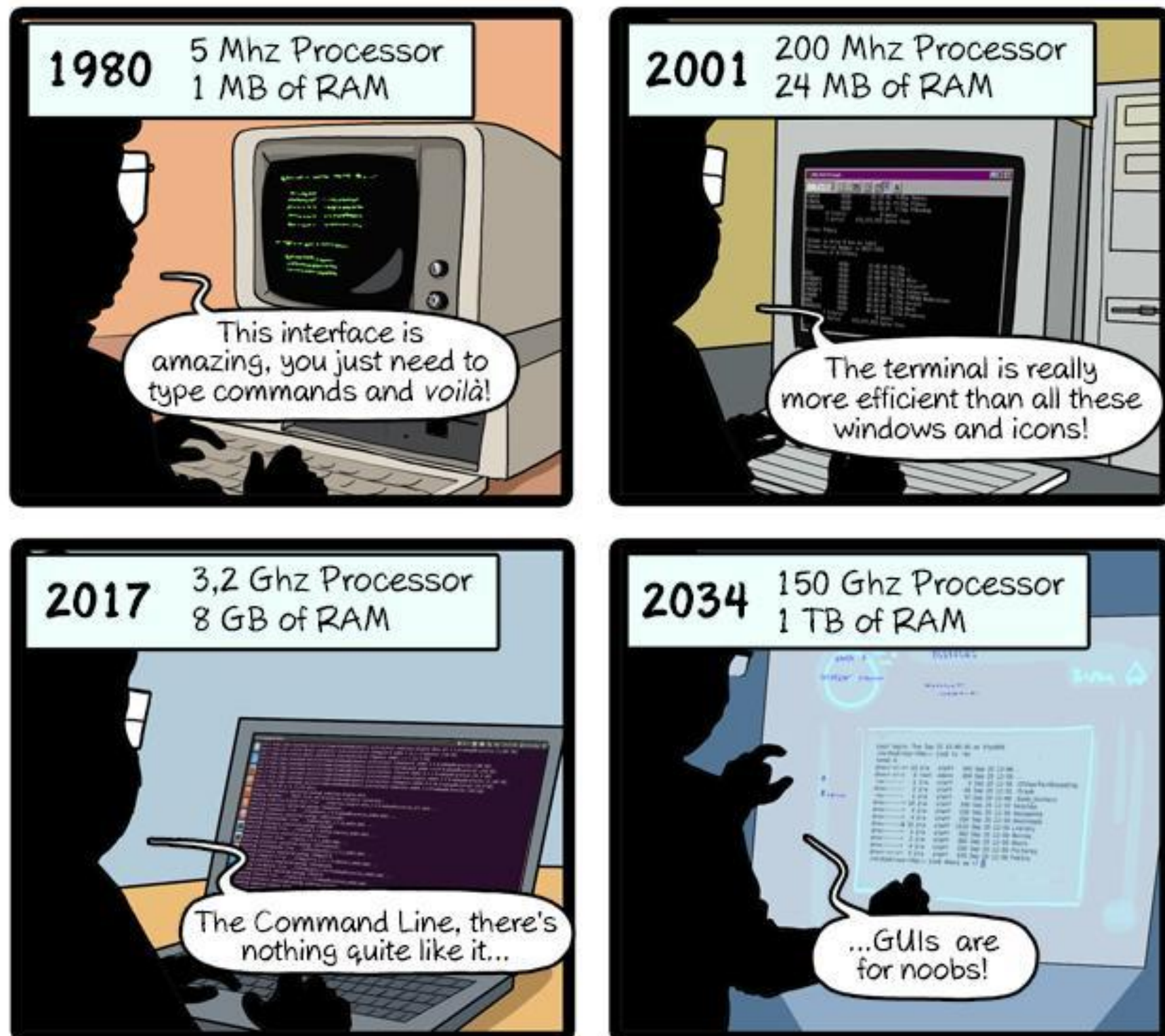


# Interacting with the Shell

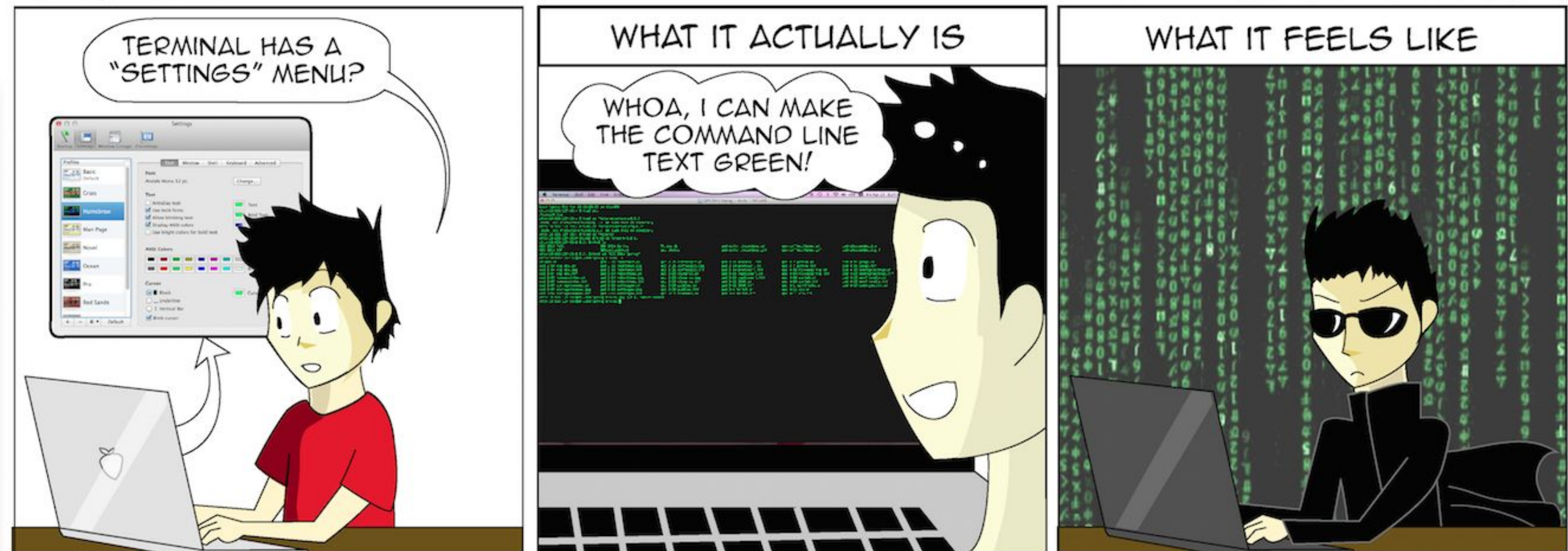
Spring 2022

PCfB Class 2

January 21, 2022



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# Outline

- Intro to Unix shell
- Configuration files
- Useful commands
- Assignment

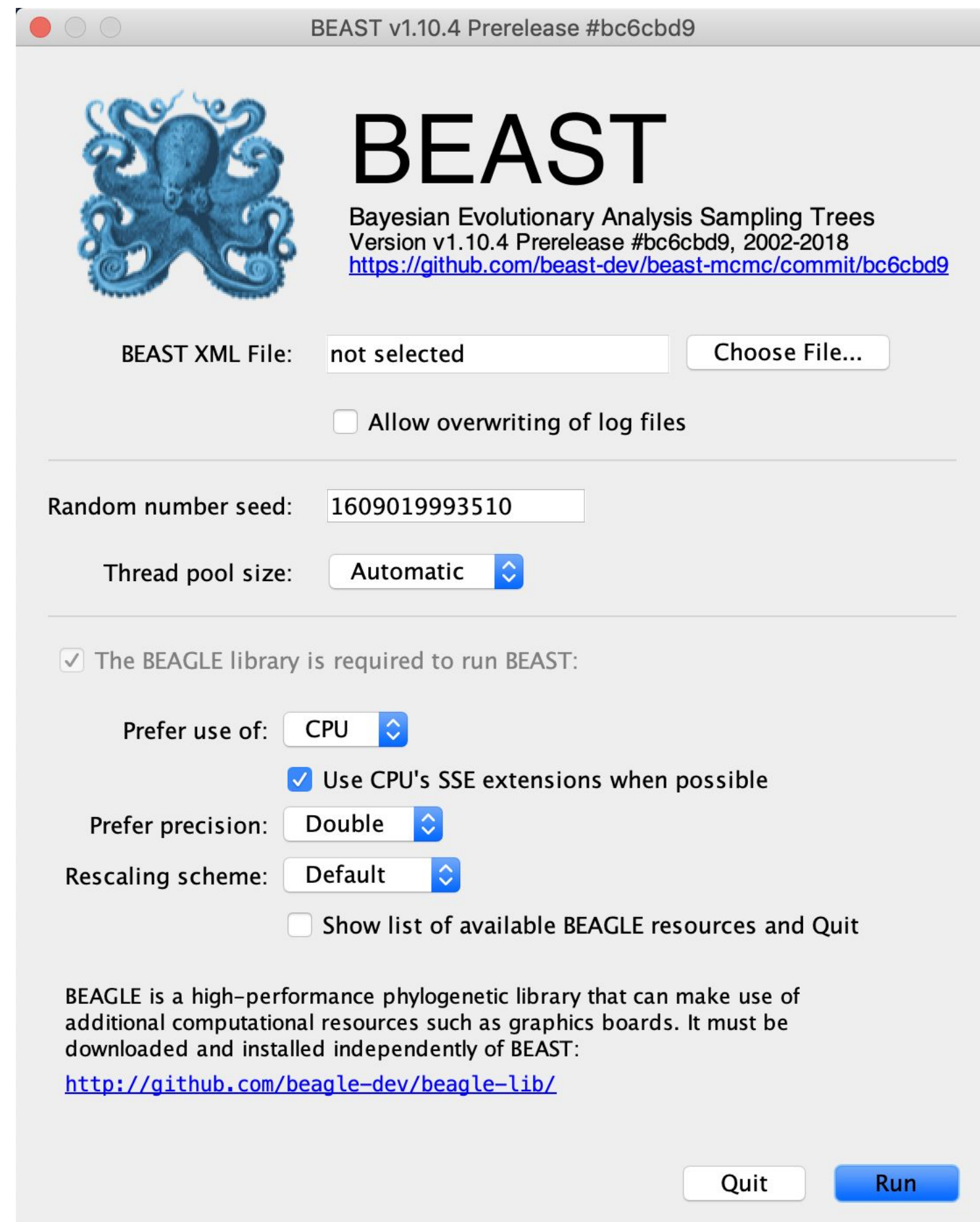
# Intro to unix shell



# GUI vs. Command line

## Graphical user interface

## Command line/Terminal



```
~ — jtl276@wind:/scratch/jtl276/coronaPepSeq/demux/COVID5 — -bash — 108x21
~ — jtl276@wind:/scratch/jtl276/coronaPepSeq/demux/COVID5 — -bash
(base) JTL-MacBook-Pro:~ jtladner$
(base) JTL-MacBook-Pro:~ jtladner$
(base) JTL-MacBook-Pro:~ jtladner$
