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Introduction to Linux

By Lars Eklund

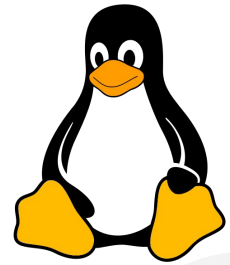
Based on work by Marcus Lundberg

- What is Linux
- Logging in to UPPMAX
- Navigate the file system
- “Basic toolkit”



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What is Linux

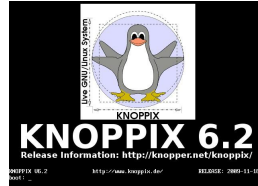


- The Linux Operating system is a UNIX like UNIX compatible Operating system.
- Linux is a Kernel on which many different programs can run. The shell(bash, sh, ksh, csh, tcsh and many more) is one such program
- Linux has a multiuser platform at its base which means permissions and security comes easy.



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Many Flavours



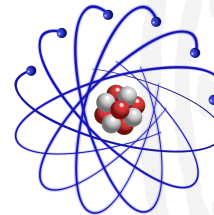
CentOS



debian

slackware

l i n u x



Scientific Linux



Connect to UPPMAX

- (Download XQuartz or other X11 server for Mac OS)
- **Linux and MacOS:**
 - start Terminal
 - **\$** ssh -X username@rackham.uppmax.uu.se

```
User Guides: http://www.uppmax.uu.se/support/user-guides
FAQ: http://www.uppmax.uu.se/support/faq

Write to support@uppmax.uu.se, if you have questions or comments.

Active notices for rackham:

Issues with Crex
http://status.uppmax.uu.se/2021-01-15/crex/

Uquota incorrectly reports quota in some cases
http://status.uppmax.uu.se/2020-10-12/uquota/

Please remove unneeded data in your project directory
http://status.uppmax.uu.se/2020-01-20/crex-no-space-left-on-device/

(Mon Jan 18 23:48:36)[laek1991@rackham1 slask]$
```



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Connect to UPPMAX for windows users

- Download a X-server such as GWSL or X-ming or VcXsrv or an other of your choosing
- Install WSL and a Distribution such as ubuntu or a ssh program such as MobaXTerm
- Connect to `$ ssh -X username@rackham.uppmax.uu.se`



Windows links

- <https://sourceforge.net/projects/vcxsrv/>
- <https://mobaxterm.mobatek.net/>
- <https://opticos.github.io/gwsl/>
- <https://sourceforge.net/projects/xming/>
- <https://docs.microsoft.com/en-us/windows/wsl/install-win10>
- Don't forget to update to wsl2




X11-forwarding graphics from the command line

- Graphics can be sent through the SSH connection you're using to connect
 - Use `ssh -Y` or `ssh -X`
- MacOS users will need to install XQuartz.
- When starting a graphical program, a new window will open, but your terminal will be “locked”.
 - Run using `&` at the end to run it as a background process e.g. “`gedit &`”
 - Alternatively, use `ctrl-z` to put `gedit` to sleep and type `bg %1` to make process number one run in background





Command line with bash

- The command-line interface: the bash prompt 
- **bash** is a program finds and runs other programs
- **bash** is scripting language that is referred to as a shell
(because it sits around the kernel making it easy to interact with)





The prompt

`[info]$ program word1 word2 word3`

- `[info]` is configurable, and usually tells you who you are, on what system, and where in the file system
- The `program` to run is the first word
- All words are separated by spaces



Program, flags, and files

- Output:
 - Most Linux programs output to the terminal
 - Some also write to files
- Input:
 - Flags: specific single letters or words that change the behaviour of a program
 - Arguments: text given to the program when started, e.g. file names.
 - Terminal input: text given to the program while it runs





Example bash command

```
$ mv -v inbox/* outbox/
```

```
'inbox/data1.dat' -> 'outbox/data1.dat'  
'inbox/data2.dat' -> 'outbox/data2.dat'  
'inbox/data3.dat' -> 'outbox/data3.dat'
```

