Week 1
Introduction to Linux

07 January 2019

CS 35L Lab 4

Jeremy Rotman

Syllabus

- Can be found on the class website:
  https://web.cs.ucla.edu/classes/winter19/cs35L/

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    - Second half will usually be time to work on your assignment

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  - Alternative
    - Reversed Classroom
    - I post slides before class
    - In class I answer questions about the material
      - Also maybe do some examples

Course Outline

- Topics we will cover
  - Week 1: Introduction, files, and editing
  - Week 2-3: Commands and shell scripting
  - Week 4: Patching and python
  - Week 5: C-programming and debugging
  - Week 6: System call programming
  - Week 7: Parallelism
  - Week 8: Linking
  - Week 9: SSH
  - Week 10: Change management

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- Lateness Penalty
  - For an assignment submitted N to $N+1$ days late, the penalty is $2^N\%$ of the assignments value
- Academic Integrity
  - Reminder that any work **you** submit should be done by **you**

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- Assignment #1 is due at the end of this week
  - 12 January 2019
  - Due by 11:55 pm on that day

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- The other assignments are posted
  - Tentative, but likely won’t change much
  - You can work on future assignments if you wish

Assignments

- ➔ Important notes for future assignments
  - ◆ Assignment 8
    - Requires use of a BeagleBone Green Wireless Development Board
      - Seeed Studio BeagleBone Green Wireless Development Board
    - Alternatively, you can purchase the larger kit which includes the basic unit you will need
      - Seeed Studio BeagleBone Green Wireless IOT Kit
      - This larger kit is currently being used in CS 111
    - Does require a teammate for the lab

Assignments

- ➔ Important notes for future assignments
  - ◆ Assignment 10
    - You should begin working on this now
    - Includes both a written report and an oral presentation
    - I will send out something to handle scheduling presentations in the coming weeks
      - Some people may need to present as early as 5th week

Piazza

- Make sure to enroll in the piazza for the course
  - Each TA is in charge of grading one of the assignments
  - That TA will be active on piazza the week of their assignment
  - Here is the link to sign up:
    - piazza.com/ucla/winter2019/cs35l

For those not currently enrolled

News for UCLA Computer Science 35L, Fall 2018

[35L home]

Here are news items that affect the core assignments and class material.

2018-09-25

- Assignment 1 and Assignment 10 are available. Please see Assignments for other assignments. These other assignments are tentative and may change before the week they are due.
- Create your SEASnet account and then check that it works as soon as you can, as there are occasionally delays before your account is activated.
- Here are suggestions if you're interested in the course but are neither enrolled nor on the waiting list.
  - Read Enrollment in Computer Science Classes and follow its advice.
  - Any PTEs are not typically given out until the end of the second week, to make sure that enough resources are available. You can try coming to classes before then. Sign up on any attendance sheet that is being passed around.

$Id: news.html,v 1.241 2018/09/25 18:13:04 eggert Exp $

Questions?

Introduction to Linux

Running Linux

- Seasnet linux servers
  - You will need a seasnet account
  - https://www.seasnet.ucla.edu/lnxsrv/
- Virtual Machines
  - Oracle VirtualBox
  - VMware

Linux Info

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  - Linux is open-source
    - The software is openly distributed to be worked on and used

Additional Terms

- Shell
  - The interface between the user and the kernel
  - Interprets commands
  - Causes commands to be carried out
  - CLI is a type of shell
- Programs

Command Line Interface VS Graphical User Interface

Command Line Interface VS Graphical User Interface

Steep Learning Curve	Intuitive
Pure Control	Limited Control
Cumbersome Multitasking	Easy Multitasking
Speed	Limited by pointing
Convenient Remote Access	Bulky Remote Access

Unix File System

- Everything is a file
  - This includes directories (folders) and devices
- Or a process
  - Processes are executing programs
- Files are organized in a tree hierarchy
  - “ / ” - the root directory
    - The topmost directory of the tree
  - “ ~ ” - the home directory
    - User specific
  - “ . ” - the current directory
  - “ .. ” - the parent directory

Moving Around

- pwd
  - print working directory
  - Print the path to the directory you are currently in
- cd
  - change directory
  - Moves the working directory to the specified directory
- man
  - Will open up a manual for any command
  - For example try man man
  - Hit “q” to exit the manual