(base) JTL-MacBook-Pro:~ jtladner$ ~/programs/bin/beast -help
Failed to load BEAGLE library: no hmsbeagle-jni in java.library.path
Usage: beast [-verbose] [-warnings] [-strict] [-window] [-options] [-working] [-seed] [-prefix <PREFIX>] [
-overwrite] [-errors <i>] [-threads <i>] [-java] [-tests] [-threshold <r>] [-adaptation_off] [-adaptation_ta
rget <r>] [-beagle] [-beagle_info] [-beagle_order <order>] [-beagle_instances <i>] [-beagle_multipartition <
auto|on|off>] [-beagle_CPU] [-beagle_GPU] [-beagle_SSE] [-beagle_SSE_off] [-beagle_threading_off] [-beagle_t
hread_count <i>] [-beagle_cuda] [-beagle_openc1] [-beagle_single] [-beagle_double] [-beagle_async] [-beagle_
scaling <default|dynamic|delayed|always|none>] [-beagle_delay_scaling_off] [-beagle_rescale] [-mpi] [-partic
les <FOLDER>] [-mc3_chains <i>] [-mc3_delta <r>] [-mc3_temperatures] [-mc3_swap <i>] [-load_state <FILENAME>
] [-save_stem <FILENAME>] [-save_at] [-save_every] [-save_state <FILENAME>] [-force_resume] [-citations_file
<FILENAME>] [-version] [-help] [<input-file-name>]
-verbose Give verbose XML parsing messages
-warnings Show warning messages about BEAST XML file
-strict Fail on non-conforming BEAST XML file
-window Provide a console window
-options Display an options dialog
-working Change working directory to input file's directory
-seed Specify a random number generator seed
```

