



# Linux Introduction

160125  
Martin Dahlö  
martin.dahlo@scilifelab.uu.se

Enabler for Life Sciences

# Linux Introduction

You will not learn this now.  
Google it or look at lecture slides when you need it.

Practice makes perfect :)

Enabler for Life Sciences

- Uppsala Multidisciplinary Center for Advanced Computational Science
  - (Uppsala supercomputer center)
- Clusters
  - Milou
  - Tintin
- Uses Linux

- Uppsala Multidisciplinary Center for Advanced Computational Science
  - (Uppsala supercomputer center)
- Clusters
  - **Milou**
  - Tintin
- Uses Linux

- UPPMAX is only accessible through SSH (Secure Shell) for security and speed
  - Command Line Interface (CLI)
  
- Scary at first, but wonderful to work with
  - Automation and scripts
  - Super computing not possible without it

```

Terminal
File Edit View Search Terminal Help
drwxr-xr-x  2 martin martin   4096 2012-01-26 21:06 .
drwxr-xr-x 53 martin martin   4096 2012-01-26 21:16 ..
-rw-r--r--  1 martin martin 108094 2011-10-06 11:05 nautilus-dropbox_0.6.9_amd64.deb
-rw-r--r--  1 martin martin 4576880 2011-09-23 23:03 nxclient_3.5.0-7_amd64.deb
[martin@martin-VirtualBox Downloads]$ cd ../../
[martin@martin-VirtualBox home]$ l
total 8.0K
drwxr-xr-x 53 martin martin 4.0K 2012-01-26 21:16 martin
drwxr-xr-x 40 martin martin 4.0K 2011-06-14 23:22 temp
[martin@martin-VirtualBox home]$ cd temp/
.adobe/          .fontconfig/    .macromedia/    .putty/
.android/        .gconf/          .mozilla/        .qt/
.cache/          .gconfd/         Music/           ssh/
.compiz/         .gegl-0.0/       .nautilus/       .ssh/
.config/         .gimp-2.6/       .nx/             Templates/
.dbus/           .gnome2/         .openoffice.org/.themes/
Desktop/         .gnome2_private/Pictures/
Documents/       .icons/          projects/        .thumbnails/
Downloads/      .linuxmint/     Public/          Videos/
.filezilla/     .local/         .pulse/
[martin@martin-VirtualBox home]$
    
```

# Navigation Commands

| 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<br>10 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<br>10 1.annovar.exonic_variant_function  | 242.9 KB  | unknown                  | 2011-05-18 15:34:30 |
| 01<br>10 1.annovar.hg19_snp131_dropped      | 837.2 KB  | unknown                  | 2011-05-18 15:34:30 |
| 01<br>10 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<br>10 1.annovar.stat                     | 938 bytes | unknown                  | 2011-05-18 15:34:30 |
| 01<br>10 1.annovar.variant_function         | 2.3 MB    | unknown                  | 2011-05-18 15:34:31 |
| 01<br>10 1.non_sym_gene_list                | 94.3 KB   | unknown                  | 2011-05-18 15:34:31 |
| 01<br>10 1.non_sym_gene_list_not_in_dbsnp   | 78.8 KB   | unknown                  | 2011-05-18 15:34:31 |
| 01<br>10 1.stop_gain_gene_list              | 4.4 KB    | unknown                  | 2011-05-18 15:34:31 |
| 01<br>10 1.stop_gain_gene_list_not_in_dbsnp | 4.3 KB    | unknown                  | 2011-05-18 15:34:31 |
| 01<br>10 1.sym_gene_list                    | 51.4 KB   | unknown                  | 2011-05-18 15:34:31 |
| 01<br>10 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<br>10 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 |







- 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 uppmx 28214 Jan  5 13:44 anotherFile.doc
drwxr-xr-x 2 dahlo uppmx  4096 Jan  5 13:45 directory1
-rw-r--r-- 1 dahlo uppmx 36458 Jan  5 13:44 file1.txt
-rw-r--r-- 1 dahlo uppmx  2273 Jan  5 13:44 file2.old
drwxr-xr-x 2 dahlo uppmx  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 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 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 |



