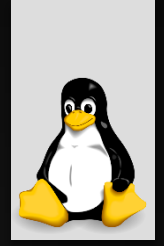
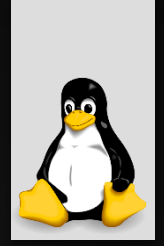


Linux

AN INTRODUCTION

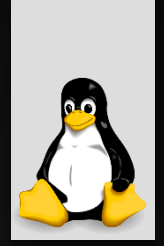
NIKIT *"NEFARI0USS"* MALKAN



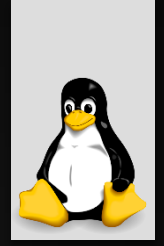
Before we start…

A NOTE ON MY PRESENTATION STYLE

Quick Side Note

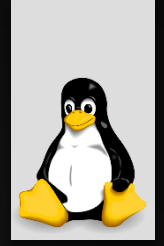


- Clear concise definitions.
  - Give context.
- Interactive presentations
  - Ask questions!
- Feedback
  - I can’t improve without it!



What is Linux?

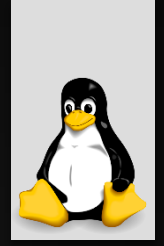
AND WHO USES IT ANYWAYS?



IT'S A UNIX SYSTEM

HTTPS://YOUTU.BE/DXIPCBMO1_U

REDDIT.COM/R/ITSAUNIXSYSTEM



Who uses it?

Who uses it?

- Hackers?
  - All the bad guys in the movies?
  - (Bonus points if it's a woman.)

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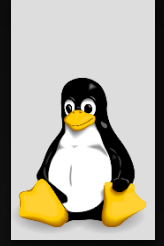

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  - That's all of you in here btw.

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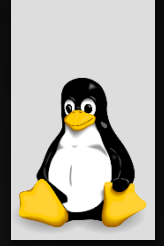

- Hackers?
  - All the bad guys in the movies?
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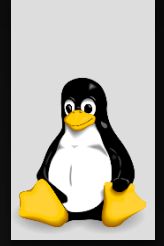
  - That's all of you in here btw.
- IT? System admins?

Who uses it?



- US Department of Defense
  - Single biggest install base of Red Hat Linux

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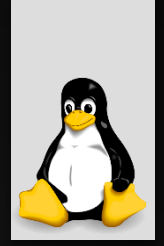

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  - Migrated government desktops due to price and ability to customize to needs of city.

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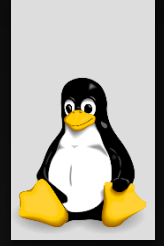

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- The City of Munich, Germany
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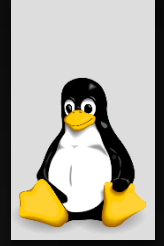
- Spain
  - Created their own distro (LinEx) and have been using it since 2002.

Who uses it?



- Amazon
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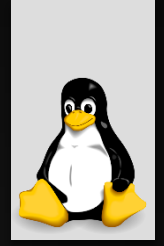

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  - Linux at its core.

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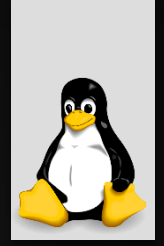

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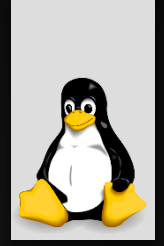
- THE Ohio State University
  - Student Linux (Red Hat Enterprise)



Key Terms

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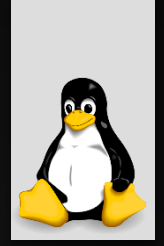

- OS: Operating System

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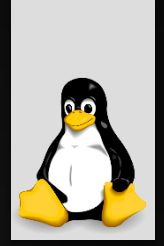

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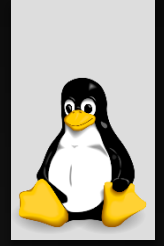

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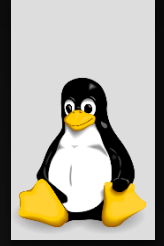

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- FLOSS: Free Libre Open Source Software

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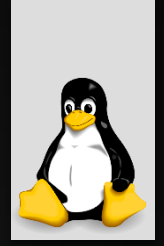

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  - Technically it's the utilities that go with the OS.

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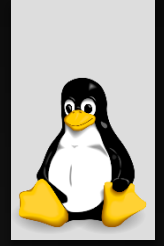

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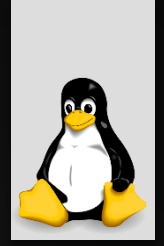

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  - Technically it's the utilities that go with the OS.
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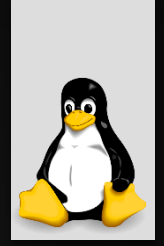
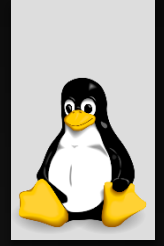
- Kernel: the core of the operating system. Where all the black magic happens.



What is it?

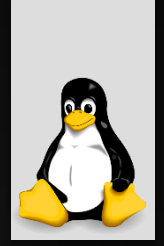
IT HELPS TO START AT THE ORIGIN



Brief History

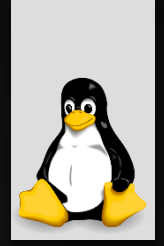
TO UNDERSTAND THE IDEAS AND PHILOSOPHIES BEHIND GNU/LINUX.

