Women in Computer Science at LSU

Spring 2023

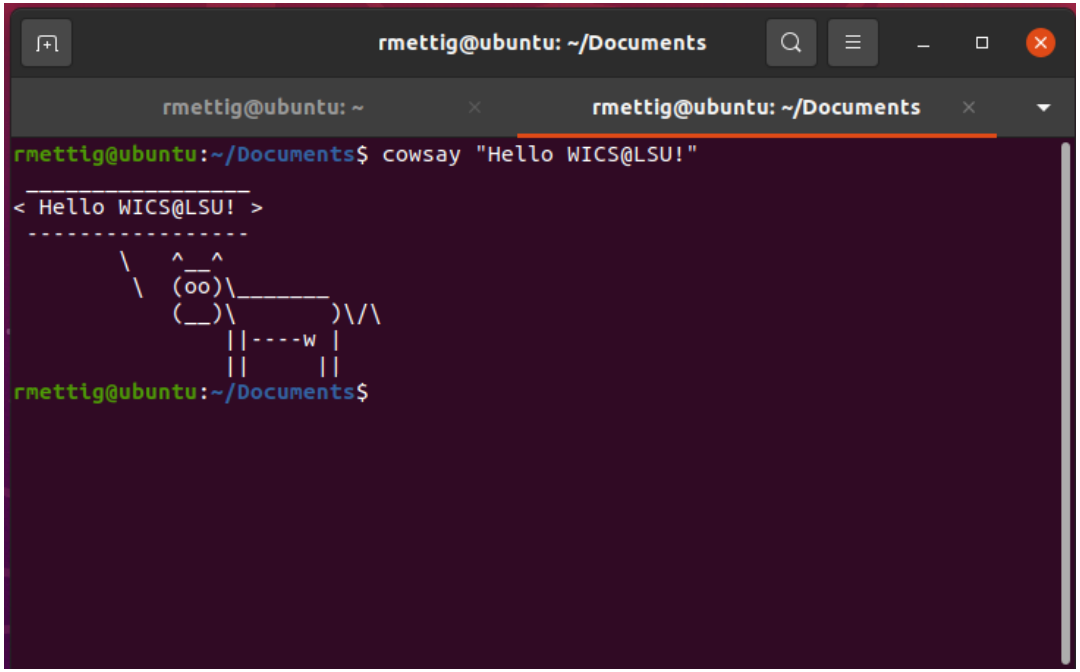
Command Line 101

A few considerations…

- This is a workshop for all levels…
  - …but we start from the ground up
- No prior experience required
- There's something for every level
- Follow along to the practical demo
- Ask questions
- Have fun! ☺

What is the command line interface (CLI)?

- Text-based interface that allows you to issue commands to the computer
- Every OS has one
- Navigate file system
- Run programs
- Create/delete/edit files
- Change system configuration
- And MUCH more!



Why use it?

- It’s quicker
- More powerful
- ~~Scare people at coffee shops~~
- Sometimes it’s your only option