Program

Flags

Argument 1

Argument 2

Output



Tab Completion

- Whenever you're writing a path or filename on the bash prompt, you can strike the 'tab' key to ask Bash to complete what you're writing
- Get in the habit of this — it will save you many hours





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Editing files



- File/text editors :
 - **nano** (keyboard shortcuts shown on-screen)
 - **gedit** (graphical, needs X11)
 - **vim** (fast and powerful, once you learn it)
 - **gvim** vim with a GUI, lots of features very Fast
 - **emacs** (fast and powerful, once you learn it)(set to xemacs on rackham which has a GUI)
- Try them out and pick one.



Sources of error



- **Capitalisation** matters in file names and program names
- **Spaces** matter. Always have a space after the program name. Don't add spaces in file names.
- Check that you are in the **right place** in the file system.
- **File permissions**. Check that the right **read, write and execute** permission are set



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Caution!!



- Some words of warning:
 - There is **no undo** for cp, mv, and rm.
 - **Beware** of overwriting (clobbering) files and deleting the wrong ones.
- If you do destroy your data, email UPPMAX support, we **may** be able to help



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Thank You for Your attention

NOW STARTS THE CODE ALONG

Remember: **Capitalisation** matters and so do **SPACES** “ “
and there are **NO** do-overs

Therefore it is good practices to work on copies of your data and keep
your data write protected which we will teach you how to do

```
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FAQ: http://www.uppsala.se/support/faq
write to support@uppsala.se, if you have questions or comments.

Action notices for rachan:
=====
Issues with CPE
http://status.uppsala.se/2021-01-15/cpe/
=====
Uppsala University reports build to new release
http://status.uppsala.se/2020-10-12/000004
=====
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cve-on-specs-safe-on-deps/
[Mon Jan 18 23:48:30][laek191@rackhost slack]$
```




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File system Navigation

pwd — where are you now?

\$ pwd

\$ pwd -P gives you the physical path
- (ignores how you got there)

User guides: <http://www.uppsala.se/support/user-guides>
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Action notices for ruckus:

Issues with CPE
<http://status.uppsala.se/2021-01-15/cpe/>

Uppsala University reports build in new CPEs
<http://status.uppsala.se/2020-10-12/requests/>

Please review unneeded data in your project directory
<http://status.uppsala.se/2020-10-20/cve-on-specs-safe-on-desec/>

[Mon Jan 18 23:48:30][lask191@rockhost slack]\$



File system Navigation

ls — contents of a directory

- Type **ls** to display the contents of the current directory.
- **\$ ls -a** also shows hidden files and directories
- **\$ ls -l** gives you detailed information
- **\$ ls -lt** sorts things by time modified

```
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Action notices for rackham:
Issues with CVM
http://status.uppsala.se/2021-01-15/cvm/

UPDATE INCORRECTLY REPORTS BOLD IN SOME CASES
http://status.uppsala.se/2020-10-12/updates/

Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cvm-on-specs-jark-on-descc/

[Mon Jan 18 23:48:30][lask191@rackham: slack]$
```



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File system Navigation

cd — moving around

- To change directory, use **cd <target>**

- \$ cd /proj/g2021010
- \$ pwd
- \$ ls
- \$ cd labs
- \$ pwd

User guides: <http://www.uppsala.se/support/user-guides>
FAQ: <http://www.uppsala.se/support/faq>
write to support@uppsala.se, if you have questions or comments.

Action notices for ruckhus:

Issues with CPE
<http://status.uppsala.se/2021-01-15/cpe/>

Uppsala incorrectly reports build to some users
<http://status.uppsala.se/2020-10-12/issue64>

Please review unneeded data in your project directory
<http://status.uppsala.se/2020-01-20/cve-on-some-labs-on-desires/>

[Mon Jan 18 23:48:30][lask191@ruckhus: slack]\$



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File system Navigation

cd

- Experiment with cd. Try adding spaces or extra / in various places
- Use tab completion to avoid typos and typing “ls” a lot.
- Figure out the use of the following:
 - `cd -`
 - `cd ..`
 - `cd`
 - `cd ~`

```
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http://status.uppsala.se/2020-01-20/cve-on-spaces-also-on-descriptors/
[Mon Jan 18 23:48:30][lact191@rockhust slack]$
```



