



History

Level 0x01: pwn.college



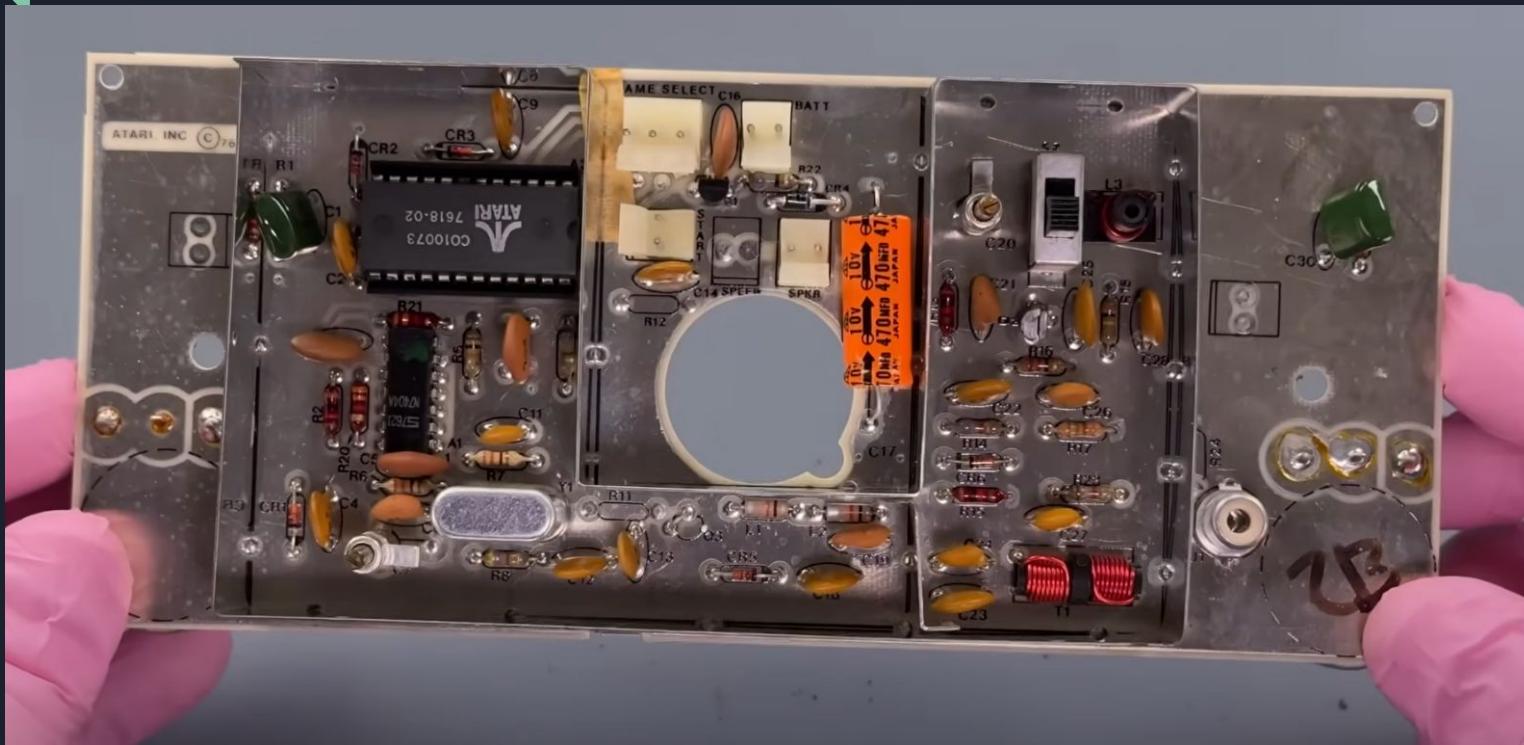
Quick Overview

- Early Computers
- Operating Systems
- Linux

What is this?

