Linux Commands Cheatsheet

Core Linux Commands:

- ❖ **pwd** → Shows the current working directory.
- ❖ **ls** → Lists files and directories in the current location.
- ❖ **cd** → Changes the current directory.
- ❖ **tree** → Displays directories and files in a tree-like format.
- ❖ **stat** → Shows detailed information about a file.
- ❖ **touch** → Creates an empty file or updates file timestamps.
- ❖ **file** → Determines the type of a file.
- ❖ **basename** → Extracts the filename from a path.
- ❖ **dirname** → Extracts the directory path from a full path.
- ❖ **cat** → Displays the contents of a file.
- ❖ **tac** → Displays a file's contents in reverse order.
- ❖ **less** → Views a file one page at a time (scrollable).
- ❖ **more** → Views a file one page at a time (simpler than less).
- ❖ **head** → Shows the first few lines of a file.
- ❖ **tail** → Shows the last few lines of a file.
- ❖ **nl** → Displays a file with line numbers.

❖ **strings** → Extracts readable text from binary files.

❖ **od** → Displays files in octal or other formats.

❖ **nano** → Simple text editor in terminal.

❖ **vi / vim** → Advanced terminal text editor.

❖ **emacs** → Feature-rich terminal/GUI text editor.

❖ **hexdump / hd** → Displays file contents in hexadecimal format.

❖ **xxd** → Creates a hex dump or converts hex back to binary.

❖ **col / colrm** → Formats or removes specific columns from text.

❖ **clear** → Clears the terminal screen.

❖ **reset** → Resets the terminal.

❖ **sleep** → Pauses execution for a specified time.

❖ **yes** → Repeatedly outputs a string (default “y”) until stopped.

❖ **rev** → Reverses the content of each line.

❖ **cmp** → Compares two files byte by byte.

❖ **comm** → Compares two sorted files line by line.

Searching & Text Processing Commands:

- ❖ **grep** → Searches for patterns in files.
- ❖ **egrep** → Extended grep; supports regex patterns.
- ❖ **fgrep** → Searches for fixed strings (no regex).
- ❖ **zgrep** → Searches compressed files (.gz) using grep.
- ❖ **find** → Searches files and directories by name, type, size, etc.
- ❖ **locate** → Quickly finds files using a prebuilt database.
- ❖ **updatedb** → Updates the database used by locate.
- ❖ **which** → Shows the path of an executable command.
- ❖ **whereis** → Shows binary, source, and man page locations of a command.
- ❖ **type** → Displays command type (builtin, alias, or file).
- ❖ **cut** → Extracts sections/columns from text.
- ❖ **sort** → Sorts lines of text alphabetically or numerically.
- ❖ **uniq** → Removes duplicate lines (works with sorted input).
- ❖ **comm** → Compares two sorted files line by line.
- ❖ **join** → Joins lines of two files based on a common field.
- ❖ **paste** → Merges lines of files side by side.
- ❖ **wc** → Counts lines, words, and characters in a file.

❖ **tr** → Translates or deletes characters.

❖ **xargs** → Builds and executes commands from input.

❖ **tee** → Writes output to a file and displays it simultaneously.

❖ **awk** → Pattern scanning and processing language for text files.

❖ **gawk / mawk** → Variants of awk with added features or performance.

❖ **sed** → Stream editor for modifying text in files or streams.

❖ **diff** → Shows differences between two files line by line.

❖ **sdiff** → Shows side-by-side differences between files.

❖ **cmp** → Compares two files byte by byte.

❖ **iconv** → Converts text from one character encoding to another.

❖ **recode** → Converts text between different encodings.

❖ **pr** → Formats text for printing with headers and pagination.

❖ **jq** → Parses and processes JSON data.

❖ **yq** → Parses and processes YAML data.

❖ **fold** → Wraps long lines to a specified width.

❖ **expand** → Converts tabs to spaces.

❖ **unexpand** → Converts spaces to tabs.