- pwd – print working directory

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









- pwd – print working directory

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

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

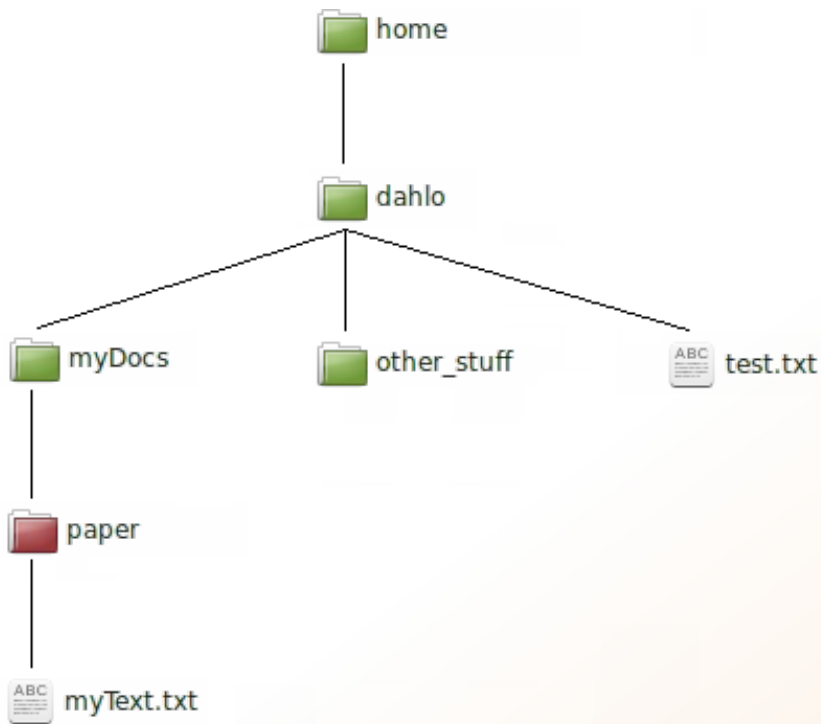
```
[dahlo@kalkyl4 directory1]$ pwd  
/home/dahlo/glob/work/testarea/temp/dir/directory1
```

- Summary
  - ls – list content of directory
  - cd – change working directory
  - pwd – print working directory

