Linux 101

But I just installed Windows 10 though

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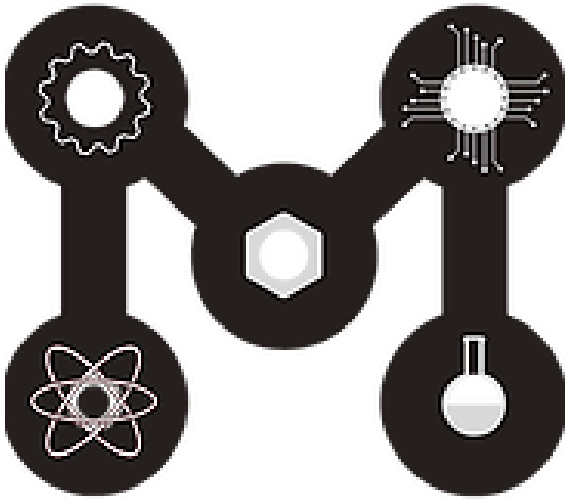
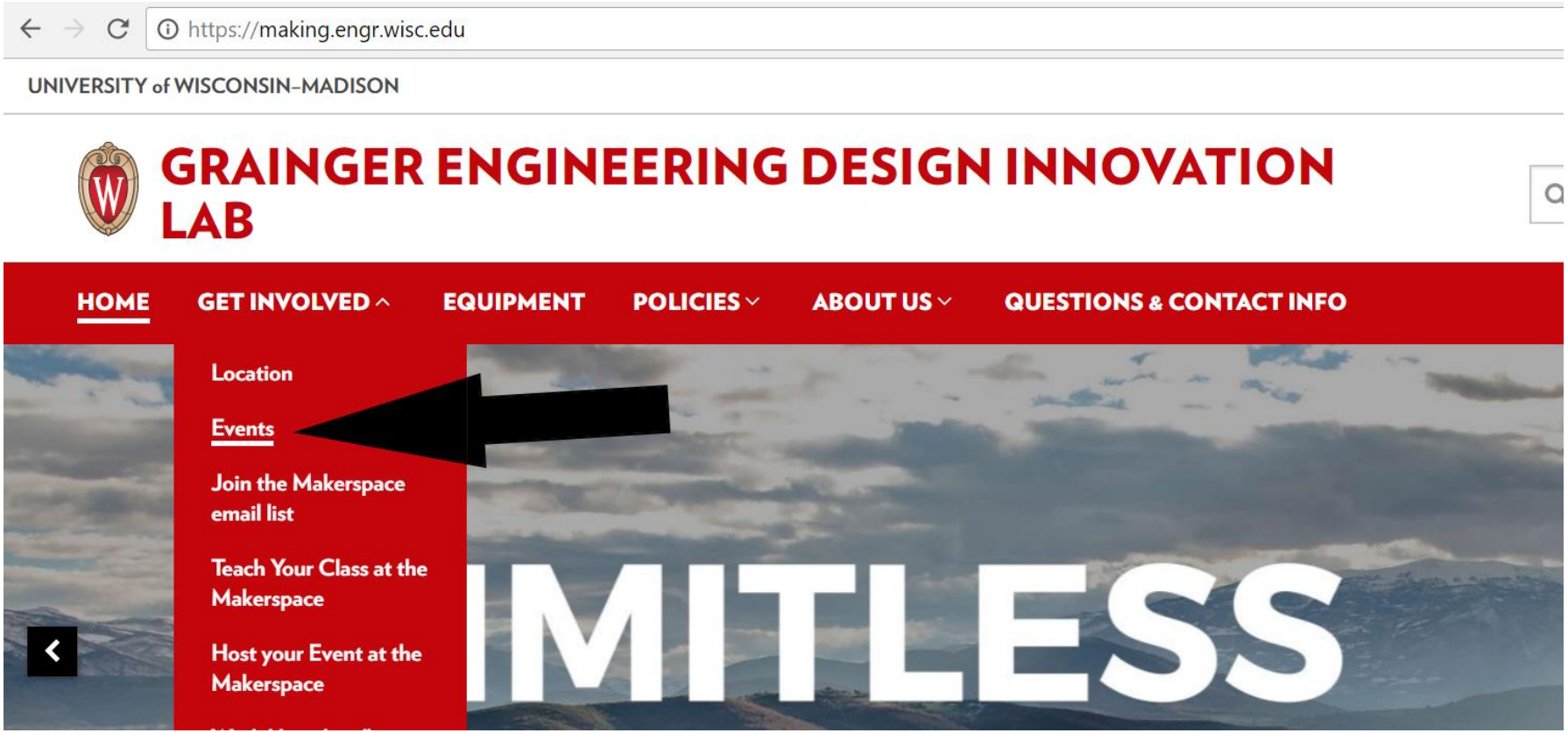


