

Linux 101

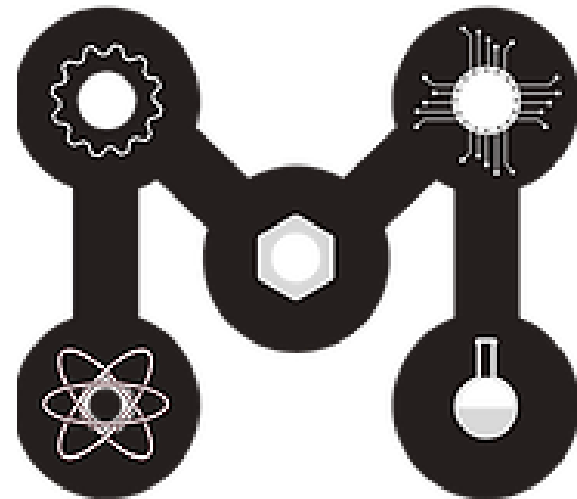
But I just installed Windows 10 though

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UNIVERSITY of WISCONSIN-MADISON

 **GRAINGER ENGINEERING DESIGN INNOVATION LAB**

HOME GET INVOLVED ^ EQUIPMENT POLICIES v ABOUT US v QUESTIONS & CONTACT INFO

Location

Events

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IMITLESS

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

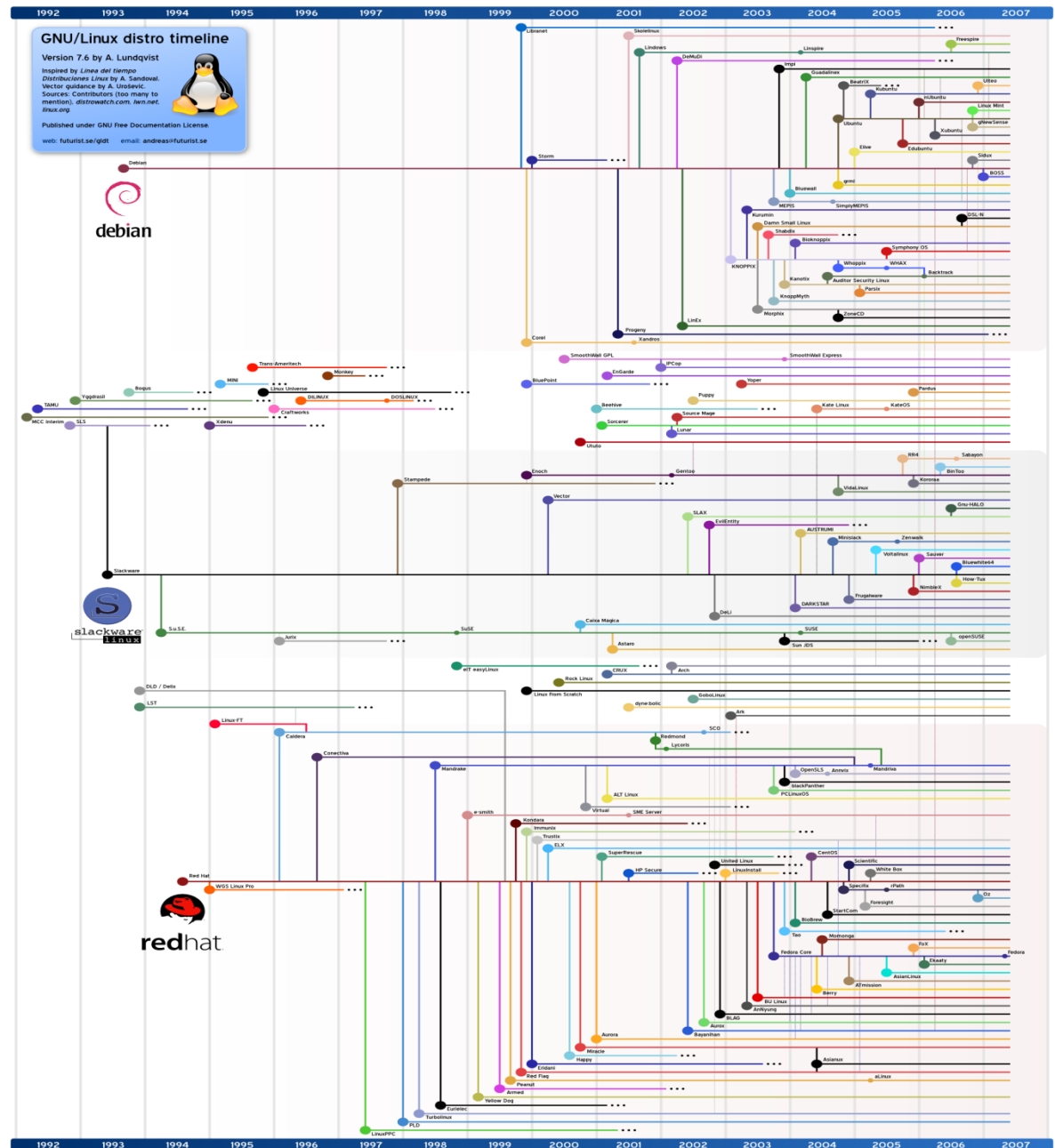
- **/** is not the same as ****
 - **/** is a forward slash
 - **** is a back slash
 - EVERYONE uses a forward slash...except Windows
 - Also Windows is **NOT** case sensitive
 - “Test” != “test” in the unix world
- **Don't copy and paste**
commands in from Windows to
Linux!!! #YouHaveBeenWarned

