Introduction to Linux

What is Linux?

- Open source Operating System
- Kernel: Core of OS
  - Allocates time and memory to programs
  - Handles file system and communication between software and hardware
- Shell: interface between user and kernel
  - Interprets commands user types in
  - Takes necessary action to cause commands to be carried out
- Programs

Which Linux should you use for this course?

- **Seasnet Servers**: (required for assignments)
  - lnxsrv.seas.ucla.edu
  - Username: SEAS ID
  - Password: SEAS password
  - On windows: ssh with putty, with XMing running
  - On Mac/Linux: ssh -X <username>@lnxsrv.seas.ucla.edu
- **Ubuntu Linux Distribution**
  - Debian based architecture
  - Most popular

Command Line Interface vs. Graphical User Interface

CLI	GUI
• Steep learning curve	• Intuitive
• Pure control (e.g., scripting)	• Limited Control
• Cumbersome multitasking	• Easy multitasking
• Speed: Hack away at keys	• Limited by pointing
• Convenient remote access	• Bulky remote access

Unix File System Layout

- Everything is either a **file** or a **process**
  - **Process**: an executing program
  - **File**: a collection of data
    - Document
    - Text of program written in high level language
    - Executable
    - Directory
    - Devices
  - Laid out in a **tree structured hierarchy**

The Basics: Moving Around

- **pwd** : print working directory
- **cd** : change working directory
  - **~** : home directory
  - **.** : current directory
  - **/** : root directory, or directory separator
  - **..** : parent directory

The Basics: History

- **<up arrow>**: previous command
- **<tab>**: auto-complete
- **!!**: replace with previous command
- **![*str*]**: refer to previous command with str
- **^[*str*]**: replace with command referred to as str

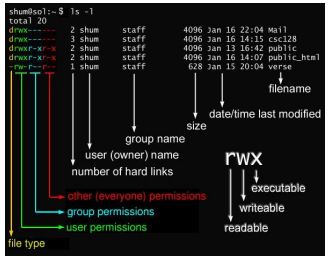
The Basics: Dealing with Files

- **mv**: move/rename a file (no undos!)
- **cp**: copy a file
- **rm**: remove a file
  - **-r**: remove directories recursively
- **mkdir**: make a directory
- **rmdir**: remove a directory
- **ls**: list contents of a directory
  - **-d**: list only directories
  - **-a**: list all files including hidden ones
  - **-l**: show long listing including permission info
  - **-s**: show size of each file, in blocks
  - **-h**: human readable form (shows size in Byte\KB\MB...)

The Basics: File Name Matching

- **?**: matches any single character in a filename
- *****: matches one or more characters in a filename
- **[]**: matches any one of the characters between the brackets. Use '-' to separate a range of consecutive characters.

The Basics: File Permissions



The Basics: Changing File Attributes

- **ln**: create a link
  - Hard links: points to physical data
  - Soft links aka symbolic links (-s): points to a file
- **touch**
  - Update access & modification time to current time
  - Can also be used to create a file
- **chmod**
  - read (r), write (w), executable (x)
  - User, group, others

The Basics: Man Pages

- **Manual (Man) pages**
  - **man**: get manual or man pages
  - **man ls**: shows the man page for 'ls' command
  - **/keyword**: forward slash followed by the word you are searching for to search within a man page
  - **q**: quit the man page

The Basics: Redirection

- **> *file***: write stdout to a file (potentially overwriting)
- **>> *file***: append stdout to a file
- **< *file***: use contents of a file as stdin

The Basics: find

- **type**: type of a file (e.g,, directory, symbolic link)
- **perm**: permission of a file
- **name**: name of a file
- **prune**: don't descend into a directory
- **ls**: list current file(s)