A Brief History of Linux



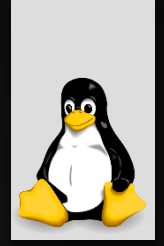
- Two very important men to remember:
- Richard Stallman
- Linus Torvalds

A Brief History of Linux



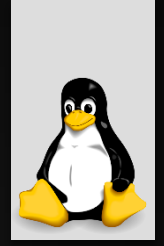
- Richard Stallman
  - Founder of the GNU project and FSF.
  - Bit of an extremist.
  - Visited OSU!

A Brief History of Linux



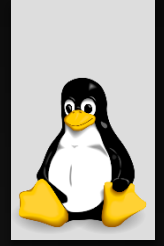
- Linus Torvalds
  - Wrote the Linux kernel.
  - Loves yelling at people in mailing lists.

A Brief History of Linux



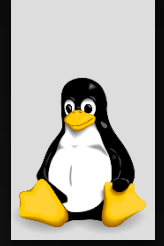
- Richard Stallman
  - Pioneer of the concept of “free software”
  - Free as in freedom, not free cost.
  - Started the GNU project in1983.
  - Left MIT in 1984 to work on the project full time.

A Brief History of Linux



- The GNU Project
  - GNU is Gnu's Not Unix.
  - Goal: Develop a Unix-compatible OS.
  - Must use only free software.
  - Most components were completed by 1991
  - Was missing kernel.

Brief History



- Linus Torvalds
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  - Used non-free UNIX OS called Minix.

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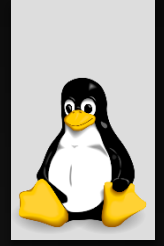

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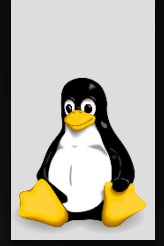

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  - Many users, including Tovarlds sent improvements to creator.
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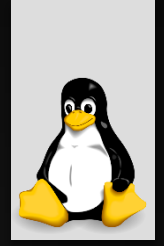
  - Tovarlds decided to write his own OS.
  - Wrote Linux kernel in 1991.

- And thus a beautiful harmony was born.

Takeaway - Core Philosophies



- Anyone should be able to contribute.
- Users tend be rather obstinate.
  - Self-sufficient
  - “If it doesn’t exist, I’ll make it myself”

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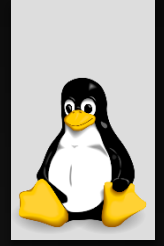

- Anyone should be able to contribute.
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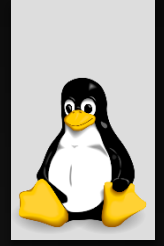
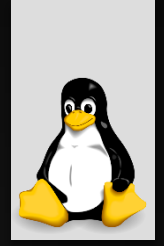
- Every single person in this room can contribute.
- That’s a very powerful philosophy.



OK but what is it?

LINUX IS THE KERNEL OF THE OS.

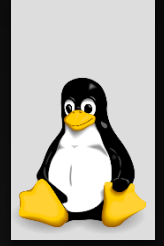
PEOPLE COMMONLY REFER TO THE ENTIRE OS ECOSYSTEM AS SIMPLY LINUX OR GNU/LINUX.



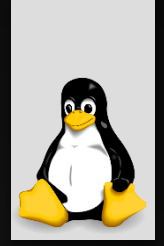
Installing Linux

SOME THINGS TO BE AWARE OF

Quick Steps



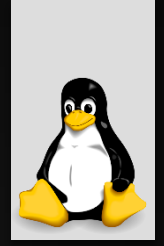
- 1) Disable secure boot, fast boot, and the like.
- 2) Partition your hard disk.
- 3) Burn live USB and boot from it.
- 4) Install to blank partition.
- 5) Enjoy!



More Key Terms

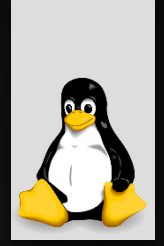
YES, I HAVE A LOT OF THESE. DEAL WITH IT.

Key Terms



- Dual booting: Installing two OSes on a computer.

Key Terms



- Dual booting: Installing two OSes on a computer.
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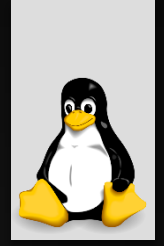

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- Bootloader: software that runs upon system startup.
  - Allows you to select which OS to run.

