



# Linux Introduction

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Enabler for Life Sciences

# **Linux Introduction**

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

Practice makes perfect :)

Enabler for Life Sciences

- **Parallelldatorcentrum**  
<http://www.pdc.kth.se>  
(KTH:s supercomputer center)
- 1 computer cluster, **Dardel**
- Uses Linux

- Why Linux?

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

The image shows a Linux desktop environment with a dark theme. At the top, there is a system tray with various icons. The desktop background features a blurred image of a person in a hospital bed.

**Terminal Window:**

```
Terminal - dahlo@dahlo-home:~/testarea/edge2redm
1 ..
2 Test script for Efecte WebAPI
3 ''
4
5 import requests
6 import xml.etree.ElementTree as ET
7 from dotenv import load_dotenv
8 import os
9
10 # Load environment
11 load_dotenv()
12
13 # Load config
14 esm_host = os.environ.get('ESM_HOST')
15 esm_user = os.environ.get('ESM_USER')
16 esm_password = os.environ.get('ESM_PASSWORD')
17
18 if esm_host is None:
19     print("No host specified")
20     exit()
21 elif esm_user is None:
22     print("No user specified")
23     exit()
24 elif esm_password is None:
25     print("No password specified")
26     exit()
27
28 urlBase = "https://" + esm_host +
29
edgeAPITest.py 67L, 1600B 1
```

**File Manager:**

Places

Name	Size	Type
dahlo	20 items	Folder
Desktop	2 items	Folder
File System	5 items	Folder
Downloads	3 items	Folder
Trash	1 item	Folder
499 GB Volume	9 items	Folder
bjornlunden_docume...	11 items	Folder
bokadirekt-watcher	9 items	Folder
btrfs_find_corrupted...	1 item	Folder
ceph-kvm-cluster	2 items	Folder
confluence-server-to...	24 items	Folder
courses	1 item	Folder
cuda	5 items	Folder
dineros	2 items	Folder
edge2redmine	3 items	Folder
forbok-di	11 items	Folder
hertz-config	21 items	Folder
imei	11 items	Folder
it87	13 items	Folder
john	1 item	Folder
john-jumbo	7 items	Folder
leodium-ReLive-NoMa...	20 items	Folder
mattias	4 items	Folder
maya	2 items	Folder
mimir	1 item	Folder
mimir2librechat	7 items	Folder
ml	6 items	Folder
modorganizer2-linux-i...	13 items	Folder
nbfc-linux	31 items	Folder
nms	3 items	Folder

