UNIX COMMANDS

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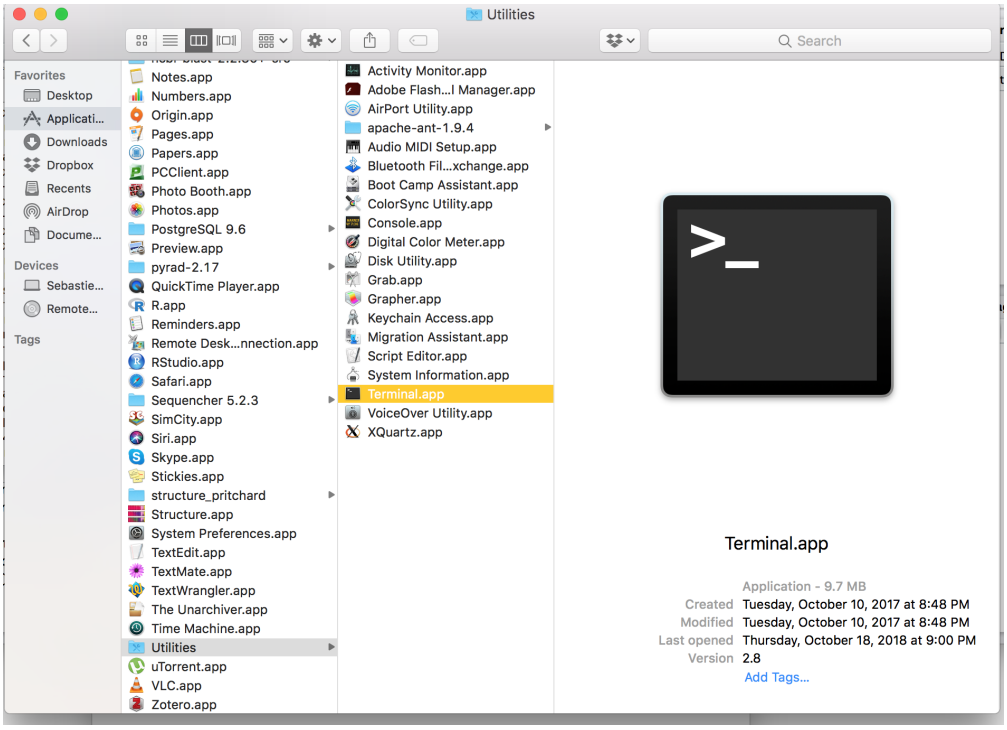
Get started

- Open terminal



- Download github repo (`curl -L https://github.com/seb951/basic_unix/archive/master.zip >master.zip`)
- Decompress (`unzip master.zip`)

General principles

- All commands are short, perform simple tasks & are highly optimized (fast)
- Nearly all commands and options (~99%) work across Unix-based OS
- Commands can take (many) options
- Commands can be combined (see more later)
- Many commands don't require any argument, some do
- `command -option1 -option2 -optionN... parameter object`
- Many commands output directly to terminal

Exploration

Command	Meaning
`ls`	what's there
`ls -1`	with an option
`ls -t -h`	with more options
`ls -thor`	combining even more options
`man ls`	how to run command (q = quit; d = next page; ; arrows & fn arrows = scrolling)
`pwd`	where are we (full path)
`cd`	move somewhere else (default to home)
`cd ..`	move back
`cd ../Applications`	move back, then forward

Command	Meaning
`cd ~`	move home
`cd /`	move to root

Moving / removing / creating files

Command	Meaning
`mv`	move
`cp`	copy
`rm`	**careful** remove a file
`rmdir`	**careful** remove an empty directory
`rm -r`	**VERY careful** remove directory recursively
`mkdir`	create empty directory
`touch`	create empty file
`echo`	print message to screen

Examining files

Command	Meaning
`head`	print first 10 lines to screen
`tail`	print last 10 lines to screen
`less`	print file line by line (use arrows + fn arrows to move up/down)
`cat`	print file content to screen
`sort`	sort a file
`uniq`	unique lines in a file
`clear`	clear terminal
`wc`	wordcount
`du`	disk usage

Tricks

Command	Meaning
`>`	redirect
`>>`	append to file
`|`	pipe
`*`	anything (special character: for literal `*`, use `\*`)
`?`	any character (special character)
`Ctrl+A`	go to beginning of line in terminal
`Ctrl+E`	end of line
`tab key`	autocomplete

Working remotely

Command	Meaning
`ssh`	secure shell (remote connection)
`scp`	secure copy (remote connection)

Other useful commands

Command	Meaning
`chmod`	change mode of file
`sudo`	superuser do
`top`	what's running
`kill`	kill a process
`curl`	get stuff from web (MACOS native) or `wget` (MACOS non-native)
`history`	see recent history
`open`	open a file
`ln`	symbolic link
`which`	where is a command
`alias`	create own commands
`nano`	edit text (whole file loaded in memory)
`nano +123`	specify location in file

Profile

- Let's look at .bash_profile to modify options (e.g. `nano ~/.bash_profile`)
- Usefull options are here: `examples/bash_example_commands`

Compression

Command	Meaning
`gzip`	compression/decompression of files
`gzip -cd file.gz`	decompress to standard out (use a `>` redirect)
`gunzip`	compression/decompression of files
`tar`	compression/decompression of archives
`tar -xvzf file tar.gz`	decompress a tar.gz (tarball)

Regular expressions

Command	Meaning
`grep`	regular expression
`grep -options 'pattern' file`	regular expression

Examples

Combining commands:

- Let's look at the file `examples/sequence.fasta`
- print line 17 by piping `head` and `tail`
- Count lines starting with '>' (pipe `grep` and `wc`)
- Count unique lines starting with '>' (pipe `grep`, `sort`, `uniq` and `wc`)
- How many files is there in the directory (pipe `ls` & `wc`)

Install and run command line programs

- Let's look at this example: https://github.com/rec3141/rec-genome-tools/blob/master/bin/fastagrep.pl
- Notice the `!#` (shebang) on the first line
- It is a short `perl` script that *greps* sequences in a *.fasta* formatted file
- Copy-paste the text in a new file (e.g. `touch fastagrep.pl`,`nano fastagrep.pl`, paste and save)
- Make it executable (`chmod +x fastagrep.pl`)
- Let's look at it (`./fastagrep.pl`)
- Let's try it (`./fastagrep.pl 'deserticola' examples/sequence.fasta`)
- Let's symbolic link it so the computer knows where to find it (`ln source target`)

bash

- The terminal runs (by default) the `bash` command language
- We can write or use more complex executable `bash` code
- Let's look at an example `less examples/bash_cmd2`