User & Group Management Commands:

- ❖ **useradd** → Creates a new user account.
- ❖ **adduser** → Adds a new user (interactive version of useradd).
- ❖ **passwd** → Sets or changes a user's password.
- ❖ **usermod** → Modifies an existing user account.
- ❖ **userdel** → Deletes a user account.
- ❖ **groupadd** → Creates a new group.
- ❖ **groupdel** → Deletes a group.
- ❖ **gpasswd** → Administers / manages group memberships.
- ❖ **groups** → Lists groups a user belongs to.
- ❖ **id** → Displays user ID (UID) and group IDs (GID).
- ❖ **whoami** → Shows the current logged-in username.
- ❖ **who** → Displays who is logged in.
- ❖ **w** → Shows logged-in users and their activity.
- ❖ **last** → Shows the login history of users.
- ❖ **lastlog** → Displays the last login of all users.
- ❖ **faillog** → Shows failed login attempts.
- ❖ **finger** → Displays information about system users.
- ❖ **su** → Switches to another user account.
- ❖ **sudo** → Executes commands as another user (usually root).

- ❖ **visudo** → Safely edits the sudoers file.
- ❖ **chage** → Manages user password expiration info.
- ❖ **expiry** → Shows account expiration info.
- ❖ **logname** → Prints the current login name.
- ❖ **tty** → Shows the terminal associated with the session.
- ❖ **users** → Displays logged-in users in one line.
- ❖ **write** → Sends a message to another user's terminal.
- ❖ **wall** → Sends a message to all logged-in users.
- ❖ **mesg** → Controls write permissions to your terminal.
- ❖ **pkill -KILL -u user** → Terminates all processes of a specific user.

Permissions & Ownership Commands:

- ❖ **chmod** → Changes file or directory permissions.
- ❖ **chown** → Changes file or directory owner.
- ❖ **chgrp** → Changes group ownership of a file or directory.
- ❖ **umask** → Sets default permission mask for new files/directories.
- ❖ **getfacl** → Displays Access Control List (ACL) of a file/directory.
- ❖ **setfacl** → Sets or modifies ACL for a file/directory.
- ❖ **lsattr** → Lists extended attributes of files.

- ❖ **chattr** → Changes file attributes (e.g., immutable, append-only).
- ❖ **getcap** → Shows capabilities of a file.
- ❖ **setcap** → Sets capabilities on a file.
- ❖ **lssec** → Lists security attributes of files (SELinux context).
- ❖ **chsec** → Changes security attributes of a file.
- ❖ **faillock** → Displays or locks failed login attempts.
- ❖ **test** → Evaluates expressions (e.g., file, string, or numeric tests).
- ❖ **install** → Copies files and sets attributes (permissions, owner, timestamps).
- ❖ **stat** → Displays detailed status of a file or filesystem object.

Process & Job Management:

- ❖ **ps aux** → Shows all running processes with detailed info.
- ❖ **ps** → Displays current processes (default: user's own).
- ❖ **top** → Interactive real-time view of processes and resource usage.
- ❖ **htop** → Enhanced, interactive version of top with color and easier navigation.
- ❖ **atop** → Advanced system & process monitor with historical logging.

❖ **glances** → Cross-platform system monitoring tool with summary view.

❖ **pgrep** → Finds process IDs matching a pattern.

❖ **pkill** → Kills processes by name or other attributes.

❖ **kill** → Sends a signal (default TERM) to a process by PID.

❖ **killall** → Kills all processes matching a name.

❖ **jobs** → Lists background jobs in the current shell.

❖ **fg** → Brings a background job to the foreground.

❖ **bg** → Resumes a suspended job in the background.

❖ **disown** → Removes a job from the shell's job table.

❖ **nohup** → Runs a command immune to hangups, keeping it alive after logout.

❖ **setsid** → Starts a process in a new session (detached from terminal).

❖ **nice** → Starts a process with a specified priority.

❖ **renice** → Changes the priority of a running process.

❖ **uptime** → Shows system load and uptime.

❖ **watch** → Repeatedly runs a command at intervals and shows output.

❖ **time** → Measures the execution time of a command.

❖ **timeout** → Runs a command with a time limit.

❖ **mpstat** → Displays CPU usage per processor.

- ❖ **pidstat** → Shows statistics of processes including CPU/memory usage.
- ❖ **pstree** → Displays processes in a tree structure showing parent-child relation.
- ❖ **lsof** → Lists open files and the processes using them.
- ❖ **vmstat** → Shows virtual memory, CPU, and system stats.
- ❖ **pidof** → Returns the PID(s) of a given process name.