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Copy, Create, Move

mkdir — create a new directory

- Make sure you're in your home directory
 - **\$** mkdir uppmax-intro
- Go in there:
 - **\$** cd ~/uppmax-intro/

User guides: <http://www.uppmax.uu.se/support/user-guides>
FAQ: <http://www.uppmax.uu.se/support/faq>
write to support@uppmax.uu.se, if you have questions or comments.

Action notices for ruckus:

Issues with CVM
<http://status.uppmax.uu.se/2021-01-15/cvm/>

Uppmax incorrectly reports disk IO time usage
<http://status.uppmax.uu.se/2020-10-12/requests/>

Please remove unneeded data in your project directory
<http://status.uppmax.uu.se/2020-09-24/cvm-on-spaces-are-on-disk/>
[Mon Jan 18 23:48:30][lask1091@rackhus1 slack]\$



Copy, Create, Move

cp — copy files

- Copy files with: `cp <source> <target>`
 - `$ cp /proj/g2021006/labs/linux_tutorial/ .`
- Well, that didn't work. What does the error say?
 - `$ cp -r /proj/g2021006/labs/linux_tutorial/ .`

```
User guides: http://www.uppsala.se/support/user-guides
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http://status.uppsala.se/2021-01-15/cpe/
UPDATE: Incorrectly reports build to have failed
http://status.uppsala.se/2020-10-12/updates/
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cve-on-spaces-are-on-deadend/
[Mon Jan 18 23:48:30][lack191@rackhost slack]$
```



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Copy, Create, Move

cp — copy files

- Move to `linux_tutorial/`
- Make a copy the file “newfile” in the same directory:
 - `$ cp newfile copyfile`

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
write to support@uppsala.se, if you have questions or comments.

Action notices for ruckus:
Issues with CPE
http://status.uppsala.se/2021-01-15/cpe/
UPDATE: Incorrectly reports BOLD to some users
http://status.uppsala.se/2020-10-12/updates/
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cve-on-some-jark-on-desk/
(Mon Jan 18 23:48:30)[lack191@rockwell slack]$
```



Copy, Create, Move

scp — copying remote files

- Linux/MacOS: To copy data to/from Rackham, you can use scp from your local machine:
 - [bob@macbook]\$ scp myinput bob@rackham.uppmax.uu.se:~/copyofmyinput
 - [bob@macbook]\$ scp bob@rackham.uppmax.uu.se:~/mydata copyofmydata

```
User guides: http://www.uppmax.uu.se/support/user-guides
FAQ: http://www.uppmax.uu.se/support/faq
write to support@uppmax.uu.se, if you have questions or comments.

Active notices for rackham:
===== with CPE
http://status.uppmax.uu.se/2021-01-15/cpe/
=====
UPDATE: Incorrectly reports failed to save traces
http://status.uppmax.uu.se/2020-10-12/updates/
Please remove unneeded data in your project directory
http://status.uppmax.uu.se/2020-01-20/cve-on-spaces-also-on-desks/
(Mon Jan 18 23:48:30)[lack191@rackham slack]$
```




Copy, Create, Move

mv — move/rename file

- Moving files works just like copying files:

mv <source> <target>

- Move the copy you just made to another place:

- **\$ mv copyfile ../**

- Rename it.

- **\$ mv ../copyfile ../renamedfile**

User guides: <http://www.uppsala.se/support/user-guides>
FAQ: <http://www.uppsala.se/support/faq>
write to support@uppsala.se, if you have questions or comments.

Action notices for ruckhus:

Issues with CPE
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Update incorrectly reports build to have failed
<http://status.uppsala.se/2020-10-12/updates/>

Please review unneeded data in your project directory
<http://status.uppsala.se/2020-01-20/cve-on-spaces-jarvis-on-deck/>

[Mon Jan 18 23:48:30][lack1991@ruckhus slack]\$



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Deliting

rm — delete file

- Deleting files works just like copying or moving them:
 - **rm <target>**
- Try it out:
 - **\$ rm ../renamedfile**

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
write to support@uppsala.se, if you have questions or comments.

Action notices for rackham:
Issues with CVM
http://status.uppsala.se/2021-01-15/cvm/
Update Incorectly reports build to new state
http://status.uppsala.se/2020-10-12/updates
Please remove unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cvm-on-specs-jark-on-deck/
[Mon Jan 18 23:48:30][lask191@rackham: slack]$
```