53 items, Free space: 469,8 GB

**Web Browser:**

UNT, Upsala Nya Tidning - https://www.unt.se

JUST NU Slask

JUST NU Jordbävning i Värmland

Lagkompisen drabbades av allvarlig sjukdom – nu agerar hela laget

Ville göra något ytterligare ✓ Vill rädda andra – så ska det gå till Innebandy

Psst... Lyssna istället för att läsa!

```
File Edit View Terminal Tabs Help
drwxrwxr-x 1 dahlo dahlo 1,5K 15 mar 2024 confluence-server-to-cloud-utils
drwxr-xr-x 1 dahlo dahlo 12 5 sep 09.32 courses
drwxr-xr-x 1 dahlo dahlo 56 11 feb 2024 cuda
drwxr-xr-x 1 dahlo dahlo 84 1 feb 2024 dineros
drwxrwxr-x 1 dahlo dahlo 164 17 apr 2024 edge2redmine
drwxrwxr-x 1 dahlo dahlo 248 25 apr 2024 forbok-cli
drwxr-xr-x 1 dahlo dahlo 486 31 jan 2024 hertz-config
drwxrwxr-x 1 dahlo dahlo 364 9 feb 2024 imei
drwxrwxr-x 1 dahlo dahlo 316 13 feb 2024 it87
drwxrwxr-x 1 dahlo dahlo 18 28 maj 09.32 john
drwxrwxr-x 1 dahlo dahlo 316 28 maj 09.28 john-jumbo
drwxr-xr-x 1 dahlo dahlo 1,1K 29 okt 22.37 leodium-ReLive-NoMansSky-Expeditions-Offline
drwxrwxr-x 1 dahlo dahlo 72 21 mar 2024 mattias
drwxr-xr-x 1 dahlo dahlo 32 5 sep 10.32 maya
drwxrwxr-x 1 dahlo dahlo 16 1 mar 2024 mimir
drwxrwxr-x 1 dahlo dahlo 242 16 apr 2024 mimir2librechat
drwxr-xr-x 1 dahlo dahlo 66 31 jan 2024 ml
drwxr-xr-x 1 dahlo dahlo 286 1 okt 12.24 modorganizer2-linux-installer
drwxrwxr-x 1 dahlo dahlo 600 11 mar 2024 nbfc-linux
drwxr-xr-x 1 dahlo dahlo 76 25 sep 23.25 nms
drwxr-xr-x 1 dahlo dahlo 43K 31 jan 2024 polonix_data
drwxr-xr-x 1 dahlo dahlo 458 30 aug 15.30 POL-POM-4
drwxr-xr-x 1 dahlo dahlo 750 30 aug 15.45 POL-POM-5
drwxrwxr-x 1 dahlo dahlo 42 22 aug 11.36 remove_old_kernels
drwxrwxr-x 1 dahlo dahlo 140 26 feb 2024 roy
drwxr-xr-x 1 dahlo dahlo 72 19 feb 2024 sink_switcher
drwxrwxr-x 1 dahlo dahlo 148 5 apr 2024 straip_utils
drwxrwxr-x 1 dahlo dahlo 44 18 jun 23.02 syncthing
drwxrwxr-x 1 dahlo dahlo 136 24 nov 21.39 temp
drwxrwxr-x 1 dahlo dahlo 210 14 aug 09.45 timelog-bot
drwxr-xr-x 1 dahlo dahlo 120 31 jan 2024 tsai
drwxr-xr-x 1 dahlo dahlo 448 15 okt 11.59 UPPMAX-documentation
drwxrwxr-x 1 dahlo dahlo 56 6 feb 2024 venv
drwxrwxr-x 1 dahlo dahlo 216 21 mar 2024 weather
drwxrwxr-x 1 dahlo dahlo 538 24 nov 21.26 workshop-ngsintro
drwxr-xr-x 1 dahlo dahlo 214 15 okt 14.39 xferticket-python
drwxr-xr-x 1 dahlo dahlo 222 27 aug 10.04 xone
drwxrwxr-x 1 dahlo dahlo 318 20 aug 22.09 xpadneo
-rw-r--r-- 1 dahlo dahlo 23M 19 nov 13.39 bokadirekt-watcher.tar.gz
-rw-rw-r-- 1 dahlo dahlo 2,1K 24 maj 2024 timelogbot_v2_prompt.txt
[21:39:58] dahlo@dahlo-home ~/testarea $ uptime
21:40:44 up 12:57, 2 users, load average: 0,27, 0,43, 0,41
[21:40:44] dahlo@dahlo-home ~/testarea $ who
dahlo      tty7          2024-11-24 09:43 (:0)
[21:40:47] dahlo@dahlo-home ~/testarea $
```

# 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
01 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
01 1.annovar.exonic_variant_function		242.9 KB	unknown	2011-05-18 15:34:30
01 1.annovar.hg19_snp131_dropped		837.2 KB	unknown	2011-05-18 15:34:30
01 1.annovar.hg19_snp131_filtered		905.6 KB	unknown	2011-05-18 15:34:30
ABC 1.annovar.log		725 bytes	application log	2011-05-18 15:34:30
01 1.annovar.stat		938 bytes	unknown	2011-05-18 15:34:30
01 1.annovar.variant_function		2.3 MB	unknown	2011-05-18 15:34:31
01 1.non_sym_gene_list		94.3 KB	unknown	2011-05-18 15:34:31
01 1.non_sym_gene_list_not_in_dbsnp		78.8 KB	unknown	2011-05-18 15:34:31
01 1.stop_gain_gene_list		4.4 KB	unknown	2011-05-18 15:34:31
01 1.stop_gain_gene_list_not_in_dbsnp		4.3 KB	unknown	2011-05-18 15:34:31
01 1.sym_gene_list		51.4 KB	unknown	2011-05-18 15:34:31
01 1.sym_gene_list_not_in_dbsnp		34.3 KB	unknown	2011-05-18 15:34:31
ABC test.out		2.7 MB	out document	2011-05-18 15:34:31
01 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