| 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 |

- Copy a file

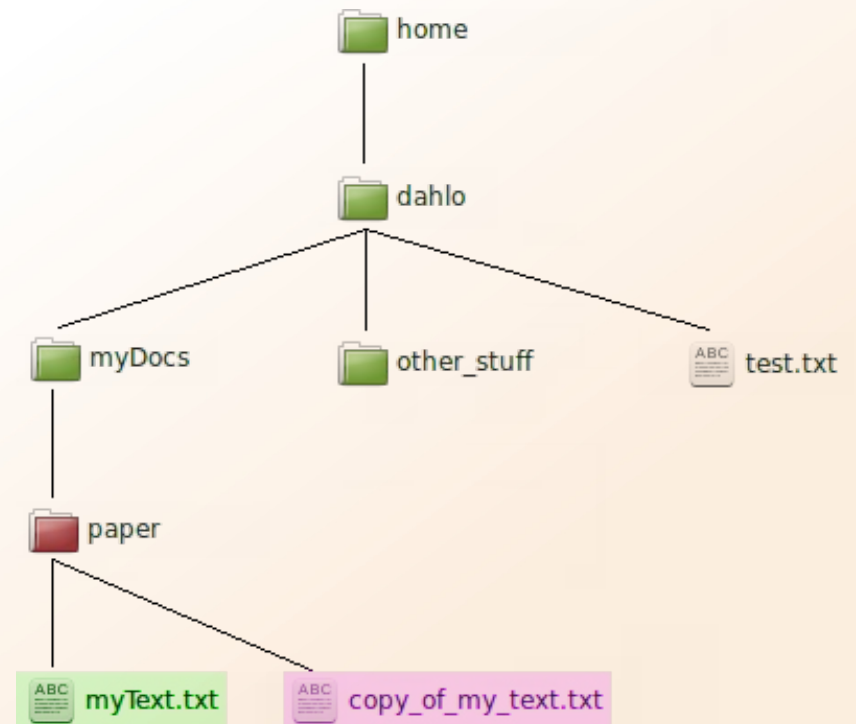
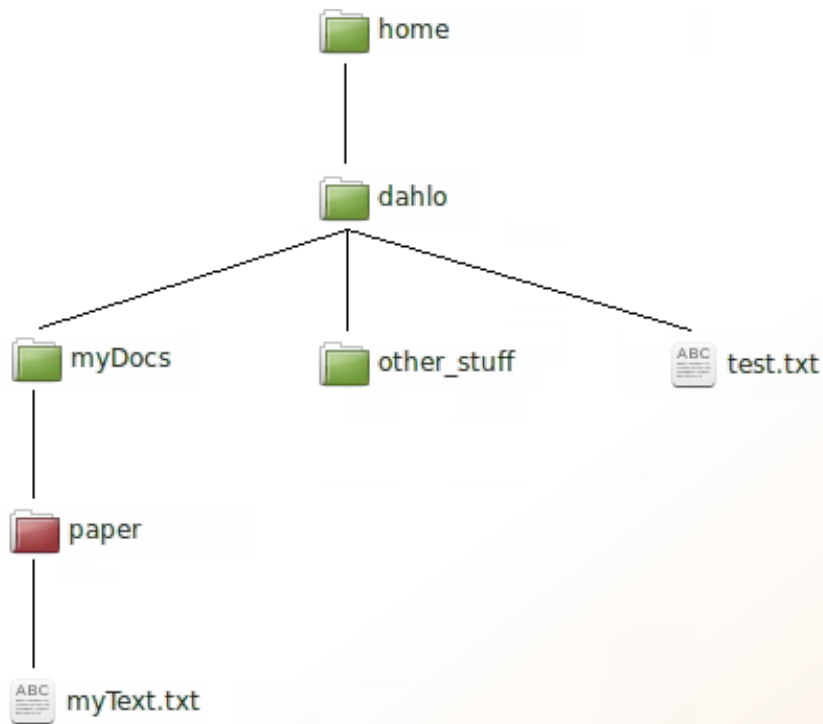
`cp <name of original> <name of copy>`



