

The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic look.

CS 35L

Software Construction Laboratory

Lecture 1.2

1st October, 2019

Logistics

- ▶ Assignment 1 is due on October 4 by 11:55pm
 - ▶ Submit on CCLE. If you do not have access, mail it to tanmayrc@g.ucla.edu
- ▶ If you are looking for PTE's or wanting to switch labs, continue to write your name on the sheet of paper
- ▶ Signup on Piazza:
 - ▶ <https://piazza.com/ucla/fall2019/cs35l>

Review - Previous Lab

- ▶ Linux
- ▶ Absolute Path vs. Relative Path
- ▶ Basic commands
 - ▶ Pwd, cd
 - ▶ Mv,cp, rm
 - ▶ Mkdir, rmdir

Process: ps and kill

- ▶ Process
 - ▶ An instance of a computer program in execution
- ▶ ps
 - ▶ List processes that are currently running
- ▶ kill
 - ▶ Terminate a certain process
 - ▶ Usage
 - ▶ kill PID

Daemon

- ▶ A process that runs unobtrusively in the background
- ▶ Example: cron
 - ▶ Enables users to schedule jobs to run periodically at certain times (cron jobs)
 - ▶ Usage: Full Backup every month

Linux File Permissions

- ▶ `chmod`
 - ▶ read (r), write (w), executable (x)
 - ▶ User, group, others

Reference	Class	Description
u	user	the owner of the file
g	group	users who are members of the file's group
o	others	users who are not the owner of the file or members of the group
a	all	all three of the above, is the same as <i>ugo</i>

Linux File Permissions

- ▶ A user who creates a file is also the owner and group owner of that file.
- ▶ The file is assigned separate read, write, and execute permissions for the owner, the group, and everyone else.
- ▶ The file owner can be changed only by the root user
- ▶ Access permissions can be changed by both the root user and owner of the file.

The Basics: chmod (symbolic)

Operator	Description
+	adds the specified modes to the specified classes
-	removes the specified modes from the specified classes
=	the modes specified are to be made the exact modes for the specified classes

Mode	Name	Description
r	read	read a file or list a directory's contents
w	write	write to a file or directory
x	execute	execute a file or recurse a directory tree

The Basics: chmod (numeric)

#	Permission
7	full
6	read and write
5	read and execute
4	read only
3	write and execute
2	write only
1	execute only
0	none

- Usage
 - `chmod ["references"]["operator"]["modes"] "file1" ...`
 - Example: `chmod ug+rw mydir`, `chmod a-w myfile`,
 - Example: `chmod ug=rx mydir`, `chmod 664 myfile`

The Basics: find

- ▶ -type: type of file (e.g: directory, symbolic link)
- ▶ -perm: permission of file
- ▶ -name: name of file
- ▶ -user: owner of file
- ▶ -maxdepth: how many levels below to go into

The Wildcards

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

find Examples

► Examples

- `find ~/Documents -name "*.txt"`
- `find . -name "a?.txt"`
- `find . -name "[abc]1.txt"`
- `find ~/ -type f -name a*`

wh... Commands

- ▶ `whatis <command>`: returns Name section of man page
- ▶ `whereis <command>`: locates the binary, source, and manual page files for a command
- ▶ `which <command>`: locates the binary for a command

Look these up:

- ▶ cat
- ▶ echo
- ▶ head
- ▶ tail
- ▶ ps
- ▶ kill
- ▶ sort

More Commands: diff

- ▶ A file comparison utility that outputs the differences between two files.
- ▶ Usage
 - ▶ `diff <original_file> <new_file>`
 - ▶ `diff -c <original_file new_file>`

Diff example

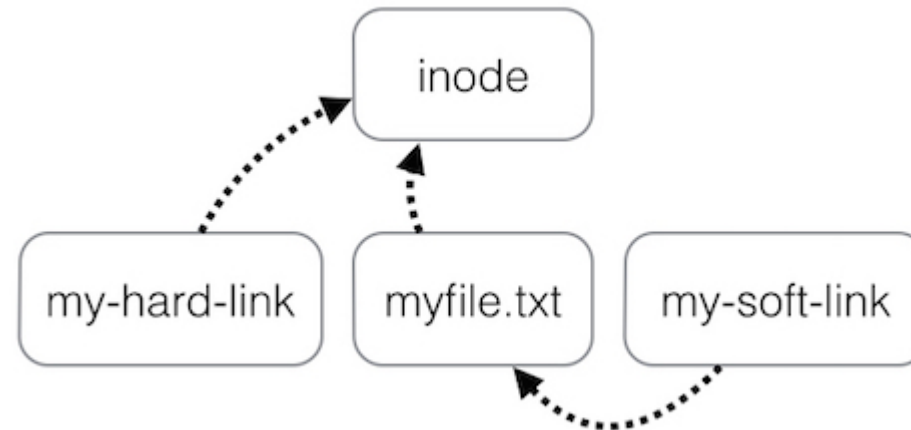
\$cat	\$cat	\$ diff c1 c2
c1	c2	2,5c2,4
ps	ps	< cp
cp	pwd	< mv
mv	cd	< stat
stat	rm	< kill
kill		---
		> pwd
		> cd
		> rm

wget

- ▶ A computer program that retrieves content from web servers
- ▶ Usage
 - ▶ `wget <URL>`
- ▶ Options
 - ▶ `-b` : background
 - ▶ `--tries = n` : To try n number of times