More Workshops This Year!

https://making.engr.wisc.edu



2 Minute History Lesson

- Unix
  - Created at Bell Labs in 1969
- Richard Stallman
  - Started the Open Source movement (1989)
    - GPL
  - Built programs, but no kernel
    - Kernel? Take CS 537
- Linus Torvalds
  - Smart dude from Finland, low key built a kernel (1991)
    - Also built git

Unix or Linux

- What is an operating system?
  - Lets hardware and software communicate
  - Handles memory and processes on CPU
- Linux is a "***Unix-like***" OS
  - Macs are ***Unix-like,*** not Linux
  - Android is Unix
    - has modified Linux Kernel
  - Windows is its own monster
- Linux is just the kernel

What makes it Unix

	Windows	Unix
Root location	C:\	/
Slash used	\ (backslash)	/ (frontslash)
Case sensitive	No	Yes
Open Source	No	Yes
Size	Large	Small

Caution to all Window users

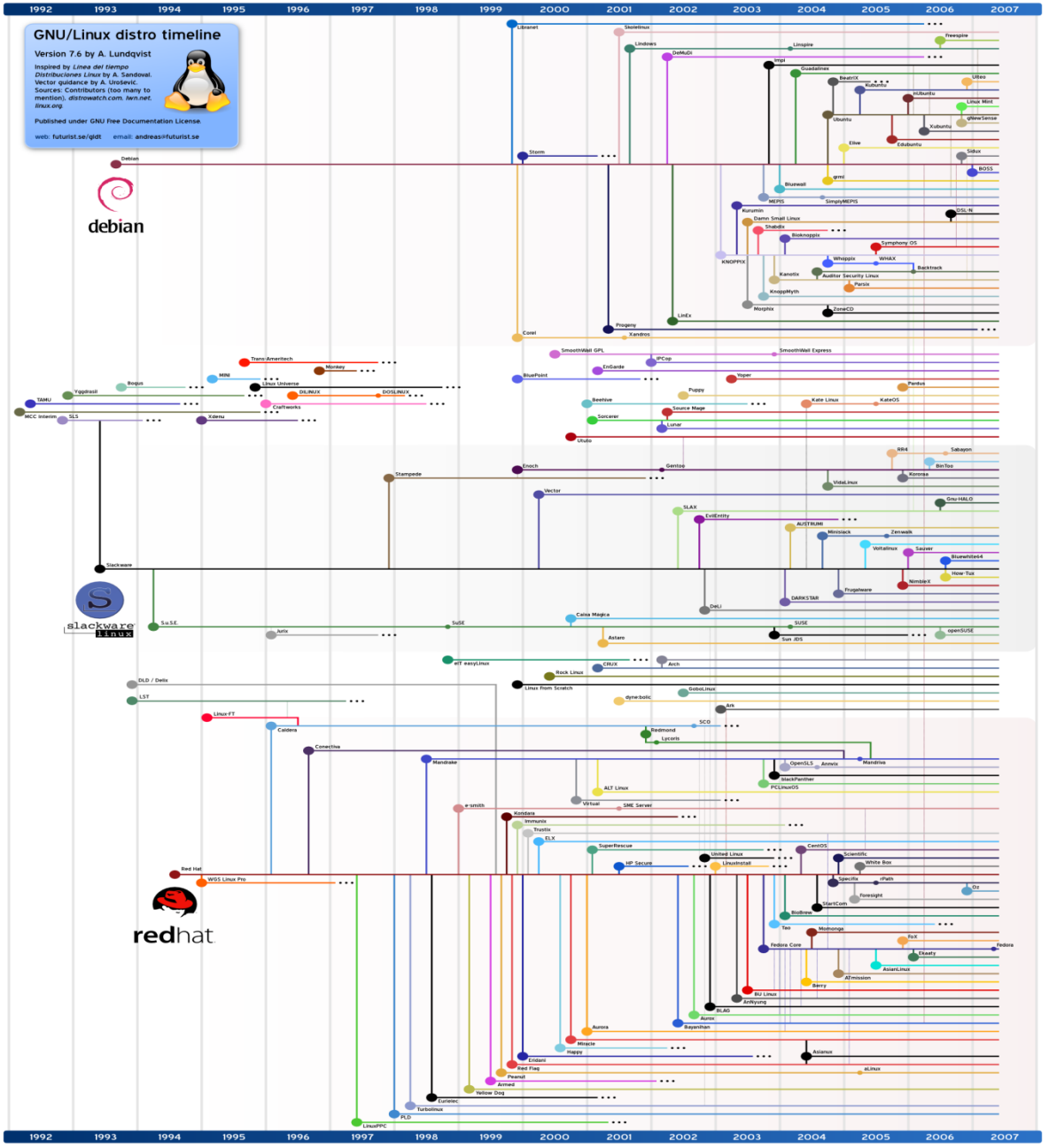
- / is not the same as \
  - / is a forward slash
  - \ is a back slash
  - EVERYONE uses a forward slash...except Windows
  - Also Windows is **NOT** case sensative
  - “Test” != “test” in the unix world
- **Don’t copy and paste commands in from Windows to Linux!!! #YouHaveBeenWarned**