Acroymns Frenzy Uno

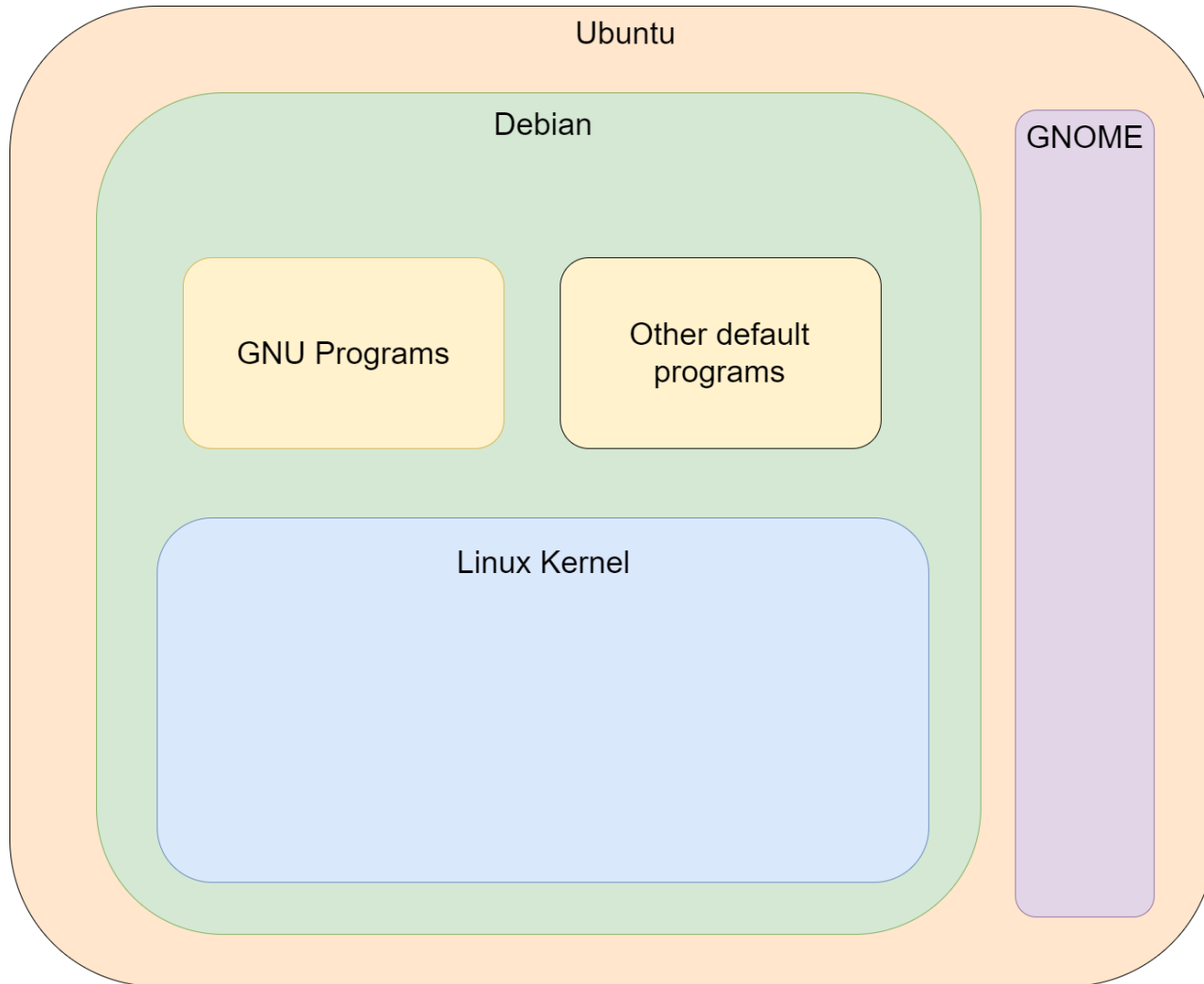
- GNU
 - GNU's Not Unix!
 - Recursive jokes, ECE majors try to be funny when possible
 - Most programs found on Linux
 - GCC, Emacs, Bash, Git, etc.
 - Like Unix programs, but written from scratch under GPL
- POSIX
 - A set of IEEE standards
 - Mainly because of the number of Linux/Unix distros that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

