

## CS246 Lab Notes #1 Unix and Emacs

The unix operating system consist of three parts: the kernel, the shell and the programs. The kernel is the heart of Unix, it allocates time and memory, handles file operations and system calls.

The shell acts as an interface between the user and the kernel. The shell is what you are typing to at the Unix prompt after you log in.

- Basic Unix Knowledge
  - Login
  - Find out default shell, change to tcsh
    - chsh, /bin/tcsh
  - SecureCRT, Cygwin
  - ssh
    - Connect to powerpuff.brynmawr.edu
  - **man (RTFM)**
    - man <manentry>
    - Displays the manual for a given command, whether a unix command or a C function.
    - Flags you should know
      - -k Search the man pages for the given word.
      - -a Displays all entries for the command instead of the first one (if there are more than one). This is important when shell commands and C functions have the same name
      - -s Display man page in the given section.
  - File manipulation
    - ls
      - Displays all the files in the directory.
      - Flags:
        - -l displays additional information for each file
        - -a displays all files, files that begin with “.” are not displayed automatically
        - -F displays “/” after directories, and “\*” after executables
        - -t sort by timestamp instead of alphabetically
    - mkdir
      - mkdir cs246
      - You can use this as your primary directory for storing your homework files and stuff; create subdirectories for each of the homeworks and projects.
    - cd
      - cd cs246
      - Switches the current working directory. All file names that you enter are relative to the current working directory.
      - cd ..

- cd with no argument (cd ~)
    - pwd
      - Displays the current working directory
  - Understand the Unix path
    - The Unix file system groups all files together in a hierarchical tree structure.
    - The top of the hierarchy is traditionally called the root.
    - Root is denoted by /
    - Any path name that starts with a / is a so-called absolute path name
    - Traverse the path (/home/eeaton), e.g. whatever pwd returned:
      - cd /
      - ls
      - cd home
      - ls
      - cd dxu
  - lpr
    - Printer command
    - lpr <file> - prints the given file. Need to specify a printer.
    - lpr -P<printer name> <file>
    - available printer: ancho
- Emacs
  - Buffer-based editor
  - Actually a fully functional LISP interpreter, but most people use it for editing purposes mostly. EXTREMELY POWERFUL; can do things like run a shell, do compilation internally, etc.
  - To start emacs: emacs filename (if filename does not exist, it will be created)
  - Emacs Commands
    - Syntax for commands
      - C-<letter> means “Control + <letter>”
      - M-<letter> means “Escape, followed by letter”
    - C-x C-s
      - Saves the current document
    - C-g
      - Cancel any mistaken command
    - C-\_
      - Undo the last action.
    - C-k
      - Cuts the current line (starting from current cursor position).
    - C-spacebar
      - Sets the mark for the beginning of a text region
    - C-w
      - Cuts text from the last mark set to the current cursor. Note: in Unix, blocking text automatically copies it to the clipboard.
    - C-y
      - Paste. Can also be done with middle click.

- C-a
    - Works just like the home key in Windows.
  - C-e
    - Works just like the end key in Windows.
  - M-x global-font-lock-mode
    - Colors your text for easy reading, similar to that in other editors.
  - M-x recover-file
    - If Emacs crashes, a “#” file will be created. Use this command to restore that file.
  - C-h t
    - Bring up the Emacs tutorial. Feel free to read this in addition to the Emacs guide sheet for other commands. Read until you can't stand it anymore. No one every finishes.
  - C-x C-c
    - Quits Emacs, will give opportunity to save.
- Unix revisited
  - Some more commands now that we can make files
    - cp
      - cp test.txt and long.txt from /home/eaton/public/cs246/
      - cp test.txt test2.txt
      - Copies a file from one location to another.
    - mv
      - mv test.txt test3.txt
      - Moves a file from one location to another. Works across directories.
    - cat
      - cat test2.txt
      - cat test2.txt test3.txt
      - Displays multiple files in succession.
    - more (less)
      - more long.txt
      - Displays a file in multiple pages determined by terminal size.
    - clear
      - Clears all text on the screen except for a single shell prompt.
    - rm
      - rm test2.txt
      - **Unix does NOT have undelete!!!**
      - Flags you should know
        - -r Recursive Delete
        - -i Always Confirm
        - -f Force Delete
- Unix FAQ

- <http://www.faqs.org/faqs/unix-faq/faq/part1/preamble.html>
- History of Unix
  - <http://www.bell-labs.com/history/unix/>
- Emacs HOWTO:
  - <http://www.tldp.org/HOWTO/Emacs-Beginner-HOWTO.html>
- Emacs tutorial (yet another)
  - <http://web.nwe.ufl.edu/writing/help/others/emacs/tutorial/index.html>
- **Google and use key words unix tutorial, emacs tutorial**

**Exercise:**

In your home directory, make directory cs246, under cs246, make directory lab01. cd ~/cs246/lab01/.

1. Use emacs to create your own helloworld.c.
2. Compile and run.
3. Copy the file /home/eeaton/public/cs246/lab01.c.
4. Compile and run.
5. Use emacs to make the following changes to your copy of the file lab01.c:
  1. Delete the first two printf lines using C-k
  2. Now yank them back (C-y)
  3. Delete them again using set region then cut (C-spacebar, C-w)
  4. Now paste them back to the end of the file (C-y)
  5. Save and quit