System Monitoring & Performance:

- ❖ **vmstat** → Shows virtual memory, CPU, and system performance statistics.
- ❖ **iostat** → Displays CPU and I/O statistics for devices and partitions.
- ❖ **dstat** → Real-time system resource statistics including CPU, disk, network, and more.
- ❖ **sar** → Collects, reports, and saves system activity metrics over time.
- ❖ **iotop** → Shows real-time I/O usage per process.
- ❖ **iftop** → Monitors real-time network bandwidth usage per connection.
- ❖ **nethogs** → Displays real-time network usage per process.
- ❖ **lsof** → Lists open files and the processes using them.

❖ **strace** → Traces system calls and signals made by a process.

❖ **perf** → Performance analysis tool for CPU profiling and performance events.

❖ **glances** → Cross-platform system monitoring tool with CPU, memory, disk, network summary.

❖ **uptime** → Shows how long the system has been running with load averages.

❖ **free -h** → Displays total, used, and free memory in a human-readable format.

Disk & Filesystem:

❖ **lsblk** → Lists information about all block devices in a tree format.

❖ **blkid** → Shows block device attributes like UUID and filesystem type.

❖ **fdisk** → Interactive tool to create, delete, or modify disk partitions (MBR).

❖ **parted** → Advanced partitioning tool (supports GPT and MBR).

❖ **cfdisk** → Curses-based interactive partition editor.

❖ **sfdisk** → Scriptable partitioning tool.

❖ **mkfs** → Creates a filesystem on a partition or disk.

❖ **fsck** → Checks and repairs a filesystem.

❖ **tune2fs** → Adjusts/ext2/ext3/ext4 filesystem parameters.

❖ **resize2fs** → Resizes an ext2/ext3/ext4 filesystem.

❖ **mount** → Mounts a filesystem to a directory.

❖ **umount** → Unmounts a mounted filesystem.

❖ **df** → Shows disk space usage of mounted filesystems.

❖ **du** → Displays disk usage of files and directories.

❖ **findmnt** → Finds mounted filesystems or searches by criteria.

❖ **quota** → Displays disk usage and limits for users.

❖ **edquota** → Edit disk quotas for users.

❖ **repquota** → Reports disk quotas for a filesystem.

❖ **swapon** → Enables swap space.

❖ **swapoff** → Disables swap space.

❖ **mkswap** → Prepares a partition or file as swap space.

❖ **wipefs** → Wipes filesystem signatures from a device.

❖ **partprobe** → Updates kernel with new partition table info.

❖ **losetup** → Manages loop devices (mounts disk images).

❖ **cryptsetup** → Sets up encrypted block devices (LUKS).

- ❖ **du -sh** → Shows total disk usage of a file/directory in human-readable format.
- ❖ **df -h** → Shows disk space usage in human-readable format.
- ❖ **stat** → Displays detailed information about a file or filesystem.
- ❖ **file** → Determines file type.
- ❖ **mount | column -t** → Lists mounted filesystems in a clean, column-aligned format.

Compression & Archiving:

- ❖ **tar** → Archives files and directories into a single file (optionally compresses).
- ❖ **tar --exclude** → Creates a tar archive while excluding specified files or directories.
- ❖ **gzip** → Compresses files using the gzip algorithm.
- ❖ **gunzip** → Decompresses .gz files.
- ❖ **bzip2** → Compresses files using the bzip2 algorithm (better compression than gzip).
- ❖ **bunzip2** → Decompresses .bz2 files.
- ❖ **xz** → Compresses files using the xz algorithm (high compression ratio).
- ❖ **unxz** → Decompresses .xz files.
- ❖ **zip** → Compresses files into a .zip archive.
- ❖ **unzip** → Extracts files from a .zip archive.