- Copy a file

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

`cp myText.txt copy_of_my_text.txt`

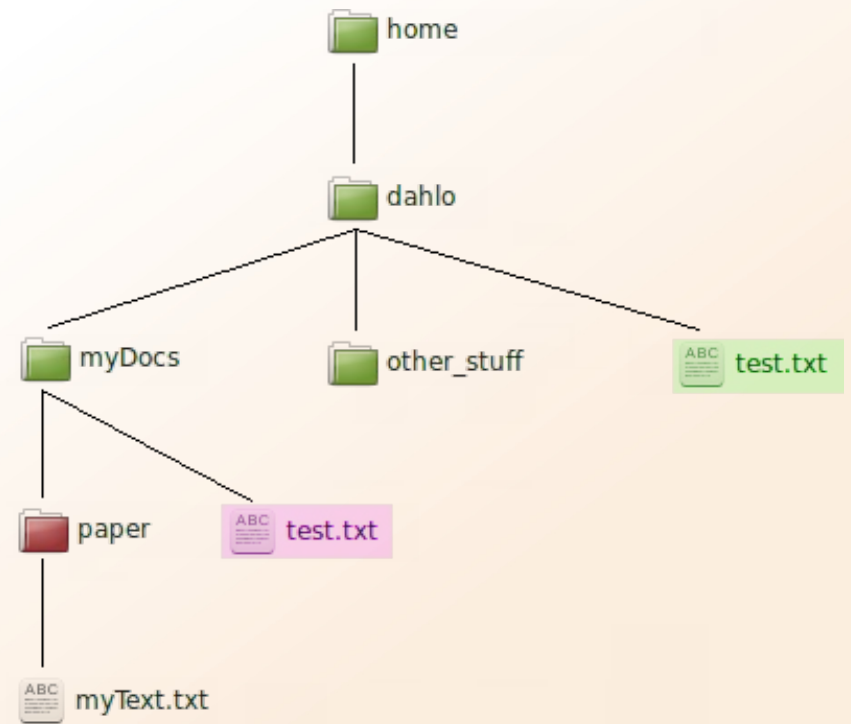
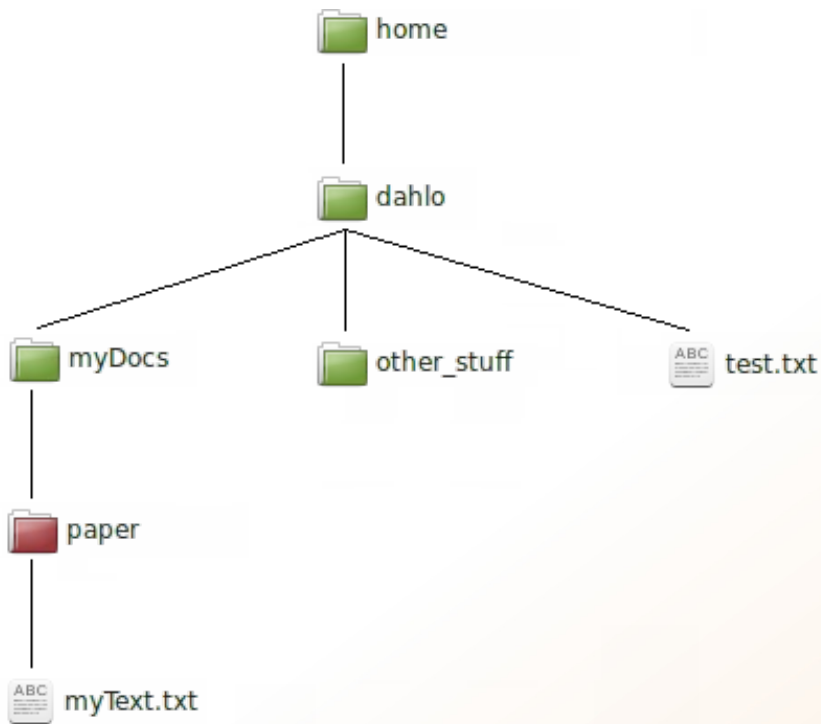