# Unix Shell

- Command-line interpreter
- A programming language
- Commands can be entered by a user or read from a file



# Available shells on my computer

```
[(base) jtladner@mggen231 matrices % ls -l /bin/*sh
-r-xr-xr-x  1 root  wheel 1296704 Jan  1  2020 /bin/bash
-rwxr-xr-x  1 root  wheel 1106144 Jan  1  2020 /bin/csh
-rwxr-xr-x  1 root  wheel  277440 Jan  1  2020 /bin/dash
-r-xr-xr-x  1 root  wheel 2585424 Jan  1  2020 /bin/ksh
-rwxr-xr-x  1 root  wheel  120912 Jan  1  2020 /bin/sh
-rwxr-xr-x  1 root  wheel 1106144 Jan  1  2020 /bin/tcsh
-rwxr-xr-x  1 root  wheel 1347856 Jan  1  2020 /bin/zsh
```



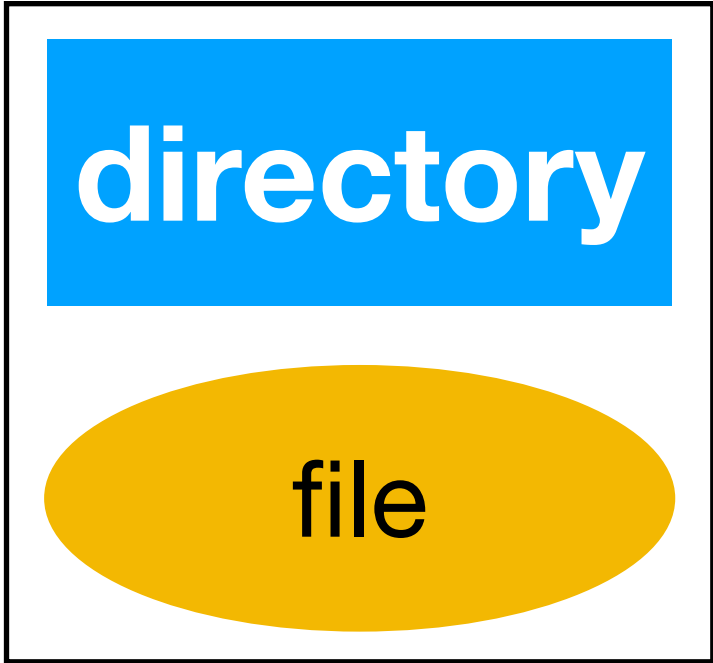
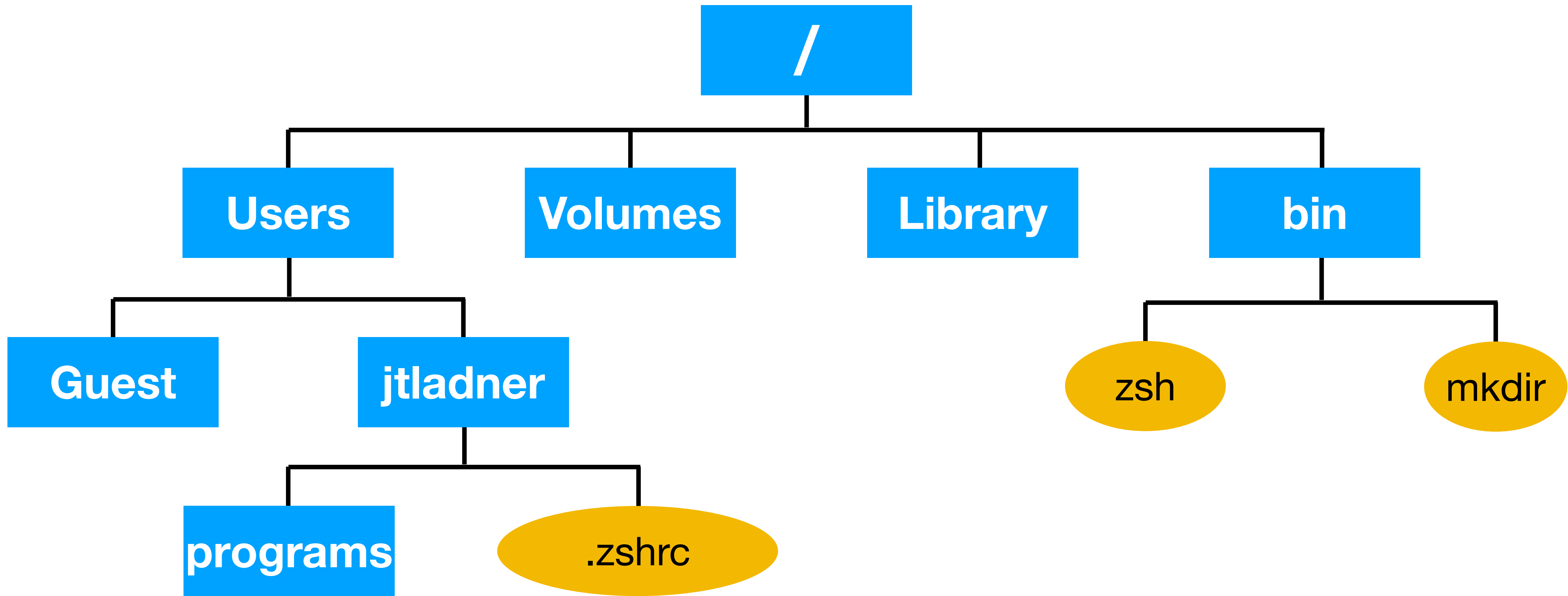
# Be careful!