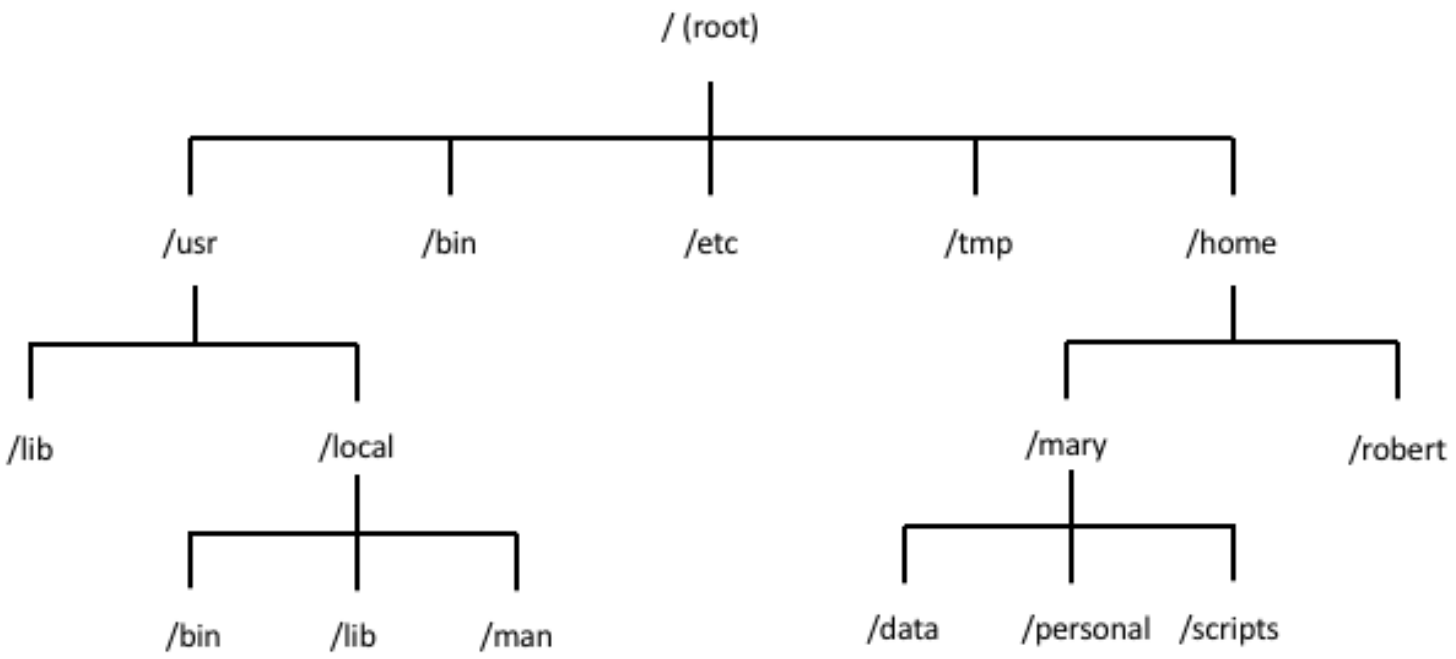
Workshop

- Linux-based
  - Kali Linux VMs
- Basic commands
  - Navigation
  - File creation/editing
  - Directory
  - Package management
  - …more
- Exercises
- If you are already an advanced user:
  - https://overthewire.org/wargames/bandit/

Navigation Commands

Command	Purpose	Command	Purpose
pwd	path of working dir	cd ..	change back one level
ls	list contents of dir	cd ../..	change back two levels
ls –l	list contents long format	cd ../../..	change back three levels
ls –a	list all contents in dir	…	so on and so forth
ls –t	list and sort by time	cd /	change to root dir
ls <target dir>	list contents of target dir	cd	change to home dir
cd <target dir>	change directory to target dir	cd ~	change to home dir

Linux File System Overview



Demo

Exercises -- Navigation

1. Use pwd to see your current location
2. Use ls to see the contents of your current location
    1. Use flags –l, -a, -t, and a combination of them all (e.g.: -la, lt, -at, etc)
3. Use ls to list the contents of /bin
    1. After listing it, use the pwd to check your location – did your location change from the previous check?
    2. Bonus – did you notice anything interesting about the contents of the directory?
4. Use cd / to change into the root directory, then use pwd and ls
    1. Did your location change? Where are you now?
5. Spend some time navigating around and playing with the commands
6. Challenge: using only cd <target dir>, navigate back to your home directory!