Basic File Commands

- mv
  - Move a file
  - Alternatively, it is used to rename files
- cp
  - Copy a file
- rm
  - Remove a file
- mkdir
  - Make a directory

Basic File Commands

- rmdir
  - Remove an *empty* directory
- ls
  - List the contents of a directory
  - Some useful options
    - -d: lists only directories
    - -a: lists all files, including hidden files
    - -l: lists the long listing which includes file permissions
    - -s: shows size of each file, in blocks

Command History

- < up arrow >
  - Previous command
  - Can continue to scroll through more previous commands
- < tab >
  - Auto-complete
    - ie complete the filename that you began typing
  - Hitting a second time will give you auto-complete options
- !!
  - Replace with previous command

Other Useful Commands

Look these up using man

- ➔ echo
- ➔ cat
- ➔ head
- ➔ tail
- ➔ ps
- ➔ kill

Redirection

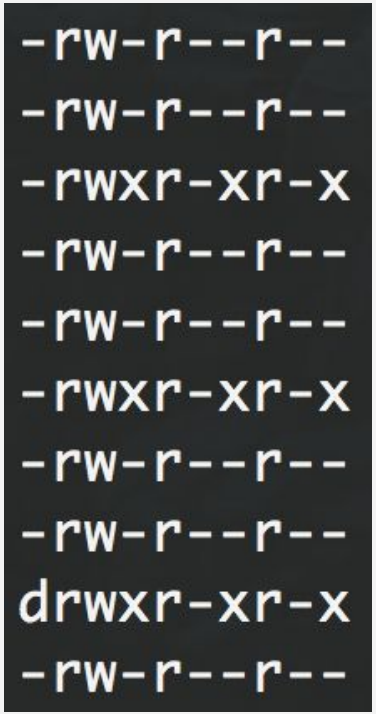
- > *file*
  - Writes stdout to a file
- >> *file*
  - Append stdout to a file
- < *file*
  - Use contents of a file as stdin

Changing File Attributes

- What are file attributes?
  - The metadata attached to files
- touch
  - Updates the access and modification time to the current time
  - Additionally allows options to specify a time
- ln
  - Creates a link to a file
  - Hard links
    - Point to a file's physical data
  - Symbolic links (soft links)
    - Point to the file

File Permissions

- ➔ Every file has permissions that determine how a user may interact with it
- ➔ These can easily be seen with the command “ ls -l ”
- ➔ The first character is a “d” if the file is a directory
- ➔ The other letters represent:



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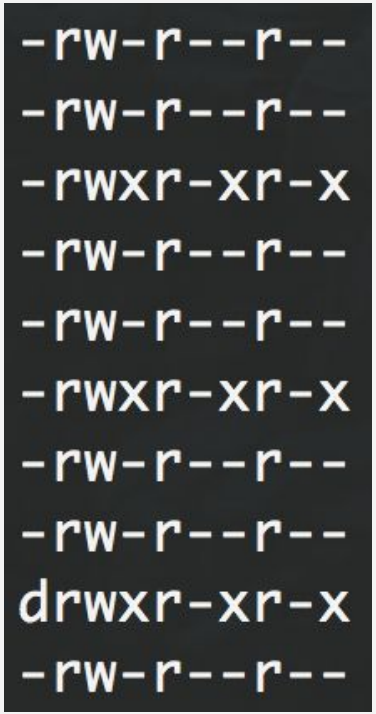
  - ◆ “r” - read



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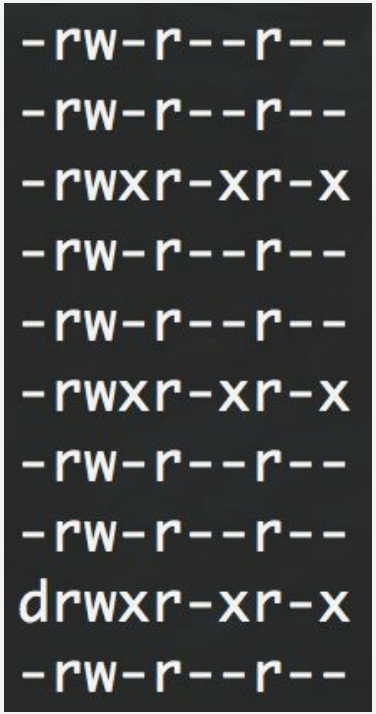

