

Week 6

Announcements

- Basic, Advanced 5 due October 20
- Advanced 3 deadline pushed back to tonight (October 8)
- Basic 2 graded
 - Don't hesitate to reply to the feedback email, especially when nearly all the points are lost!
- Try using the course server!
 - It's more than just a way to run the autograder

Clarifications

- Don't commit "junk"
 - System metadata files
 - Build outputs (object code, binaries built from source, `.dSYM` files on mac OS)
 - Text editor swap files
- Avoid *blindly* using `git add .`
 - Most appropriate time is adding a *bunch* of new files (like with a new repo)
 - Be mindful of what you're committing
 - A good `.gitignore` file helps with this
 - `git add -u` to add modified files is usually the most appropriate

Lecture 6: (Text) Editors

`vi` != Vim

Overview

- What is a text editor
- Examples of text editors
- Looking at text editors
 - Featuring a large section on Vim because it's the one I know the best

What is a text editor?

- Tool that modifies plain-text data in files
- The best ones conform to your needs and further enable your productivity

Q: Who has used features beyond moving around with arrow keys, using the mouse to select/move the cursor, copy and paste in their preferred text editor/development environment?

The goal of today's lecture is to expose you to text editors and how powerful they can be

- Ultimately editor choice is a highly personalized decision
 - No, we're not fanning the flames of the Editor Wars
- One editor is not *inherently* better than another: it depends on whether or not it works for *you*
 - I'll make an exception for Microsoft Notepad: literally anything is better
- A relatively vanilla Vim just so happens to be what works for how I work
 - Don't take this as a guideline for you to follow: I just happen to be highly productive with it
 - You can use whatever text editor you want, with as many or few customizations and plugins as you want

Q: What are some text editors?

Terminal text editors

Q: Why learn them in **\$CURRENT_YEAR**?

- Yes, nearly all of us will be working in a GUI environment
- In some cases you may need to SSH into an environment that has no GUI; some base level competency in terminal text editors will come in handy
- Why learn and configure a GUI editor AND a terminal editor when you can keep your experience consistent with a terminal editor?

ed (1969)

The OG

(Oh god why would you use this in `$CURRENT_YEAR`)

- The original UNIX editor
- Part of the POSIX spec!
- Developed back when we had *teleprinters*, not even video terminals
 - The root of some design decisions and quirks of UNIX, such as short commands and lack of output
- Known as a "line editor" where you specified lines you wanted to edit
- Provides very little feedback
- "The most user-hostile editor ever created"

ed summary

	ed
Quit	q

Save	w
	w <file name>

Append text	a (text) .

Print all	, p
Print line	<n>p for line <i>n</i>

Delete line	<n>d for line <i>n</i>

vi (1976)

We've got these fancy "screen" things now

- Part of the POSIX spec!
- Born out of another line editor **ex** (and ultimately **ed**); the "colon" commands are actually **ex** commands
- *Modal* text editor
 - "Command" mode for commands and navigation
 - "Insert" mode for writing text
 - "Command-line"/"ex" mode for **ex** commands
- ESC brings you Command mode
 - **:** enters "Command-line"/"ex" mode and allows you to enter **ex** commands (which allow you to save and quit)
- Certain commands (e.g. **i**, **a**) bring you into Insert mode

Vim (1991)

vi but better (but not in the POSIX spec 😞)

- Plain ole **vi** kinda sucks for today's use
- Many distros don't even provide OG **vi**, opting to alias it to a minimal version of Vim or even just normal Vim
- Vim's features is a superset of **vi**'s

Vim (1991)

- *Massively* extends the functionality of **vi**
 - Syntax highlighting!
 - Line numbers!
 - Undo history larger than 1!
 - Plugins!
 - Multiple windows!
 - ...and much more!
- New modes:
 - "Visual" mode for selecting text
 - "Command" mode renamed to "Normal" mode

vi/Vim abridged cheatsheet

- `<ESC>`: Enter Command/Normal mode
- The following are for when you're in Command/Normal mode
- A neat thing is that you can put a number before a command to repeat it
 - `10j` to move down 10 lines
- You can record *macros* with `q <letter to save to> <commands> q`
 - You can invoke them with `@<letter you saved to>`
- The "register" I refer to is sort of like a copy-paste clipboard
- `^` (caret) is shorthand for the Control key serving as a modifier

