

Basics of Linux

EE 107S: Introduction to Linux

Lecture 1

Before we get started...

- [Ubuntu 16.04 \(32-bit\)](#)
- [VirtualBox \(latest\)](#)
- [Video Tutorial](#)

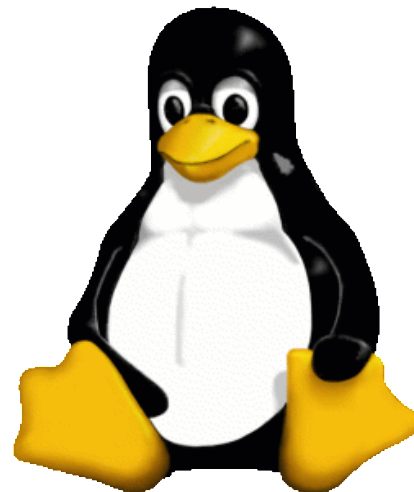
About me

- Received BSEE and BSCS in 2015 from UT
- Received MSEE in 2017 from UT
- Current full time employee at nvidia
- Made/taught Intro to Linux last semester

About the class

- Bring your laptops to lecture and lab!
- One homework assignment each week
 - To pass, you must have an average of 50% and complete at least 5/7 assignments
- Expected to be low-stress and self-driven

What is Linux?



Why Linux?

- Very likely to encounter Linux at an internship or job
- Makes software development easier
- Almost 100% customizable (both a blessing and a curse)
- Well supported by a massive community
- Updates that are easy to install and completely under your control
- More secure than Windows
- More stable than Windows
- Free (usually open source) alternatives to almost everything
- Works on pretty much any hardware
- ...

How do we get Linux?

- A computer can only run one operating system (OS) at a time
- We can create a “virtual” machine to run Linux “virtually”
 - A common way of running multiple OSes at the same time

Alternative ways of using Linux

- Install Linux as a primary OS
- Log into remote machine that runs Linux

Basics of a terminal

- Text-only interface
- Enter "commands" (really, programs) into the terminal to perform actions
 - Commands accept flags and parameters
- Concept of a current working directory (CWD)

```

13:23      essen | entity: 0-10, start of second column
13:23      essen | not percentage but number of each in a very large project
13:23      entity | ahh there it is
13:23      entity | thank you :)
13:24      essen | 122 gen_server 36 gen_event 10 gen_fsm
13:24      essen | np, read that part like 2 days ago
13:26      entity | hm, any clue if I can just say that gen_server is the most widespread behaviour and cite that history paper?
13:26      entity | I mean, it is a bit hard to find in the text
13:26      emauton | I think that would be reasonable, if this is a write-up for a project or whatever.
13:26      entity | alright
13:26      entity | it's my thesis
13:27      emauton | You could consider counting in a few large modern projects (e.g. riak & deps?) to verify.
13:27      entity | that'd be too much work tho :P
13:28      emauton | Pff, grep for -behaviour lines. Students these days!
13:28      emauton | ;o)
13:28      entity | deadline is in 3 weeks and I'm about 1/3 through
13:28      emauton | Just kidding, forge ahead and good luck with the writeup.
13:28      entity | emauton: I guess I might give it a try... if I find some spare time
13:28      entity | emauton: thanks
[16:52] [mhi^(+Zi)] [8:fn/#erlang(+cgnt)] -- more --
#erlang:
cyllene irc                                0:irssi*                                16:52

12 | case VTERM_PROP_ALTSCREEN:                | 2015-04-22 10:05 Thomas Adam           M- [master] {origin/master} {origin/HEAD} Merge
11 |     break;                                | 2015-04-21 22:42 n1cm                  | o Look up indexes as number before name, makes
10 |                                           | 2015-04-21 22:38 n1cm                  | o Always format real layout even when zoomed.
9 | case VTERM_PROP_CURSORVISIBLE:            | 2015-04-21 22:32 n1cm                  | o Do not die on USR1 if any of the socket paren
8 |     term->cursor.visible = val->boolean;    | 2015-04-21 22:21 n1cm                  | o Simplify error messages when socket connect f
7 |     invalidate_terminal(term, term->cursor.row, term->cursor.row + 1); | 2015-04-21 21:31 n1cm                  | o The free callback could end up being fired be
6 |     break;                                | 2015-04-21 21:24 n1cm                  | o Fix moving windows to nonexistent indexes whe
5 |                                           | 2015-04-21 15:34 n1cm                  | o Bind mouse dragging so that it is passed thro
4 | case VTERM_PROP_TITLE: {                  | 2015-04-21 15:21 n1cm                  | o Don't eat the mouse event that triggers a dra
3 |     Error err;                             | 2015-04-21 15:18 n1cm                  | o Put mouse_any_flag back, don't know where it
2 |     dict_set_value(term->buf->b_vars,      | 2015-04-21 15:18 n1cm                  | o Pass mouse events through to commands for if-
1 |         cstr_as_string("term_title"),    | 2015-04-21 15:16 n1cm                  | o cmd_mouse_pane can return NULL, check for tha
! 0 |     STRING_OBJ(cstr_as_string(val->string)), &fail); | 2015-04-20 15:41 n1cm                  | o Remove unused-but-set variables, from Thomas
1 |     break;                                | 2015-04-20 15:34 n1cm                  | o Support for multiple key tables to commands t
2 | }                                           | 2015-04-20 14:48 n1cm                  | o Style nit - unnecessary brackets.
3 |                                           | 2015-04-20 15:44 Thomas Adam           M- Merge branch 'obsd-master'
4 | case VTERM_PROP_MOUSE:                    | 2015-04-20 09:39 n1cm                  | o Make jump-to-backward/jump-to-forward repea
5 |     term->forward_mouse = (bool)val->number; | 2015-04-20 07:50 n1cm                  | o Use a more sensible buffer size for flags str
6 |     break;                                | 2015-04-19 22:10 jmc                  | o tweak previous;
7 |                                           | 2015-04-19 21:46 n1cm                  | o Honour renumber-windows when unlinking a wind
8 | default:                                  | 2015-04-19 21:34 n1cm                  | o Rewrite of tmux mouse support which was a mes
|/data/repo/neovim/src/nvim/terminal.c:master | [main] 6e7219d437ce565d518b336a5d5b112e0e0e0dc5a - commit 7 of 5043

