CS2043 - Unix Tools & Scripting
Lecture 8
Vim and Tmux

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[1] based on slides by Hussam Abu-Libdeh, Bruno Abrahao and David Slater over the years

Announcements

- Remaining CSUGLab accounts activated
- A2 is due Saturday 02/07
- A3 coming out within the next 24hrs

Today

- Text editor: `vim`
- Multiplexing terminals: `screen / tmux`

Vim = Awesome!

- Vim is a powerful lightweight text editor.
- The name “Vim” is an acronym for “Vi IMproved”
  - `vi` is an older text editor
- Ports of Vim are available for all systems
  - including Microsoft Windows

Vim allows you to perform text editing tasks much faster than most other text editors!

- Though it does have a learning curve

A modal text editor

- One of the reasons that `Vim` allows you to performs tasks quickly is because it works in modes.
- Without modes, users would have to either use command menus (with a mouse or keyboard), or use complex/long command shortcut keys involving the control key (`ctrl`) or the alt key (`alt`).
- `Vim` uses modes to speed up editing by not relying on command keys or menus.

You can do all of your editing by just using the keyboard which is super fast!!

The 3 main modes of Vim

- **Normal mode:**
  - Launching pad to issue commands or go into other modes
  - Allows you to view the text but not edit it
  - Vim starts in normal mode
  - You can jump to normal mode by pressing the `Escape` (`Esc`) key on your keyboard
- **Visual mode:**
  - Used to highlight text and perform operations on selected text
  - You get to visual mode from normal mode by pressing the `v` key on your keyboard
- **Insert mode:**
  - Used to type text into the buffer (file)
  - This probably what you're used to from your text editor
  - You get to the insert mode by pressing the `i` key on your keyboard

Command line commands

- You can issue “command-line commands” from inside Vim to perform some functionalities
  - write to disk, quite, get help, split screen, ...etc
- To issue a command, go to normal mode and the type : followed by your command

Launching Vim help

```
:help
```

Moving around

Fast

You can use your mouse to move around in Vim (assuming a graphical interface as in `gVim`

Faster

However it is much faster to just use your keyboard, and for that you can just use the arrow keys to move up/down/left/right.

Fastest

You can even be more efficient by not leaving the main area of the keyboard and using "h" to go left, "j" to go down, "k" to go up, and "l" to go right.

To start off, I recommend you just use the arrow keys.

Getting started

To get started, launch Vim and go through the built in help.

```
:help
```

You can search for help on a specific topic as well.

```
:help [topic to search for]
```

Helpful commands

I can't possibly teach you about all the power of Vim in a few minutes, however here are a few commands to help you get started.

Getting help

```
:help
```

Entering normal mode

```
<Esc>
```

Entering insert mode (from normal)

```
<i>
```

Entering visual mode (From normal)

```
<v>
```

Helpful commands

Save text to filename.txt

```
:w filename.txt
```

Exit

```
:q
```

Quit without saving

```
:q!
```

Open another file

```
:e [filename]
```

Helpful commands

Turn on syntax highlighting

```
:syntax on
```

Turn on line numbering

```
:set number
```

Turn on spell check

```
:set spell
```

Helpful commands

Split screen horizontally

```
:sp
```

Split screen vertically

```
:vsp
```

Move between split regions

```
<ctrl-w w>
```

The most helpful command

The Most Helpful Command By Far

```
:help
```

GUI + Vim

Vim can run right in your shell, but there are also implementations of it that run in a nice GUI window (with menus, toolbars, and mouse)

- Use `gVim` for that
- `MacVim` for Mac OS X

Useful links

Vim project website

http://www.vim.org/

Vim tips and tricks

http://www.cs.swarthmore.edu/help/vim/home.html

Vim recipes

http://vim.runpaint.org/toc/

Bash isn't Perfect

There are a few problems with your basic BASH session. Some of these you may even have encountered already:

- Your session isn't preserved if you close your `ssh` connection
- It's a pain to switch back and forth between files/the prompt.
- Sometimes using two or three shells at once would be really convenient!

All of these complaints can be resolved by using `screen`.

Intro To Screen

The `screen` command

`screen` - a screen manager with terminal emulation

Generally `screen` can be used just as you would normally use a terminal window. However, special commands can be used to allow you to save your session, create extra shells, or split the window into multiple independent panes.