Deliting

rmdir — delete an empty directory

- **\$** rm this_is_empty
- Need another command to delete directories
- **\$** rmdir this_is_empty
- **\$** rmdir this_has_a_file
- Is there a way to use rm to delete directories?

```
User guides: http://www.upeax.uu.se/support/user-guides
FAQ: http://www.upeax.uu.se/support/faq
write to support@upeax.uu.se, if you have questions or comments.

Action notices for ruckus:
Issues with CPE
http://status.upeax.uu.se/2021-01-15/cpe/
Upeax incorrectly reports build to some users
http://status.upeax.uu.se/2020-10-12/issue64
Please review unneeded data in your project directory
http://status.upeax.uu.se/2020-09-24/cve-on-some-safe-on-desce/
[Mon Jan 18 23:48:30][lack191@rackhost slack]$
```



Deliting

- Recursive commands are applied to directories and their contents
 - `$ rm -r this_has_a_file`
- Compare:
 - `$ ls ..`
 - `$ ls -R ..`

User guides: <http://www.uppsala.se/support/user-guides>
FAQ: <http://www.uppsala.se/support/faq>
write to support@uppsala.se, if you have questions or comments.

Action notices for ruckus:
Issues with CPE
<http://status.uppsala.se/2021-01-15/cpe/>

Uppsala University reports held in time table
<http://status.uppsala.se/2020-10-12/quest4>

Please reuse unneeded data in your project directory
<http://status.uppsala.se/2020-10-20/cve-on-specs-safe-on-desks/>

[Mon Jan 18 23:48:30][lact191@rockwell slack]\$



Compress, archive and extract

tar — archiving and compression

- We're going to need more files.
 - **\$** `tar -vxzf files.tar.gz`
- The flags mean:
 - **v**erbosely
 - **x**tract
 - **z**ipped
 - **f**ile
- You should see a list of files being extracted

```
User guides: http://www.uppsala.uu.se/support/user-guides
FAQ: http://www.uppsala.uu.se/support/faq

write to support@uppsala.uu.se, if you have questions or comments.

Action notices for ruckhus:
Issues with CPE
http://status.uppsala.uu.se/2021-01-15/cpe/
Update incorrectly reports build to new users
http://status.uppsala.uu.se/2020-10-12/updates/
Please review unneeded data in your project directory
http://status.uppsala.uu.se/2020-01-20/cve-on-spaces-lets-on-desires/
[Mon Jan 18 23:48:30][laek191@ruckhus slack]$
```



Help

man — look up the right flags

- Nobody can remember whether it's -R or -r for recursive, or if -f lets you choose a file or forces an action.
- **\$** man ls
shows you how to use ls and all its options
- Type '/keyword' to search for "keyword", use 'n' and 'N' to scan through hits.
- Type 'q' to quit.
- Spend some time now to browse the man pages for the commands you've just learned

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
write to support@uppsala.se, if you have questions or comments.

