	100.0	0.2	679:49.38	invaperco
5759	zhibing	20	0	1531m	43m	9480	S	100.0	0.2	679:56.71	invaperco
5779	zhibing	20	0	1531m	44m	9492	S	100.0	0.2	679:21.84	invaperco
6212	nicusor	20	0	451m	377m	3356	R	100.0	1.6	668:47.67	cretin
28221	roca	20	0	3114m	88m	4188	R	99.7	0.4	8:26.15	seward.exe
16870	root	20	0	0	0	0	S	0.7	0.0	0:13.69	flush-8:0
1781	root	39	19	0	0	0	S	0.3	0.0	17:26.31	kipmi0
1903	root	20	0	0	0	0	S	0.3	0.0	1:24.46	kpanfs_dispatch
28483	dahlo	20	0	13384	1292	884	R	0.3	0.0	0:00.03	top
1	root	20	0	21416	652	448	S	0.0	0.0	0:01.70	init
2	root	20	0	0	0	0	S	0.0	0.0	0:00.03	kthreadd
3	root	RT	0	0	0	0	S	0.0	0.0	0:00.14	migration/0
4	root	20	0	0	0	0	S	0.0	0.0	0:01.40	ksoftirqd/0
5	root	RT	0	0	0	0	S	0.0	0.0	0:00.00	migration/0

Instructions how to use programs

Easy to forget syntax

Manual pages

`man <program name>`

Ex.

`man ls`

(q to quit)

```

LS(1)                                User Commands                                LS(1)

NAME
    ls - list directory contents

SYNOPSIS
    ls [OPTION]... [FILE]...

DESCRIPTION
    List information about the FILES (the current directory by default).
    Sort entries alphabetically if none of -cftuvSUX nor --sort.

    Mandatory arguments to long options are mandatory for short options
    too.

    -a, --all
        do not ignore entries starting with .

    -A, --almost-all
        do not list implied . and ..
    
```

How do I log out?

```
exit
```

Exits only the current terminal

- Summary

- `cp` – copy a file
- `mv` – move a file
- `less` – view a file
- `nano` – view and edit a file
- `rm` – remove a file
- `head / tail`
- wildcards
- **tab completion** – use it!!!
- `top` – see active processes
- `man` – manual pages
- `exit` – Log out current terminal

About 581 000 results (0,79 seconds)

However, **renaming multiple** or group of **files** quickly makes it very difficult task in a terminal. **Linux** comes with a very powerful built-in tool called **rename**. The **rename** command is used to **rename multiple** or group of **files**, **rename files** to lowercase, **rename files** to uppercase and overwrite **files** using perl expressions. Oct 10, 2013



Rename – A Command Line Tool For Renaming Multiple Files in Linux

<https://www.tecmint.com/rename-multiple-files-in-linux/>

 About this result  Feedback

Howto: Linux Rename Multiple Files At a Shell Prompt – nixCraft

<https://www.cyberciti.biz/tips/renaming-multiple-files-at-a-shell-prompt.html> ▼

Nov 26, 2005 - **Rename** command syntax. It is a faster way to group **rename files** in **Linux** or Unix-like system. Say hello to zmv for zsh. Say hello to mmv command. Examples: **Linux Rename Multiple Files** Using a Shell Script. POSIX shell **rename** all *.bak to *.txt. **Linux** Shell script to **rename files**. Perl Script To **Rename File**.

linux - How to rename multiple files in single command or script in ...

<https://unix.stackexchange.com/.../how-to-rename-multiple-files-in-single-command-...> ▼

ssh - Secure SHell connection (ssh)

```
ssh -Y <username>@rackham.uppmax.uu.se
```

Ex:

```
ssh -Y dahlo@rackham.uppmax.uu.se
```

Terminal in Linux and OS X

MobaXterm in Windows (<http://mobaxterm.mobatek.net/>)

Windows Terminal also alternative, but no graphics

Laboratory time!

https://nbisweden.github.io/workshop-ngsintro/2105/lab_linux_intro.html