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# Quality of Life

## a better terminal experience

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Enabler for Life Sciences

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# 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
  - Finding files and contents of files

- Also covered: How to transfer files to/from Rackham

# Command history

- Up & down arrow to step through history

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# Command history

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

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# Command history

- Up & down arrow to step through history

- Ctrl+r to search through previous commands
  - Ctrl+r again to search further back

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# 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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# Quicker cursor

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

  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

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

```
$ echo “Position not important”
```

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# Previous directory

- Remembers previous directory

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

# Previous directory

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2020009
```

# Previous directory

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2020009
user@rackham5 /proj/g2020009 $
```

# Previous directory

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2020009
user@rackham5 /proj/g2020009 $ cd -
```

# Previous directory

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2020009
user@rackham5 /proj/g2020009 $ cd -
user@rackham5 ~/ $
```

# Previous directory

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2020009
user@rackham5 /proj/g2020009 $ cd -
user@rackham5 ~/ $ cd -
```

# Previous directory

- Remembers previous directory

```
user@rackham5 ~/ $ cd /proj/g2020009
user@rackham5 /proj/g2020009 $ cd -
user@rackham5 ~/ $ cd -
user@rackham5 /proj/g2020009 $
```

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# Rsync & SCP

- Copy files between computers
- Similar syntax as cp

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

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# Rsync & SCP

- Copy files between computers
- Similar syntax as cp

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

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# Rsync & SCP

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

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

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# Rsync & SCP

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

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

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

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# Rsync & SCP

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

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

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# Find

- Find files based on name

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

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# Find

- Find files based on name

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

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# Grep

- Searches content of files

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

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# Grep

- Searches content of files

```
$ grep texttofind filetolookin.txt

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

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# Grep

- Searches content of files

```
$ grep texttofind filetolookin.txt

$ grep “text to find” /path/to/files/*.txt

$ cd /sw/courses/ngsintro/linux/qol
$ grep MYNAME protein_seq.fa
```

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# Grep

- Searches content of files

```
$ grep texttofind filetolookin.txt

$ grep “text to find” /path/to/files/*.txt

$ cd /sw/courses/ngsintro/linux/qol
$ grep MYNAME protein_seq.fa

$ grep -r “found” filetree/*
```

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# Ctrl+c

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

```
$ cd /sw/courses/ngsintro/linux/qol
$ python friendly_counter.py
```

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# Ctrl+c

- 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

# UPPMAX cheat sheet

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

## SNIC-UPPMAX CHEAT SHEET

www.uppmax.uu.se

**Logging in**

| | |
|---|---|
| `ssh -AX user@host` | Connect to host with ssh |

**Getting Help**

| | |
|---|---|
| `man command` | Read manual for command |
| `apropos keyword` | Find commands related to keyword |

**File commands**

| | |
|---|---|
| `ls` | List contents of current dir |
| `ls -al` | Detailed listing with hidden files |
| `cd dir` | Go to directory (if dir is not given, go to home dir) |
| `pwd` | Show the current directory |
| `mkdir dir` | Create directory |
| `rm file` | Remove file |
| `rm -r dir` | Recursively remove directory |
| `rm -f file` | Force remove file |
| `rm -rf dir` | Force recursively remove directory |
| `cp -i file1 file2` | Copy file1 to file2 |
| `cp -r dir1 dir2` | Recursively copy directory |
| `mv -i file1 file2` | Rename or move file/directory (if file2 is a directory, it places file1 inside it) |
| `ln -s file link` | Create a symbolic link |
| `touch file` | Create file or update timestamp of existing one |
| `command > file` | Write output of a command to a file |
| `command >> file` | Append (add to end) output to file |
| `less file` | Show contents of file, with scrolling (quit with 'q') |
| `head file` | Show 10 first lines of file |
| `tail file` | Show 10 last lines of file |
| `tail -f file` | Show file as it grows, starting with 10 last lines |
| `nano file` | Edit file with a simple command line text editor |

**File Permissions**

| | |
|---|---|
| `chmod permission file` | Change file permission |
| `chmod -R perm dir` | Recursively change permission for dir |

Ex: Allow read/write/exec for user, r/w for group and r for others:

```
chmod u=rwx,g=rw,o=r file
```

| | |
|---|---|
| `chmod a-x file` | Ex: Remove execute permission for all |

**Searching**

| | |
|---|---|
| `grep pattern files` | Find lines in files, containing pattern |
| `grep -r pattern dir` | Recursively do same as above in dir |
| `command \| grep pattern` | Run grep on command output |
| `find dir \| grep pattern` | Find filepaths matching pattern |

**Compression**

| | |
|---|---|
| `tar cf file.tar files` | Create tar archive, adding files |
| `tar xf file.tar` | Extract tar archive |
| `tar czf file.tar.gz files` | With gzip compression |
| `tar xzf file.tar.gz` | Extract gzip compressed tar archive |
| `gzip file` | Compress file with gzip |
| `gunzip file.gz` | Decompress file with gzip |

**UPPMAX modules**

| | |
|---|---|
| `module avail` | List available modules |
| `module load modulename` | Load module |

**Showing user and project info**

| | |
|---|---|
| `uquota` | Show current user's disk usage |
| `projinfo` | Show used core hours for current user's projects |

View details of a specific project:

```
egrep '^b2011999' /etc/slurm/grantfile
```

**Running jobs with the Slurm resource manager**

| | |
|---|---|
| `jobinfo` | Show all running and waiting jobs in the queue |
| `jobinfo -u user` | Show jobs for specific user |
| `interactive -A project` | Start interactive job |

Start batch job (see user guide on the web for more info):

```
sbatch -A project -t d-hh:mm:ss -n cores \
 -p partition jobscript_file
```

Ex: Running for **7** days on **16** cores (2 nodes) on **node** partition:

```
sbatch -A b2011999 -t 7-00:00:00 -n 16 \
 -p node my_jobscript_file
```

| | |
|---|---|
| `scancel jobid` | Cancel a single job |
| `scancel -i -u user` | Interactively cancel all jobs for user |

**Logging out**

```
exit
```

www.snic.vr.se

# 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, check the results in a third…
- Just like you might have several tabs in your browser or have several documents open at once