Action notices for ruckus:
Issues with CPE
http://status.uppsala.se/2021-01-15/cpe/
UPDATE INCOMPLETE reports filed in time table
http://status.uppsala.se/2021-01-15/cpe/
Please review unneeded data in your project directory
http://status.uppsala.se/2021-01-15/cpe/
[Mon Jan 18 23:48:30][lax191@rockwell slack]$
```



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Let's get wild with Wildcards



- `$ ls many_files`
- `$ ls many_files/*.txt`
- `$ ls many_files/file_1*1.docx`
- Want to clean out temporary files ending in `.tmp` in all the subdirectories?
 - `$ rm */*.tmp`
(could be wise to do `ls -a */*.tmp` first to see what will be deleted...)
- **Exercise:**
 - Create a new directory and move all `.txt` files in `many_files` to it

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq

Write to support@uppsala.se, if you have questions or comments.

Action notices for racknet:
Issues with Crm
http://status.uppsala.se/2021-01-15/crm/
UPDATE: Incorrectly reports 2021-01-15: 10:00
http://status.uppsala.se/2021-01-15/updates/

Please review unneeded data in your project directory
http://status.uppsala.se/2021-01-15/updates/

[Mon Jan 18 23:48:30][lask191@racknet slack]$
```



Reading files

- In Linux, you can display files without being able to change the
 - `$ cd old_project`
 - `$ ls`
- Hmm, which of these files are useful?

```
User guides: http://www.uppsala.se/support/user-guides
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Action notices for rachan:
Issues with CPE
http://status.uppsala.se/2021-01-15/cpe/
Update incorrectly reported build to new CPEs
http://status.uppsala.se/2020-10-12/updates/
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cve-on-spaces-also-on-deps/
[Mon Jan 18 23:48:30][lact091@rackhost slack]$
```




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cat



- **cat** dumps the contents of files to the terminal as text
- **\$ cat the_best**
Yummy!
- **\$ cat a**
???
- Concatenate files with this wizardry:
 - **\$ cat a the_best > combinedfiles.txt**

```
User guides: http://www.uppsala.se/support/user-guides
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http://status.uppsala.se/2020-01-20/cve-on-spawn-jarv-on-dead/
[Mon Jan 18 23:48:30][lack191@rockhust slack]$
```



head — display the top of a file

- `$ head a`
- You can choose how many lines to display (default 10)
 - `$ head -n 4 a`
- Tail is the same as head, but for the other end
 - `$ tail -n 5 a`
 - Handy to look at log files or to figure out the structure of a text file

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
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Action notices for ruckhus:
Issues with CPE
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http://status.uppsala.se/2020-10-12/updates/
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cve-on-spaces-left-on-disk/
[Mon Jan 18 23:48:30][lack191@ruckhus: slack]$
```



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less — read a whole file

- **cat** doesn't really work for long files
- **\$** less a
- Search with '/keyword' and 'n'/'N'
- Hit 'q' to quit.

“less is more”

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
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Active notices for ruckhus:
Issues with CFE
http://status.uppsala.se/2021-01-15/cfe/
UPDATE: Incorrectly reports build to have failed
http://status.uppsala.se/2020-10-12/updates/
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cfe-on-specs-jafs-on-decks/
[Mon Jan 18 23:48:30][lask1991@rockhust slack]$
```



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File permissions



ls -l

ex. `drwxrwxr-x 2 marcusl marcusl 4096 Sep 19 2012 external_hdd`
or `-rwxr-xr-x 1 marcusl marcusl 17198 Jul 16 14:12 files.tar.gz`

- Leading symbol:
 - **d** directory
 - **-** regular file
 - **l** symbolic link (more on this tomorrow)
 - Others exist, but you can ignore them for now

```
User guides: http://www.uppsala.se/support/user-guides
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Update incorrectly reports build to have failed
http://status.uppsala.se/2020-10-12/queue/
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cve-on-some-safe-on-desec/
[Mon Jan 18 23:48:30][laek191@rockwell slack]
```



File permissions

- **\$** `ls -l /proj/g2021006/`
- Huh, `rwxrwsr-x?`
- ‘**s**’ in the group means ‘**x**’ but with gid bit set(group id of creator not launcher).
- ‘**S**’ means ‘-’ with gid bit set (rarely seen).
- Among other things, this makes the default group for new files/subdirectories the `g2021010` group.

```
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(Mon Jan 18 23:48:30)[lack191@rockhust slack]$
```