Navigation (1)

- **h, j, k, l**: move cursor left, down, up, right
 - **vi**: Arrow keys *might* be supported, and *might* work in Insert mode
 - Vim: Arrow keys work as expected (nowadays)
- **w**: "word", go to beginning of next word
- **b**: "back", go to beginning of current word (or beginning of previous word)
- **e**: "end", go to end of current word (or end of next word)
- **0**: go to beginning of line
- **\$**: go to end of line

Navigation (2)

- **^u**: go up half a page
- **^d**: go up down a page
- **gg**: go to top of document
- **G**: go to bottom of document
- **<n>G**: go to line *n*
- **/**: search for a pattern
 - **n**: next match
 - **N**: previous match

Editing (1)

- **i**: "insert", goes into Insert mode *before* character under cursor
 - **I**: goes into Insert mode at the beginning of the line
- **a**: "append", goes into Insert mode *after* character under cursor
 - **A**: goes into Insert mode at the end of th line
- **x**: deletes character under cursor, putting character into "register"
 - **X**: deletes character *before* character under cursor, putting character into "register"
- **r**: "replace", replaces character under cursor with next entered character
- **R**: enter a "replacement" mode

Editing (2)

- **d<w, e>**: "delete word", deletes word; **w** puts cursor on next word, **e** puts cursor at the end of the word
- **cw**: "change word", deletes word and enters Insert mode
- **dd**: "delete", deletes line under cursor (putting line in "register")
- **yy**: "yank", copies line to "register"
- **p**: "paste", copies "register" contents *after* character under cursor
- **P**: "paste", copies "register" contents *before* character under cursor
- **u**: "undo" (in **vi**, there's only a history of 1 so undo-ing again reverts the undo)
- **^r**: "redo" (Vim)
- **v**: enter Visual mode (Vim)

Visual mode (Vim)

- While in Visual mode you can select text, offering some more options
- **x**, **d**: deletes selection, putting it into the "register"
- **y**: yanks selection, putting it into the "register"

Command-Line/**ex** mode

- **:e**: "edit", open file for editing
- **:w**: "write", save
- **:w <file name>**: "write", save to particular file
- **:q**: quit
- **:q!**: quit without saving
- **:wq**: save and quit
- **:x**: quit, write if modified
- **:s/<pattern>/<replace>/**: search for pattern and replace (**sed** style!)
 - **:snomagic/<pattern>/<replace>/**: non-magical pattern substitution

...and there's many many more

emacs (1976, 1984)

What's a mode?

- Powerful and fancy modeless editor
- Highly extensible
- Has an image manipulation library as a dependency (wut)
 - Can display embedded images
- Exit with **C-x C-c** where **C-** is Control
- Heavy use of modifier keys such as Control and "Meta" (Alt)

nano (2000)

- Fairly straightforward, acts like a "typical" basic text editor
- On screen legend shows you common editing shortcuts
- **^G** for more shortcuts
- Exit with **^X**

But wait, what about GUIs?

Once we get here, there's a lot more functionality

gedit (1999) and Kate (2001)

gedit: GNOME's basic editor

Kate: KDE's basic editor

- "Basic" text editors associated with desktop environments
 - Still pretty well featured text editors
- Analogous to Microsoft Notepad but way better

Sublime Text (2008)

This was the hotness when I was an undergrad

- \$\$\$
- Huge plugin ecosystem

Visual Studio Code (2015)

The new hotness

You're probably already using this

- Almost steps into IDE territory while remaining lightweight

Parting thoughts

- Try out another editor and see if you like it
- You may find something that you really like
- Try to learn more about the features of your preferred editor

Questions?