# Interaction Commands

- Copy a file

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

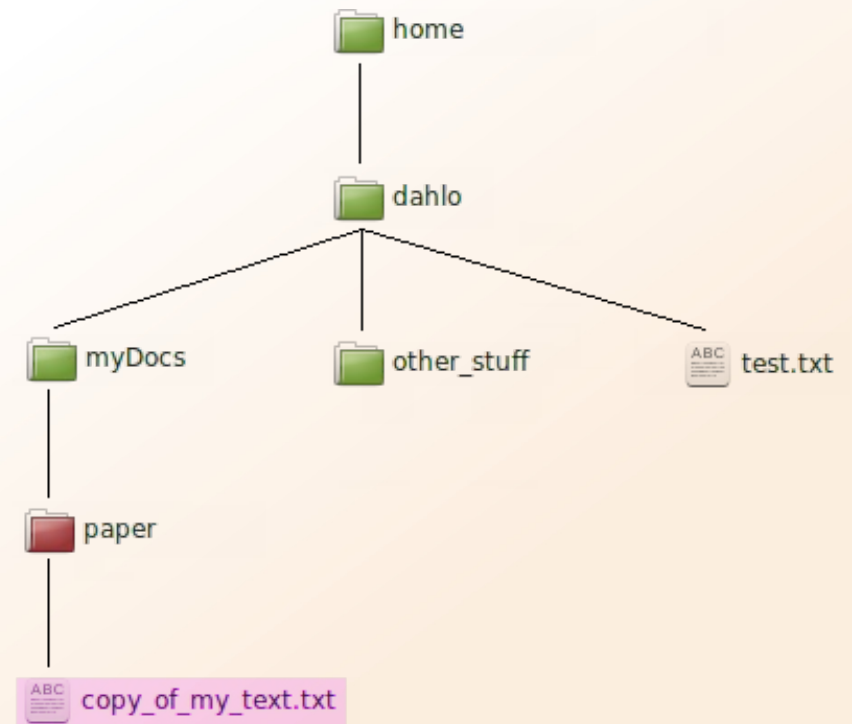
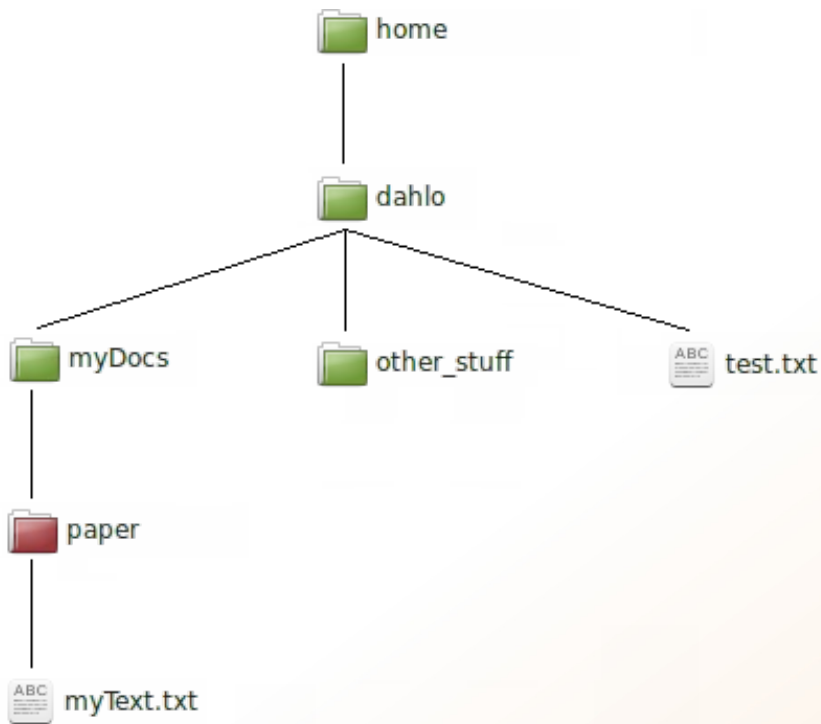
`cp /home/dahlo/test.txt ../../myDocs/`



