**Linux File System Explained (like your Windows breakdown)**

Think of / as the \**C:\** drive in Windows. Everything starts from / — it's the **root of the entire file system**.

**📁 /**

📌 **What it is:**  
The root directory — everything in Linux starts here. Like C:\ in Windows.

🎯 **When it's used:**  
Always. Every path in Linux branches off from /.

**📁 /bin**

📌 **What it is:**  
Essential **user command binaries** (like ls, cp, mv, etc.) — like C:\Windows\System32.

🎯 **When it's used:**  
When a user runs basic commands in the terminal.

💡 **Real-world:**  
• /bin/ls — List directory  
• /bin/cp — Copy files

**📁 /sbin**

📌 **What it is:**  
System binaries for **admin tasks** (like iptables, reboot) — think of it like admin tools in System32.

🎯 **When it's used:**  
When the system or root user needs to manage devices or services.

💡 **Real-world:**  
• /sbin/reboot — Reboot the machine  
• /sbin/ifconfig — Network config (older systems)

**📁 /etc**

📌 **What it is:**  
Configuration files — like Windows’ Registry + C:\Windows\ config files.

🎯 **When it's used:**  
Every time a service, daemon, or tool starts — it reads its config from here.

💡 **Real-world:**  
• /etc/passwd — List of users  
• /etc/ssh/sshd\_config — SSH server config  
• /etc/fstab — Auto-mount disks at boot

**📁 /home**

📌 **What it is:**  
User profiles — just like C:\Users\Shadow.

🎯 **When it's used:**  
Each user has their own folder: /home/shadow = Shadow’s personal space.

💡 **Real-world:**  
• /home/shadow/Desktop  
• /home/shadow/.bashrc — Shell config  
• /home/shadow/scripts/myscript.sh

**📁 /root**

📌 **What it is:**  
Home directory of the **root user** — like C:\Users\Administrator.

🎯 **When it's used:**  
Whenever root logs in.

💡 **Example:**  
• /root/.bashrc  
• /root/Downloads/

**📁 /var**

📌 **What it is:**  
Variable data — logs, mail, print spool — like C:\ProgramData + parts of C:\Windows\Logs.

🎯 **When it's used:**  
• System logs  
• Package caches  
• Web server data (Apache, etc.)

💡 **Real-world:**  
• /var/log/syslog or /var/log/messages  
• /var/www/html/ — Web files for Apache

**📁 /usr**

📌 **What it is:**  
**User programs & libraries** (installed apps) — like C:\Program Files.

🎯 **When it's used:**  
When you install software like VS Code, Wireshark, Python...

💡 **Real-world:**  
• /usr/bin/python3  
• /usr/lib — Libraries  
• /usr/share — App icons, docs, etc.

**📁 /tmp**

📌 **What it is:**  
Temporary files — like %TEMP% or C:\Windows\Temp.

🎯 **When it's used:**  
Software installs, cache files, etc.

💡 **Real-world:**  
• /tmp/setup.sh  
• /tmp/tmpXYZ123

**📁 /opt**

📌 **What it is:**  
Optional apps — manually installed software. Like a separate D:\Software folder.

🎯 **When it's used:**  
When you install third-party apps not from the package manager.

💡 **Example:**  
• /opt/VMware/  
• /opt/google/chrome/

**📁 /dev**

📌 **What it is:**  
Device files — your disks, USBs, keyboard, etc. Like Device Manager + Disk Management.

🎯 **When it's used:**  
Access hardware (disks, RAM, keyboard) as if they were files.

💡 **Real-world:**  
• /dev/sda — First hard disk  
• /dev/ttyUSB0 — USB device

**📁 /proc**

📌 **What it is:**  
Virtual FS showing live system info — like Windows Task Manager, but in file form.

🎯 **When it's used:**  
Check running processes, CPU info, memory, etc.

💡 **Example:**  
• /proc/cpuinfo — CPU specs  
• /proc/1/status — Info about PID 1 (systemd)

**📁 /sys**

📌 **What it is:**  
Another virtual FS — lets kernel and devices talk. Low-level like BIOS settings.

🎯 **When it's used:**  
At boot, driver loading, and power management.

**📁 /lib and /lib64**

📌 **What it is:**  
Shared libraries for /bin and /sbin. Like DLLs in System32.

🎯 **When it's used:**  
When apps need system functions.

**📁 /media and /mnt**

📌 **What it is:**  
Mount points — where USBs, CDs, and other file systems appear. Like E:\ or D:\.

🎯 **When it's used:**  
When you plug in a drive or mount a remote server.

💡 **Example:**  
• /media/shadow/USB\_DRIVE  
• /mnt/nas/ ← Mounted NAS server

**📁 /boot**

📌 **What it is:**  
Boot files like the Linux kernel and GRUB bootloader — like bootmgr, BCD, winload.efi.

🎯 **When it's used:**  
On system startup

💡 Real-world:  
• /boot/grub/grub.cfg  
• /boot/vmlinuz ← Linux kernel

**📁 /swap or [swap partition]**

📌 **What it is:**  
Virtual memory like pagefile.sys.

🎯 **When used:**  
When physical RAM is full.

/

├── bin/ ← essential user binaries (ls, cp, rm)

├── sbin/ ← system binaries (reboot, iptables)

├── etc/ ← config files

├── home/

│ └── shadow/ ← your personal folder

│ └── .bashrc ← user shell config

├── root/ ← root user's home

├── var/ ← logs, mail, www, package cache

│ └── log/

├── usr/

│ ├── bin/ ← app binaries (python3, nmap)

│ └── share/ ← icons, docs

├── opt/ ← optional third-party apps

├── tmp/ ← temp files

├── dev/ ← devices (USB, disk)

├── proc/ ← live system info

├── sys/ ← kernel/device info

├── lib/ lib64/ ← system libraries

├── media/ mnt/ ← external drives

└── boot/ ← bootloader files (kernel, grub)