Introduction to Unix

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Unix

- What is Unix?
- History
- Overview
- Important Things To Know
What is Unix

• A time sharing operating system kernel
• Lets users run processes
• Lets processes control devices
• Disks, terminals, networks, printers, etc.
• Associated tools:
  Command shells, editors, filters, compilers, etc.
• Associated philosophy:
  Small tools working together \(=\) powerful system
What is Unix

- DOS is Unix done poorly
- Powerful largely text based operating system
Unix Philosophy

- There should be one way to do things
- Portability instead of efficiency
- Modularity
- Pipe and Filter architecture
- “Give the user enough rope to hang themselves and then a couple of feet just to be sure.”
Why Learn/Use Unix

- Stable
- Flexible
- Good Development Environment
- Still the OS of choice for large applications: The Internet runs off Unix
- Because real programmers use Unix
File System

- Like a tree
- directory is like a folder in windows
- / is root directory
- Everything is mounted off /
- / not \n- Everything is a file
Security/Permissions

- Read Write Execute
- User Group World
- chmod
- chmod 644 document.txt
- chmod 755 myprogram
- chmod 600 loveletter.txt
Links

- links and symlinks
- `ln -s file_to_link_to link`
- `cd`
- `pwd`
**man**

- man is the most important command
- short for manual
- basic usage: `man command_name`
- example:
  - `man ls`
  - `man -s 3S printf`
apropos

- use `apropos` if you don't know the command name
- usage: `apropos` keyword
- example:
  - `apropos copy`
Basic File Commands

- `ls` – list
- `cd` – change directory
- `pwd` – path of working directory
- `cp` – copy
- `mv` – move rename
- `rm` – remove files
- `chmod` – change permissions
File Viewing Commands

- more – pages text
- less – fancy version of more
- cat – concatenate and display files
Directory Commands

- mkdir – make directory
- rmdir – remove directory
- mv – move rename
Current Directory

- default path vs. explicit path
- foobar /foo/bar
- ~ short cut: ~drl7x/unixslides/
- ~/unixslides
Shell Tricks To Save Typing

• Up Arrow – scroll through previous commands

• Tab completion

• !! – Reexecute the last command line

• ! – Reexecute a command line
  
  rm stupid/file

  ...

  !rm

• ctrl-k usually cut to end of line

• ctrl-y paste ("yank")

• ctrl-a goto start of line

• ctrl-e goto end of line
X-Windows tricks

- Use & to start a process in the background
- If you forget you can do ctrl-z to suspend then
- Right mouse button is copy
- Middle mouse button is paste
- For 2 button mice hitting left and right simultaneously usually emulates the middle button.
- Page Up/Down scroll through x-terms
Some advanced commands

- echo – print to standard input
- grep – search
  usage: grep string [files]
- tr – character substitution
- passwd – change password
- cmp – compare to files
- df – print disk free space
- du – disk usage of files
- find – find files
- history – list previous command lines
• kill – kill a process
• ps – list processes
• ispell – interactive spell checker
• mail – send mail
• wc – word count
• head – header print the first few lines
• tail – print the last few lines
• nice – make the process slow down other processes less
• lpr – print
Useful Interactive Programs

- emacs
- pico & nano - simple editors
- vi
- nedit
- pine - simple text based mail reader
- exmh
- top
- xfig - make diagrams
- gv & ghostview - view .ps and .pdf files
- acroread
Regular Expressions

• Your shell will expand regular expressions to fit files
• * – any sequence of zero or more characters
• ? – any single character
• Examples:
  • *.cpp – files that end in .cpp
  • *t* – contains a ’t’
  • *f*j?g –
• orthogonality (unlike DOS)
• * gives a super set of *.*
• do not do .*

• use "" to prevent wildcard expansion.
Putting it all together

- Pipes: maps standard out of one process to standard in of another process
  
  Example: `ls -l | more`

- Redirection:
  
  - `>` - redirects standard output to a file
  
  - `<` - redirects standard input from a file
  
  - `>` - redirects standard error from a file

- Example:
  
  `myProgram my_Arguments < testCaseFile > Outputfile`
Examples

- `ls -l | less`
- `ls *.c | grep project | grep data | tr a-z A-Z`
Parting Words

- man and apropos are your friends
- Learning curve is high but its worth the investment
- Don’t be afraid to ask for help
- More Information:
  - O’REILLY animal books
  - Outside web sites: i.e. geek-girl.com
  - cs department help page