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### Administrivia

- Reminder: Homework 3 due today, Homework 4 Wednesday.

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### Why Text Editors?

- In traditional UNIXworld, everything is a text file (source code, configuration files, e-mail, input to text formatting programs, etc., etc.), so mastering a cryptic but powerful "text editor" can pay off.
- Does this approach still make sense? Maybe, though you have to choose your other tools carefully to get maximum payoff. But a determined person can use the same text editor to write programs, compose e-mail messages, "word process", etc.)

### Which Text Editor?

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- Traditionally a “religious war” topic, with `vi` and `emacs` having the most supporters. Both very powerful and very widely available. There are others, but they’re not as widely available, and often are more novice-friendly than expert-friendly.
- `vi` (or one of its clones) slightly more universally available. Plain `vi` is lightweight but a little primitive. `vi` under Linux is really `vim`, and has lots of extra features. Useful to know which are not “real” `vi` in case you ever have to use real `vi`. `:set cp` makes `vim` behave almost like “real” `vi`.
- `emacs` is almost as available and highly customizable — can do almost anything (compile and test programs, send e-mail, etc.) from within it. (If I had it to do over again, I might well choose `emacs`!)

### `vi` Basics

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- `vi` is “modal” — input mode and command mode. (A subset of command mode is “`ex` mode”, where you enter commands understood by the line editor `ex`. These are the ones that start with `:.` )
- You know how to start `vi`. To quit (saving changes), `:wq`. To quit (not saving changes), `:q!`. To save changes but not quit, `:w`.

## vi Basics, Continued

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- To move around, arrow keys usually work (and in `vim` you can use them in insert mode). Old way — which always works, but requires command mode — `h`, `j`, `k`, `l`. Does anyone still use those keys? Fanatical touch typists, maybe!
- Scrolling up and down — `ctrl-F` and `ctrl-B`. Moving to start or end of line — `^` and `$`.
- Many other “cursor-movement” commands, e.g., `w` (next word) which can be usefully combined with commands to do something (next slide).
- To find `foo`, `/foo<CR>`. (`<CR>` means “enter” here.) Repeat with `/<CR>` (forward) or `?<CR>` (backward), or `n` to repeat search in same direction.

## vi Not-So-Basics

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- A lot of `vi` functionality is built around the idea of combining commands to do something (e.g., `d` to delete, `y` to “yank” (copy to buffer)) with commands that move the cursor (e.g., `w` to move forward a word, `$` to move to end of line).
- So, `dw` deletes a word, `y$` copies text from cursor to end of line, etc. For many of the commands, the letter twice applies it to a whole line (e.g., `dd`).
- Other useful ways to move the cursor: `fc` to move to next `c`, `tc` to move to just before next `c`. Several more; in `vim`, `:help cursor-motions` to learn more.

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### vi Basics, Continued

- Inserting text — `a` (after cursor) or `i` (after cursor), `<ESC>` to exit insert mode.
- Deleting text — `x` to delete a character, `dw` to delete a “word”, `dd` to delete a line.
- To undo most recent change, `u`. (vim supports multiple undo. Real vi does not!)
- To read in file `foo`, `:r foo`.

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### vi Not-So-Basics

- `.` to repeat previous command. Precede any command with `n` to repeat it  $n$  times (e.g., `10dd` to delete 10 lines).
- Deleted text (with `x`, `dw`, `dd`) goes into a “cut/copy” buffer. `p` pastes it back after the cursor, `P` before. To copy rather than delete, “yank” — `yw`, `yy`. There are also 26 more buffers, referred to by lowercase letters. E.g., `"ayy` to copy current line into buffer `a`. `"ap` to paste it back. (Yes, those are unmatched double quotes.)
- `cw` to change a word, `r` to replace a single character, `R` to go into overwrite/replace mode.