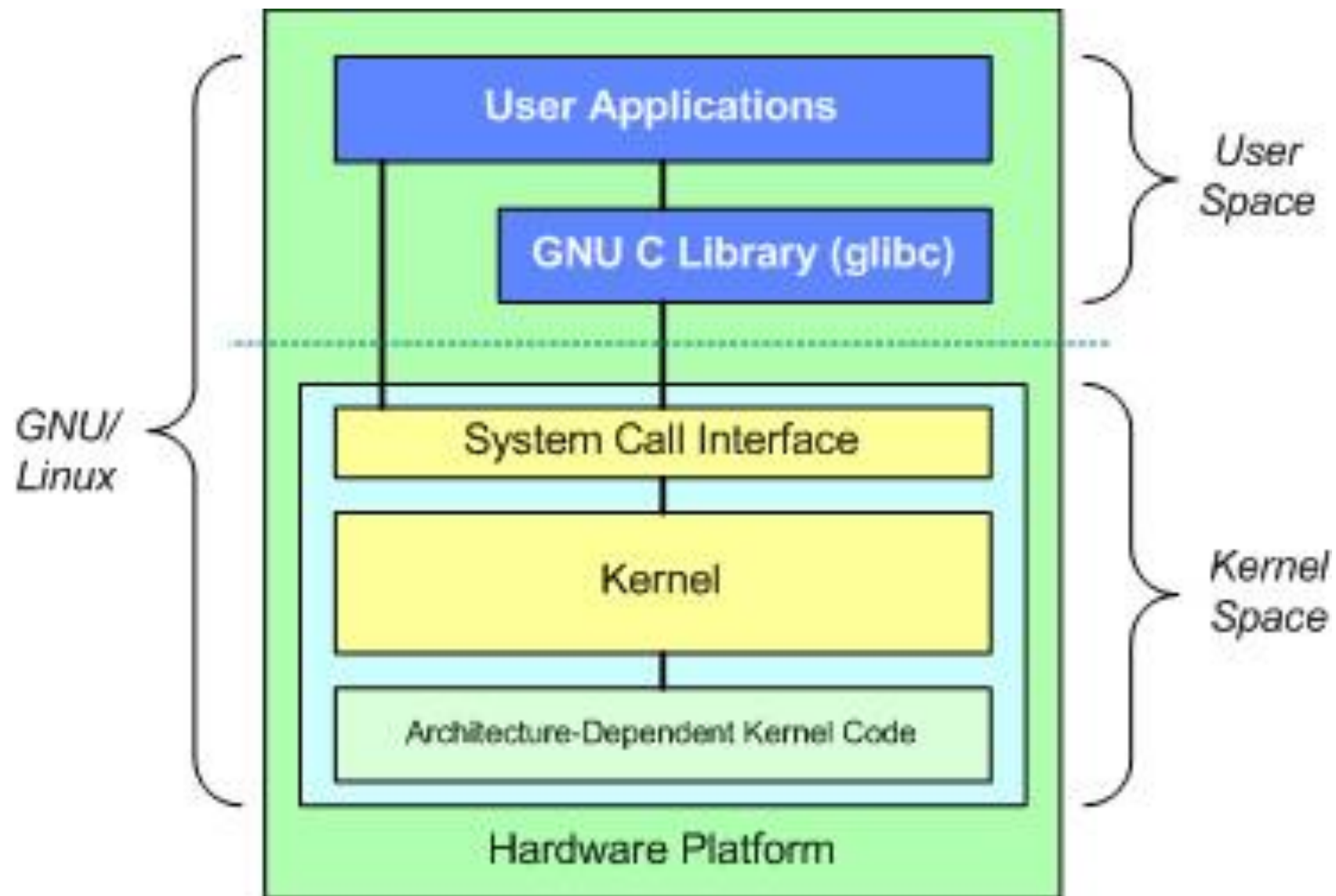
Distros

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



Ubuntu Example





GUI and what it caused

- Computers didn't always have Graphical User Interfaces
- Apple tried suing Microsoft over this stuff
- Most “Engineering” tools are command line based
- We are only talking command line from here 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
 - That's why people use underscores
 - The first word is the program name
- **Flags**
 - Ways of turning on optional settings to command programs
 - Will either 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

```
pi@raspberrypi:~ $
```

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 hierarcal 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/LinuxWorkshop1EEE

[Note: it's case sensitive]