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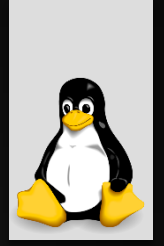
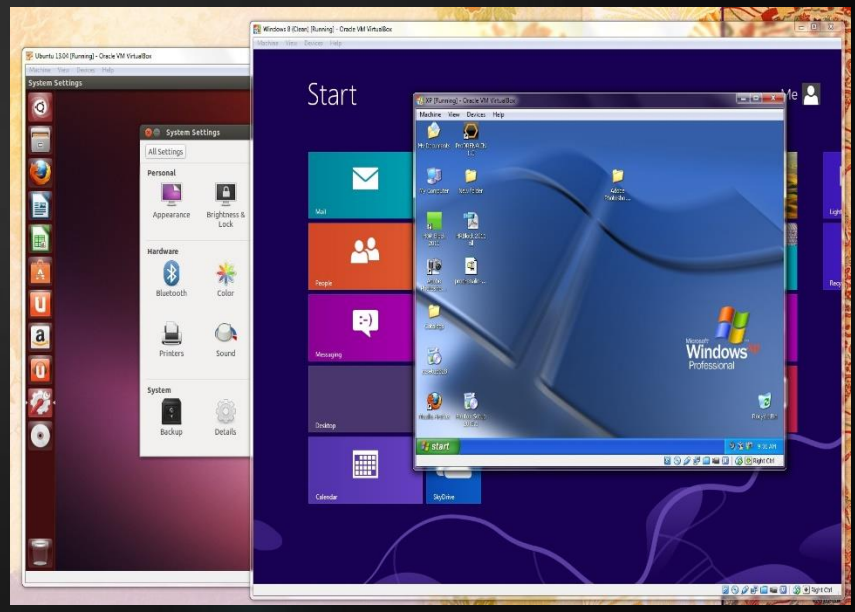
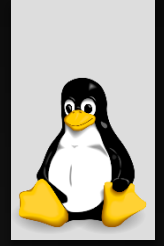


- Dual booting: Installing two OSes on a computer.
- Partition: allocate free space on the hard disk.
- Bootloader: software that runs upon system startup.
  - Allows you to select which OS to run.
- Virtualization: Running an OS while running an OS.
  - Software that pretends to be the hardware.



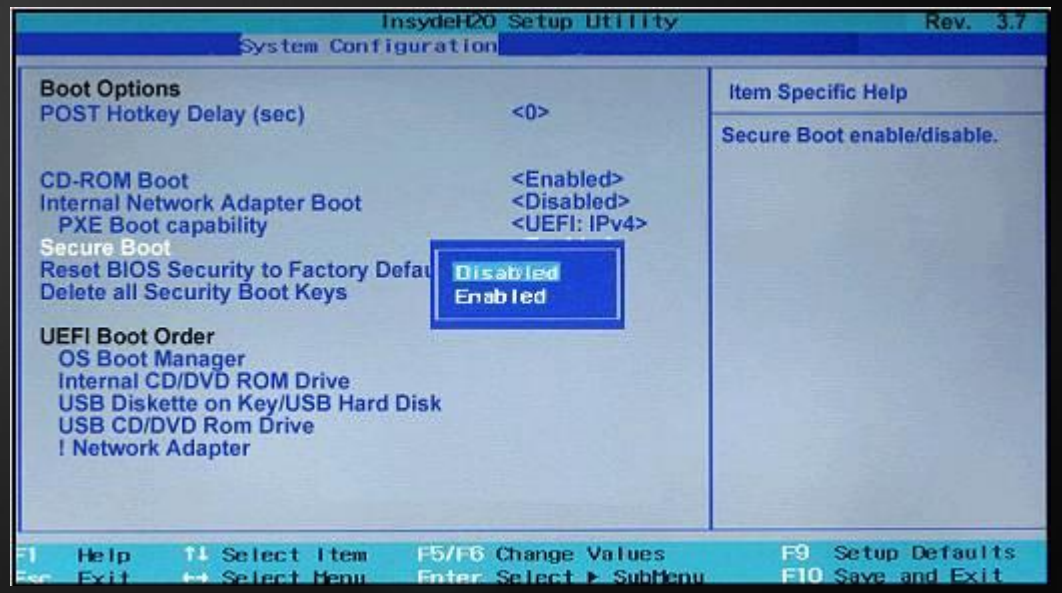
Secure Boot



- Malicious software can run upon startup.
- Secure boot only allows trusted software to run during start up.

- Unfortunately, GRUB (boot loader) needs to run upon start up for dual booting.

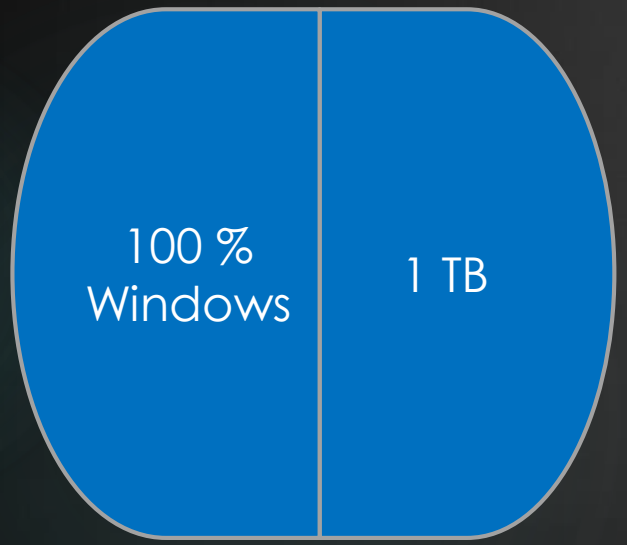
- Turn on computer and go to BIOS.
  - Each laptop manufacturer has different way.
- Turn off secure boot.