Acronyms Frenzy Uno

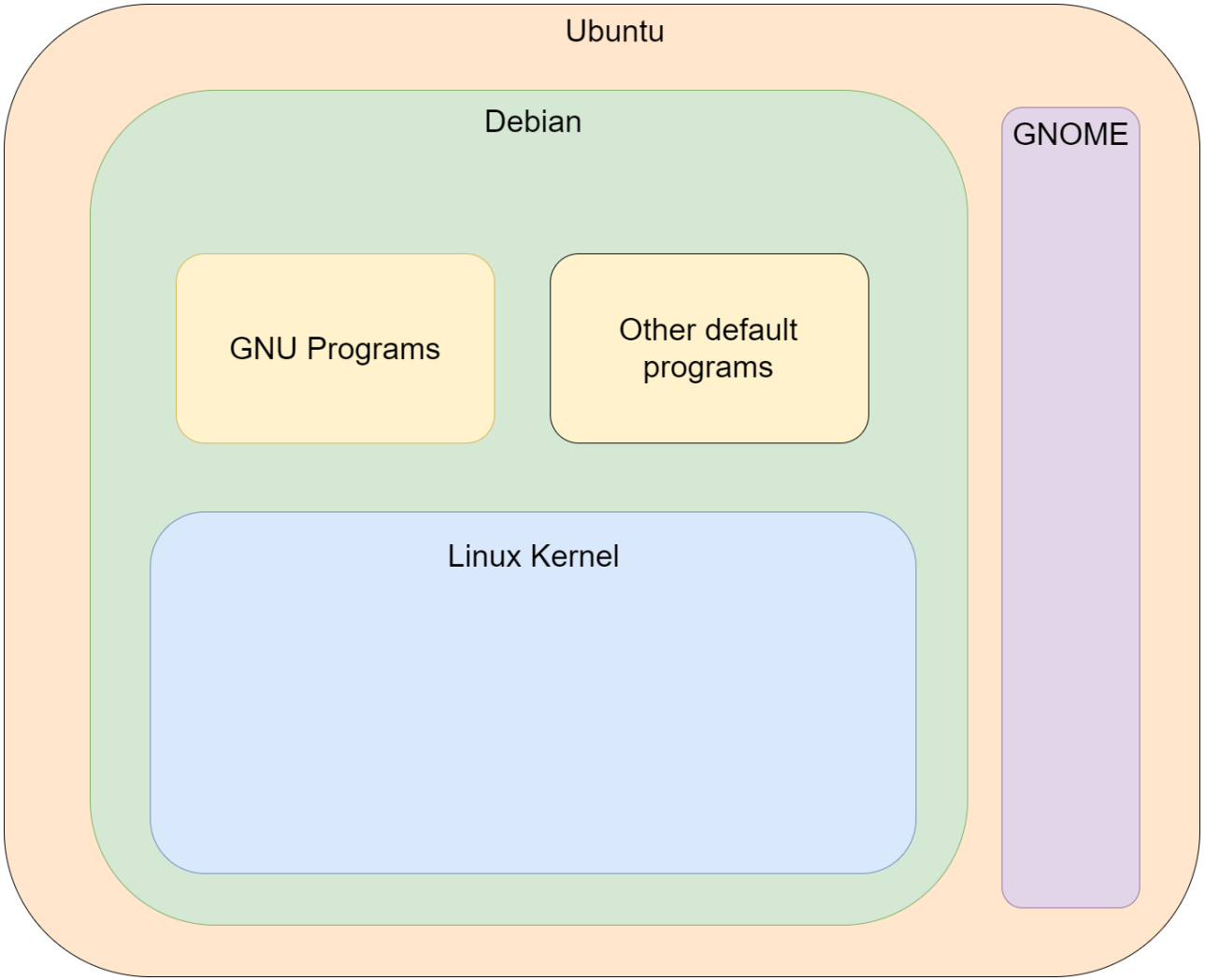
- GNU
  - GNU's Not Unix!
    - Recursive jokes, ECE majors try to be funny when possible
  - Most programs found on Linux
    - GCC, Emacs, Bash, Git, etc.
    - Like Unix programs, but written from sctatch under GPL
- POSIX
  - A set of IEEE standards
  - Mainly because of the number of Linux/Unix distros that popped up