# Navigation Commands

- **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	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

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

```
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-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	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 uppmax 56427 Jan  5 13:45 notes
-rw-r--r-- 1 dahlo uppmax 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 uppmax 28214 Jan  5 13:46 bird.jpg
-rw-r--r-- 1 dahlo uppmax 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 uppmax 56427 Jan  5 13:45 notes
-rw-r--r-- 1 dahlo uppmax 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** – print working directory

```
[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/Relative paths

- 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**

# Absolute/Relative paths

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

**`.. /documents/results.csv`**

**`nobackup/dahlo/linux_intro/files.zip`**

# Absolute/Relative paths

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

`./documents/results.csv`

`nobackup/dahlo/linux_intro/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

## **cp - copy a file**

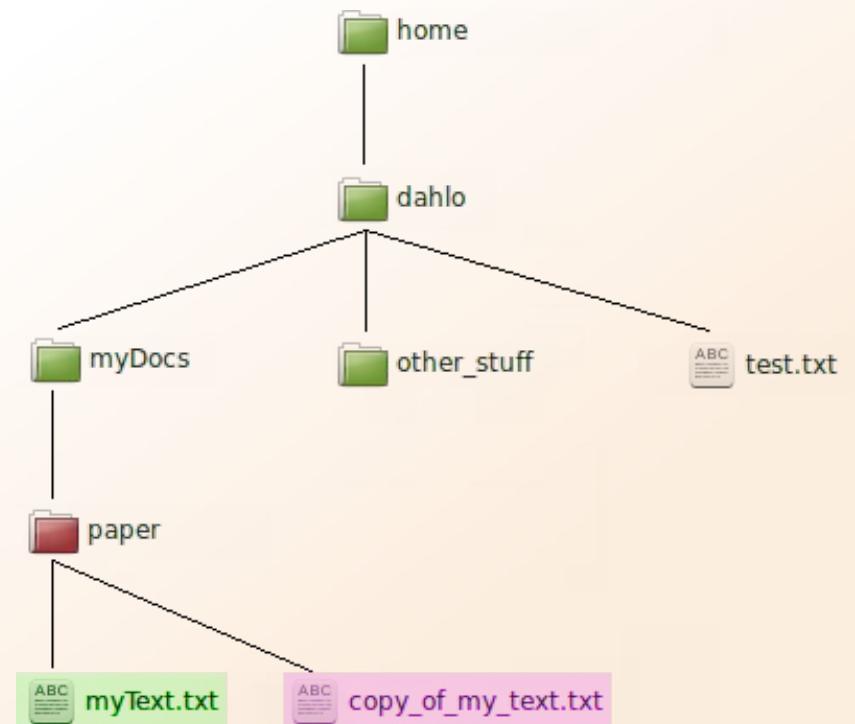
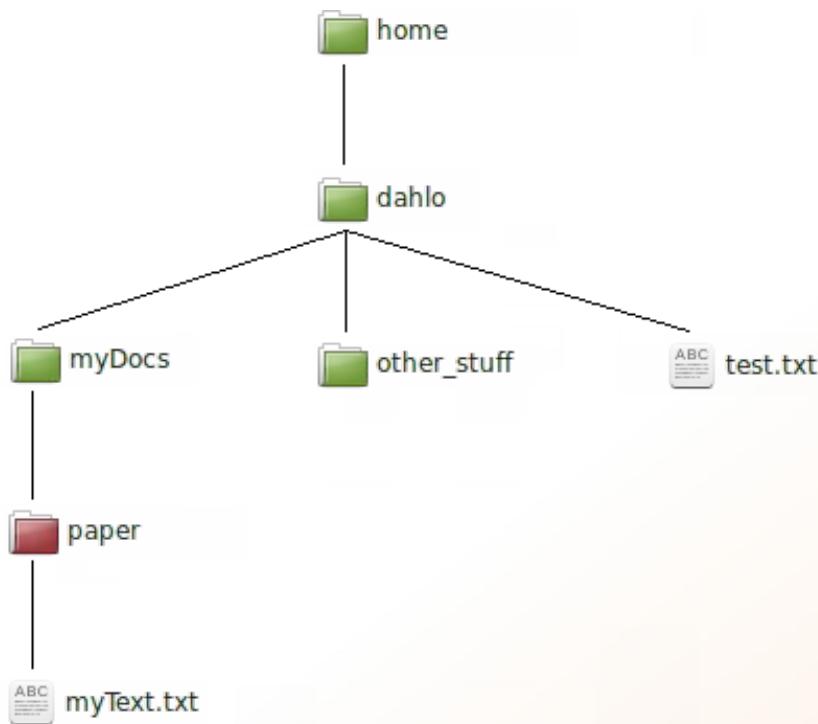
```
cp <name of original> <name of copy>
```