- Move a file

`mv <name of original> <name of copy>`

`mv myText.txt copy_of_my_text.txt`

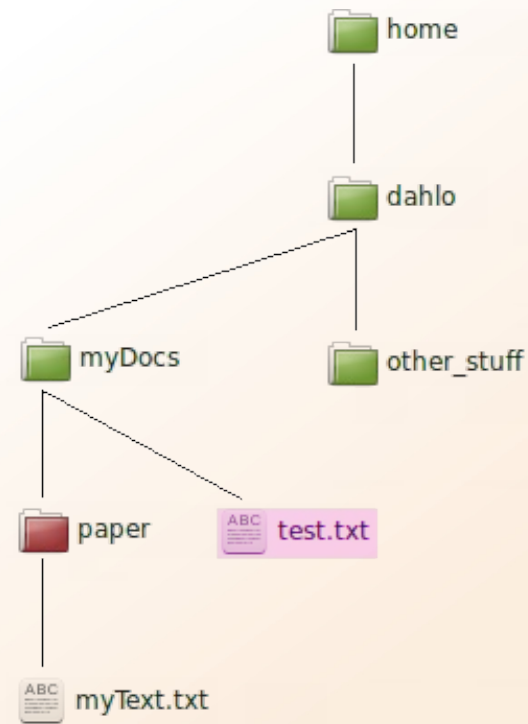
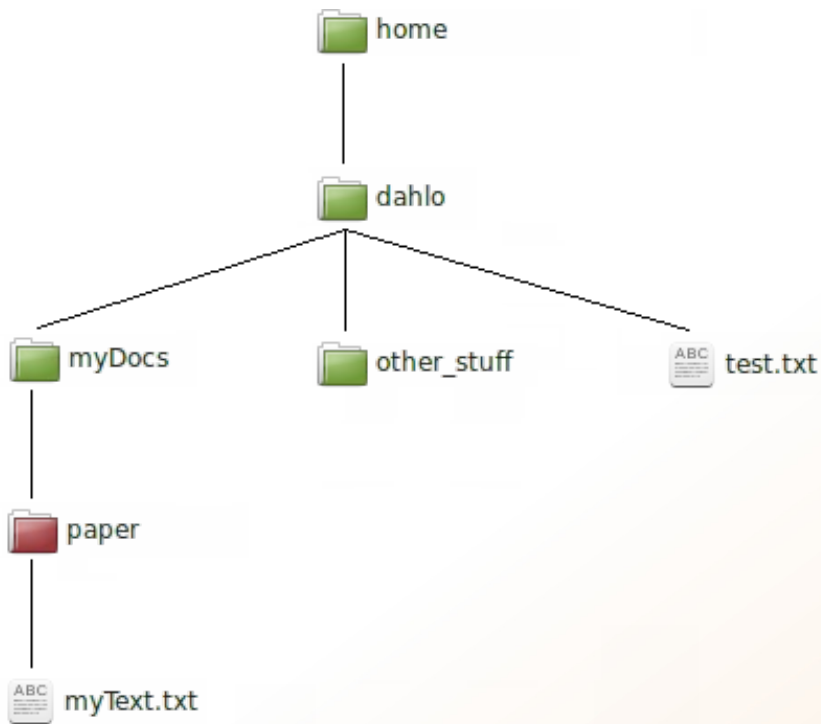