File permissions

- `$ ls -l`

```
drwxrwxr-x 2 marcusl marcusl 4096 Sep 19 2012 external_hdd
```

```
-rwxr-xr-x 1 marcusl marcusl 17198 Jul 16 14:12 files.tar.gz
```

- Three sets of “rwx” permissions
 - rwx: **r**ead, **w**rite, **e**xecute
 - User: the user account that owns the file (usually the one that created it)
 - Group: the group that owns the file (usually the project group in /proj/xyz or the user’s group elsewhere)
 - Others: everyone else on the system (literally a thousand strangers)

User guides: <http://www.uppsala.se/support/user-guides>
FAQ: <http://www.uppsala.se/support/faq>
write to support@uppsala.se, if you have questions or comments.

Action notices for rackham:

Issues with CFE
<http://status.uppsala.se/2021-01-15/cfe/>

Uppsala incorrectly reports build to have failed
<http://status.uppsala.se/2020-10-12/000064>

Please remove unneeded data in your project directory
<http://status.uppsala.se/2020-01-20/cfe-on-specie-jark-on-desicc/>

[Mon Jan 18 23:48:30][laek191@rackham slack]\$



File permissions

- **r** – read
 - Files: Read the contents of the file
 - Directories: List the files in the directory
- **w** – write
 - Files: Modify the file
 - Directories: Add, rename, or delete files in the directory
- **x** – execute
 - Files: Run the file as a program
 - Directories: Traverse the directory (e.g. with “cd”)

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
write to support@uppsala.se, if you have questions or comments.

Action notices for ruckhus:
Issues with CFE
http://status.uppsala.se/2021-01-15/cfe/
UPDATE INCORRECTLY REPORTS BOLD IN SOME CASES
http://status.uppsala.se/2020-10-12/updates/
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cve-on-spaces-are-on-desires/
[Mon Jan 18 23:48:30][laek1991@ruckhus slack]$
```



Changing permissions

- **chmod**
- Files with **w** can be modified and destroyed by accident. Protect your input data!
- If you want to share data or scripts with a person not in your project (e.g. support staff like me), you can!
- If you want to keep non-members from even seeing which files you have, you can!

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
write to support@uppsala.se, if you have questions or comments.

Action notices for ruckhus:
Issues with CFE
http://status.uppsala.se/2021-01-15/cfe/
UPDATE INCORRECTLY REPORTS BOLD TO NEW CASES
http://status.uppsala.se/2020-10-12/cases/
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/case-on-space-safe-on-desck/
[Mon Jan 18 23:48:30][lask191@ruckhus: slack]$
```




Change file mode

- **chmod** <mode> <files>
- <mode> can be e.g.
 - u+x (let you run a script you just wrote)
 - -w (no write permissions for anyone)
 - g+rw (let group members read and edit this file)
 - g=xw (let group members go into your directory and put files there, but not see which files are there)
- **chmod** takes flags as usual, e.g. -R for recursive

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
write to support@uppsala.se, if you have questions or comments.

Action notices for rachan:
Issues with CFE
http://status.uppsala.se/2021-01-15/cfe/
UPDATE: Incorrectly reports build to have failed
http://status.uppsala.se/2020-10-12/cfe/
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cfe-on-specs-safe-on-deps/
[Mon Jan 18 23:48:30][lach191@rockshot slack]$
```



chmod – numerical permissions

- Online, you will come across e.g. “**chmod 755**”, what does this mean? It’s a “bit mask”:
 - $7 = 4 + 2 + 1 = r + w + x$
 - $5 = 4 + 0 + 1 = r + x$
- What number would $r + w$ be?

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
write to support@uppsala.se, if you have questions or comments.

Action notices for ruckus:
Issues with CPE
http://status.uppsala.se/2021-01-15/cpe/

Update Insecurely reports build to new tests
http://status.uppsala.se/2020-10-12/requirements/

Please review unneeded data in your project directory
http://status.uppsala.se/2020-10-20/cve-on-specs-lets-on-descc/

[Mon Jan 18 23:48:30][laek1991@rockwell slack]$
```



chmod — Hands-on

- In the `linux_tutorial` directory, find important files and old saved data that you wouldn't want to lose.
 - Directories: `important_results/`, `old_project/`
 - File: `last_years_data`
- Use `chmod` to remove write permission from those files and directories (use the `-R` flag to also do the files in the directories).
- Take a moment to play around with `chmod` and explore the effects of permissions on files and directories.

