

Introduction to Linux and the CSL Machines

- **Logging in**
- **The graphical environment**
 - setting up eclipse (for 367 students)
 - The printers: print to **laser** and it will go across the hall from the labs
- **Command line:** You can type commands to run programs, manage files, etc. Can be a lot faster than using the GUI!
 - **Some basic commands:**
 - `ls` lists the contents of the current directory (folder)
 - `pwd` prints path to the current directory
 - `cd` changes the current directory (`cd private/mystuff`)
 - `cp` copies a file (`cp orig.txt copy.txt`)
 - `rm` removes a file (`rm copy.txt`)
 - `mv` moves a file or directory (`mv oldname.txt newname.txt`)
 - `mkdir / rmdir` makes/removes a directory (`mkdir newdir`)
 - **History:** hit the **up arrow** to see previously used commands
 - **Tab completion:** If you hit **tab** after typing the beginning of a name, you will get a list of commands/files that match
 - **History search:** **ctrl-r** will let you search previous commands
 - **Kill currently running command:** **ctrl-c** is useful if your program has an infinite loop. Note that it is not for copying to the clipboard!
 - **Man Pages:** This stands for manual and will tell you lots of useful stuff.
 - `man cp` will tell you all the arguments, return values, options, errors, etc for the `cp` command.
 - move around with **arrow keys**, **page up**, **page down**, search with `/`, quit with `q`.
 - also exist for C functions! `man malloc`
 - There are multiple chapters; 1 is often shell built-ins, 2 is system calls, 3 is C functions, etc. To see all entries for a particular page, you can type, for example `man -a printf`
 - **Compilation:** compilers (like **gcc** for c programs and **g++** for c++ programs) are simply programs. For example: `gcc hello_world.c -o hello_world`
There are very many options for debugging, optimization, etc that you might want to use. Check the man page for details.
A great reference for this: <http://pages.cs.wisc.edu/~remzi/OSTEP/lab-tutorial.pdf>
 - You can edit from the command line using a text editor! Two common programs are **vim** (or **vi**) and **emacs**. You should at least learn how to exit from each of these!
 - **vim:** mode-based editor; to exit, type `:q` (possibly preceded by **esc** if you typed something else first!). To not save, type `:q!`, while `:w` will save and `:wq` will save, then quit.
<http://www.openvim.com/tutorial.html>
 - **emacs:** **ctrl-x ctrl-c** will exit.
<http://www2.lib.uchicago.edu/keith/tcl-course/emacs-tutorial.html>

- **Useful tricks**

- **backups**: the CSL backs up the contents of your home directory every night at midnight. If you accidentally delete your file(s), you can recover the copy as of midnight the previous night using the recover command.
<http://research.cs.wisc.edu/twiki/bin/view/CSDocs/BackupFAQs>
- **quotas**: the CSL provides you with a certain amount of file space plus a number of printer pages per course you take. These expire at the end of the semester; if you run out, you can purchase more from the lab.
 - `fs 1q` will tell you about your disk space quota
 - `1pquota` shows your printer quota
- **directory structure**
 - `/u//e/lena` for Lena's home directory: **u** for users, **l** is the first letter of my username, **e** is the second, and **lena** is my full username
 - **private**: this is where you should store your course files. Only you can read them.
 - **public**: this is world-readable by default, so don't put secret things here. If you place things under **public/html**, they will appear on your web page, which you can access at <http://cs.wisc.edu/~yourusername>
 - **permissions**: outside the scope of this presentation! However, the AFS permission system is very powerful, and you can use it to share files with specific groups of people.
<http://research.cs.wisc.edu/twiki/bin/view/CSDocs/AfsHowTo>
 - `/s` and `/unsup` contain many interesting programs; take a look if the program you want doesn't appear in the menus.
- **profile**: your shell is very customizable. To find out what shell you are using, you can type `echo $SHELL` at the prompt. We will assume you are using bash, the default for CSL accounts. Edit your `.bashrc.local` to alias commands, change the appearance of your prompt, or change your **path** (where you look for executables). Once you log out and back in again, your changes will take effect. Other shells have similar configuration options.
- Files that start with a `.` are hidden, and will not show up using `ls`! Use `ls -a` to see them.

- **Working from home**

- `best-linux.cs.wisc.edu` will give you the CSL linux machine with the lowest number of current users (you can use **mumble-XX** where **XX** is a number between 01 and 40 to get a specific machine).
- `ssh` (unix, linux, OS X) `ssh myusername@best-linux.cs.wisc.edu`
- `putty` (for Windows) <http://www.chiark.greenend.org.uk/~sgtatham/putty/>
- `scp` is like `cp`, but between machines
- `screen` <http://www.rackaid.com/resources/linux-screen-tutorial-and-how-to/>
- `vnc` allows you to use the GUI <http://pages.cs.wisc.edu/~karu/courses/cs552/spring2013/wiki/index.php/Main/UsingMentorRemotely>

- **Other useful resources**

<https://csl.cs.wisc.edu/> CSL homepage

<http://research.cs.wisc.edu/twiki/bin/view/CSDocs/CSLDocumentation> CSL docs