

# Unix command line; editors

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Course web: [kbroman.org/AdvData](https://kbroman.org/AdvData)

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...

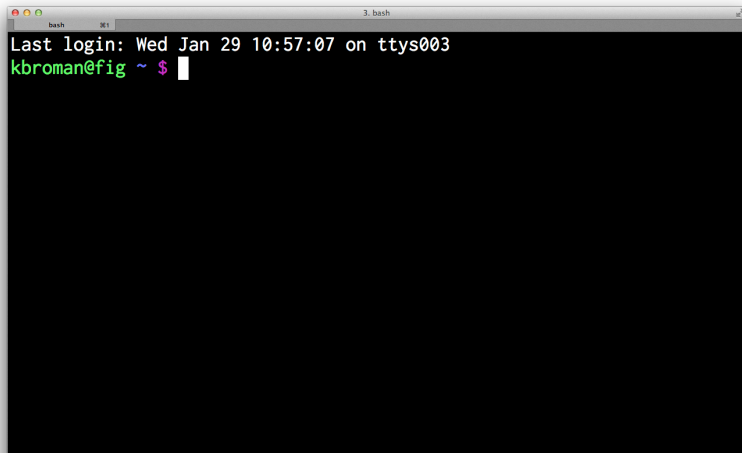
Consider **Homebrew** and **iTerm2**

Also the **XCode** command line tools

# The command line is your friend

- ▶ Don't touch that mouse!
- ▶ Scriptable
- ▶ Flexible

# The shell

A screenshot of a terminal window. The window has a title bar with three colored buttons (red, yellow, green) on the left and the text "3. bash" on the right. Below the title bar, there is a tab labeled "bash" and a small icon. The main area of the terminal is black. The text "Last login: Wed Jan 29 10:57:07 on ttys003" is displayed in white. Below this, the prompt "kbroman@fig ~ \$" is shown in green, followed by a white cursor. The terminal window is slightly shadowed, giving it a 3D appearance.

```
Last login: Wed Jan 29 10:57:07 on ttys003
kbroman@fig ~ $
```

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
```

## ~/.bash\_profile

```
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 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'