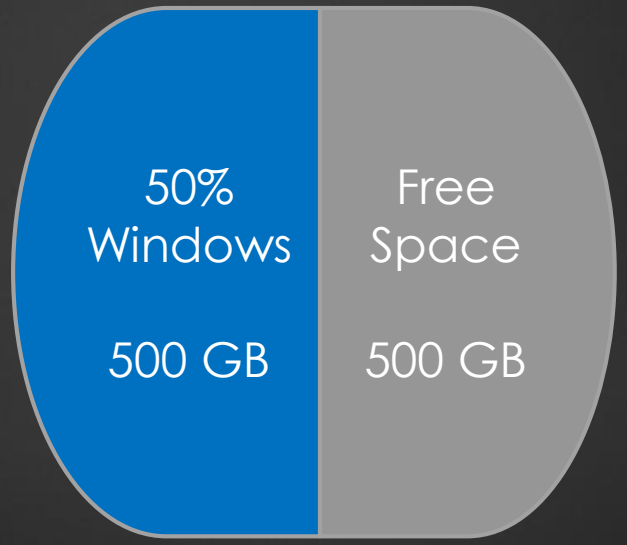
Grub


GNU GRUB version 1.98-1ubuntu5
Ubuntu, with Linux 2.6.32-21-generic
Ubuntu, with Linux 2.6.32-21-generic (recovery mode)
Memory test (memtest86+)
Memory test (memtest86+, serial console 115200)
Use the ↑ and ↓ keys to select which entry is highlighted.
Press enter to boot the selected OS, 'e' to edit the commands
before booting or 'c' for a command-line.
ubuntu

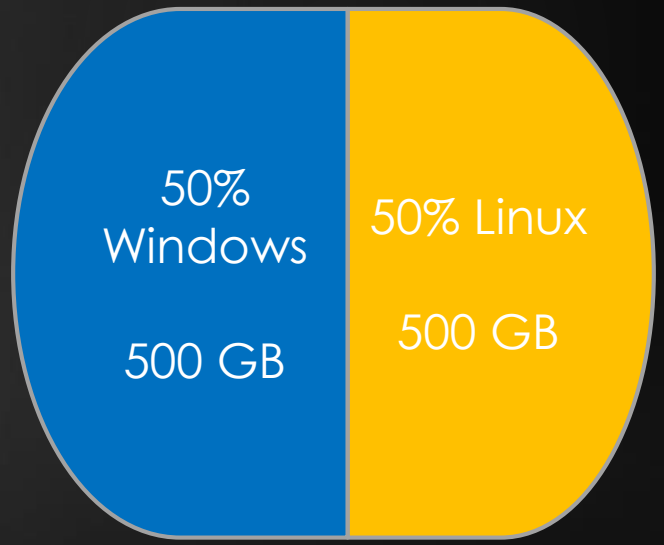
Partitioning Your Hard Disk



Pre-Allocation

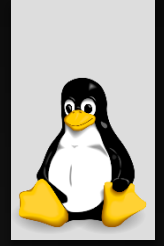


Post-Allocation



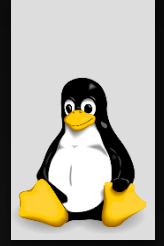
Post-Install

Partitioning Your Hard Disk



- ONLY PARTITION IN WINDOWS.

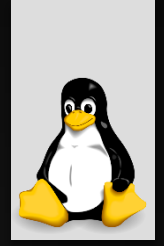
Partitioning Your Hard Disk



- ONLY PARTITION IN WINDOWS.

- Windows + X
- Disk Management
- Right click on C drive
- Shrink Volume
- Allocate space
  - 1024 MB = 1 GB
  - Trying Linux? Don't need much.
  - 20-30 GB is sufficient.

Quick Steps



- 6) Get bored of Ubuntu.

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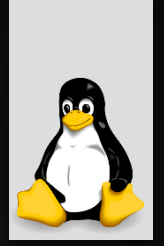

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- 7) Look at all the sexy installations online.

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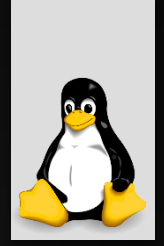

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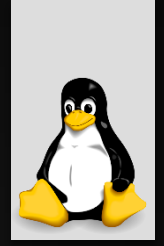

