

Lecture 1: Preparation for Learning OS

Linux, VS Code, GitHub, JSON, and AI

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COP 4610 Operating Systems
<https://xinliulab.github.io/FSU-COP4610-Operating-Systems/>

Meet Your Instructor



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Research Area:

**AI-driven edge networks and
transformative IoT applications**

Hobby: *Not Working*

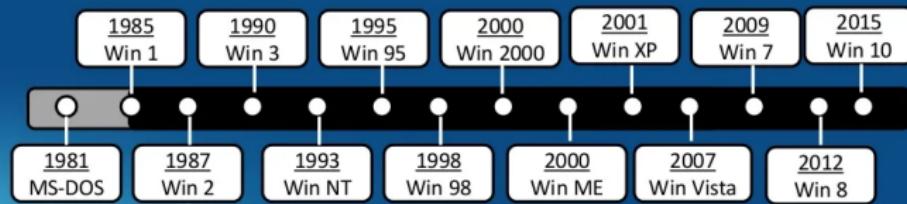
Started at FSU in Fall 2024

[Click here to visit my homepage](#)

Operating System: your most familiar stranger

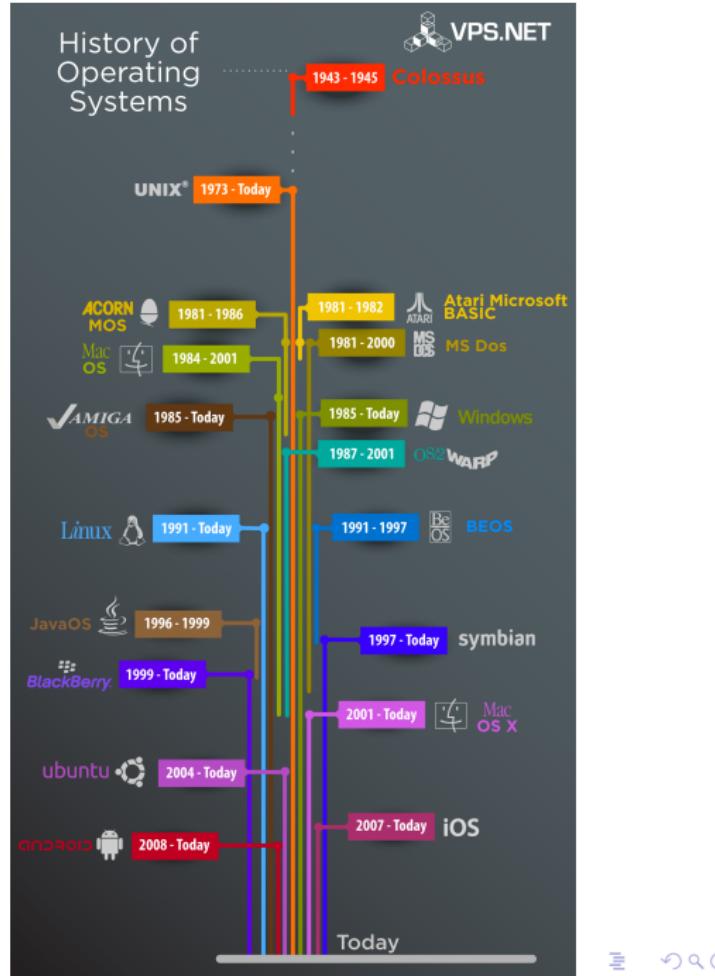


Timeline of Windows



Which Windows version is the earliest you've used?

Which of these OS have you used before?



Guess my age ... and OS

My very first operating system
was **MS-DOS**.
It was the summer of 1993 ...



Why We Choose Ubuntu



Things Linux OS Can Do That Others OS Can't

- ① Open-source and free software – full access to source, no licensing cost.
- ② Strong community and support – large forums and up-to-date documentation.
- ③ Stable and secure – regular updates, built-in security features, and fast vulnerability fixes.
- ④ Rich software ecosystem – thousands of packages in repositories, easy install via APT or Snap.
- ⑤ Lightweight and efficient – runs well even on older hardware, saves system resources.

In-Class Quiz: Which Feature Matters Most?

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Answer: Why Open Source Matters Most

