

Quality of Life tips

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Enabler for Life Sciences

Terminal improvements

- There are a lot of small tips that will improve your experience greatly.
- This lecture will cover some of them:
 - Navigating the terminal
 - Shortcuts for programs, files and directories
 - Finding files and contents of files
- Also covered: How to transfer files with rsync, scp

- Create shortcuts to files and catalogs

```
$ ln -s /link/to/folder/or/file
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You can create shortcuts to access your project catalog without the entire path

```
$ cd ~
```

```
$ ln -s /proj/g2019015/nobackup/yourusername g2019015
```

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```

You can create shortcuts to access your project catalog without the entire path

```
$ cd ~
```

```
$ ln -s /proj/g2019015/nobackup/yourusername g2019015
```

Now you can go to the project directory from your home folder:

```
$ cd g2019015
```

- Create shortcuts to files and catalogs

```
$ ln -s /link/to/folder/or/file
```

Now create a shortcut to this lab's folder!

```
$ ln -s /sw/courses/ngsintro/qol/
```

- Create shortcut commands

```
$ alias sc="program -gRe /proj/g209999/test"
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```
$ alias ngsintro="module load bioinfo-tools ;  
module load samtools ; module load bwa ; cd  
/proj/g2019015/nobackup/yourusername"
```

- Create shortcut commands

```
$ alias sc="program -gRe /proj/g209999/test"  
$ sc
```

```
$ alias ngsintro="module load bioinfo-tools ;  
module load samtools ; module load bwa ; cd  
/proj/g2019015/nobackup/yourusername"
```

```
$ ngsintro
```

Command history

- Up & down arrow to step through history

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- Ctrl+r to search through previous commands

- Up & down arrow to step through history
- Ctrl+r to search through previous commands
 - Ctrl+r again to search further back

Quicker cursor

- Navigating the command line can be done quicker than with just left and right arrows

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ctrl+a and ctrl+e places the cursor at the beginning and end of command line respectively

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ctrl+a and ctrl+e places the cursor at the beginning and end of command line respectively

alt+b to go **b**ack a word, alt+f to go **f**orward

Cursor position

- No need to be at end of line when pressing enter
- Only determines where you type or erase

```
$ echo "Position not important"█
```

Cursor position

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- Only determines where you type or erase

```
$ echo "Position not iimportant"
```

- Remembers previous directory

```
user@rackham5 ~/ $
```

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2099004
```

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2099004  
user@rackham5 /proj/g2099004 $
```

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2099004  
user@rackham5 /proj/g2099004 $ cd -
```

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2099004
user@rackham5 /proj/g2099004 $ cd -
user@rackham5 ~/ $
```


- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2099004
user@rackham5 /proj/g2099004 $ cd -
user@rackham5 ~/ $ cd -
```

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2099004
user@rackham5 /proj/g2099004 $ cd -
user@rackham5 ~/ $ cd -
user@rackham5 /proj/g2099004 $
```

- Copy files between computers
- Similar syntax as cp

```
rsync user@host:/path/to/file /local/path
```

```
scp user@host:/path/to/file /local/path
```

- Copy files between computers
- Similar syntax as cp

```
rsync user@rackham.uppmax.uu.se:/home/user/t.txt .
```

```
scp user@rackham.uppmax.uu.se:/home/user/t.txt .
```

- Copy files between computers
- Similar syntax as cp
- rsync: -a save modification time, -P show progress
- scp: -p save modification time

```
rsync -aP user@rackham.uppmax.uu.se:/home/user/t.txt .
```

```
scp -p user@rackham.uppmax.uu.se:/home/user/t.txt .
```

- Copy files between computers
- Similar syntax as cp
- rsync: -a save modification time, -P show progress
- scp: -p save modification time
- Copy files either direction

```
rsync -aP t.txt user@rackham.uppmax.uu.se:/home/user/
```

```
scp -p t.txt user@rackham.uppmax.uu.se:/home/user/
```

- Copy files between computers
- Similar syntax as cp
- rsync: -a save modification time, -P show progress
- scp: -p save modification time
- Copy files either direction

```
rsync -aP user@rackham.uppmax.uu.se:/sw/courses/ngsintro/qol/aa.fa .
```

```
scp -p user@rackham.uppmax.uu.se:/sw/courses/ngsintro/qol/aa.fa .
```

- Find files based on name

```
$ find /path/to/look/ -name nametolookfor.txt
```


- Find files based on name

```
$ find /path/to/look/ -name nametolookfor.txt  
$ find . -name *.txt
```

- Find files based on name

```
$ find /path/to/look/ -name nametolookfor.txt  
$ find . -name *.txt  
$ cd ~/g2019015/q01  
$ tree
```

- Find files based on name

```
$ find /path/to/look/ -name nametolookfor.txt  
$ find . -name *.txt  
$ cd ~/g2019015/q01  
$ tree  
$ find . -name CARROTCAKE
```

- Find files based on name