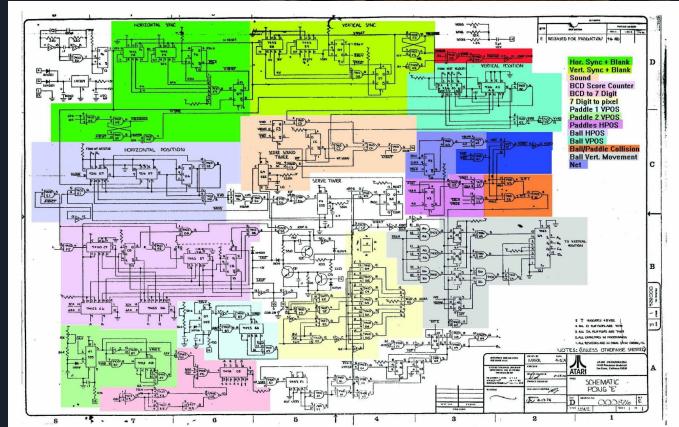
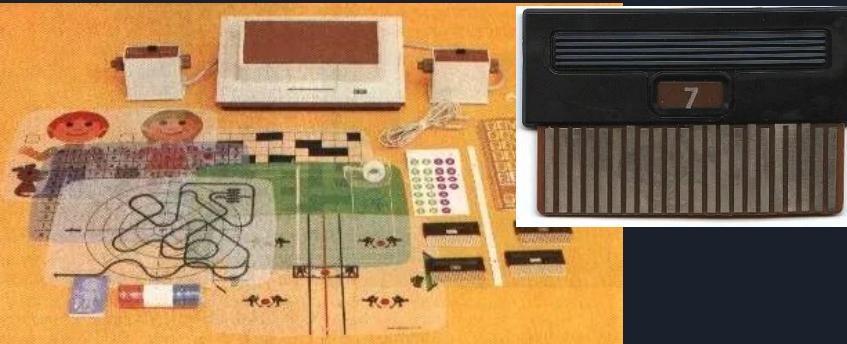


What CPU runs Atari Pong?



Early Games / Consoles

- Arcade Pong release in 1973
- Not first video game, that would be?
 - Spacewar
 - 1962 MIT
 - Ran on PDP-1
- Magnavox Odyssey 1972
 - Stick on TV graphics
 - Cartridges. But they don't have ROMs

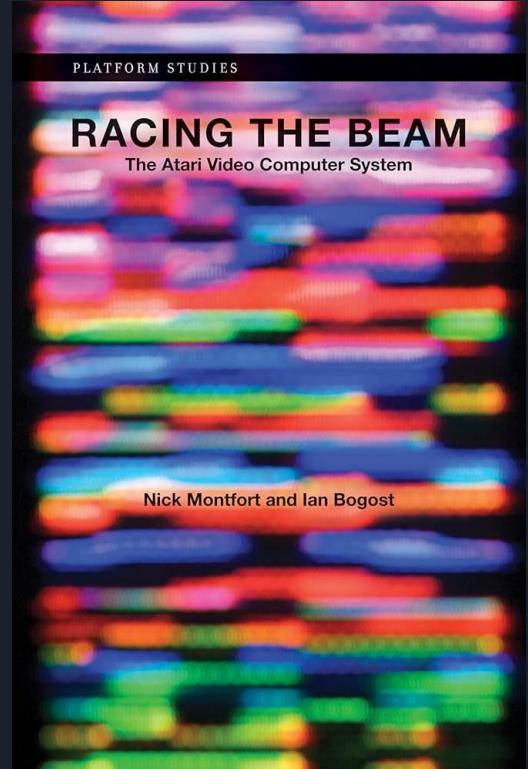


What is this? What CPU?



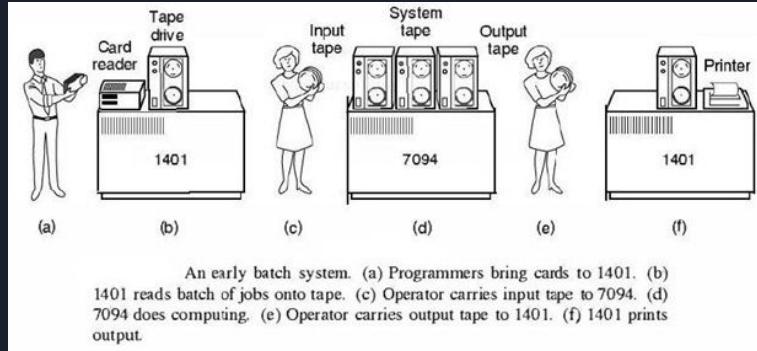
Atari 2600

- Release in 1977 for \$200
- 6502 CPU (\$25 value!) 1.19 MHz
- 128 Bytes of RAM
- Glitches galore aka “Frying”
- 4 Sprites
- Racing the beam
 - No framebuffer
 - Graphics are drawn while electron beam scans
 - 76 CPU clocks per line
 - 60 screen refresher per second
 - When beam goes from bottom to top, run game code
- First Easter Egg in Adventure