- ❖ **7z** → Compresses files using 7-Zip format.
- ❖ **rar** → Compresses files using RAR format.
- ❖ **unrar** → Extracts files from a RAR archive.
- ❖ **split** → Splits a large file into smaller chunks.
- ❖ **csplit** → Splits a file into sections based on patterns.
- ❖ **dd** → Low-level copying/conversion of files or partitions.
- ❖ **rsnapshot** → Incremental filesystem backup utility using rsync.
- ❖ **borg** → Deduplicating backup tool for efficient storage.
- ❖ **restic** → Secure, fast, and efficient backup program.
- ❖ **compress** → Compresses files using the older Unix compress algorithm.
- ❖ **uncompress** → Decompresses files created with compress.

Networking & Remote Access:

- ❖ **ip** → Shows/manages network interfaces, routing, and addresses.
- ❖ **ip a** → Displays all network interfaces and their IP addresses.
- ❖ **ifconfig** → Displays or configures network interfaces (legacy).

❖ **ethtool** → Displays and modifies Ethernet device settings.

❖ **iwconfig** → Displays or configures wireless network interfaces.

❖ **ping** → Checks connectivity to a host and measures response time.

❖ **traceroute** → Shows the path packets take to reach a host.

❖ **mtr** → Combines ping and traceroute for real-time route analysis.

❖ **curl** → Transfers data to/from a server using various protocols.

❖ **wget** → Downloads files from the web via HTTP, HTTPS, FTP.

❖ **scp** → Securely copies files between hosts over SSH.

❖ **rsync** → Efficiently synchronizes files and directories locally or remotely.

❖ **ssh** → Securely logs into a remote machine over SSH.

❖ **sftp** → Securely transfers files over SSH.

❖ **ftp** → Transfers files using the FTP protocol.

❖ **telnet** → Connects to remote hosts using Telnet protocol (insecure).

❖ **nc / netcat** → Reads/writes data over network connections (TCP/UDP).

❖ **dig** → Queries DNS servers for domain info.

❖ **nslookup** → Queries DNS servers for domain info (legacy).

❖ **host** → Resolves domain names to IP addresses.

❖ **arp** → Displays or manipulates ARP table (IP-to-MAC mapping).

❖ **route** → Displays/manages the IP routing table.

❖ **ss** → Shows socket statistics and network connections.

❖ **netstat** → Displays network connections, routing tables, and interface stats.

❖ **tcpdump** → Captures and analyzes network packets.

❖ **tshark** → Command-line version of Wireshark for packet analysis.

❖ **nmap** → Network scanning and port discovery tool.

❖ **arping** → Sends ARP requests to a host to check link-layer connectivity.

❖ **iwlist** → Displays detailed wireless network info.

❖ **bridge** → Shows/manages network bridge devices.

❖ **brctl** → Configures Ethernet bridge devices.

❖ **vconfig** → Manages VLANs on Linux (legacy).

❖ **ip netns** → Manages network namespaces for isolated network environments.

- ❖ **socat** → Creates bidirectional data streams between two endpoints.
- ❖ **bmon** → Monitors bandwidth usage per interface.
- ❖ **ping6** → Sends ICMPv6 echo requests to check IPv6 connectivity.
- ❖ **traceroute6** → Traces IPv6 route to a host.
- ❖ **netcat** → Alias for nc; general TCP/UDP communication tool.
- ❖ **netstat -tulpn** → Shows listening ports and associated processes.
- ❖ **ss -tulpn** → Displays detailed socket info for listening ports (replacement for netstat).

Package Management:

- ❖ **apt** → High-level package manager for Debian/Ubuntu systems (install, remove, update).
- ❖ **apt-get** → Lower-level package manager for Debian/Ubuntu systems (script-friendly).
- ❖ **apt-cache** → Searches and queries package information in Debian/Ubuntu.
- ❖ **dpkg** → Installs, removes, or queries individual .deb packages.
- ❖ **snap** → Manages snap packages (universal Linux packages).

- **yum** → Package manager for older RHEL/CentOS systems.
- **dnf** → Modern package manager for Fedora/RHEL/CentOS systems (replacement for yum).
- **rpm** → Installs, queries, or removes .rpm packages.
- **zypper** → Package manager for openSUSE systems.
- **flatpak** → Manages sandboxed Linux applications.
- **yumdownloader** → Downloads RPM packages without installing them.
- **lsb_release -a** → Shows Linux distribution info and version details.

