

CS1003/1004: Intro to CS, Spring 2004

Lecture #2: Intro to UNIX

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Administrivia

- Textbooks should now be available from Papyrus – has anyone tried to pick them up?
- Awaiting confirmation on increasing section 2 size for 1114
 - We'll probably move the room
- Please register!

A “Warning”

- I'm about to cover a lot of material in 75 minutes
- I don't expect you to get everything initially, but try and understand *the basics* of what's going on
- Stop me and ask questions!
 - Especially if I type something too quickly...

What is UNIX?

- UNIX was an operating system invented in AT&T/Bell Labs in the 70s
- Became extremely popular as it was easily adaptable to a variety of computing hardware, and because it supported multiuser/multitasking environments
- Who owns “UNIX” now?
- Linux is not UNIX -- but is *very* similar
 - SCO is just plain wrong, IMHO

Why do you need to know UNIX?

- Columbia’s main computing cluster runs a version of UNIX
 - Sun’s Solaris 9 == Solaris 2.9 == SunOS 5.9
- Provides an “equal” and robust environment for everyone to work in
- Useful for many engineering fields, or as a background for anyone interested in Computer Science
 - Resume material

Is UNIX user-friendly?

- No.
- Well, it’s getting better, but for many years, UNIX was considered “hacker/programmer-friendly”
 - Simple example: commands are generally very short
- UNIX is heavily command-line driven
 - A “command-line” is a textual way of interacting with a computer, one line at a time
 - Windows has a command-line too: Start => Programs => Accessories => Command Prompt
 - Less intuitive, but very powerful

How do you log onto CUNIX?

- Through an AcIS Solaris-based machine
 - In particular, 251 Engineering Terrace: full graphical UNIX interface (known as X)
 - Requires extended account, unlike other AcIS labs
- Via a remote machine: use telnet or ssh (Secure SHell)
 - Advice: *Don't* use telnet – it's insecure, and AcIS will be turning it off
 - AcIS provides a free ssh client, TeraTerm – let's take a look...

Useful UNIX commands

- | | |
|-----------------------------------|--|
| ■ ls : List files | ■ cd : change directory |
| ■ mv : move/rename files | ■ pwd : print working directory |
| ■ cp : copy files | ■ man : manual page |
| ■ rm : remove files | ■ gcc, javac : compilers |
| ■ cat : print out a file | ■ emacs, pico, vi : editors |
| ■ mkdir : make directory | ■ more, less : pagers |
| ■ rmdir : remove directory | ■ lpr : print (in 251) |

Directory structure

- Ever used Windows Explorer?
- A “/” is the *delimiter* to separate out parts of the *pathname*
 - Windows uses “\”...
 - Just “/” is the root: *no* drive letters in UNIX
- “..”: parent directory
- All your files are in / {home} /UNI/
 - On CUNIX, not literally “home”, some prefix
 - ~ or ~/cs10034 is easiest way to reference your “home”

UNIX environment

- You run in a “shell”, typically bash
- “Settings” that apply when you’re logged in
- PATH: where to look for programs to run (including the aforementioned UNIX utilities, which are in /usr/bin)
 - Sometimes, may need “./a.out”, not “a.out”
- **set, export:** Lets you manipulate the environment
 - “export CLASSPATH=/home/jjp32/javacode”
 - Goes into “~/profile” if you want it to be automatic
- Don’t worry about this yet, just keep it in mind...

Pipes, redirection

- Lets you reroute output from one program to a file (redirection) or to another program (pipes)
- **ls > test.txt:** Puts list of files in test.txt
- **less < test.txt:** Cat’s test.txt through a pager
- **ls | less:** Useful if you have a long list of files

Editors

- Pico: The “Pine Composer” – *very* easy to use, but very plain-jane
- Emacs: “Editor MACroS”
 - Extremely powerful
 - <http://c2.com/cgi/wiki?EmacsStandsFor>
 - I recommend this, especially “over” X – auto-indenting will save you *many* times over
- Vi: “Visual Interpreter”
 - Want to be 133ter than me? Learn this
- Windows tools, IDEs: you can use, but not supported

X

- The X Window System is the GUI for UNIX
- Invented at MIT in the 80s
 - X11 was released in the 90s
- Supports “remote displays” over the network
 - “X server” is the display: you can download one for Windows at <http://www.cs.columbia.edu/crf/crf-guide/resources/software/xwin32.html>
- Tip: Use the “X Forwarding” option in TeraTerm’s ssh client, start up X server, have fun
- emacs is 100 times easier this way...

If you don’t have broadband...?

- Various workarounds
 - Get broadband
 - Stay connected for long times, and don’t use X
 - Use 251 ET
 - Set up a UNIX-like environment on Windows
- Windows has a command prompt called “cmd” (NT/2k/XP) or “command” (95/98/Me)
- For 1003: cygwin gives you a UNIX shell, gcc, ls, etc.
- For 1004: Java Development Kit from Sun gives you javac
- Emacs can be downloaded for free, too
- See the resources page tonight for links to the above

Transferring files

- Especially for those of you working from home, might want to copy files back and forth
- FTP: File Transfer Protocol
- AcIS provides WS_FTP for free
 - Insecure :-/
 - PuTTY has a free Secure FTP client, but it’s command-line based; see resources

Other useful utilities

- finger, who, w: See who's logged in, get more info
- lookup: Columbia's white pages
 - Not everyone is listed though
- fortune: OK, not necessarily useful, but fun

Additional resources

- I know this tutorial was admittedly quick...
- Web-based tutorials on UNIX and emacs:
 - <http://www.columbia.edu/acis/webdev/unix/index.html>
 - <http://www.columbia.edu/acis/publications/emacs.html>
 - More links on Resources page
- AcIS will have hands-on training sessions in 252 ET
 - How many 1003 students interested? (Java by default)
 - I'll mail a list of the sessions
- Come see me or the TAs: we're happy to help
 - I'll try to have a TA hold office hours in 251 ET
