OS 1/21

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Historical Stuff

- 1960s ish there was the space race, so a lot of money went into machines and computation for space stuff
- Lots of statistics
- Developing operating systems to manage data
  - data about: orbit trajectories, probabilities, etc
- Unix came from the OS that was developed around that time
- An unfathomable shit load of operating systems came around because of it, close to 1984

Unix

- Unix has two definitions:
  - Unix as an operating system that has been certified by "the Open Group"
    - This is the "proper" definition
    - Unix seal of approval used to be important but people don't give a fuck anymore
  - Systems that look and behave like Unix
    - Not a proper definition but eh it works
- Single UNIX Specification (SUS)
  - There are different Unix specifications that you need to follow to fall into this group
- Timeline
  - First implemented in 1969
  - The name was a pun on MULTICS (does someone wanna tell me what MULTICS is because I don't get the pun)
    - If I could read the damn slide...
    - MULTICS was an AT&T, MIT, GE project but AT&T left because it wasn't making money
  - Unix was implemented by Ken Thompson but was rewritten in C by Dennis Ritchie in 1973
  - MIT was already using MULTICS on campus
  - In 1974, UNIX installs on more than 50 systems
  - The first edition was created outside of AT&T (they were in on it the whole time but backed out) in 1975
- Bell Labs
  - Invented: readio astronomy, the transistor, the laser, charged-coupled device, Information Theory, C, C++, Unix
  - Eight nobel prize winners
  - In 1974, AT&T was deemed a monopoly and broke up bell labs into little bells (PAC Bell, Southwestern Bell, US West, etc)
    - They couldn't sell Unix so the licensed it away
  - In 1977, Unix was running in 500 cities and 125 universities
    - This is when people started teaching OS classes
  - Some dude from AT&T took a sobattical to Berkley and found a dude (Bill Joy) who ended up creating SunOS
    - The two dudes worked together to create a fast file system, pascal, and virtual memory

Vi/Vim

- Not an operating system but it's going in this section anyways
- In 1976, Bill Joy (the dude from above) developed Vi/Vim as the visual mode for the line editor ex
  - Vi is short for visual
  - ed (don't know what ed is but I typed it anyways) used a series of commands to edit text
  - Inspired by BRAVO text editor froim Xerox PARC
- In 1985, AT&T looked for other editors (enter EMACS) because they weren't allowed to use Vi due to copyright issues (because Bill Joy began with ed)

Emacs and Richard Stallman (rms)

- Also not an OS but still in this section
- In 1974, this dude visited Standford AI lab while at the MIT AI lab
  - He saw the *E* editor and liked it because it was WYSIWYG (what you see is what you get)
- In 1975, he combined it with TECO which was a system with a *macro* feature
  - A lot of people added their own macros
  - There were *so many* macros that RMS asked everyone to send him their updates and changes so he could make the whole system better
- In 1984, he started working on GNU Emacs

AT&T Involvment

- The government broke up At&T in 1982
  - No more monopoly on telephone, but now they can market UNIX
- AT&T Unix Support Group (USG) developed an implementation
  - System III in 1981 included named pipes and a mix of AT&T Unixes
  - System V in 1983 was System Version Release 4 and was the most successful, competed with BSD in usage and technology, still infused with features from BSD
- UNIX was implemented over several different hardware types; hardware purchasers were no longer locked into what they were using

Back to the pedo

- In 1984, Richard Stallman started creating a free (liberty, not price) UNIX
  - Started GNU (**G**NU is **n**ot **U**NIX)
- In 1985 founded FSF
  - FSF was a foundation that donates to stuff, can't remember what he just said it stood for
    - Just Googled it, free software foundation
  - GPL License
  - Bash shell, glibc
  - GCC (cnu c compiler $\rightarrow$ gnu compiler collection)
- GPL is the General Public License
  - This means software licensed as GPL must be freely redistributable under GPL
  - Modifications to and distributions of GPL software must also be licensed as GPL

BSD and Linux

- In 1990, Bill and Lynne Jolitz forted the mature BSD
- In 1991, Linus Torbalds sent a message inviting people to build an OS

  - Started with MINIX
- In 1993, NetBSD and FreeBSD had development groups and had OpenBSD in 1996
  - BSD came from Berkley
- In 1994, Linux had a team of people and developed version 1.0 (now they're on 5.4)
- At some point, AT&T sued the BSD people because it was too close to their stuff

Linux

- Linux refers to the kernel developed by Linux Torvalds
  - Kernel means something about hardware receiving commands? I missed what he said. Linux won't work by itself
- Need Linux+something else, Mr. Pedophile prefers GNU/Linux
- The market opened up to companies who can package Linux distributions
  - Slackware is the oldest, then Debian, then SUSE and Red Hat
  - In 2004, Ubuntu came out (based on Debian)
    * Close binary compatibility with debian, most popular cloud OS
    * Ubuntu means "I am what I am because of who we all are"
- Holy shit the Ubuntu family tree is HUGE

C (C is the happy key, but not the happy language)

- Ken Thompson worked on the B language, Dennish Ritche who was also at Bell Labs wrote C
- All Unix implementations made a standard for C necessary
  - In 1978, K&R is a defacto standard
  - in 1985, C++ highlighted improvements
  - in 1989, The American National Standards Institute had standards for C or something

POSIX - Portable Operating System Interface (X or UNIX)

- This is a group of standards to promote portability of source code
- It describes the interface that will support different file system activities

Finally. . . moving away from history

- Interrupt
  - Interrupt is a mechanism by which other modules may interrupt the normal sequencing of the processor
  - Example: In a GUI system, and interrupt can be moving the mouse because the processor has to update the location
    * A timer is also an interrupt (every task can only run for 10 instructions)
  - Interrupts are also called when an error happens
  - Not always a bad thing, interrupts can be good things
  - Main types of interrupts
    * I/O is based on interrupts
      · This is because I/O is *very* slow