Services & Systemd:

- **systemctl** → Controls and manages systemd services and the system state.
- **service** → Starts, stops, or checks status of SysV or systemd services (legacy).
- **chkconfig** → Manages service runlevels and auto-start (SysV legacy).
- **journalctl** → Views logs collected by systemd's journal.
- **logger** → Adds custom messages to the system log.
- **systemctl isolate** → Switches the system to a specific target (runlevel).

- ❖ **systemctl list-units** → Lists loaded units (services, sockets, mounts, etc.).
- ❖ **systemctl status** → Shows status and logs of a specific service.
- ❖ **systemctl start** → Starts a service immediately.
- ❖ **systemctl stop** → Stops a running service.
- ❖ **systemctl enable** → Configures a service to start automatically on boot.
- ❖ **systemctl disable** → Prevents a service from starting on boot.
- ❖ **systemctl rescue** → Switches system to rescue mode (single-user).
- ❖ **systemctl reboot --firmware-setup** → Reboots into firmware/BIOS setup.
- ❖ **systemctl default** → Switches system to the default target (normal boot).

Scheduling:

- ❖ **cron** → Daemon that runs scheduled tasks automatically at specified times.
- ❖ **crontab** → Edits or lists a user's scheduled cron jobs.
- ❖ **at** → Schedules a one-time task to run at a specific time.
- ❖ **batch** → Schedules a task to run when system load is low.

- ❖ **anacron** → Runs periodic jobs on systems that are not always powered on.
- ❖ **systemd-run** → Schedules a command to run as a transient systemd service.
- ❖ **timers** → systemd units that schedule tasks like cron jobs.
- ❖ **watch** → Repeatedly executes a command at intervals and displays output.

Shell & Environment:

- ❖ **echo** → Prints text or variables to the terminal.
- ❖ **printf** → Formats and prints text with more control than echo.
- ❖ **read** → Reads input from the user into a variable.
- ❖ **history** → Shows previously executed commands.
- ❖ **alias** → Creates a shortcut for a command.
- ❖ **unalias** → Removes an existing alias.
- ❖ **export** → Sets environment variables for child processes.
- ❖ **env** → Displays or runs commands with modified environment variables.
- ❖ **set** → Shows or sets shell options and variables.
- ❖ **unset** → Removes a shell variable or function.
- ❖ **.bashrc** → Shell startup file executed for interactive non-login shells.

- ❖ **.profile** → Shell startup file executed for login shells.
- ❖ **PATH** → Environment variable listing directories searched for executables.
- ❖ **which** → Shows the full path of a command.
- ❖ **type** → Describes how a command will be interpreted (builtin, alias, file).
- ❖ **hash** → Caches the locations of commands to speed up execution.
- ❖ **basename** → Extracts the filename from a path.
- ❖ **dirname** → Extracts the directory path from a full path.
- ❖ **command** → Executes a command bypassing shell functions or aliases.
- ❖ **eval** → Evaluates and executes arguments as a shell command.
- ❖ **exec** → Replaces the current shell with a specified command.
- ❖ **sleep** → Pauses execution for a specified amount of time.

Security & Access Control:

- ❖ **getenforce** → Shows the current SELinux mode (Enforcing, Permissive, Disabled).
- ❖ **setenforce** → Changes the SELinux mode temporarily.
- ❖ **sestatus** → Displays detailed SELinux status.

❖ **semanage** → Manages SELinux policy components (ports, users, file contexts).

❖ **apparmor_status / aa-status** → Shows the status of AppArmor profiles.

❖ **ufw** → Simplified firewall management tool (Ubuntu).

❖ **firewall-cmd** → Manages firewalld (RHEL/Fedora) rules and zones.

❖ **iptables** → Configures IPv4 packet filtering rules.

❖ **nft** → Manages modern packet filtering (nftables).

❖ **tripwire** → Monitors file integrity for security violations.

❖ **aide** → Advanced Intrusion Detection Environment; checks file integrity.

❖ **getcap** → Shows capabilities set on files.

❖ **setcap** → Sets file capabilities (e.g., allow root privileges on binaries).

❖ **lssec** → Displays security attributes of files (SELinux).

❖ **chsec** → Changes security attributes of files (SELinux).

❖ **faillock** → Tracks failed login attempts and locks accounts.