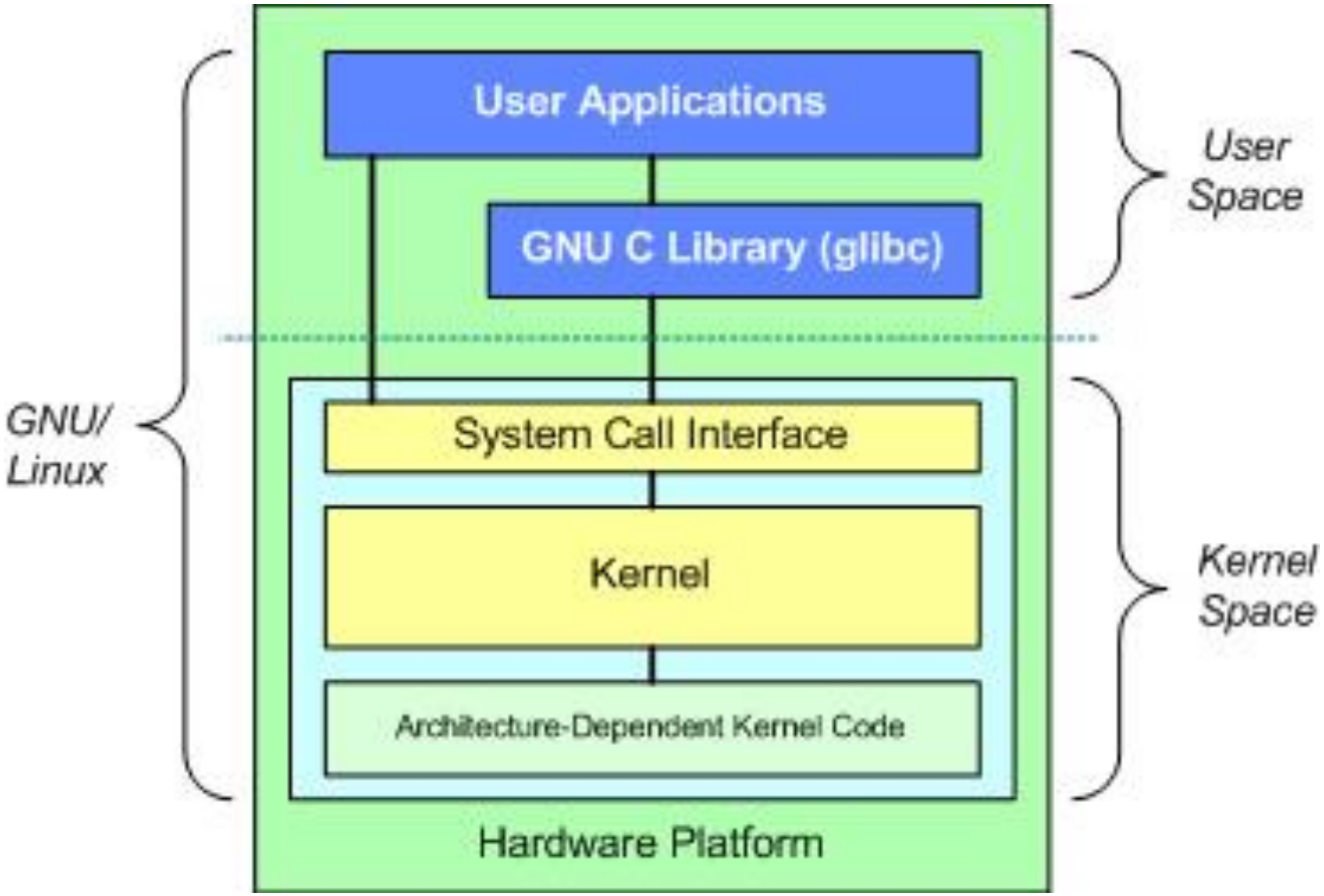
Distros

- Everyone wants something different
- Many options for many different needs
- No “best” distro



Ubuntu Example




User Applications
GNU C Library (glibc)
System Call Interface
Kernel
Architecture-Dependent Kernel Code
Hardware Platform
User Space
Kernel Space
GNU/ Linux

GUI and what it caused

- Computers didn't always have **G**raphical **U**ser **I**nterfaces
- Apple tried suing Microsoft over this stuff
- Most "Engineering" tools are command line based
- We are only talking command line from here on out

SSH and Putty

- SSH
  - Secure Shell Protocol
  - Way of gaining access to a terminal of another machine
  - Can't SSH ***INTO*** a Windows machine, but can SSH ***FROM*** a Windows machine
    - You will need a **SSH Client**
    - Putty, MobaXterm, etc
  - Macs are Unix based so can just run ssh in terminal

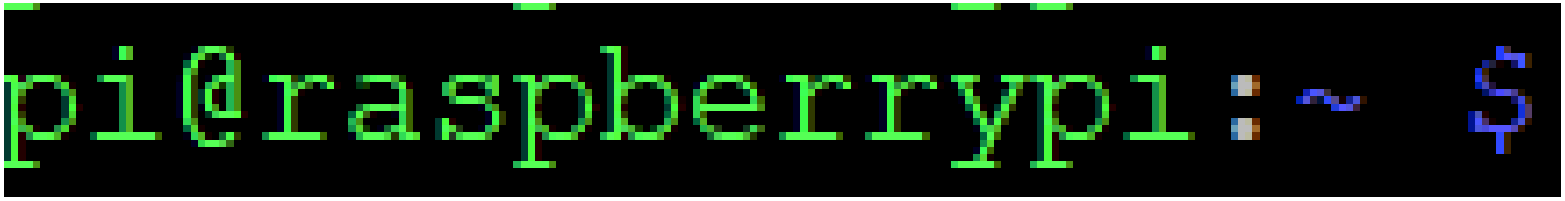
Before we start - keywords

- Commands are separated by spaces
  - Thats_why_people_use_underscores
  - The first word is the program name
- **Flags**
  - Ways of turning on optional settings to command programs
  - Will either be look like “-a” or “--off”
    - These are set by developer, not “official” system used
  - When in doubt “--help” will probably list options

```
$ git commit -m "my commit"