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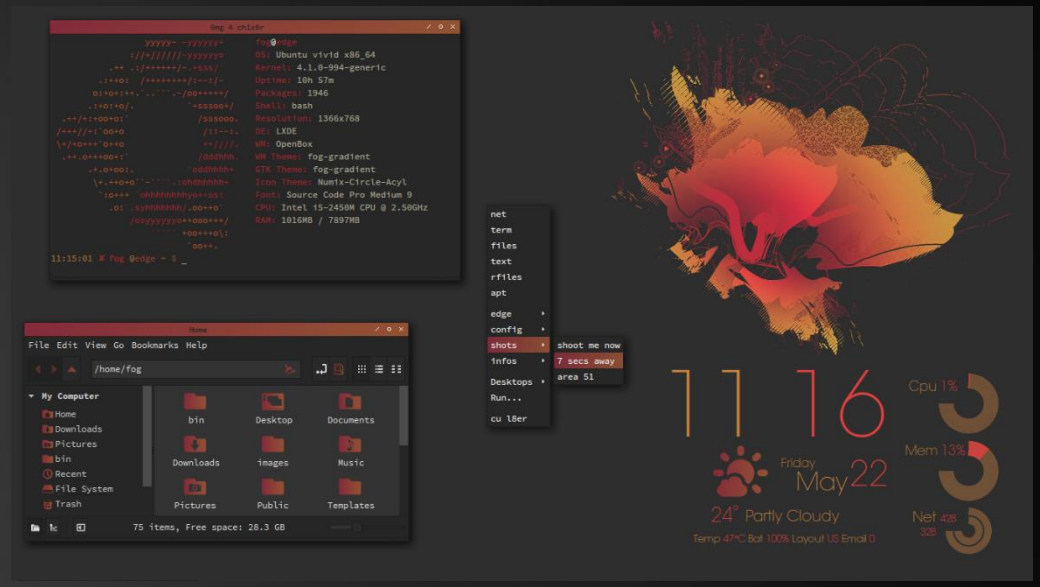

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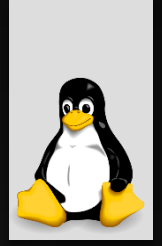

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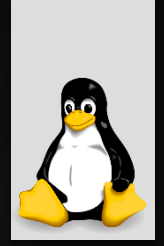
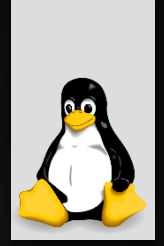


Distros

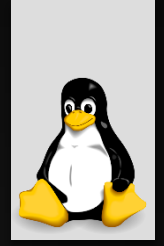
WHY ARE THERE SO MANY VERSIONS OF LINUX?

Distros



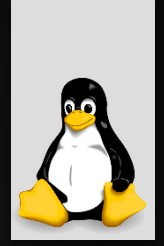
- Short for distribution.
- Windows comes in different flavors such as Home, Pro, Ultimate, et cetera.

Distros



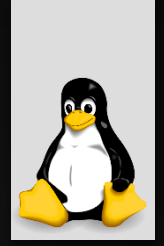
- Short for distribution.
- Windows comes in different flavors such as Home, Pro, Ultimate, et cetera.
- Linux is kinda the same way.
  - Imagine if each version of Windows came with a different desktop environment and way of doing things.
  - Two of the most popular distros are Ubuntu and Linux Mint.
  - Both are easy to use and excellent introductions to Linux.

Distros



- Why have so many options and differences?

Distros



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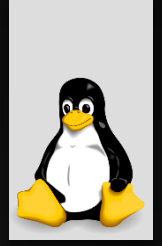
- Remember the core philosophies?
  - Everyone can contribute.
  - “I can do it myself”

Distros



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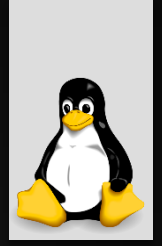
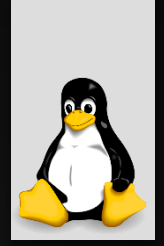
Distros

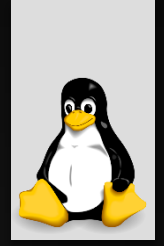


- Why have so many options and differences?
- Remember the core philosophies?
  - Everyone can contribute.
  - “I can do it myself”
- Or this?
- People like to customize.
- Make it the way they like.



Linux Family Tree

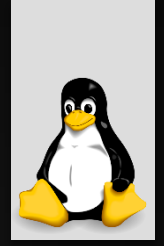
HTTPS://EN.WIKIPEDIA.ORG/WIKI/LIST_OF_LINUX_DISTRIBUTIONS



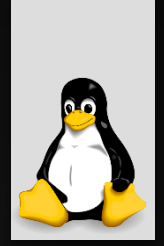
Environments

EVERYONE'S GOT AN OPINION

Environments



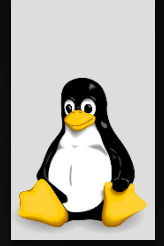
- GUI: Graphical User Interface. Mouse, folders, buttons, etc.
- DE: Desktop Environment. This is the stuff you interact with using the GUI while operating a computer.
- GNOME, KDE, Unity: Various DE. Like Distros, they can be customized how you see fit.



Terminal

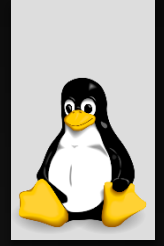
YOU HAVE TO USE IT AT SOME POINT

Terminal



- Terminal/console/shell
  - Linux equivalent of the Windows CMD/PowerShell.
  - Very powerful and flexible, you can type commands to do just about anything.

Terminal



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- Bash: The most common shell environment. Stdlinux uses c-shell.

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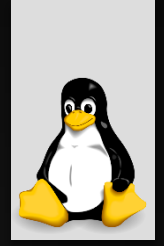

- Terminal/console/shell
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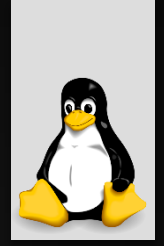
- Bash: The most common shell environment. Stdlinux uses c-shell.
- SUDO: **s**uper **u**ser **do** – equivalent to administrator in Windows.
- Root: see su.
  - Technically there is a difference. For our intents, it does not matter.