❖ **gpg / gpg2** → Encrypts, decrypts, and signs files using GPG/PGP.

- ❖ **openssl** → Toolkit for SSL/TLS, encryption, and certificate management.
- ❖ **sha256sum** → Computes SHA-256 checksum for file integrity verification.
- ❖ **md5sum** → Computes MD5 checksum for file integrity verification.
- ❖ **shasum** → Computes SHA checksums (multiple algorithms supported).
- ❖ **chroot** → Changes root directory for a process, isolating its filesystem.

Logging & Auditing:

- ❖ **journalctl** → Views logs collected by systemd's journal.
- ❖ **logrotate** → Rotates, compresses, and manages log files automatically.
- ❖ **/var/log/syslog** → System log file for general messages (Debian/Ubuntu).
- ❖ **/var/log/messages** → System log file for general messages (RHEL/CentOS).
- ❖ **dmesg** → Shows kernel ring buffer messages (boot and hardware logs).
- ❖ **dmesg -T** → Displays kernel messages with human-readable timestamps.
- ❖ **auditctl** → Configures the Linux audit system.

- **ausearch** → Searches audit logs for specific events.
- **aureport** → Generates summary reports from audit logs.
- **logger** → Adds custom messages to system logs.
- **last** → Shows login history of users.
- **lastb** → Shows failed login attempts.
- **journalctl -xe** → Displays systemd logs with priority and extended info (useful for debugging).

System Information & OS Details:

- **uname -a** → Displays all system information (kernel, hostname, architecture, OS).
- **uname -r** → Shows the kernel release version.
- **uname -m** → Shows the system architecture (e.g., x86_64).
- **arch** → Displays the machine architecture.
- **dpkg --print-architecture** → Shows Debian/Ubuntu system architecture.
- **cat /etc/os-release** → Displays OS name and version info.
- **lsb_release -a** → Shows detailed Linux distribution info.
- **hostname** → Displays the current system hostname.
- **hostnamectl** → Shows and manages system hostname and related settings.

❖ **lscpu** → Displays detailed CPU architecture info.

❖ **lsusb** → Lists USB devices connected to the system.

❖ **lspci** → Lists PCI devices (graphics, network, etc.).

❖ **lshw** → Shows detailed hardware configuration.

❖ **dmidecode** → Dumps BIOS/firmware and hardware info.

❖ **hwclock** → Displays or sets the hardware clock.

❖ **timedatectl** → Shows or sets system time, date, and timezone.

❖ **uptime -p** → Shows system uptime in a human-readable format.

❖ **free -m** → Displays memory usage in MB.

❖ **free -g** → Displays memory usage in GB.

❖ **inxi** → Shows comprehensive system hardware and OS info.

❖ **lsns** → Lists all namespaces in the system.

❖ **numactl** → Displays NUMA node info and allows process placement.

❖ **taskset** → Sets or displays CPU affinity for a process.

❖ **dmesg** → Shows kernel messages (boot, hardware, driver info).

❖ **blkid** → Shows block devices with UUID and filesystem type.

Power & Boot Management:

- ❖ **shutdown** → Schedules or immediately shuts down or reboots the system.
- ❖ **reboot** → Restarts the system immediately.
- ❖ **halt** → Stops all CPU functions and brings the system to a halt.
- ❖ **poweroff** → Powers off the system completely.
- ❖ **init** → Changes the system runlevel or initializes the system (SysV).
- ❖ **runlevel** → Shows the current and previous runlevels.
- ❖ **telinit** → Changes the system runlevel (legacy).
- ❖ **grub2-install** → Installs GRUB2 bootloader on a disk.
- ❖ **update-grub** → Generates a new GRUB configuration file.
- ❖ **fsck -y /dev/sdX** → Checks and automatically repairs a filesystem.
- ❖ **chroot** → Changes root directory for recovery or isolated environment.
- ❖ **rescue mode** → Boot mode for repairing system or recovering from failures.