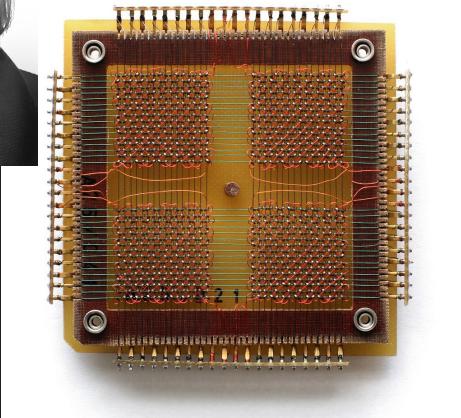
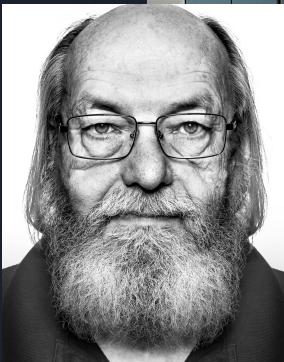
Early Mainframe OS

- Batch processing (1950s - 60s)
 - People were “part of the computer”
 - Runs 1 program at a time
- Time-slicing / Time sharing
 - Multiple users at the same time
 - Programs could now be interactive



Ken Thompson and UNIX

- AT&T Bell Labs
- 3 weeks without his wife and kids in 1969
 - Needed an editor
 - Needed an assembler
- PDP-7 and PDP-11
 - 9 to 144 KB of core memory
- Multiple users (Dennis and Ken)
- Pipes
- Bell Labs Inventions
 - UNIX, grep, C, C++
 - Solar PV Cells, transistors, lasers, Fiber optics
- Framebuffer / Graphics?



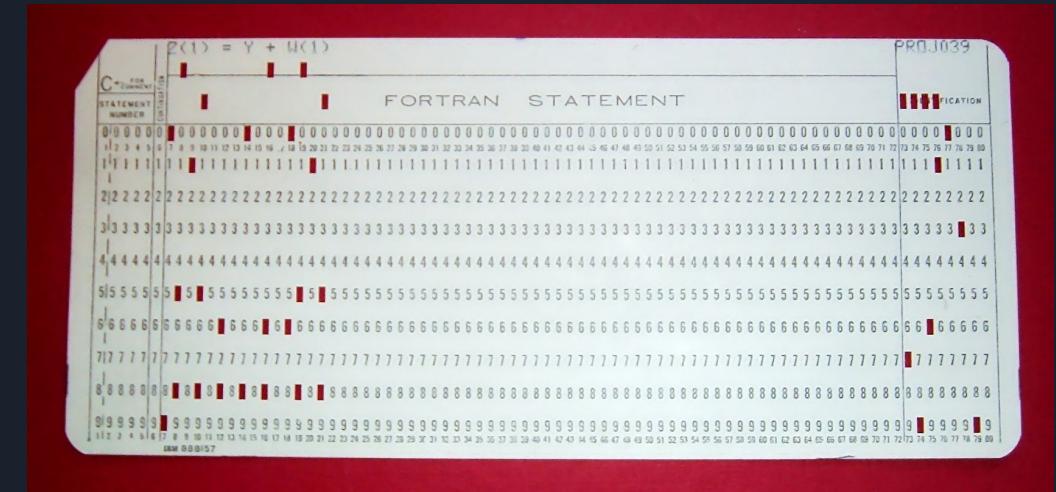
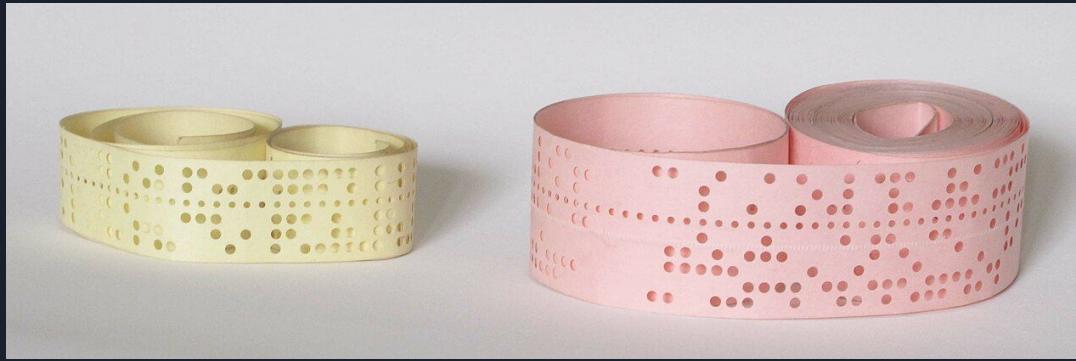
Early Interfaces