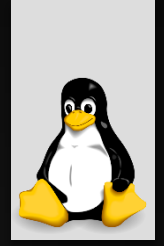
Terminal



- Lots of commands. More next week!

- su – switch user (run command as another user)
- sudo – super user do (run command as admin)
- pwd – present working directory
- ls – list files in current directory
- mv – move
- cp – copy
- cd – change directory
- mkdir – make directory
- rmdir – remove directory

Terminal



- Compiling/building
  - Turning the raw source code into something executable.
- Binary: a machine readable file.
  - Usually refers to a file you can run.

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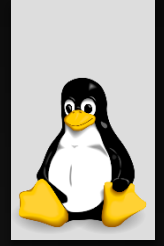

- Compiling/building
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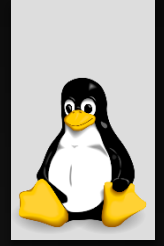
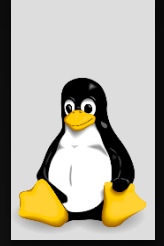
- “compile the binaries”
  - You are compiling the **source**.
  - You are running the **binaries**.
  - Saying “compile to the binary” sounds weird.

Terminal



- Be very careful when doing anything that requires root access.
- Do not blindly copy and paste commands!
  - Knowledge is power.
  - Learn what they do before typing anything!

Terminal



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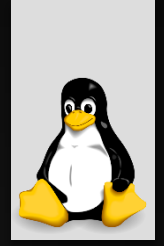
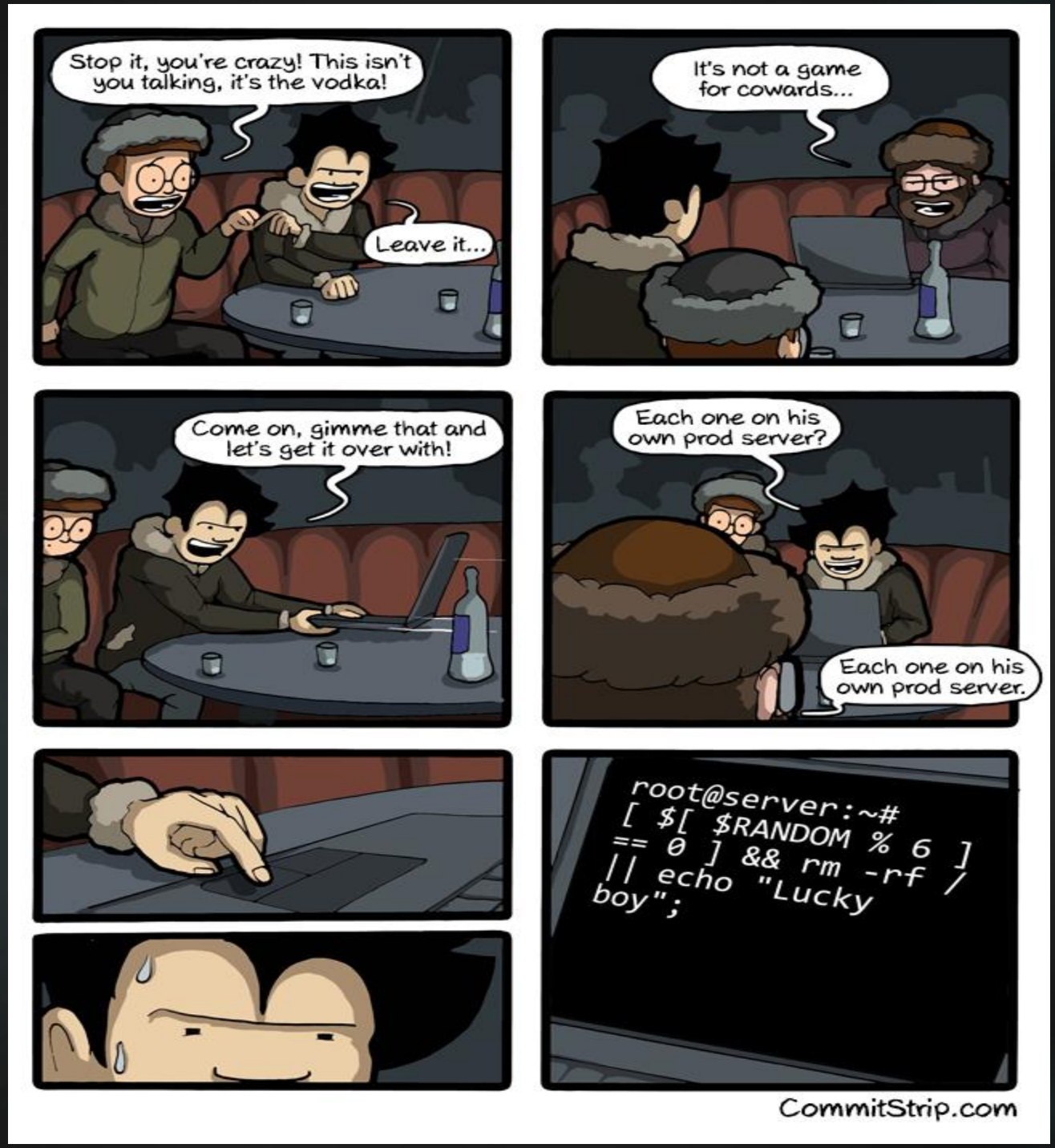
- DO NOT ENTER THE FOLLOWING COMMANDS

Terminal

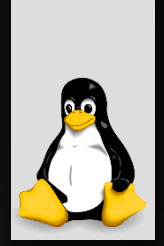


- $ sudo rm –rf / –no-preserve-root
  - sudo – super user do
  - rm – remove files
  - -rf - recursive, force
  - / - the directory; in this case, the root directory.
  - -no-preserve-root – remove safety flag.