Passing Commands to screen

Each `screen` commands consists of a CTRL-a (hereafter referred to as C-a) followed by another character.

Using Screen

Attach a screen

```
screen [options]
```

- Opens a new screen for use
- -a : include all capabilities

Resume a screen

```
screen -r [pid.tty.host]
```

- Resumes a detached screen session

```
screen -x [pid.tty.host]
```

- Attach to a non-detached screen session

If you only have one screen, the [pid.tty.host] string is unnecessary.

Identifying Screen Sessions

Screen Listing

`screen -ls` or `screen -list`

- Lists your screen sessions and their statuses

These screen sessions are the [pid.tty.host] strings required for resuming

Resuming a screen

If `screen -ls` returns `15829.pts-9.rumman (Detached)`

- `screen -r 15829.pts-9.rumman` to resume the screen

Note: You only need to specify the full "name" of the session if you have multiple sessions open. If you just have one session, just use `screen -r`

Creating More Shells

Creates a New Shell Window

`C-a c`

- Creates a new shell in a new window and switches to it
- Useful for opening multiple shells in a single terminal
- Similar to tabbed browsing/tabbed IMs

But how do we switch between windows? (hint: every window is numbered by order of creation)

Window Selection

`C-a 1` - switches to window 1 `C-a 9` - switches to window 9

Splitting Screen

Split Screen Computing

`C-a S` - splits your terminal area into multiple panes

`C-a tab` - changes the input focus to the next pane

- The 'S' is case-sensitive
- Each split results in a blank pane
- Use `C-a c` to create a new shell in a pane
- Use `C-a <num>` to move an existing window to a pane

Note:

When you reattach a split `screen`, the split view ill be gone. Just re-split the view, then switch between panes and reopen the other windows in each with `C-a <num>`

Now lets put this together to do something useful

Suppose you are doing some serious scientific computing and want to run it on a remote server. We can put together what we have learned to do this efficiently:

- `ssh` into the remote machine

```
ssh slater@boom.cam.cornell.edu
```

- start `screen`

```
screen
```

- start mathematica

```
math < BatchJob.m
```

- renice the math kernel so other uses can use the machine

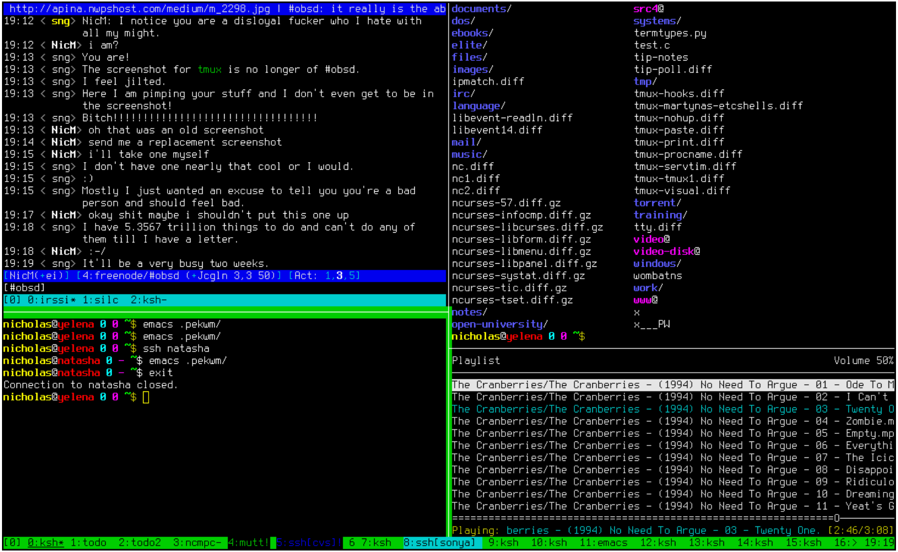
```
renice -20 PID
```

- Detach the screen, logout, and come back 8 hours later when it is done

Terminal Multiplexer `tmux`

- Concurrently view/manage multiple programs in one terminal
- Read documentation (key-binding / configuration)
- Edit `.tmux.conf`