The Link Command

- ▶ **ln:** create a link
- ▶ What is a link?
 - ▶ It is a pointer to a file
- ▶ 2 types of links
 - ▶ Soft/Symbolic Links
 - ▶ Hard Links
- ▶ Symbolic Link
 - ▶ Link to the original file
 - ▶ `ln -s <filename> <linkname>`
- ▶ Hard Links
 - ▶ Mirror copy of the original file
 - ▶ Hard links: point to physical data/inode
 - ▶ `ln -T <filename> <linkname>`
- ▶ Example



Emacs

“The customizable, extensible, self documenting, real-time display editor”

- ▶ Customizable
 - ▶ Users can customize font, colors, etc.
- ▶ Extensible
 - ▶ Run Lisp scripts to define new commands (dired)
- ▶ Self-documenting
 - ▶ C-h r (manual) and C-h t (tutorial)
- ▶ Real-time
 - ▶ Edits are displayed onscreen as they occur

Getting Started

- ▶ Installation
 - ▶ Should be installed already
 - ▶ Don't install if you are working on the SEASNET Server
- ▶ Emacs have both GUI and CLI
- ▶ All emacs commands start with “C” or “M”
 - ▶ “C” = ctrl; “M” = alt (Windows) / option(Mac)
- ▶ Starting emacs
 - ▶ emacs <filename>
- ▶ Exiting emacs - C-x C-c
- ▶ Saving a file - C-x C-s

Learning to use Emacs

- ▶ Navigating with file
 - ▶ Move up/down/left/right: C-p, C-n, C-b, C-f (arrow keys also work)
 - ▶ Move to the beginning/end of a line: C-a, C-e
 - ▶ Move to the first/last line of the text: M- < M-> (use shift for < and >)
 - ▶ Move to particular line number: M-g g [number]
- ▶ Search and replace file
 - ▶ C-s: search forward
 - ▶ C-r: search backward
 - ▶ M-%: replace (usage: M-% [source] Enter [dest]) (y/n)
- ▶ Erasing a line
 - ▶ C-k: erase from current cursor to end of line

Learning to use Emacs - contd.

- ▶ Copy and paste in a file
 - ▶ Begin: C- <spc> / C - @ / C-Shift-2
 - ▶ Use the <up> and <down> buttons to select the contents
 - ▶ End: C-w (cut), M-w(copy), C-y (paste)
 - ▶ Undo command: C-x u
- ▶ Cutting is called *kill***ing**
- ▶ Pasting is called *yank***ing**

Directory edit (dired)

- ▶ Creates an Emacs buffer containing list of dir
- ▶ Command: C-x d
 - ▶ Enter a Directory name at prompt
- ▶ Allows you to operate on files
- ▶ Allows you to navigate filesystem
 - ▶ Switch to different directories and list content

Other Emacs Tricks

- ▶ Emacs as shell
 - ▶ **M-!** <command>, **M-x shell** (interactive shell buffer)
- ▶ Emacs as IDE
 - ▶ **M-x compile**, then specify command to compile
 - ▶ Tip for homework: `gcc hello.c -o hello`
 - ▶ Run the executable by running the shell command
 - ▶ `./hello`
- ▶ Running Lisp code
 - ▶ **M-x emacs-lisp-mode**
 - ▶ **C-x C-e** : Evaluate expression up to point
- ▶ Show Row and Column Number
 - ▶ **M-x column-number-mode**

Assignment 1 Tips

- ▶ ans1.txt is specifically for LABORATORY section
- ▶ Format of the answers should be as shown below:
 - ▶ 1. Here is the command to solve question 1
 - ▶ Short description of the command used above
 - ▶ 2. Here is the command to solve question 2
 - ▶ Short description of the command used above
 - ▶ 3. Here is the command to solve question 3
 - ▶ Short description of the command used above

Assignment 1 Tips

- ▶ key1.txt is specifically for HOMEWORK section
- ▶ Format of the answers should be as shown below:
 - ▶ 1.1
 - ▶ 1. C-x s c a v M-x
 - ▶ 2. C-f e n g r C-e
 - ▶ 1.2
 - ▶ 1. C-x s c a v M-x
 - ▶ 2. C-a e n g r C-e
- ▶ No description of commands required in the HOMEWORK section
- ▶ **Kindly upload both ans1.txt and key1.txt on CCLE**

Assignment Hints

- ▶ Submit 2 files in total
 - ▶ ans1.txt for LABORATORY section
 - ▶ Holds the answers for the 15 lab questions
 - ▶ key1.txt for HOMEWORK section
 - ▶ Keystrokes have to be manually entered into a text editor
 - ▶ Notation for keystrokes is mentioned in Assignment 1 under the “submit” section

Assignment Hints

- ▶ Make sure to prepend your PATH
 - ▶ Prepend your path using the command
 - ▶ Export `PATH=/usr/local/cs/bin:$PATH`
- ▶ You can confirm it by running `echo $PATH`

Assignment Hints

- ▶ Question 4: man readlink
- ▶ Question 5: If files have the same version, double check your PATH
- ▶ Question 10: man localedef
- ▶ Emacs Questions
 - ▶ For Emacs help - C-h ?
 - ▶ For Emacs manual - C-h r

Questions?