- The shell will not ask for confirmation before permanently deleting files from your computer
- Deleted files are NOT moved to the trash
- No Undo (ctrl-z)

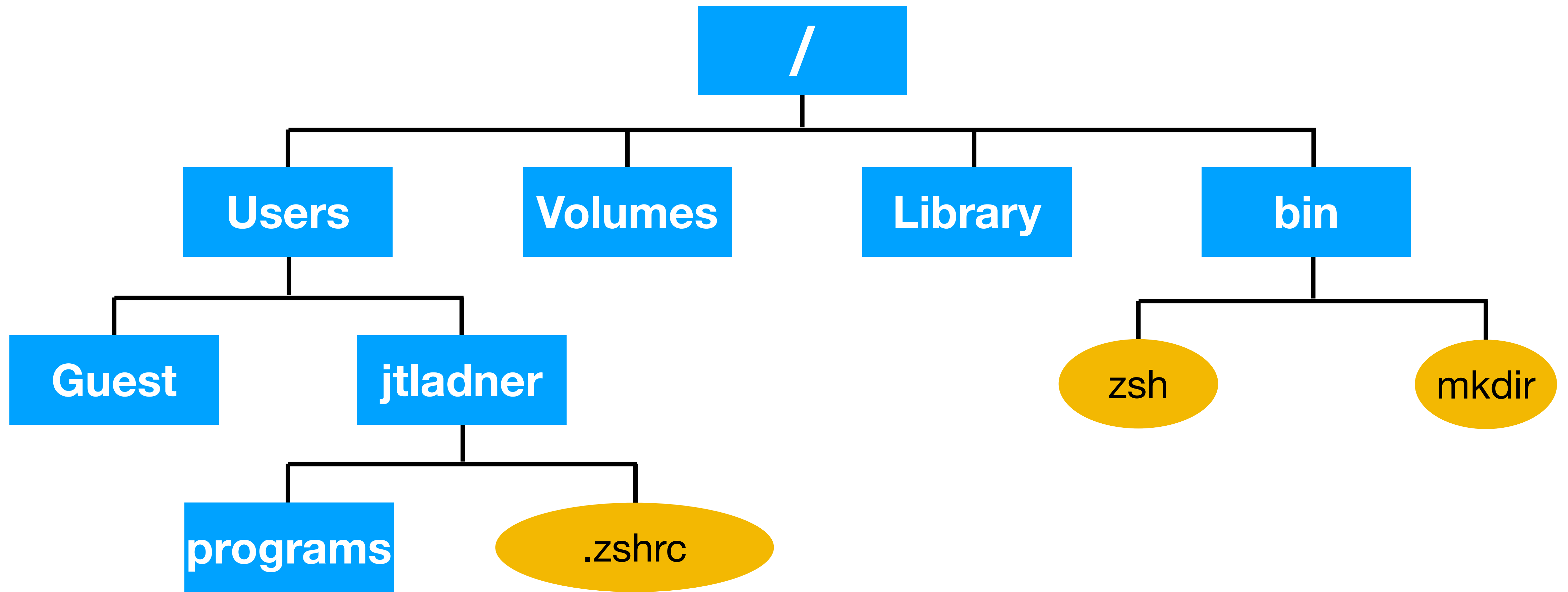
# Filesystem structure

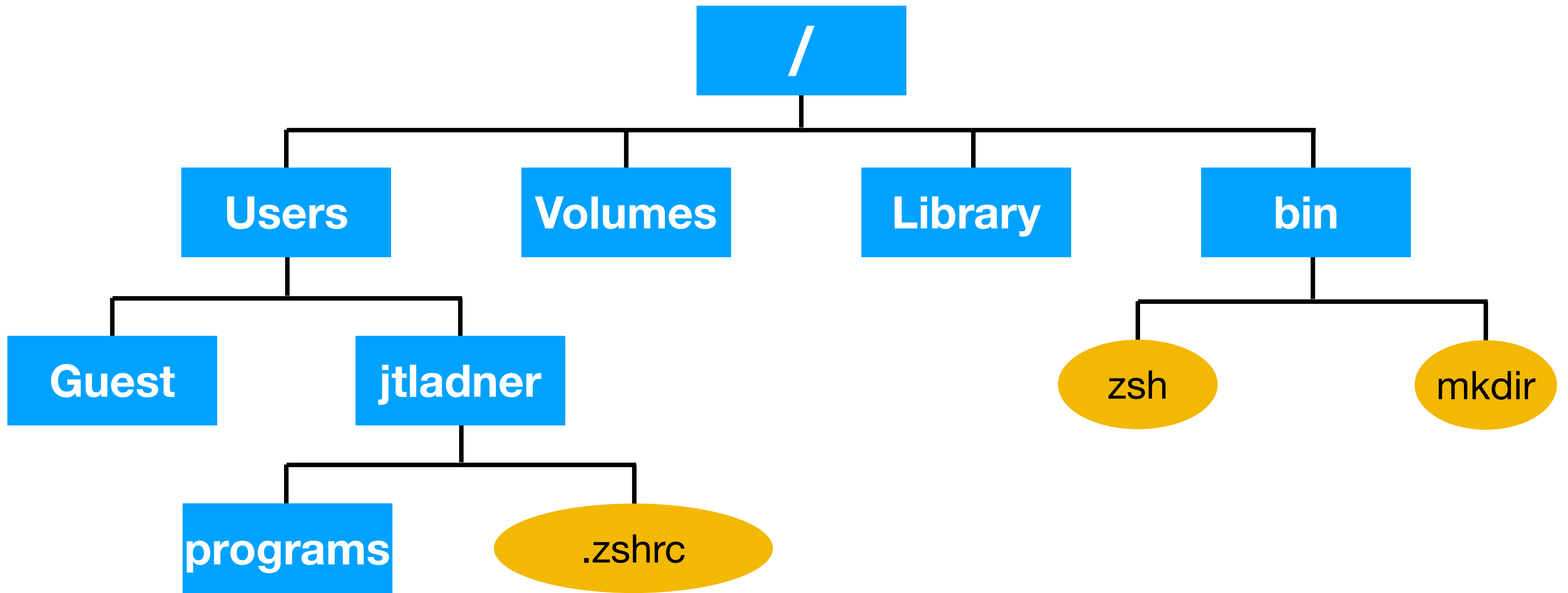




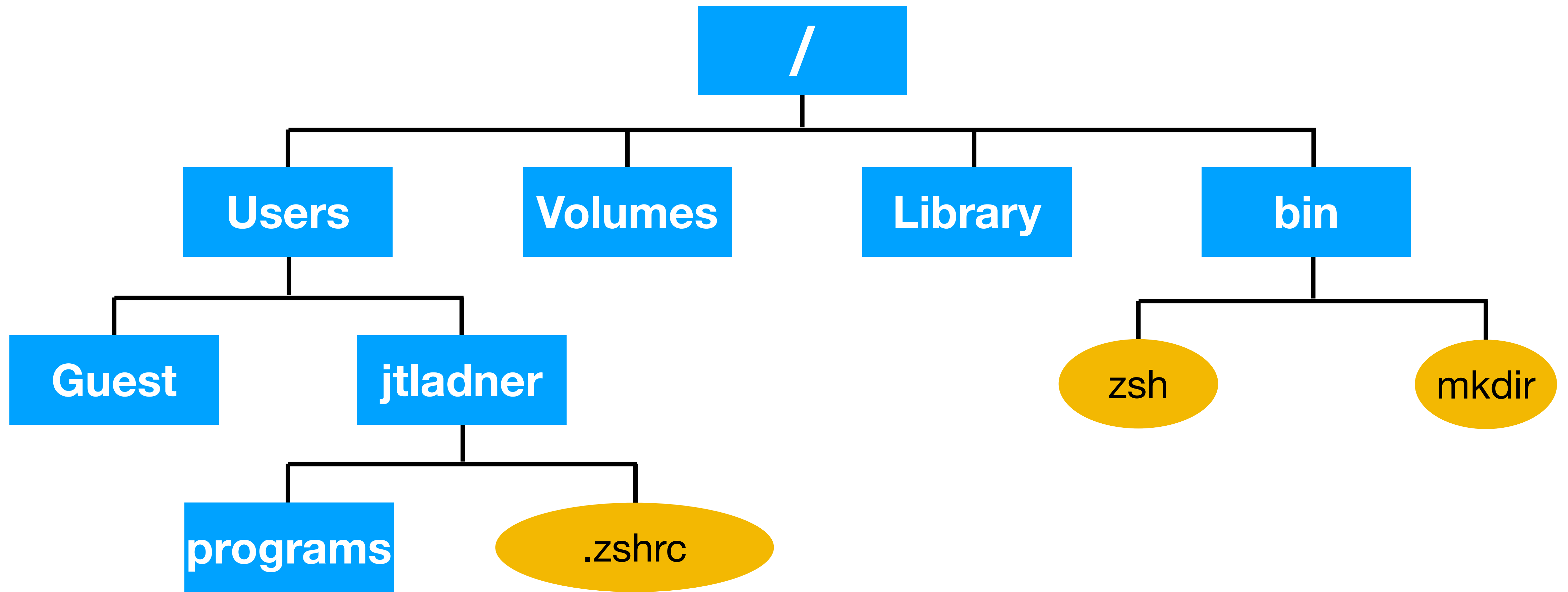
# Types of paths

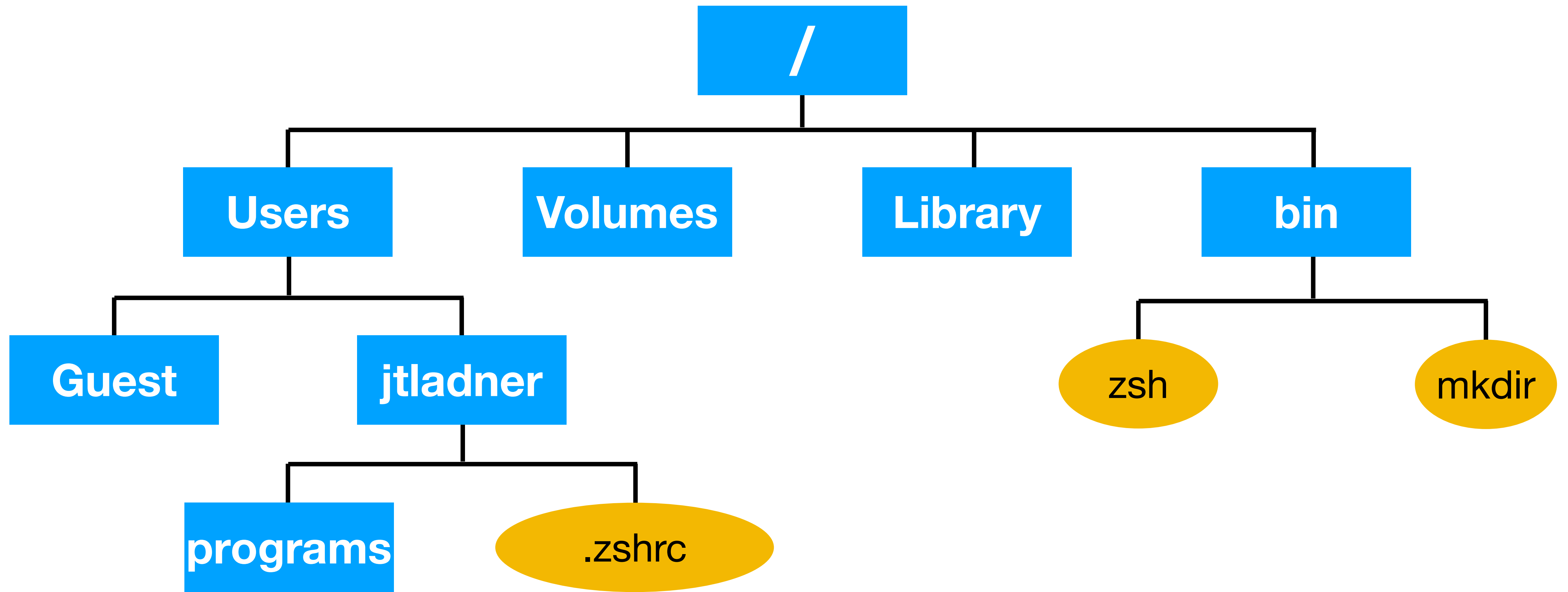














# Configuration files

Bash:

Zsh:



# Practically speaking...

- For Mac OSX:
  - You only need `.bash_profile` (or `.zshrc`)
  - Terminal.app runs login shell for each new window, by default
- For Linux:
  - Use `.bashrc` for most settings
  - Execute `.bashrc` within `.bash_profile` (instructions on GitHub)

# set -o noclobber

- Protects you from accidentally overwriting files that already exist

```
mggen115:~ jtladner$ cd Desktop/  