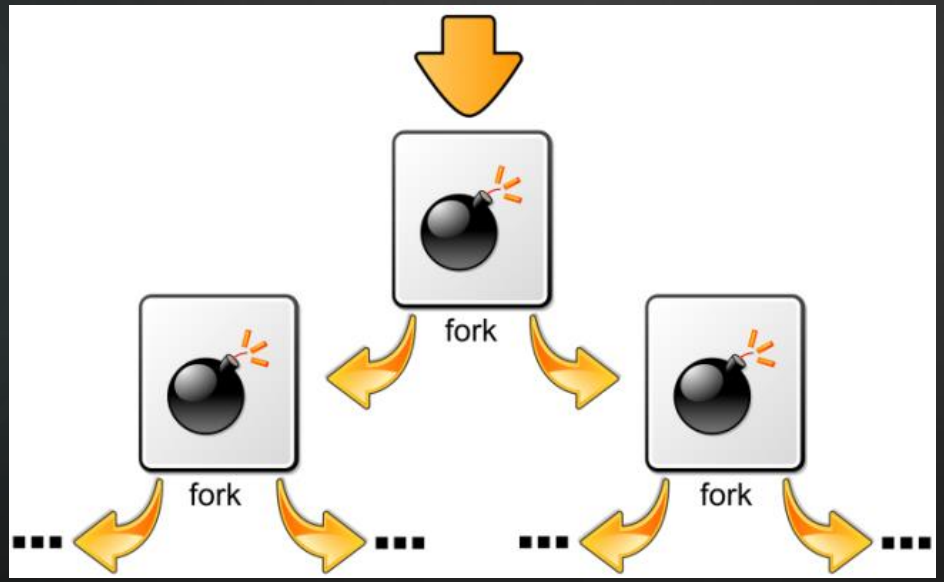
  - DO NOT ENTER THIS IN THE TERMINAL.

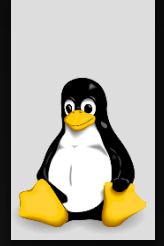

Stop it, you're crazy! This isn't you talking, it's the vodka!
Leave it...
It's not a game for cowards...
Come on, gimme that and let's get it over with!
Each one on his own prod server?
Each one on his own prod server.
root@server:~# [$[$RANDOM % 6] == 0] && rm -rf / || echo "Lucky boy";
CommitStrip.com

Terminal



- Forkbomb: :(){ :|: & };:
  - A shell function that continuously creates copies of itself.
  - The process eventually takes up all of your CPU.
  - DO NOT ENTER THIS ON YOUR TERMINAL.

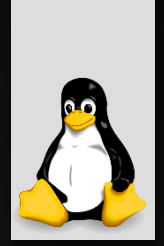




Applications/Software

YES, LINUX HAS SOFTWARE!

Applications/Software



- Myth: Linux has no software.

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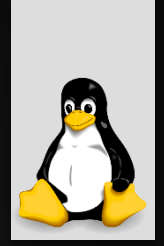

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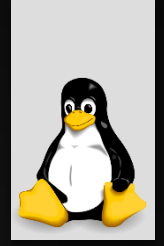

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  - Ex: $ sudo apt-get install vim

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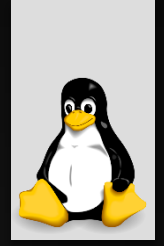

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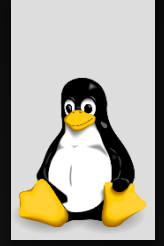
- Sometimes you download the source code and compile it yourself.
  - Cloud storage program: Copy.

Applications/Software



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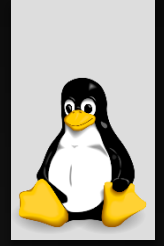

- Package managers make downloading software easy.

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  - sudo: super user do.
  - apt-get: application-packaging-tool get
  - Install – let the OS know that we want to install software
  - vim – the name of the application.

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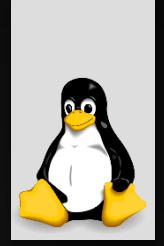

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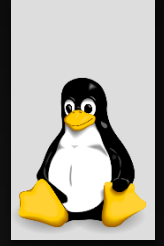
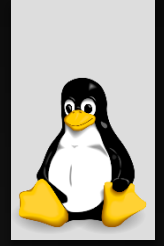
- If you have to compile it, the software is usually accompanied by a make file.
  - $ make



Licensing

WHY ARE THEY IMPORTANT?