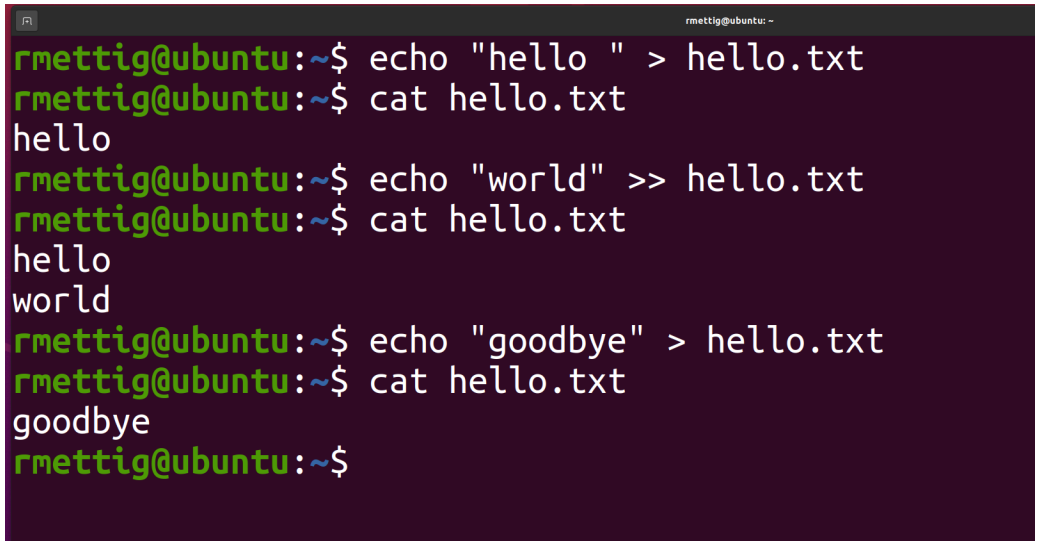
File/dir creation and editing

Command	Purpose	Command	Purpose
man <command>	manual!! Check this when in doubt!!	mv <old name> <new name>	renames a new file or dir
touch <file name>	creates an empty file	rm <file name>	deletes a file or empty dir
mkdir <name>	creates empty dir	rm –r <dir name>	recursively deletes all files in non-empty dir
mv <file> <target>	moves a file to the specified target dir	rm –rf <dir name>	same as above, but forces and overrides any warnings
cp <file> <target file>	copies a file into the specified target file	head -10 <file name>	shows first 10 lines in file
cat	see file contents	tail -10 <file name>	shows last 10 lines in file
mkdir	creates new dir	nl <file name>	shows the contents with numbered lines

Demo

Adding content to file

- Append or overwrite with echo

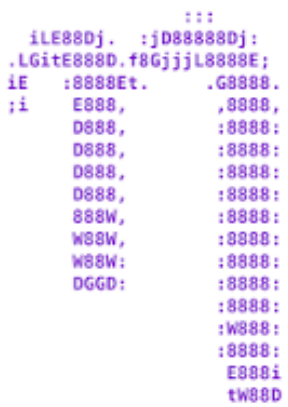


- Text editor

Text editor -- The Editor Wars™

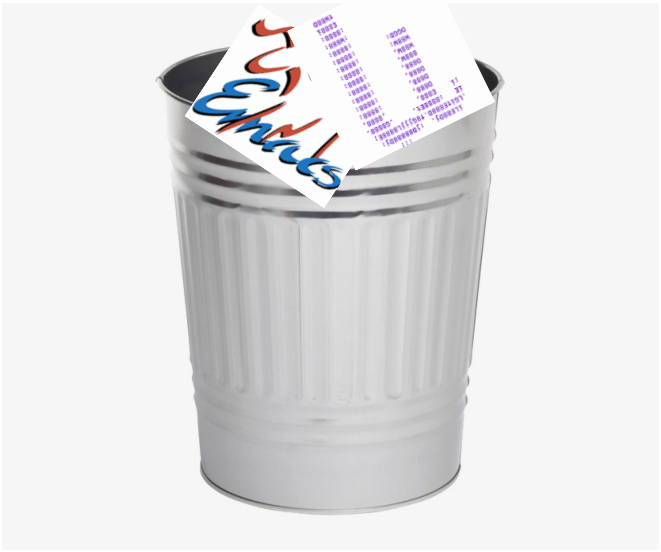
Vim

Emacs



GNU Nano

The Editor Wars™ -- MY workshop ☺



Vim basics

Command	Purpose	Command	Purpose
vim <file>	open file in Vim	:q	quit
[I]	insert mode (edit file)	:w	write to file (save)
[ESC]	return to normal mode	:wq	write then quit
[UP, DOWN, RIGHT, LEFT]	navigate the editor	:x	write changes and close file
:q!	discard changes and quit	:w <new name>	save current file as new file