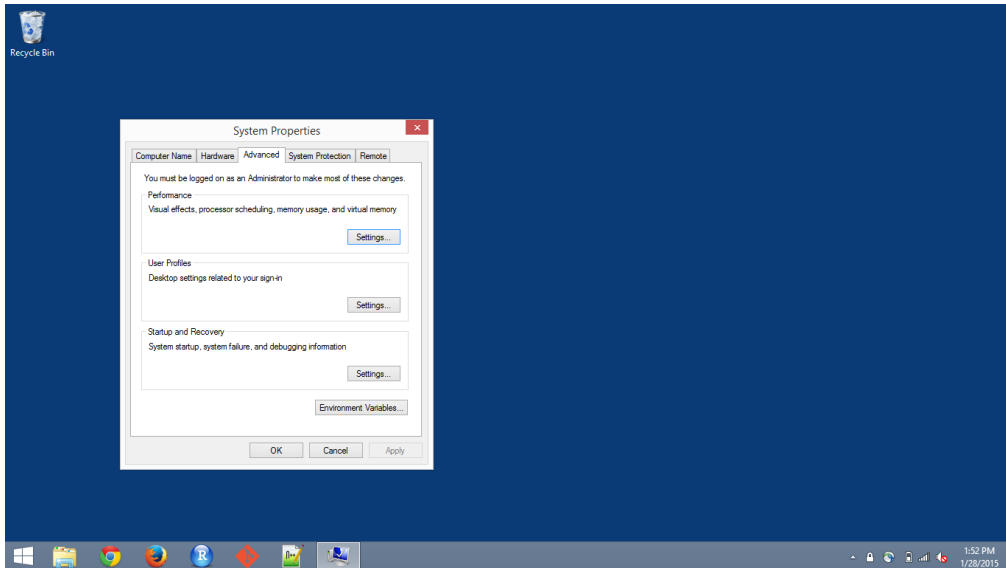
alias Rb='R CMD build --force --resave-data'
alias Ri='R CMD INSTALL --library=/Users/kbroman/Rlibs'
alias Rc='R CMD check --library=/Users/kbroman/Rlibs'
alias Rcc='R CMD check --as-cran --library=/Users/kbroman/Rlibs'
```



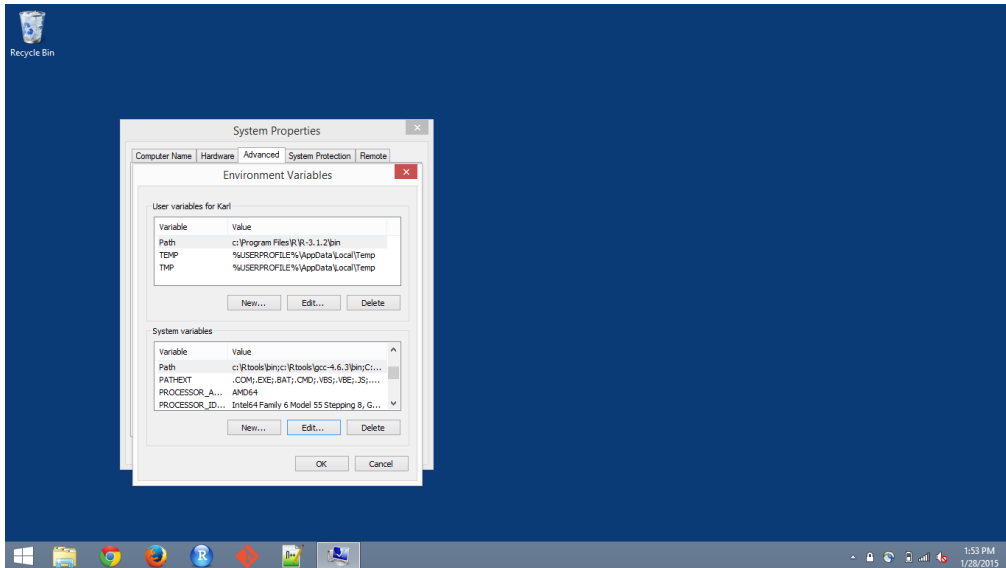
# PATH in Windows



# PATH in Windows



# PATH in Windows



# Redirection and pipes

```
$ curl -L http://bit.ly/hamlet_txt > hamlet.txt
```

```
$ 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

<code>ctrl-f, ctrl-b</code>	move forward and back
<code>ctrl-a, ctrl-e</code>	move to beginning and end of line
<code>ctrl-k, ctrl-u</code>	delete rest of line, or to the start
<code>ctrl-l</code>	clear the screen
<code>ctrl-c</code>	cancel what you've typed
<code>tab</code>	autocomplete command or file
<code>ctrl-p, ctrl-n</code>	forward and backward in history
<code>ctrl-r</code>	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
- ▶ Buy a book. Buy all of the books.



# 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`

# Important principle

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:

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

Mac:

```
$ open mypaper.pdf  
$ open http://google.com
```

# File modes

```
bash 3. bash
kbroman@fig ~/Teaching/Tools4RR/Lectures (master) $ ll
total 8
drwxr-xr-x 27 kbroman staff 918B Jan 27 11:35 01_Intro/
drwxr-xr-x 30 kbroman staff 1.0K Jan 29 11:38 02_Unix/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:28 03_KnitrMarkdown/
drwxr-xr-x 37 kbroman staff 1.2K Jan 20 23:05 04_Git/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:28 05_Organization/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:28 06_EDA/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:28 07_ClearCode/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:28 08_Rpack/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:29 09_TestingDebugging/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:29 10_BigJobs/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:29 11_KnitrPapers/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:29 12_KnitrTalks/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:29 13_KnitrPosters/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:29 14_Python/
drwxr-xr-x 2 kbroman staff 68B Jan 14 06:29 15_Licenses/
-rwxr-xr-x 1 kbroman staff 488B Oct 23 16:18 createVersionWithNotes.rb*
kbroman@fig ~/Teaching/Tools4RR/Lectures (master) $
```



# File modes/owner/group

```
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/AdvData/resources](http://kbroman.org/AdvData/resources)