mggen115:Desktop jtladner$ ls -l >text.txt  
mggen115:Desktop jtladner$ ls -l >text.txt  
-bash: text.txt: cannot overwrite existing file  
mggen115:Desktop jtladner$
```

- Subtle change to behavior of up and down arrow keys
- Still scroll through command history...
  - but now if you start typing a command, you will only scroll through commands that match what you have started typing



## Bash:

```
bind '"\e[A": history-search-backward'
```

```
bind '"\e[B": history-search-forward'
```

## Zsh:

```
bindkey '\eOA' history-beginning-search-backward
```

```
bindkey '\e[A' history-beginning-search-backward
```

```
bindkey '\eOB' history-beginning-search-forward
```

```
bindkey '\e[B' history-beginning-search-forward
```

# Add time stamp to each command from `history`

```
~/Documents/GitHub/PracticalComputing_Spring2021/Week02_Shell-pt1/Assignment — jtl276@wind:/scratch/jtl276/coronaPepSeq/demux/COVID5 —...
[(base) JTL-MacBook-Pro:Assignment jtladner$ history | tail -n 10
 526 26/12/20 16:40:49 cd
 527 26/12/20 16:40:51 cd cd ~/Documents/GitHub/PracticalComputing_Spring2021/Week02_Shell-pt1/Assignment
 528 26/12/20 16:40:55 cd ~/Documents/GitHub/PracticalComputing_Spring2021/Week02_Shell-pt1/Assignment
 529 26/12/20 16:40:58 ls -ltr
 530 27/12/20 10:39:01 ls -l /bin/*sh
 531 27/12/20 10:39:07 clear
 532 27/12/20 10:39:10 ls -l /bin/*sh
 533 27/12/20 10:41:12 man set
 534 27/12/20 10:51:41 clear
 535 27/12/20 10:51:45 history | tail -n 10
```

`HISTTIMEFORMAT="%d/%m/%y %T "`

`fc -li`

- **Alternative to `history` for `zsh`**

# source command

- Changes to your `.bash_profile/.bashrc/.zshrc` will not automatically take effect within your current session
- 2 options:
  1. Open a new terminal window
  2. `source ~/.bash_profile`



# Configuration demo

Useful  
commands

# Getting around

`pwd`

`ls`

`cd`

# Create/modify/delete files

cp

mv

rm



# Create/delete directories

`mkdir`

`rmdir`

history

# Commands covered in reading

## Getting around

- `cd`
- `ls`
- `pwd`

## Creating/deleting files

- `cp`
- `mkdir`
- `mv`
- `rmdir`
- `rm`

## Other

- `grep`
- `cat`
- `curl`
- `man (-k)`
- `history`

## View/edit text

- `less`
- `nano/pico`

## Data flow

- `>`
- `|`
- `>>`

**Questions?**

Other useful  
commands

# Extracting parts of files

`head`

`tail`



# Quantify file contents

`wc`

`grep -c`

rename

# Keyboard shortcuts

**ctrl-a**

**ctrl-e**

**ctrl-u**

**ctrl-k**

Terminal  
demos