

# 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*

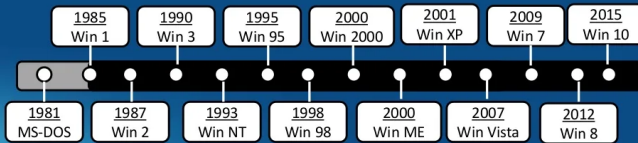
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# Operating System: your most familiar stranger



# Evolution of Microsoft Windows

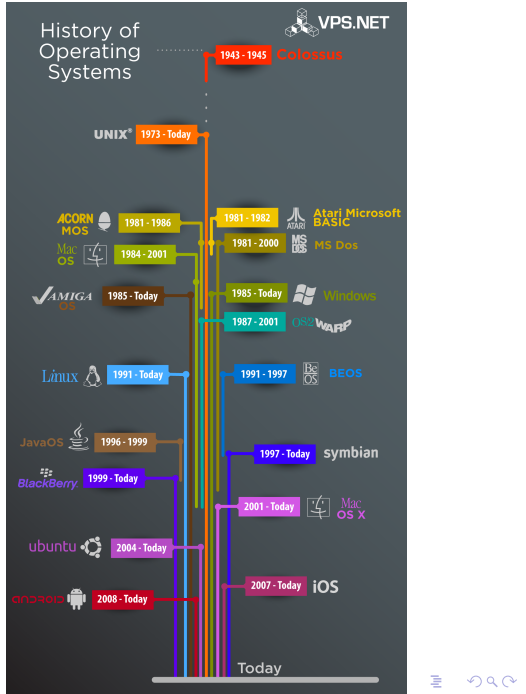
## Timeline of Windows



**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?

- 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.
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# Answer: Why Open Source Matters Most

## Correct answer: **Open-source and free software**

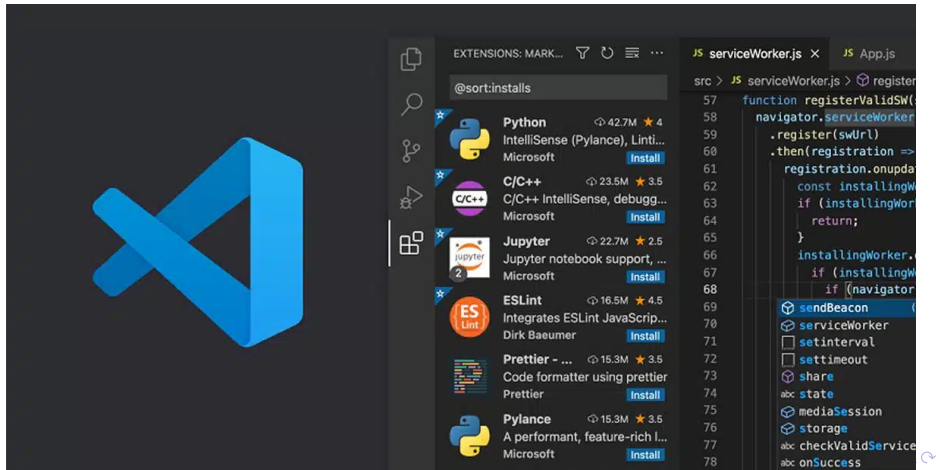
- It's not simply about cost.
- In the era of big data and AI, tech companies manage millions of servers.
- They **can't risk** handing over control to proprietary vendors like Microsoft.
- If a company's entire infrastructure runs on Windows, it becomes dependent on Microsoft's roadmap and restrictions.
- 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**