

# An Introduction to Working in the Linux Command Line

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**Note:** Do not attempt to copy/paste out of this document. Commands will likely not work!

**Some software you will need** (Note: these are examples of free software, not endorsements):

<u>In order to</u>	<u>From Mac or Linux</u>	<u>From Windows</u>
Connect to submit (ssh)	Terminal	PuTTY
Move files to/from submit	FileZilla, CyberDuck (Mac)	FileZilla, CyberDuck
Edit text files	TextWrangler (Mac)	Notepad++

## Getting around in Linux:

- File paths (directories or folders): `/`, `/home/magitz/`, `/scratch/lfs/magitz/`
- `pwd`, `cd`, `ls` (Where am I, change directory, list directory)
- `cp`, `mv`, `rm` (copy, move, delete)
- `more`, `less`, `head`, `tail`, `cat` (examine files)
- `nano`, `vim` (text editors in Linux)

## Making things easier:

- Tab completion- type part of a path and hit tab-key, shell will auto-complete for you
- `history`: redo something that you did before without retyping (use **↑**)
- `man`: getting help, also `-h` or `--help` flag (e.g.: `man ls`)

## Learning by doing:

1. Connect to HPC Center: `ssh <user>@hipergator.hpc.ufl.edu`
  - a. Type your password and hit return (no characters display while you type).
2. Where are you when you login? `pwd`
3. What files are there? `ls`
4. Make a directory: `mkdir test_script`
5. Now what's there? `ls -l`
  - a. Linux commands usually have flags to change how they work
  - b. `man`, `-h` or `--help` often give you help
6. Change into `test_script` directory: `cd test_script` or `cd tes<tab>`
7. Copy a sample file here (`.`): `cp /project/bio/training/2013-08-07/simple.pbs .`
8. Check that the copy worked: `ls`
9. Delete that file: `rm simple.pbs`
  - a. That file is now **GONE!** Not in your recycle bin or trashcan, but gone! \*  
\*We may be able to retrieve *some* files, so if it's an important file, let us know **ASAP**.
10. Luckily we were working with a copy, let's copy it again: up-arrow, up-arrow, return

11. Look at the file: `less simple.pbs` (type `q` to exit when done)
12. For now, ignore lines that start with a `#` or `#PBS`, what does this script do?
  - a. Can we run this script here? Why not?
  - b. Connect to an interactive development/test node: `ssh dev[1 or 2]`
  - c. Notice that when you connect to an interactive node, you are in your home directory—same thing happens when your jobs start on compute nodes (see 15a below).
  - d. Get back where you want to be: `cd test_script`
  - e. Now we can run our script: `./simple.pbs`
  - f. Did it do what you expected?
  - g. Logout of test node: `logout`
13. Use the scheduler to run this job:
  - a. Can't run from home, so...
  - b. Change to scratch file space: `cd /scratch/lfs/$USER`
  - c. Submit the job: `qsub ~/test_script/simple.pbs` (~ means your home)
  - d. The scheduler pays attention to the `#PBS` lines to schedule and manage your job
14. Look at the result file: `less test.out`
15. How do the results differ?
  - a. **Note** this script, and any that you write, *should* have: `cd $PBS_O_WORKDIR`
    - i. Notice that the `pwd` command shows your job was in your home directory, **not** where you launched the job from.
  - b. Notice all of new environment variables like `PBS_O_WORKDIR`, `PBS_NP`, `TMPDIR`, etc. These can all be used in your scripts.
16. Time to get some data!
  - a. Find a file on your computer, or a web site, with some text. Copy and paste that into a new file in your text editor (E.g. TextWrangler, NotePad++). We're just looking for some text to process. It doesn't matter what it is!
  - b. Save the file as: **some\_text.txt** (Check that line breaks are Unix)
  - c. Using your text editor or FileZilla, upload this file to your space in `/scratch/lfs/`
    - i. SFTP (port 22) to host: `submit.hpc.ufl.edu`
    - ii. Make a directory in `/scratch/lfs/$USER/` called: `word_cloud`
17. Go back to your ssh client and navigate to `/scratch/lfs/$USER/word_cloud`
18. Use `more`, `head` and `tail` to look at `some_text.txt`
19. Copy the example `cloud.pbs` script to your directory:
  - a. `cp /project/bio/training/2013-08-07/cloud.pbs .`
20. Edit this script to have your e-mail: `nano cloud.pbs`
21. Submit the cloud script: `qsub cloud.pbs`
22. Check your e-mail
23. Use FileZilla to download your results.
24. Open in a web browser