tmux - what it looks like



```
 http://apina.nwpshost.com/medium/m_2298.jpg | #obsd: it really is the ab
19:12 < sng> NicM: I notice you are a disloyal fucker who I hate with
             all my might.
19:12 < NicM> i am?
19:13 < sng> You are!
19:13 < sng> The screenshot for tmux is no longer of #obsd.
19:13 < sng> I feel jilted.
19:13 < sng> Here I am pimping your stuff and I don't even get to be in
             the screenshot!
19:13 < sng> Bitch!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
19:13 < NicM> oh that was an old screenshot
19:14 < NicM> send me a replacement screenshot
19:15 < NicM> i'll take one myself
19:15 < sng> I don't have one nearly that cool or I would.
19:15 < sng> :)
19:15 < sng> Mostly I just wanted an excuse to tell you you're a bad
             person and should feel bad.
19:17 < NicM> okay shit maybe i shouldn't put this one up
19:18 < sng> I have 5.3567 trillion things to do and can't do any of
             them till I have a letter.
19:18 < NicM> :-/
19:19 < sng> It'll be a very busy two weeks.
[NicM(+ei)] [4:freenode/#obsd (+Jcgln 3,3 50)] [Act: 1,3,5]
[#obsd]
[0] 0:irssi* 1:silc  2:ksh-
```

```
nicholas@yelena 0 0 ~$ emacs .pekwm/
nicholas@yelena 0 0 ~$ emacs .pekwm/
nicholas@yelena 0 0 ~$ ssh natasha
nicholas@natasha 0 - ~$ emacs .pekwm/
nicholas@natasha 0 - ~$ exit
Connection to natasha closed.
nicholas@yelena 0 0 ~$ 
```

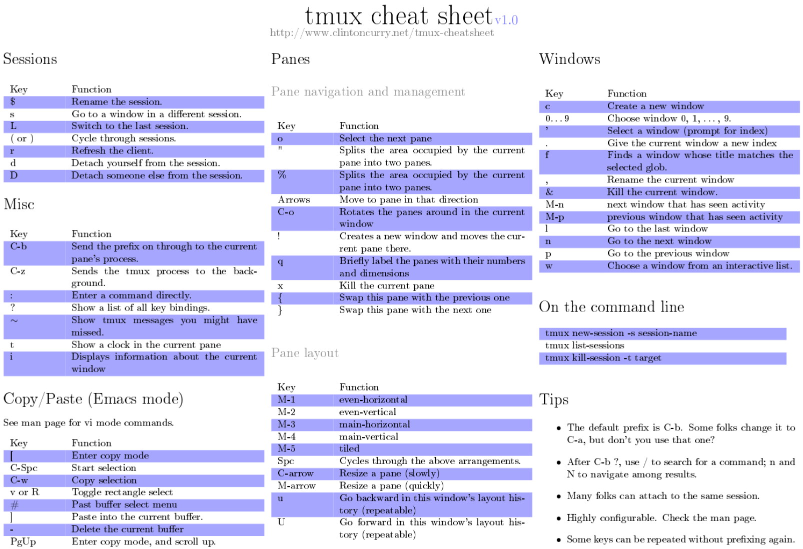
```
documents/                    src4@
dos/                          systems/
ebooks/                       termtypes.py
elite/                        test.c
files/                        tip-notes
images/                       tip-poll.diff
ipmatch.diff                  tmp/
irc/                          tmux-hooks.diff
language/                     tmux-martynas-etcshells.diff
libevent-readln.diff          tmux-nohup.diff
libevent14.diff               tmux-paste.diff
mail/                         tmux-print.diff
music/                        tmux-procname.diff
nc.diff                       tmux-servtim.diff
nc1.diff                      tmux-tmux1.diff
nc2.diff                      tmux-visual.diff
ncurses-57.diff.gz            torrent/
ncurses-infocmp.diff.gz       training/
ncurses-libcurses.diff.gz     tty.diff
ncurses-libform.diff.gz       video@
ncurses-libmenu.diff.gz       video-disk@
ncurses-libpanel.diff.gz      windows/
ncurses-systat.diff.gz        wombatns
ncurses-tic.diff.gz           work/
ncurses-tset.diff.gz          www@
notes/                        x
open-university/              x___PW
nicholas@yelena 0 0 ~$
```

```
Playlist                                                       Volume 50%

The Cranberries/The Cranberries - (1994) No Need To Argue - 01 - Ode To M
The Cranberries/The Cranberries - (1994) No Need To Argue - 02 - I Can't
The Cranberries/The Cranberries - (1994) No Need To Argue - 03 - Twenty O
The Cranberries/The Cranberries - (1994) No Need To Argue - 04 - Zombie.m
The Cranberries/The Cranberries - (1994) No Need To Argue - 05 - Empty.mp
The Cranberries/The Cranberries - (1994) No Need To Argue - 06 - Everythi
The Cranberries/The Cranberries - (1994) No Need To Argue - 07 - The Icic
The Cranberries/The Cranberries - (1994) No Need To Argue - 08 - Disappoi
The Cranberries/The Cranberries - (1994) No Need To Argue - 09 - Ridiculo
The Cranberries/The Cranberries - (1994) No Need To Argue - 10 - Dreaming
The Cranberries/The Cranberries - (1994) No Need To Argue - 11 - Yeat's G
==============================================================0----------
Playing: berries - (1994) No Need To Argue - 03 - Twenty One. [2:46/3:08]
```

```
[0] 0:ksh* 1:todo  2:todo2  3:ncmpc- 4:mutt! 5:ssh[cvs]! 6 7:ksh  8:ssh[sonya]  9:ksh  10:ksh  11:emacs  12:ksh  13:ksh  14:ksh  15:ksh  16:> 19:19
```