Vim cheat sheet:
https://www.cs.cmu.edu/~15131/f17/topics/vim/vim-cheatsheet.pdf

Demo

Exercises – File/dir creation

1. Change into the home dir
2. Create a new directory named “darkness” and change into it
3. Inside the new dir, create a new file “hellodarkness”
4. Open the new file in Vim, write “my old friend”, save and exit
5. From the terminal, show the contents of the file without using the editor
6. Change the name of the file to “herecomesthesun”
7. Without the editor, overwrite the contents to “sun, sun, sun”
8. Still without the editor, append “here it comes” to the end of the file
9. Show the contents of the file on the terminal
10. Exit the directory to the upper level
11. Make a copy of it and name it “sunshine”
12. Delete the “darkness” directory with the contents inside

Package management

Command	Purpose	Command	Purpose
sudo <command>	run command with admin privileges	sudo apt-get upgrade	updates the installed packages in your system
apt-get install <package>	install the package		
apt-get remove <package>	uninstall the package		
apt-get purge <software>	uninstall and remove configuration files		
apt-get update	updates list of packages available for download		

Demo

Exercises – Package management

1. Update your list of available packages
2. Update your installed packages
    1. It will throw an error… why?
3. Successfully run apt-get upgrade
4. Using the install module, install the docker package

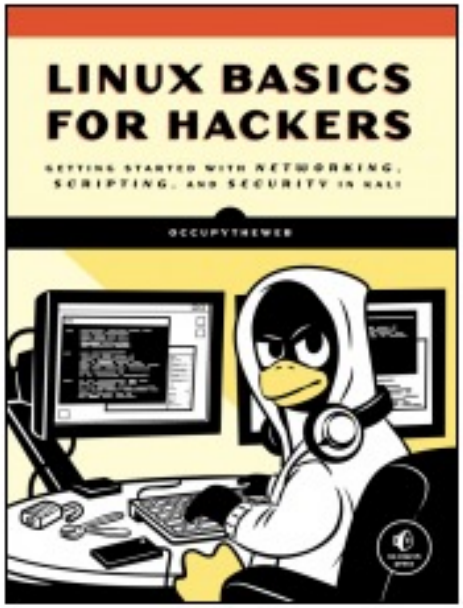
Other useful commands

Command	Purpose	Command	Purpose
history	shows CLI history	ssh	connect to remote server over ssh
!<history number>	runs the command in history	chmod	change file permissions
find <start> -type <f|d> -name <name>	scans the FS for a target file or directory	cowsay <text>	prints cow made of ASCII art with input text
grep <string>	will only show results containing string	clear	clear the contents in the terminal window
less <file>	display file contents in a fixed amount of lines	[UP, DOWN]	scroll through recent command history
sed	text replacement	which	checks whether a given command is installed in $PATH
wc	counts output lines		

Next steps:

- Get comfortable with the commands we've discussed
- Learn how to compile and run programs in the CLI
  - Java, C, Rust, Python, etc.
- Learn Bash scripting basics
- Learn how to customize your CLI environment
  - Hint: check out .bashrc
- Learn how to interact with your OS
  - Network config, manage processes, schedule jobs...

Further reading



Linux Basics for Hackers

Getting Started with Networking, Scripting, and Security in Kali

by OccupyTheWeb

December 2018, 248 pp.

ISBN-13: 9781593278557

- (•) Print Book and FREE Ebook, $34.95
- ( ) Ebook (PDF, Mobi, and ePub), $27.95

+ Add to cart

https://nostarch.com/linuxbasicsforhackers

For next time:

- Set up Github account
  - Make sure you verify your email!
- Workshop: part 2 -- Intro to Git
  - Setup GH access tokens
  - Git overview and basics
  - Prep for part 3! ☺

Challenge time!

https://overthewire.org/wargames/bandit/