```

Keywords continued

- **User**
  - Everyone is a user with set of permissions
  - “root” is FULLY in charge
  - sudo
    - Lets you run root commands without being root



Text Editor

- Many editors
  - Vi vs Emacs

- Nano
  - The easier cop-out for today
  - Two things to know
  - ^ means CTRL key
  - M means ALT key
  - ^X means CTRL+X to quit

Piping

- Unix programs designed to be small programs that can be “piped” together
- Every program has an input and out
- Can send output from one program to the input of another

The File System

- Linux is much more hierarchal than Windows
  - Everything starts at the root
  - “Folder” == “Directory”
- / vs ./ vs ../
  - / is the root directory (the top part)
  - ./ is the current directory
  - ../ is the parent directory
    - Can compound these like ../../../../../
- ~
  - Your home directory
  - ~/ is the start of your home directory

Bash

- Is a terminal program
  - Created with GNU tools in 1989
- Can write “Bash Scripts”
  - Will do commands for you
  - .sh files usually
    - Stands for “shell script”

Linux and my Pi

– Whats the difference?

VS

GPIO PINS!!!

- Take ECE 353
- Way to send data
- Can interact with board
- “Raspbian” is a distro made for this

Time to get some practice!

tinyurl.com/LinuxWorkshopIEEE

[**Note: it’s case sensitive**]