Unix command line; editors
Tools for Reproducible Research

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Course web: kbroman.org/Tools4RR
Windows vs. Mac OSX vs. Linux

Remote vs. Not
If you use Windows...

Consider **Git Bash** (or **Cygwin**)

(and perhaps **Mintty** or **ComEmu**)
If you use a Mac...

Consider Homebrew and iTerm2

Also the XCode command line tools
The command line is your friend

- Don't touch that mouse!
- Scriptable
- Flexible
The shell

Options: tcsh, bash, zsh
Basics

- Directory structure
  Absolute vs. relative paths
  `ls -l ~/Figs ../Rawdata/`

- Creating, removing, changing directories
  `mkdir`
  `rmdir`
  `cd`
  `cd -`

- Moving, copying, removing files
  `mv`
  `cp`
  `rm -i`
export PATH=./usr/local/bin:$PATH
export LD_LIBRARY_PATH=./usr/local/lib

noclobber=1 # prevent overwriting of files
IGNOREEOF=1  # disable Ctrl-D as a way to exit
HISTCONTROL=ignoredups

alias cl='clear; cd'
alias rm='rm -i'
alias mv='mv -i'
alias cp='cp -i'
alias ls='ls -GF'
alias l.'='ls -d .[a-zA-Z]*'
alias ll='ls -lh'
alias md='mkdir'
alias rd='rmdir'
alias rmb='rm .*~ *~ *.bak *.bk!'

alias Rb='R CMD build --force --resave-data'
alias Ri='R CMD INSTALL --library=/Users/kbroman/Rlibs'
alias Rc='R CMD check --library=/Users/kbroman/Rlibs'
alias Rcc='R CMD check --as-cran --library=/Users/kbroman/Rlibs'
PATH in Windows
PATH in Windows
PATH in Windows
Redirection and pipes


$ wc -l hamlet.txt

$ grep Ham hamlet.txt > tmp.txt
$ wc -l tmp.txt

$ grep Ham hamlet.txt | wc -l

$ grep Ham hamlet.txt | less

$ cat file1.txt file2.txt > combined.txt
$ cat file3.txt >> combined.txt
Wild cards

$ grep blah *.txt

$ ls blah.???

$ ls [a-z]*

$ ls /usr/bin/[auz]*

$ ls /usr/bin/[auz]*.*

$ ls -l *.txt | wc -l

$ wc -l *.txt | grep total
Suspend/foreground/background

$ R CMD BATCH input.R output.txt &

$ R CMD BATCH input.R output.txt
[ctrl-Z]
$ bg

$ emacs afile.txt
[ctrl-Z]
$ fg
Moving around the command line

- **ctrl-f, ctrl-b**: move forward and back
- **ctrl-a, ctrl-e**: move to beginning and end of line
- **ctrl-k, ctrl-u**: delete rest of line, or to the start
- **ctrl-l**: clear the screen
- **ctrl-c**: cancel what you've typed
- **tab**: autocomplete command or file
- **ctrl-p, ctrl-n**: forward and backward in history
- **ctrl-r**: search for a previous command
How to solve computing problems

- Try stuff!
- man pages and help files
- `blah -h` or `blah --help`
- Google
- Stackoverflow and other StackExchange sites
- Google with `site:stackoverflow.com`
- email lists and google groups
- friends or colleagues
- Twitter
Examples

- How do you suppress warnings in knitr?
- What symbol corresponds to the unicode \u00B1?
- What's the difference between curl and wget?
- What does "502 Bad Gateway" mean?
- "To open gs you need to install X11"
- mclapply isn't working in Windows
- How to ping a server in Python?
- Font shape `EU1/pplx/m/n' undefined
- except KeyError, k: raise AttributeError, k
Learn to code by looking at good code.
Choose a good editor

- Emacs
- VIM
- RStudio
- Textwrangler
- Notepad++
- Sublime Text
- Atom
A good editor

▶ Doesn't require pointing-and-clicking
▶ Easy to get code between R and a script
▶ Syntax highlighting of code
▶ Automatic indentation
▶ Close parentheses/brackets/braces
▶ Browse code across files
▶ Integrated with other tools (e.g., version control)
Other useful tools

$ find . -name *.py
$ locate article.cls

$ ps ux
$ top
$ df -hk
$ du -h
$ du -hd2

$ ln -s ~/Projects/SomeFriend/Data
$ ln -s ~/Projects/SomeFriend/Data SomeFriend_Data

$ tar xzvf qtl_1.29-2.tar.gz
$ tar czvf blah.tgz Blah/
$ tar tzvf blah.tgz
Further useful tools

$ whereis bash
$ type rm
$ type emacs

$ pwd

$ head afile.txt
$ tail afile.txt
$ head -n20 afile.txt

$ man head

$ kill 8453
$ kill -9 8453

$ history
$ !!
$ !-2
$ !503

$ ping www.google.com

$ ispell afile.txt
Opening a file from the command line

Windows:

```bash
$ start mypaper.pdf
$ start http://google.com
```

Mac:

```bash
$ open mypaper.pdf
$ open http://google.com
```
File modes/owner/group

```bash
sudo chown kbroman .
chgrp -R staff .
chmod +x createVersionWithNotes.rb
chmod 755 02_Unix
chmod 644 02_Unix/02_unix.tex
chmod 700 Private_stuff
```
Don't forget to look at the resources page

kbroman.org/Tools4RR/pages/resources.html