File Transfer & Sharing:

- ❖ **scp -r** → Recursively copies directories/files securely over SSH.
- ❖ **rsync -avz** → Synchronizes files/directories with archive mode, verbose output, and compression.
- ❖ **curl -O** → Downloads a file from a URL and saves it with its original name.
- ❖ **wget -c** → Continues downloading a partially downloaded file.
- ❖ **nc -l -p 1234 > file + nc host 1234 < file** → Transfers a file over TCP using netcat (listener + sender).
- ❖ **python3 -m http.server 8080** → Starts a simple HTTP server on port 8080.
- ❖ **nfs-utils** → Provides utilities for mounting and managing NFS shares.
- ❖ **samba** → Provides SMB/CIFS file sharing services on Linux.
- ❖ **smbclient** → Connects to and interacts with SMB/CIFS shares.
- ❖ **mount.cifs** → Mounts SMB/CIFS network shares on Linux.

Virtualization & Containers:

- ❖ **virsh** → Manages and controls KVM/QEMU virtual machines.
- ❖ **virt-install** → Creates and installs new virtual machines on KVM/QEMU.
- ❖ **qemu-img** → Creates, converts, and manipulates disk images for QEMU.
- ❖ **docker** → Manages Docker containers, images, and networks.
- ❖ **podman** → Manages containers and images without requiring a daemon (Docker alternative).
- ❖ **ctr** → CLI client for containerd to manage containers and images.
- ❖ **crictl** → CLI for interacting with CRI-compatible container runtimes (Kubernetes).
- ❖ **lxc** → Manages Linux containers (low-level).
- ❖ **lxd** → Provides a daemon and tools for managing LXC containers (higher-level).

Developer Tools:

- ❖ **gcc** → GNU C/C++ compiler for compiling source code into binaries.
- ❖ **make** → Automates building projects based on Makefile rules.

- ❖ **cmake** → Cross-platform build system generator for complex projects.
- ❖ **ldd** → Shows shared library dependencies of a binary.
- ❖ **strace** → Traces system calls and signals used by a program.
- ❖ **ltrace** → Traces library calls made by a program.
- ❖ **gdb** → GNU debugger for debugging programs at runtime.
- ❖ **perf** → Performance analysis tool for CPU profiling and performance events.
- ❖ **git** → Distributed version control system for source code management.
- ❖ **svn** → Centralized version control system (Subversion).
- ❖ **patch** → Applies changes to files using diff output.

Troubleshooting & Recovery:

- ❖ **journalctl -xe** → Displays systemd logs with priority and extended info for troubleshooting.
- ❖ **systemctl rescue** → Switches the system to rescue mode (single-user, minimal services).
- ❖ **grub2-install** → Installs GRUB2 bootloader on a disk.
- ❖ **update-grub** → Regenerates GRUB configuration file.
- ❖ **chroot** → Changes root directory for recovery or isolated environment.

- ❖ **fsck -y /dev/sdX** → Checks and automatically repairs a filesystem on the specified device.
- ❖ **rescue mode** → Boot mode for repairing system issues or recovering from failures.

Fun / Miscellaneous Linux commands:

- ❖ **cowsay** → Displays a message as spoken by an ASCII cow (or other characters).
- ❖ **fortune** → Displays a random witty or inspirational quote.
- ❖ **sl** → Steam Locomotive animation, a fun joke when ls is mistyped.
- ❖ **yes** → Repeatedly outputs a string (default: “y”) until stopped.
- ❖ **rev** → Reverses lines of text.
- ❖ **cal** → Displays a simple calendar for the current month or specified month/year.
- ❖ **ncal** → Displays an alternate calendar format with week numbers.
- ❖ **date** → Shows or sets the system date and time.
- ❖ **timedatectl** → Displays or changes system time, date, and timezone.
- ❖ **figlet** → Creates large ASCII text banners from input.
- ❖ **toilet** → Creates colorful ASCII text banners with effects.

Practice Recommendation

- **Cloud:** Launch a free-tier Linux VM (AWS, Oracle, Azure, GCP) and practice commands.
- **Local VM:** Use Oracle VirtualBox or VMware to run Ubuntu/CentOS/Debian safely.
- **Tips:** Start with basic commands (files, processes), then try networking, monitoring, and system management.
- **Explore:** Use man <command> or <command> --help and try combining commands (e.g., ps aux | grep <process>).

Practicing on a VM or cloud instance helps you learn Linux and prepares you for DevOps/Cloud tasks.