# Interaction Commands

## cp - copy a file

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

```
cp myText.txt copy_of_my_text.txt
```

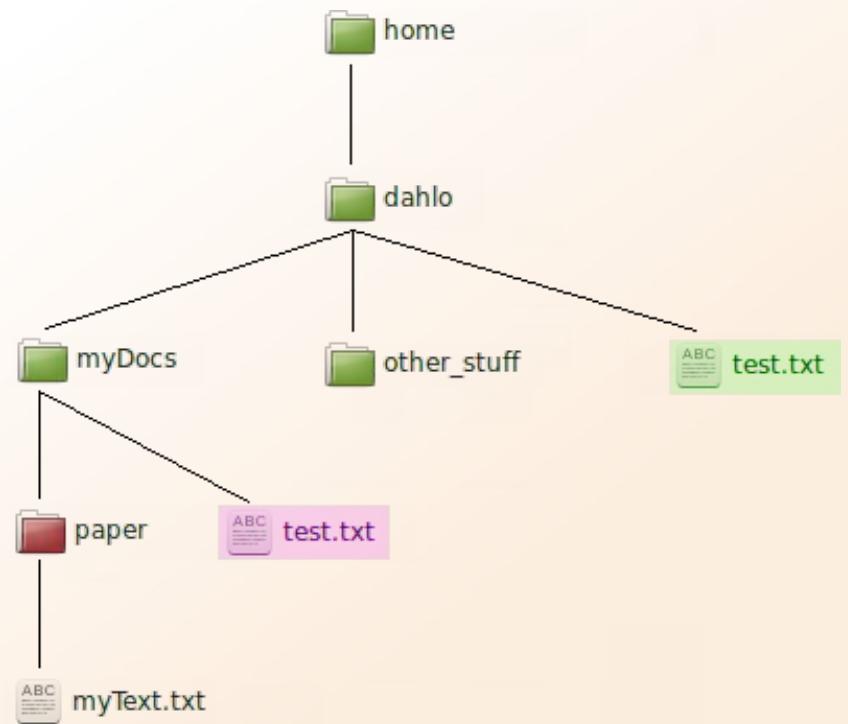
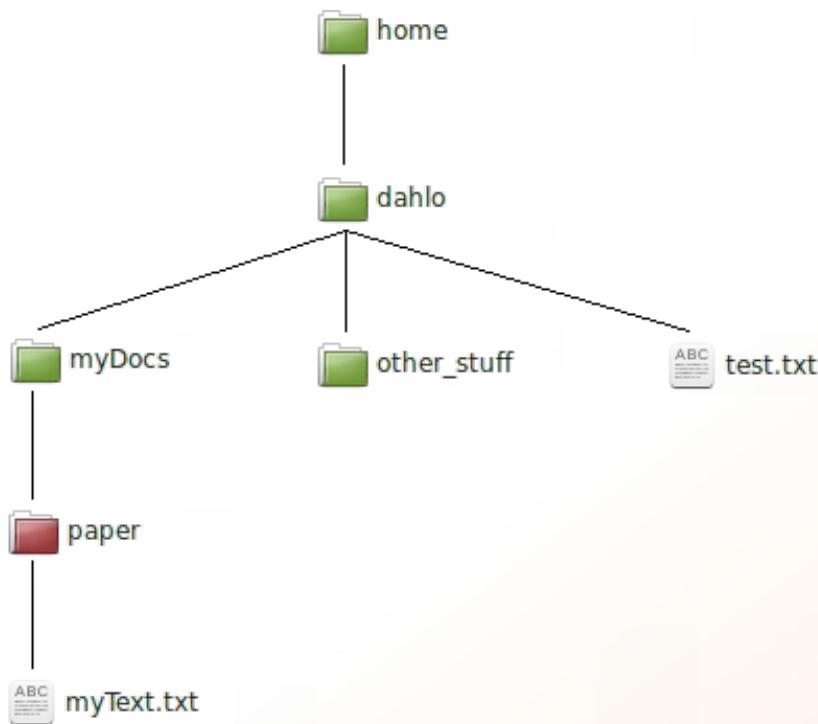