```
$ find /path/to/look/ -name nametolookfor.txt
$ find . -name *.txt
$ cd ~/g2019015/q01
$ tree
$ find . -name CARROTCAKE
$ find . -name CARROT*
```

- Searches content of files

```
$ grep texttofind filetolookin.txt
```

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```
$ grep texttofind filetolookin.txt
```

```
$ grep "text to find" /path/to/files/*.txt
```

- Searches content of files

```
$ grep texttofind filetolookin.txt
```

```
$ grep "text to find" /path/to/files/*.txt
```

```
$ grep MYNAME protein_seq.fa
```

- Searches content of files

```
$ grep texttofind filetolookin.txt
```

```
$ grep "text to find" /path/to/files/*.txt
```

```
$ grep MYNAME protein_seq.fa
```

```
$ grep -r found filetree
```


- Kills whatever your terminal is currently running
 - Sometimes we want to end programs prematurely, for whichever reason.

Within the qol folder, run the following program:

```
$ python friendly_counter.py
```

- Kills whatever your terminal is currently running
 - Destroys hanged or non-executing commands
 - Cancel commands that are running for too long
 - Cancel commands that you realize are incorrect

- <https://uppmax.uu.se/support/getting-started/uppmax-cheat-sheet/>

SNIC-UPPMAX CHEAT SHEET

Logging in	
<code>ssh -AX user@host</code>	Connect to host with ssh
Getting Help	
<code>man command</code>	Read manual for command
<code>apropos keyword</code>	Find commands related to keyword
File commands	
<code>ls</code>	List contents of current dir
<code>ls -al</code>	Detailed listing with hidden files
<code>cd dir</code>	Go to directory (if dir is not given, go to home dir)
<code>pwd</code>	Show the current directory
<code>mkdir dir</code>	Create directory
<code>rm file</code>	Remove file
<code>rm -r dir</code>	Recursively remove directory
<code>rm -f file</code>	Force remove file
<code>rm -rf dir</code>	Force recursively remove directory
<code>cp -i file1 file2</code>	Copy file1 to file2
<code>cp -r dir1 dir2</code>	Recursively copy directory
<code>mv -i file1 file2</code>	Rename or move file/directory (if file2 is a directory, it places file1 inside it)
<code>ln -s file link</code>	Create a symbolic link
<code>touch file</code>	Create file or update timestamp of existing one
<code>command > file</code>	Write output of a command to a file
<code>command >> file</code>	Append (add to end) output to file
<code>less file</code>	Show contents of file, with scrolling (quit with 'q')
<code>head file</code>	Show 10 first lines of file
<code>tail file</code>	Show 10 last lines of file
<code>tail -f file</code>	Show file as it grows, starting with 10 last lines
<code>nano file</code>	Edit file with a simple command line text editor
File Permissions	
<code>chmod permission file</code>	Change file permission
<code>chmod -R perm dir</code>	Recursively change permission for dir
Ex: Allow read/write/exec for user, r/w for group and r for others: <code>chmod u=rwx,g=rw,o=r file</code>	
<code>chmod a-x file</code>	Ex: Remove execute permission for all

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Searching	
<code>grep pattern files</code>	Find lines in files, containing pattern
<code>grep -r pattern dir</code>	Recursively do same as above in dir
<code>command grep pattern</code>	Run grep on command output
<code>find dir grep pattern</code>	Find filepaths matching pattern
Compression	
<code>tar cf file.tar files</code>	Create tar archive, adding files
<code>tar xf file.tar</code>	Extract tar archive
<code>tar czf file.tar.gz files</code>	With gzip compression
<code>tar xzf file.tar.gz</code>	Extract gzip compressed tar archive
<code>gzip file</code>	Compress file with gzip
<code>gunzip file.gz</code>	Decompress file with gzip
UPPMAX modules	
<code>module avail</code>	List available modules
<code>module load modulename</code>	Load module
Showing user and project info	
<code>uquota</code>	Show current user's disk usage
<code>projinfo</code>	Show used core hours for current user's projects
View details of a specific project: <code>egrep '^b2011999' /etc/slurm/grantfile</code>	
Running jobs with the Slurm resource manager	
<code>jobinfo</code>	Show all running and waiting jobs in the queue
<code>jobinfo -u user</code>	Show jobs for specific user
<code>interactive -A project</code>	Start interactive job
Start batch job (see user guide on the web for more info): <code>sbatch -A project -t d-hh:mm:ss -n cores \</code> <code>-p partition jobscript_file</code>	
Ex: Running for 7 days on 16 cores (2 nodes) on node partition: <code>sbatch -A b2011999 -t 7-00:00:00 -n 16 \</code> <code>-p node my_jobscript_file</code>	
<code>scancel jobid</code>	Cancel a single job
<code>scancel -i -u user</code>	Interactively cancel all jobs for user
Logging out	
<code>exit</code>	

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Using multiple terminals

- Launch and use several terminals for better overview of your work
 - Write your scripts in one terminal, run your scripts in another, read the output in a third...
- Just like you might have several tabs in your browser or have several documents open at once