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
write to support@uppsala.se, if you have questions or comments.

Action notices for ruckus:
Issues with CPE
http://status.uppsala.se/2021-01-15/cpe/
Update incorrectly reports build to new users
http://status.uppsala.se/2020-10-12/updates/
Please review unneeded data in your project directory
http://status.uppsala.se/2020-09-24/cve-on-spaces-lets-on-deletes/
[Mon Jan 18 23:48:30][laek191@rockwell slack]$
```



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Now try this

Review exercise:

- Now try this:
 - Create a new directory inside your home directory
 - Cd into it
 - Copy any file into the directory
 - Rename the file to something else
 - Delete the directory and its contents

```
User guides: http://www.uppsala.se/support/user-guides
FAQ: http://www.uppsala.se/support/faq
write to support@uppsala.se, if you have questions or comments.

Action notices for ruckhus:
Issues with CFE
http://status.uppsala.se/2021-01-15/cfe/
UPDATE: Incorrectly reports build to have failed
http://status.uppsala.se/2020-10-12/ouibuf
Please review unneeded data in your project directory
http://status.uppsala.se/2020-01-20/cfe-on-specs-late-on-dead/
[Mon Jan 18 23:48:30][laek191@ruckhus: slack]$
```



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Summarising exercises (1)

- Find and delete the files named temp_file-1 and temp_file-2.
 - Can you do it with one command, standing in linux_tutorial/?
 - You may have to give yourself permission.

```
User guides: http://www.uppsala.se/support/user-guides  
FAQ: http://www.uppsala.se/support/faq  
write to support@uppsala.se, if you have questions or comments.
```

```
Action notices for ruckus:
```

```
Issues with CPE  
http://status.uppsala.se/2021-01-15/cpe/
```

```
Uppsala incorrectly reports build to some users  
http://status.uppsala.se/2020-10-12/build/
```

```
Please review unneeded data in your project directory  
http://status.uppsala.se/2020-01-20/cve-on-spaces-left-on-decay/
```

```
[Mon Jan 18 23:48:30][laek1991@rockhust slack]$
```



Summarising exercises (2)

- Create a directory named “text_files”
- Move all the .txt files in subdirectories of linux_tutorial into this directory
 - Use the “verbose” flag to get a report of which files were moved.

```
User guides: http://www.uppsala.se/support/user-guides  
FAQ: http://www.uppsala.se/support/faq  
Write to support@uppsala.se, if you have questions or comments.  
  
Active notices for ruckus:  
Issues with CPE  
http://status.uppsala.se/2021-01-15/cpe/  
Update incorrectly reports build to new users  
http://status.uppsala.se/2020-10-12/updates/  
Please review unused data in your project directory  
http://status.uppsala.se/2020-01-20/cve-on-spaces-left-on-deck/  
[Mon Jan 18 23:48:30][laek191@rockwell slack]
```



Summarising exercises (3)

- Transfer files to and from Rackham. Use scp or FileZilla or MobaXterm or whatever you like.
- Read up on the rsync tool for moving files.

```
User guides: http://www.uppsal.se/support/user-guides
FAQ: http://www.uppsal.se/support/faq
write to support@uppsal.se, if you have questions or comments.

Action notices for rackham:
Issues with CVM
http://status.uppsal.se/2021-01-15/cvm/
UPDATE: Incorrectly reported build in new CVM
http://status.uppsal.se/2020-10-12/updates/
Please review unneeded data in your project directory
http://status.uppsal.se/2020-01-20/cvm-on-specs-late-on-dec2/
[Mon Jan 18 23:48:30][laek1991@rackham: slack]$
```