# Interaction Commands

## cp - copy a file

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

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

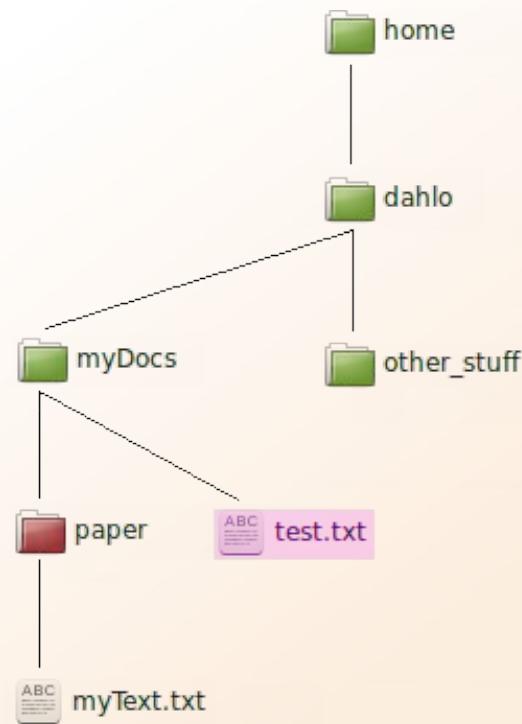
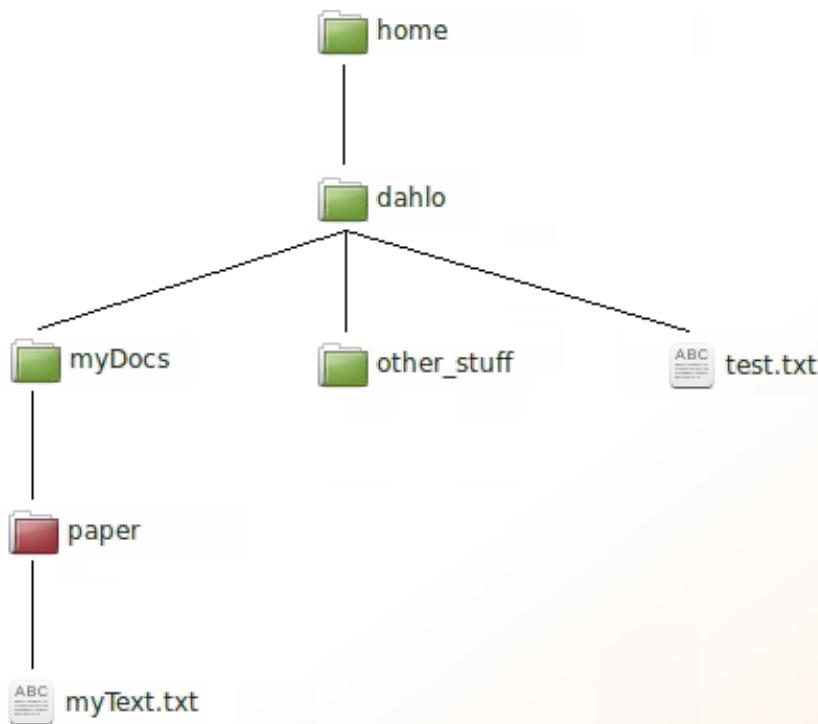