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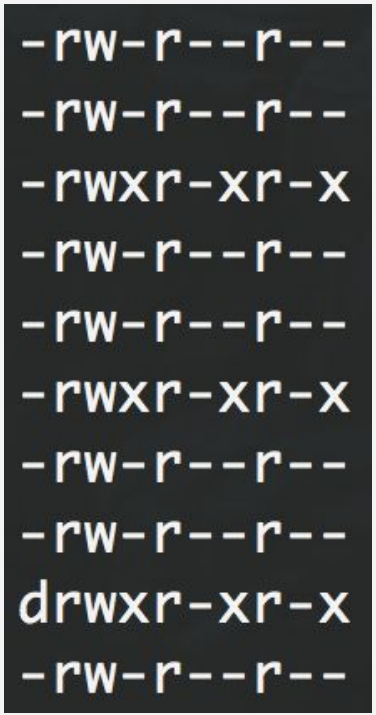
  - ◆ “w” - write
  - ◆ “x” - executable



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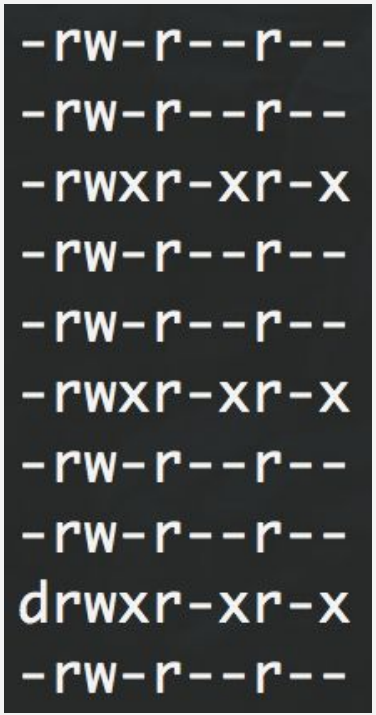
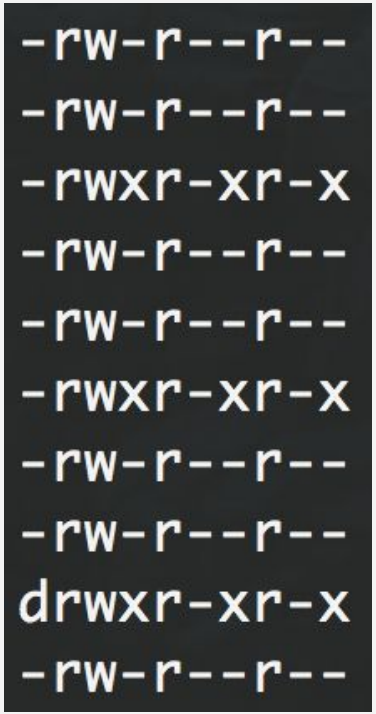
➔ Why are there three groups of three?



File Permissions

- Why are there three groups of three?
- There are permissions for 3 types of users
  - User
    - The owner of the file
  - Group
    - A group that the owner is in
  - Others
    - Anyone else
- In that order



Changing Permissions

- chmod
  - Change the mode of the file
- Can be used in multiple ways
- chmod [*ugoa*][+-=][*rwx*]
  - To apply one or more permissions to one or more types of user
  - Eg. chmod u+x
  - Symbolic Notation
- chmod [*0-7*][*0-7*][*0-7*]
  - To modify all of the permissions in one command
  - Eg. chmod 754
  - Octal Notation

The “find” Command

- Useful for searching the tree for one or many files
- Some useful options
  - -type: type of file (like directory)
  - -perm: permission of file
  - -name: name of file
  - -user: the owner of the file
  - -prune: don’t descend into a directory
  - -maxdepth: descend into directories to a given depth

Linux Wildcards

When searching for files a few special characters can be very useful

- ?
  - Matches a single occurrence of any character
- *
  - Matches zero or more occurrences of any character
- [ ]
  - Matches any one of the characters between the brackets
  - A “-” can be used for a range of characters

Wh- Commands

- Whatis
  - Returns the name section of the man page for a command
  - Equivalent to man -f
- Whereis
  - Locates the binary, source, and manual pages for a command

Lab #1 Tips

- You will submit 2 files
  - ans1.txt should hold the answers to the laboratory section
  - key1.txt should hold the answers to the homework section
- Remember, if you need to know how a command works you can use the “man” command