- Serial terminal / Teletype
- No graphics, just characters
- No mouse



Early Storage

- Paper tape
- Punch card
- Analog magnetic tape
- Magnetic disks
- Optical disk



Interactive Kernel / DOS

- Commodore 64
 - 64 KB RAM
 - 8 KB Kernal
 - 4 KB Character Graphics
 - 8 KB Basic
- Microsoft DOS
- 1 Process at a time

```
A>dir command.com

Volume in drive A is MS-DOS 3.30
Directory of A:\

COMMAND.COM 25276 12-23-90 2:37p
 1 File(s) 254976 bytes free

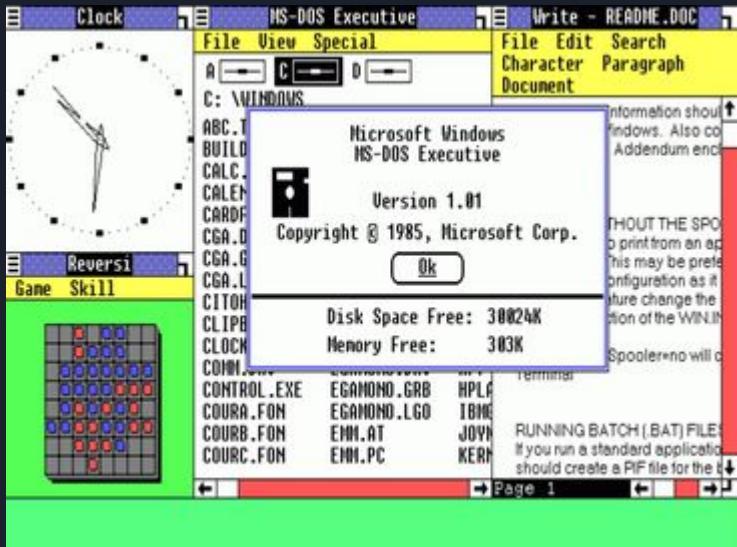
A>ver
MS-DOS Version 3.30

A>
```



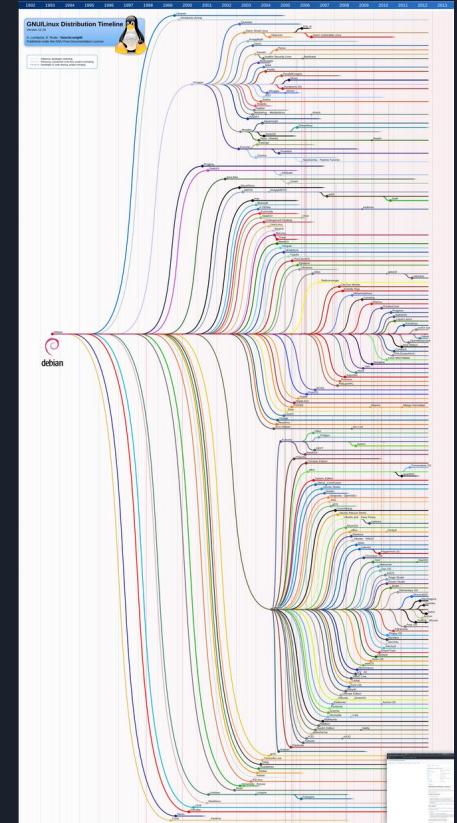
Operating Systems - GUI

- Xerox / PARC / Apple
 - Mouse, Window Systems, GUI conventions
 - Steve Jobs
- Windows (DOS Application)
 - Multiple applications
 - Resizable GUIs, Networking
- Windows 95/NT
 - Became core operating system
 - Long filenames
 - Start menu
 - 32-bit Only



UNIX Children

- Solaris, SCO Unix, HP-UX
- Berkley Systems Distribution (BSD) - very permissive license
 - BSDs: FreeBSD, OpenBSD, NetBSD
 - Apple: Mac OSX, iOS
 - Sony: Playstation 3 - 5
- GNU 1983
- Linux 1991 - Linus Torvalds kernel released, GNU tools
 - Red Hat, Debian, SUSE, Slackware
- Android



Other OSes

- *nix is pretty large / complex
- Real Time Operating System (RTOS)
 - VxWorks
 - QNX
 - Integrity
- Hypervisor OS
 - ESX
 - Proxmox (Linux)





Why Linux focus?

- Get you experience using a CLI shell
- Get you used to the inner working of *nix
 - It's on everything besides Windows
 - It's even inside of Windows too
- Containerization / Docker / Podman
- Cloud (Azure, AWS)
- Tools
 - Best shell / scripting
 - Development tools
- Open source
 - You can learn / research the kernel, the userspace applications
 - Hardware support



Attributions

- [Atari Super Pong & The Notorious Security Screws](#)
- <https://www.digibarn.com/collections/games/super-pong/>
- <https://computerhistory.org/blog/50-years-of-fun-with-pong>
- <https://www.ign.com/wikis/history-of-video-game-consoles/Odyssey>
- <https://www.amazon.com/Racing-Beam-Computer-Platform-Studies/dp/0262539764>
- [Ken Thompson interviewed by Brian Kernighan at VCF East 2019](#)