Licenses



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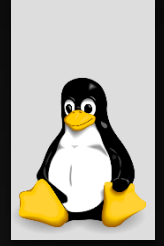

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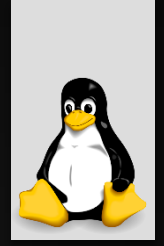

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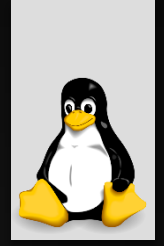
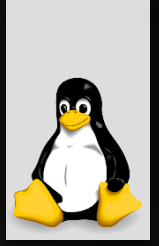
- Copyleft licenses
  - Allow you various degrees of freedom.
  - GPL, MIT, BSD, et cetera.



Fixing Things in Linux

CREDIT TO THEOEATMEAL.COM



Windows

Step 1. Reboot

Did that fix it?

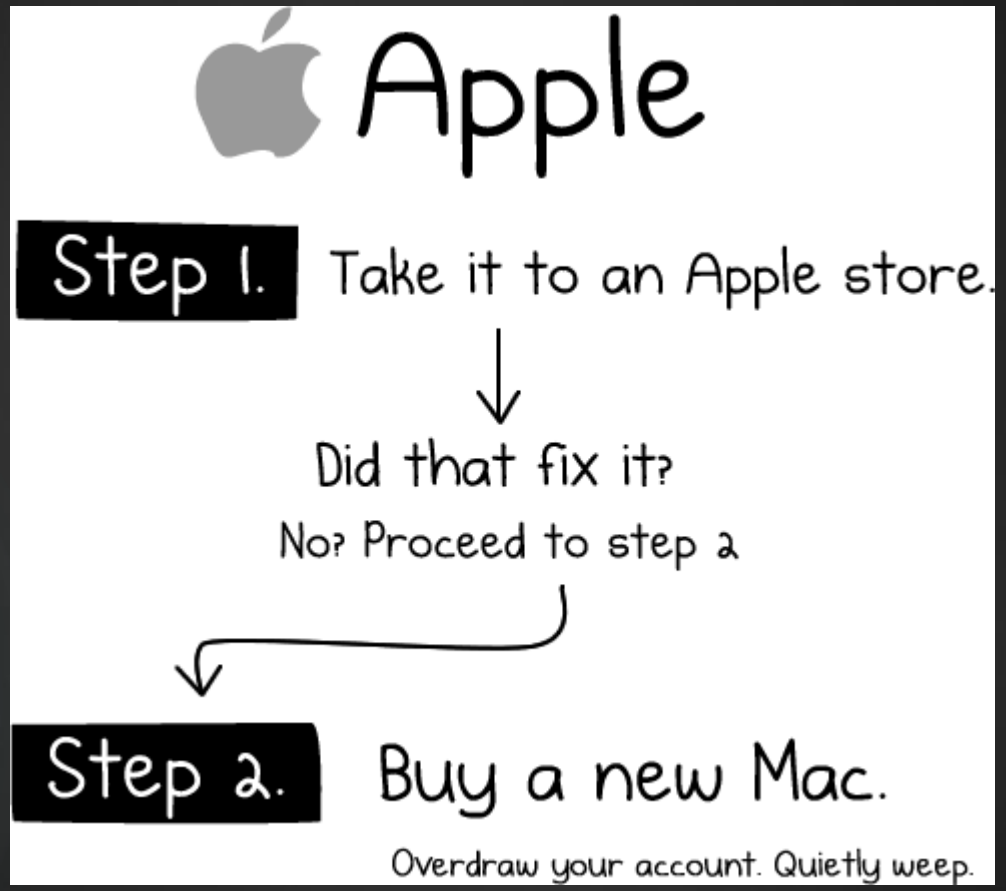
No? Proceed to step 2

Step 2.

Format hard drive.

Reinstall Windows.

Lose all your files. Quietly weep.


Apple
Step 1.
Take it to an Apple store.
Did that fix it?
No? Proceed to step 2
Step 2.
Buy a new Mac.
Overdraw your account. Quietly weep.

Linux

Step 1.

Learn to code in C++. Recompile the kernel. Build your own microprocessor out of spare silicon you had lying around. Recompile the kernel again. Switch distros. Recompile the kernel again but this time using a CPU powered by refracted light from Saturn. Grow a giant beard. Blame Sun Microsystems. Turn your bedroom into a server closet and spend ten years falling asleep to the sound of whirring fans. Switch distros again. Abandon all hygiene. Write a regular expression that would make other programmers cry blood. Learn to code in Java. Recompile the kernel again (but this time while wearing your lucky socks).

↓

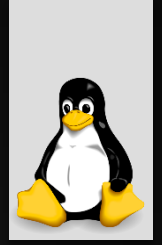
Did that fix it?

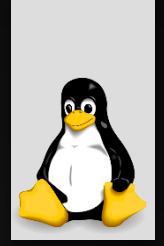
No? Proceed to step 2 ↓

Step 2.

Revert back to using Windows or a Mac.

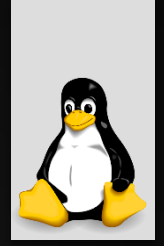
Quietly weep.





Fin

THANKS FOR LISTENING. HOPE YOU LEARNED SOMETHING!



Questions?

ASK AWAY!