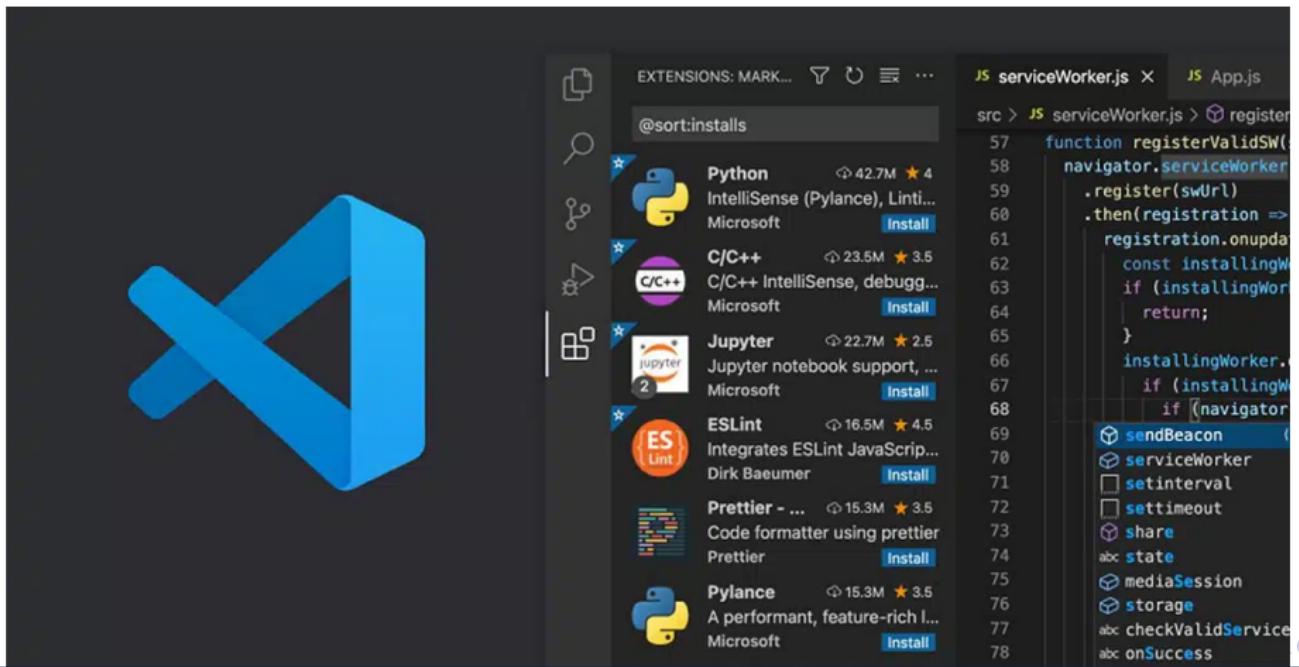
Correct answer: Open-source and free software

- It's not simply about cost.
- In the era of big data and AI, tech companies manage millions of servers.
- They **can't risk** handing over control to proprietary vendors like Microsoft.
- If a company's entire infrastructure runs on Windows, it becomes dependent on Microsoft's roadmap and restrictions.
- Open-source systems like Linux and Ubuntu allow full control, customization, and independence.
- That's why companies like Amazon, Google, and Meta build their platforms on customized Linux.

Why Linux is the Best Choice for Learning OS

- Even Microsoft now supports Linux deeply via WSL (Windows Subsystem for Linux)- because the ecosystem has become too essential to ignore.
- Linux is no longer hard to use — Virtual machines (e.g., VirtualBox, VMware) are fading—Docker and containers are more efficient.
- For your future careers in industry, knowing Linux is not optional—it's essential.

The Best IDE in the World: Visual Studio Code



Just remember one thing:

Ctrl + Shift + P

This shortcut opens the Command Palette — your gateway to: *Extensions, settings, themes, terminal, and everything else.*

“Professor... I don’t want to install all that stuff.”



No problem!

We use **GitHub Codespaces!**

No installs. No setup. Just code in your browser.

We will use GitHub in three key ways:

- **GitHub Codespaces** — Write and run code directly in your browser. No local setup needed.
- **GitHub Classroom** — Submit your programming assignments.
- **Code Version Control** — Learn how to use GitHub to manage your code, especially when collaborating in a team.

We Use JSON for Assignment Answers

- JSON (JavaScript Object Notation) is a lightweight, structured data format based on **key-value pairs**.
- It's simple, human-readable, and widely used in modern software systems (e.g., APIs, configs, logs).
- In the AI and cloud era, JSON has become a **de facto standard**.
- For assignments, JSON lets us automatically parse your answers and process them programmatically.

What does JSON look like?

What does JSON look like?

- JSON is a structured data format based on **key-value pairs**.
- JSON supports **nesting** — values can be strings, numbers, lists, or even other JSON objects.

Example JSON Format

```
{  
    "student_id": "FSU12345",  
    "answers": {  
        "Q1": "B",  
        "Q2": "D"  
    }  
}
```

My View on AI

Can we use **ChatGPT, Copilot, Gemini, etc.**
to help with assignments?

Absolutely —
I strongly
encourage it!



- You're welcome to use AI tools to brainstorm, generate code, or write explanations.
- You can even include notes like "This answer was inspired by GitHub Copilot" — that's fine.
- I want you to learn how to use AI productively, just like in real-world engineering.

- My job is to make sure assignments are designed so that AI won't give you perfect answers easily.
- Your real skill is not in typing a prompt — it's in understanding, adapting, and improving what AI gives you.

AI is welcome. Lazy copying is not.

So, Why Study Operating Systems?

The purpose of studying OS

- Human civilization
 - Fundamental engines, core methods, milestones, and detours
 - Toward application, innovation, and revolution
- The history of operating systems is the history of computer software/hardware development
 - Fundamental engine: serve more applications, faster and better
 - Core method: *Building Abstractions*
 - Milestones: UNIX, Linux, ...
- Within that history lies one key question:
 - What is the foundation of today's skyscrapers in computing?

What Can You Gain from Learning OS?

Awaken your inner “programming power”

- Understand what programs can do, and why they can do it
 - Why can a program create a window?
 - Why does Ctrl-C sometimes fail to terminate a program?
 - StackOverflow (2017.5): *Helping One Million Developers Exit Vim* (Today: this problem is solved!)
 - Why can some programs saturate all 128 CPUs in a server?
- Things you use every day — you could build them
 - Browser, compiler, IDE, games/cheats, antivirus, malware, ...
- And then — you can go find your dream!

**MAY THE
OPERATING
SYSTEM
BE WITH YOU**