- Move a file

`mv <name of original> <name of copy>`

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

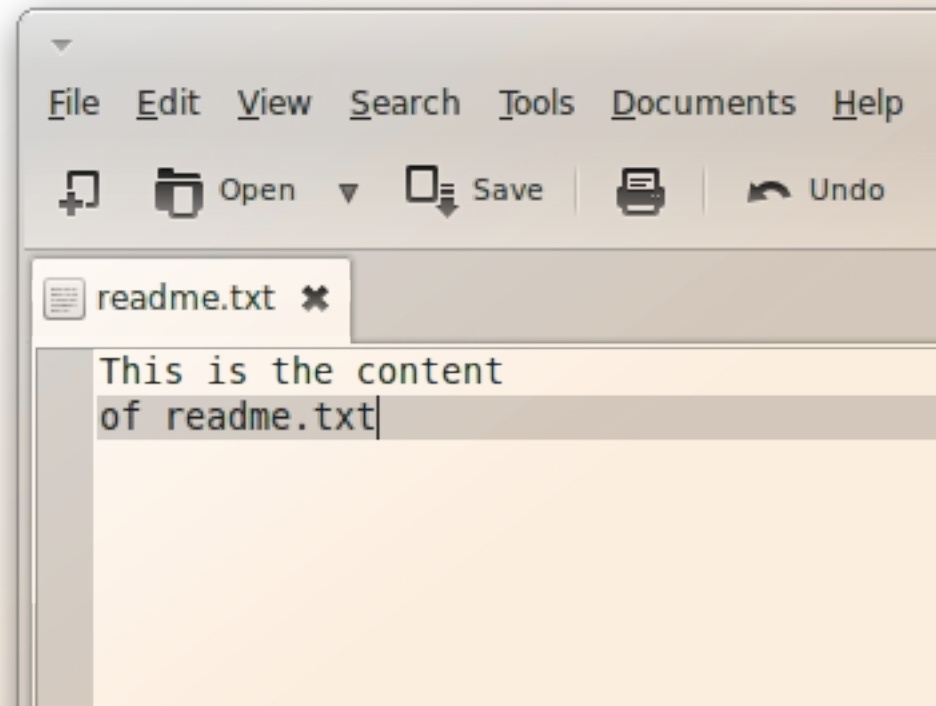


# Interaction Commands

- View content of a file

`less <file name>`

`less readme.txt`



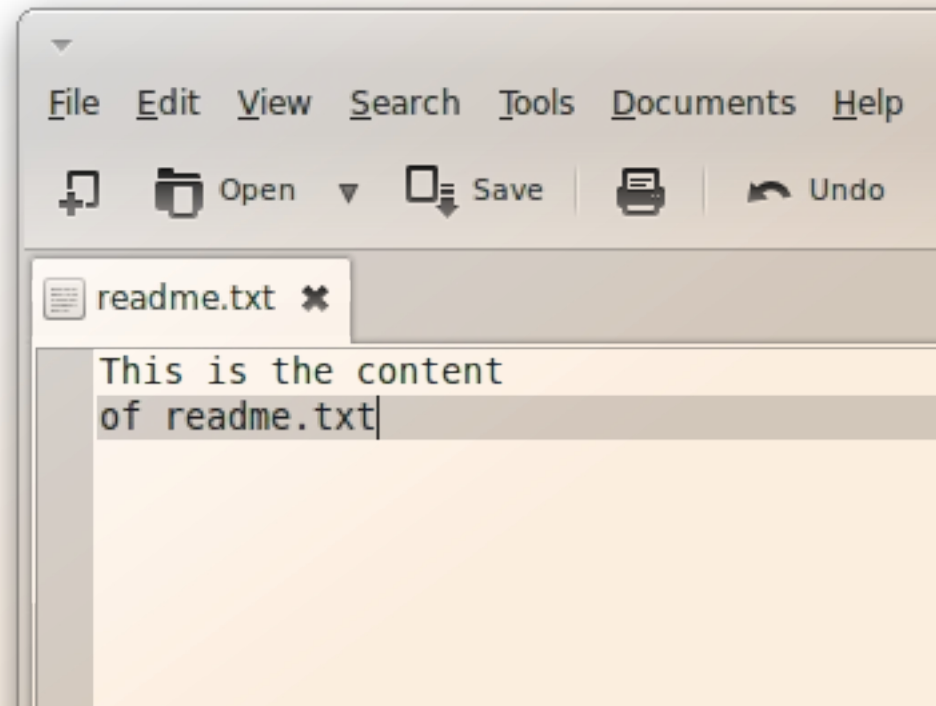
- View content of a file

`less <file name>`

`less readme.txt`

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

```
readme.txt (END)
```



- View content of a file

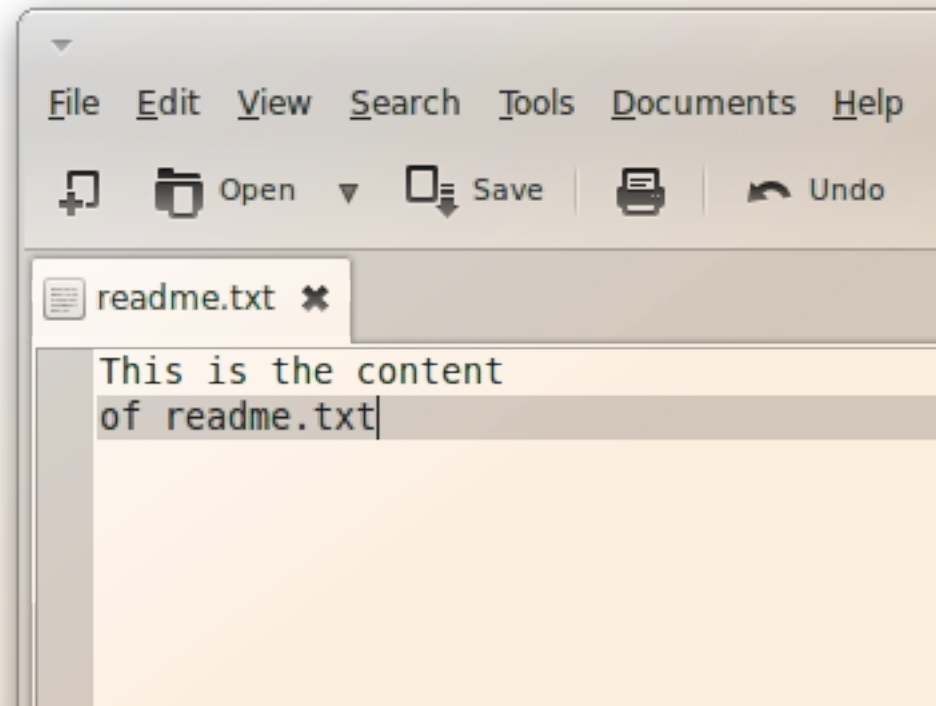
`less <file name>`

`less readme.txt`

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

```
readme.txt (END)
```

(q to exit)



- View the first rows of a file
  - `head <filename>`

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

- 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]$
```

- 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
```



- 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]$
```

- View the first n 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]$
```

- 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]$
```

- 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]$
```

- Edit content of a file

```
nano <file name>
```

```
nano readme.txt
```

# Interaction Commands

- 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
```

- Remove a file

```
rm <file name>
```

Ex.

```
rm readme.txt
```

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

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

- There is no trash bin in Linux! Gone is gone..



- \*
- Works with most Linux commands

```
[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]$
```

- \*
- Works with most Linux commands

```
[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]$
```

- \*
- Works with most Linux commands

```
[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/`

```