# Interaction Commands

## mv - move a file

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

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

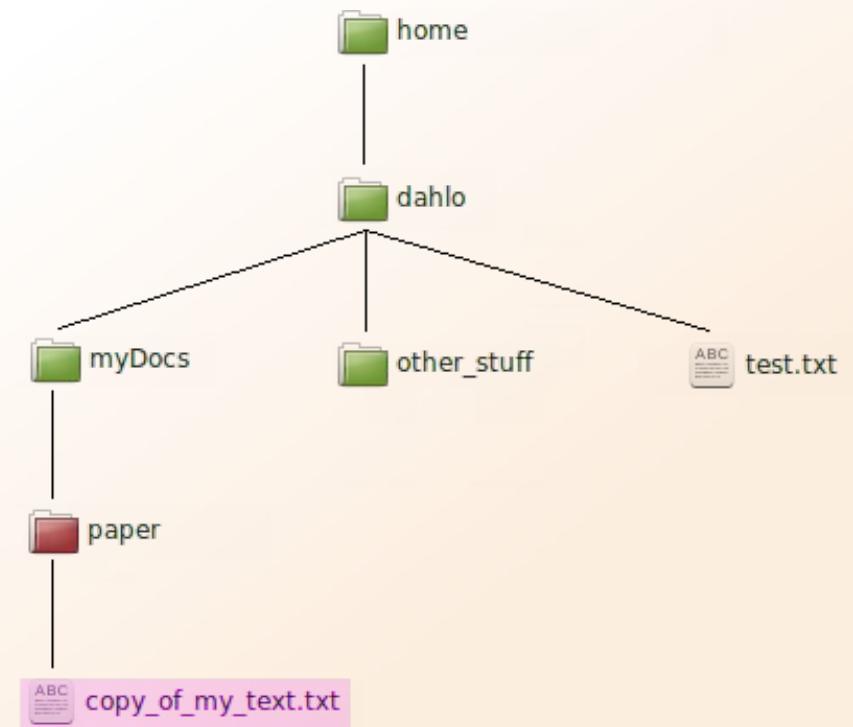
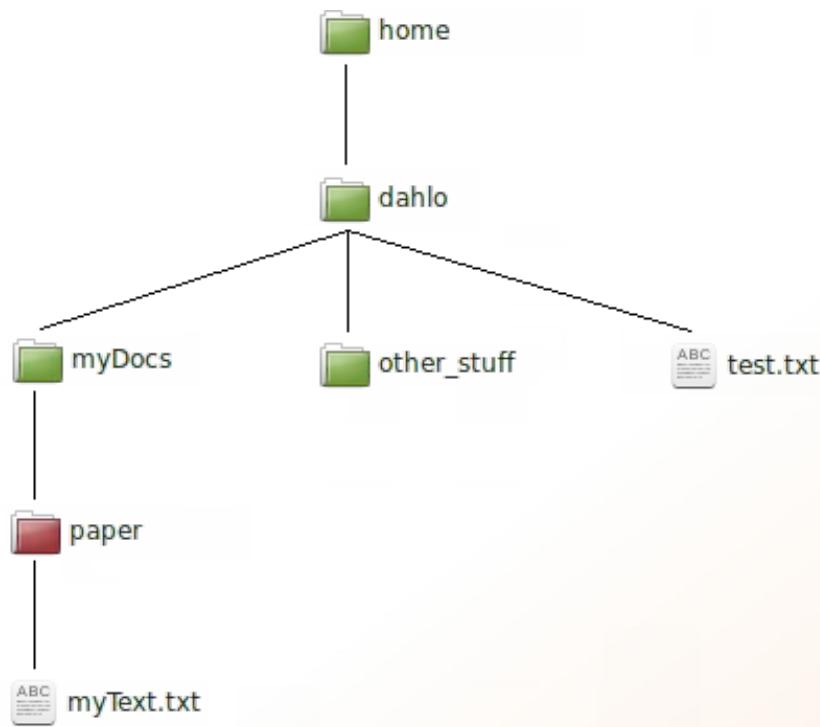