### vi Not-So-Basics, Continued

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- To work with blocks of text, can use `ex` commands that reference lines:
  - `: range-of-lines d` to delete lines. (They go into the “cut/copy” buffer and can be retrieved with `p` or `P`.) Replace `d` with `y` to yank rather than delete.
  - `: range-of-lines mtarget-line` to move lines. Replace `m` with `copy` to copy.
- `range-of-lines` can be one line, two lines with comma between, or `%` for all lines. Can reference lines with:
  - Absolute line numbers (`: set nu` to see line numbers). `$` is last line.
  - Relative line numbers — `.` is the current line, `. 1+` is the next line, etc.
  - “Marks” (lowercase letters). Mark current line with, e.g., `a`. Reference as `'a`. E.g., `: 'a , 'bm`.. No visual confirmation of marks.

### vi Not-So-Basics, Continued

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- To search and replace, can use search (`/`), replace (`cw`), and repeat (`.`).
- Or use
  - `: range-of-lines s / old / new / g`
  - `range-of-lines` is as before (`%` for all lines).
  - `old` is a “regular expression” (can include wild-card-type expressions). Can be very powerful, though syntax is cryptic! In vim, `:help regexp` to read more.
  - Omit `g` to change only the first occurrence on each line. Add `c` to be prompted before each change.
  - Can use any character (not just `/`) to delimit `old` and `new`.

### vi Not-So-Basics, Continued

- Another plus of `vi` (to its fans) is interoperability with other old-style UNIX tools.
- `: range-of-lines !pgm` to “filter” *range-of-lines* using program *pgm*. E.g., `:%!sort` to sort the whole file.
- `:r !pgm` to insert output of *pgm* after current line. E.g., `.r !ls` to get a list of files in the current directory.

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### vi Not-So-Basics, Continued

- Can edit multiple files by giving list of file names (e.g., `vi file1 file2`). `:n` cycles through files; `:rew` (“rewind”) to go back to first. This allows making similar changes in several files, or cutting and pasting text from one file to another.

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### Customizing `vi`

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- Customizations go in `.exrc` (or, for `vim`, `.vimrc` and/or `.gvimrc`) in home directory. Several ways to use different options for different needs; one involves starting `vim` with different configuration file (`vim -u someotherfilename`).
- Customizations can include settings of `vi` options, key mappings, abbreviations, macros, etc., etc.

### How is `vim` “Vi iMproved”?

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- If you try plain `vi` (or `vim` in “compatibility mode”) — well, `vim` has a lot more features. Partial list on next slide.
- `vimtutor` (from command line, not from within `vim`) starts a tutorial.
- Online help with `:help`. `:q` to exit help. Not optimally organized, but not bad for free software.
- If you must have something with little pictures across the top — `gvim`. (Actually might be useful while learning.)

### How is vim “Vi iMproved”?, Continued

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- “Visual mode” (to select text to delete/yank/etc.). `v` to start, move cursor to continue selecting. When the text you want is selected, `d` to delete, `y` to yank, `:` to start a `:` command (e.g., `:s` to search and replace).  
`:help visual-mode` for more info.
- Syntax highlighting. Can be based on filename’s extension, different for different types of files. `:help syntax` for more info.
- Automatic indenting of code. `:help C-indenting` for more info.
- Multiple “windows”. `:help split` for more info.
- Record sequences of commands and play back. `:help record` for more info.

### emacs

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- Add-ons available to do — “everything”? Maybe! (Try `<ESC>-x doctor`.  
`ctrl-x ctrl-c` to quit.)  
Add-ons/customization are done with Lisp code (similar to Scheme).
- Online help available — `ctrl-H`. `ctrl-H T` starts a tutorial.
- If you must have something with little pictures across the top — actually these days `emacs` started in a graphical environment has that. If you want the old-style text-only interface, use the command-line switch `-nw`. (There is also `xemacs`, but it’s a different code base.)



### More Unsolicited Advice

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- Both `vim` and `emacs` are powerful editors and worth the trouble to learn unless you plan to do all or most of your editing with programs that have their own editor. My advice is to try both and see if one of them appeals to you.
- As with other UNIX things, a good way to learn them is incrementally — learn a few things, practice them, then learn a few more. The online help/tutorials are good sources of new things to try. So is your local expert. A good approach is to think of something you do often and find tedious, and try to find a way to make it easier / faster.

### Minute Essay

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- What text editor do you currently use under Linux? What do you like/dislike about it?