[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: `rm *.tmp`

```
[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]$ █
```

# TAB COMPLETION

**Never** write a path or filename without it!

## TAB COMPLETION

**Never** write 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

**Never** write 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

**Never** write 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

**Never** write 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
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-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 █
```

- 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 ..
    
```

:[]

# SciLifeLab U P P S A L A Good to Know Commands

- How do I log out?
  - exit
- Exits only the current terminal

# SciLifeLab U P P S A L A Good to Know Commands

- 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 curren terminal

- Secure SHell connection (ssh)
- `ssh -Y <username>@milou.uppmax.uu.se`
  - Ex: `ssh -Y dahlo@milou.uppmax.uu.se`
- Terminal in Linux and OSX
- MobaXterm in Windows (<http://mobaxterm.mobatek.net/>)
  - Putty also alternative, but not as good..

- Special for this course
  - `salloc -A g2016001 -t 07:00:00 -p core -n 1 --no-shell --reservation=g2016001_25 &`
    - `--reservation` will be proj id and day
    - Will start a node which you have access to
      - Check which node with `queue -u username`
      - ssh to given node, from within UPPMAX

```
[dahlo@kalkyl1 work]$ salloc -A g2012205 -t 08:00:00 -p node --no-shell --reservation=sunday
salloc: Granted job allocation 1745256
[dahlo@kalkyl1 work]$ queue -u dahlo
  JOBID PARTITION    NAME    USER  ST       TIME  NODES NODELIST(REASON)
1745256   devel  (null)  dahlo  R        0:13     1 q36
[dahlo@kalkyl1 work]$
[dahlo@kalkyl1 work]$ ssh -Y q36
```



- Laboratory time!