# Interaction Commands

## mv - rename a file

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

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

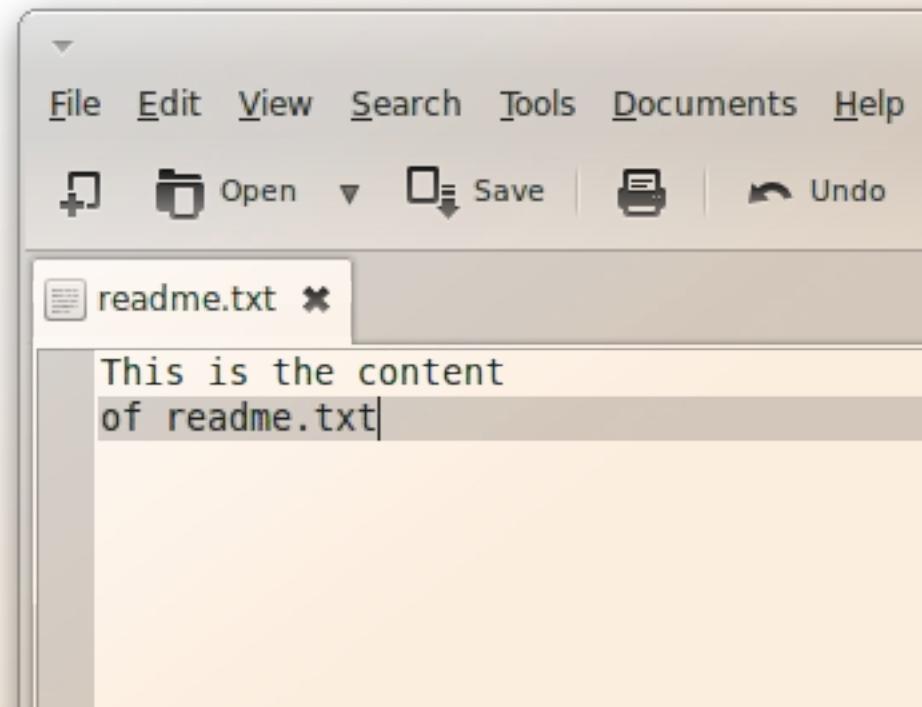


# Interaction Commands

## **less** - view content of a file

```
less <file name>
```

```
less readme.txt
```



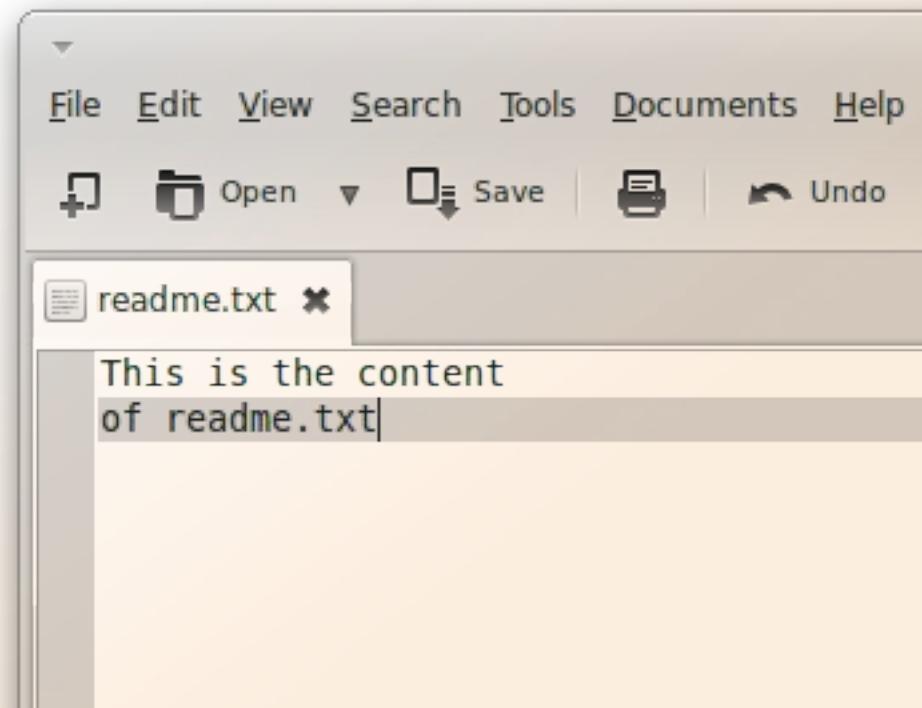
# Interaction Commands

## **less** - view content of a file

```
less <file name>
```

```
less readme.txt
```

This is the content  
of readme.txt  
**(END)**



# Interaction Commands

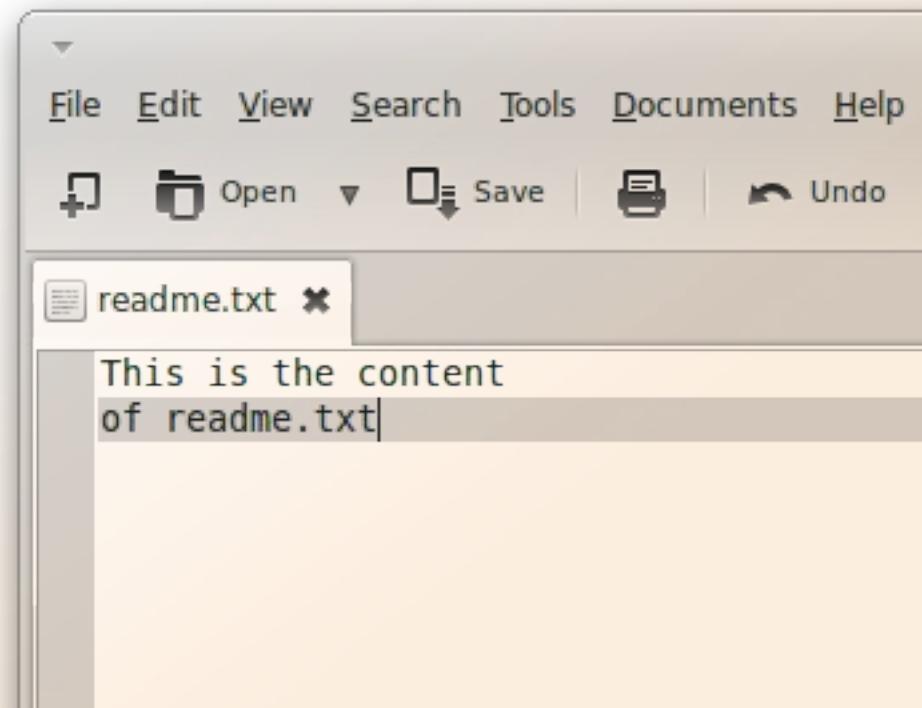
**less** - view content of a file

```
less <file name>
```

```
less readme.txt
```

This is the content  
of readme.txt  
**(END)**

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-drmaa/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`

## **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]$
```

# Wildcards

\*

```
[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:

```
cp *.txt directory1/  
rm *.tmp
```

The most important thing

# 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 █
```

**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
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>@dardel.pdc.kth.se
```

**Ex:**

```
ssh -Y dahlo@dardel.pdc.kth.se
```

Terminal in Linux and OS X

PowerShell in Windows

## ssh - Secure SHell connection (ssh)

```
ssh -Y <username>@dardel.pdc.kth.se
```

**Ex:**

```
ssh -Y dahlo@dardel.pdc.kth.se
```

Terminal in Linux and OS X

PowerShell in Windows

Requires SSH keys or Kerberos

# Laboratory time!

[https://nbisweden.github.io/workshop-ngsintro/2603/topics/linux/lab\\_linux\\_intro.html](https://nbisweden.github.io/workshop-ngsintro/2603/topics/linux/lab_linux_intro.html)