tmux - cheatsheet



tmux cheat sheet v1.0

http://www.clintoncurry.net/tmux-cheatsheet

Sessions

Key	Function
$	Rename the session.
s	Go to a window in a different session.
L	Switch to the last session.
(or)	Cycle through sessions.
r	Refresh the client.
d	Detach yourself from the session.
D	Detach someone else from the session.

Misc

Key	Function
C-b	Send the prefix on through to the current pane's process.
C-z	Sends the tmux process to the background.
:	Enter a command directly.
?	Show a list of all key bindings.
~	Show tmux messages you might have missed.
t	Show a clock in the current pane
i	Displays information about the current window

Copy/Paste (Emacs mode)

See man page for vi mode commands.

Key	Function
[	Enter copy mode
C-Spc	Start selection
C-w	Copy selection
v or R	Toggle rectangle select
#	Past buffer select menu
]	Paste into the current buffer.
-	Delete the current buffer
PgUp	Enter copy mode, and scroll up.

Panes

Pane navigation and management

Key	Function
o	Select the next pane
"	Splits the area occupied by the current pane into two panes.
%	Splits the area occupied by the current pane into two panes.
Arrows	Move to pane in that direction
C-o	Rotates the panes around in the current window
!	Creates a new window and moves the current pane there.
q	Briefly label the panes with their numbers and dimensions
x	Kill the current pane
{	Swap this pane with the previous one
}	Swap this pane with the next one

Pane layout

Key	Function
M-1	even-horizontal
M-2	even-vertical
M-3	main-horizontal
M-4	main-vertical
M-5	tiled
Spc	Cycles through the above arrangements.
C-arrow	Resize a pane (slowly)
M-arrow	Resize a pane (quickly)
u	Go backward in this window's layout history (repeatable)
U	Go forward in this window's layout history (repeatable)

Windows

Key	Function
c	Create a new window
0...9	Choose window 0, 1, ..., 9.
'	Select a window (prompt for index)
.	Give the current window a new index
f	Finds a window whose title matches the selected glob.
,	Rename the current window
&	Kill the current window.
M-n	next window that has seen activity
M-p	previous window that has seen activity
l	Go to the last window
n	Go to the next window
p	Go to the previous window
w	Choose a window from an interactive list.

On the command line

```
tmux new-session -s session-name
tmux list-sessions
tmux kill-session -t target
```

Tips

- The default prefix is C-b. Some folks change it to C-a, but don't you use that one?
- After C-b ?, use / to search for a command; n and N to navigate among results.
- Many folks can attach to the same session.
- Highly configurable. Check the man page.
- Some keys can be repeated without prefixing again.

tmux - check the website

http://tmux.sourceforge.net/

Next Time