```

What is going on??

Our first command: `ls`

- Many commands operate on files or directories
- Shows the contents of the current working directory
- Directories show up in a different color

Man's best friend: man

- "man pages" are the owner's manuals for every command
- When in doubt, type in ``man <command>`` for a description of what a command can do
- Take note of the ... next to [OPTION] and [FILE]

Where are we?: pwd

- Lists the full path of the CWD
- Directories are separated by /

Navigating directories: `cd`

- Changes the CWD
- Move to the parent directory using `..`
- Current directory is `.`
- Home directory is `~`

Creating a new directory: `mkdir`

- Only parameter is the name of the directory
- Names can be complex (i.e. contain `.`, `..`, etc.)

Deleting files/directories: `rm`

- Parameter is file or directory to delete
- If directory, must use `-r` flag
- NO RECYCLE BIN OR TRASH WHEN USING `rm`

Copying files/directories: `cp`

- Similar to `rm`, but takes source and destination parameters
- `-r` flag is necessary to copy directories

Moving files/directories: mv

- Similar to cp with source and destination
- -r flag NOT necessary to move directories

Exercise

- Make the following directories:
 - `~/lecture1/dir1/dirA`
 - `~/lecture1/dir1/dirB`
 - `~/lecture1/dir2/dirA`
 - `~/lecture1/dir2/dirB`

Possible Solution

```
cd ~  
mkdir lecture1  
cd lecture1  
mkdir dir1  
cd dir1  
mkdir dirA dirB  
cd ..  
cp -r dir1/* dir2
```

Possible Solution

```
cd ~
```

```
mkdir -p lecture1/dir1/dirA lecture1/dir1/dirB \  
lecture1/dir1 lecture1/dir2
```

Exercise

- Reorganize the previous directories as follows:
 - `~/lecture1/dir2/dir1/dirA`
 - `~/lecture1/dir2/dirA`
 - `~/lecture1/dir2/dirB`

Possible Solution

```
cd ~  
mv lecture1/dir1 lecture1/dir2  
rm -r lecture1/dir2/dir1/dirB
```

Useful shortcuts

- Up/down keys to bring back previous commands
- Ctrl+R to search previous commands
- <TAB> for autocompletion!

Assignment

- Come to lab section tomorrow or Thursday
 - Only session we will require attendance for