1. File and Directory Management

- ls : Lists the contents of a directory
- cp : Copies files and directories
- mv : Moves or renames files and directories
- rm : Removes (deletes) files or directories
- touch : Creates a new empty file or update file timestamps
- nano : Text editor (terminal-based)
- vim / vi : Advanced text editors
- cat : Concatenates and displays file content
- tac : Concatenate and display file content in reverse
- less : Displays file content one screen at a time, allowing for scrolling
- more : Displays file content one screen at a time, but with less functionality than less
- head : Displays the beginning of a file
- tail : Displays the end of a file
- diff : Compares two files line by line
- grep : Searches for patterns within files
- find : Searches for files and directories in a directory hierarchy
- file : Determines file type
- chmod : Changes file permissions
- chown : Changes file owner
- chgrp : Changes file group ownership
- ln : Creates links (hard or symbolic) between files
- locate : Find files by name
- stat : Display file or file system status
- sed : Stream editor for filtering and transforming text.
- awk : Pattern scanning and processing language
- cut : Remove sections from each line of files
- sort : Sort lines of text files.
- uniq : Report or omit repeated lines

Directory Commands

- pwd : Prints the current working directory
- cd : Changes the current directory
- mkdir : Creates new directories
- rmdir : Removes empty directories
- tree : Lists contents of directories in a tree-like format

2.Filesystem Permissions and Security

- chmod : Change file permissions
  - chmod 755 file.txt – Give read, write, and execute permissions to owner, and read-execute permissions to others
- chown : Change file owner and group
  - chown user:group file.txt – Change owner and group of a file
- chgrp : Change group ownership of a file
  - chgrp group file.txt – Change the group of a file
- umask : Set default permissions for new files
  - umask 022 – Set default permissions for newly created files to 755
- setfacl : Set access control lists (ACL) for file permissions
- getfacl : Get access control lists (ACL) for file permissions

3.User and Group Management

- useradd : Creates a new user account
- adduser : Creates a new user account with interactive prompts and generally sets up a home directory and other default configurations
- userdel : Deletes a user account
- usermod : Modifies an existing user account's properties
- passwd : Changes a user's password
- chage : Changes user password expiry information
- id : Displays user and group identity information
- whoami : Displays the effective username of the current user
- su : Switches to another user account or becomes the superuser
- sudo : Executes a command with elevated privileges
- last : Displays information about the last logged-in users
- who : Displays information about currently logged-in users
- groupadd : Creates a new group
- groupdel : Deletes a group
- groupmod : Modifies an existing group's properties
- groups : Displays the groups a user belongs to
- newgrp : Changes the current group ID, effectively switching to a new group for the current session
- gpasswd : Administers the /etc/group and /etc/gshadow files, used for managing group passwords and memberships

- chgrp : Changes the group ownership of files or directories

4.Disk Management

- lsblk : Lists block devices, including disks and their partitions, in a tree-like format
- fdisk : partition table manipulator for linux
- parted : A partition manipulator program
- blkid : Locates and displays the attributes (UUID, LABEL, TYPE) of block devices
- df : Reports filesystem disk space usage
- du : Estimates file and directory space usage

Filesystem Creation

- mkfs : Builds a Linux filesystem on a device or partition. It's a front-end for various filesystem-specific tools (e.g., mkfs.ext4, mkfs.xfs)
- mkswap : Sets up a Linux swap area
- fsck : Checks and optionally repairs a Linux filesystem. It's a front-end for filesystem-specific check tools (e.g., fsck.ext4)
- e2fsck : Checks and repairs ext2, ext3, or ext4 filesystems

Mounting and Unmounting Filesystems

- mount : Attaches a filesystem to a specified mount point in the directory tree, making it accessible
- umount : Detaches a mounted filesystem from the directory tree
- /etc/fstab : A system configuration file that contains information about filesystems to be mounted automatically at boot time

Logical Volume Management (LVM)

- pvcreate : Initializes a physical volume for use by LVM
- pvdisplay : Displays attributes of physical volumes
- vgcreate : Creates a volume group
- vgdisplay : Displays attributes of volume groups
- lvcreate : Creates a logical volume
- lvdisplay : Displays attributes of logical volumes
- lvextend : Extends the size of a logical volume
- lvreduce : Reduces the size of a logical volume
- vgremove : Removes a volume group
- lvremove : Removes a logical volume

5.Process management

- ps : Report a snapshot of current processes.
- top : Display Linux tasks.
- htop : Interactive process viewer (advanced top).
- kill : Send a signal to a process, typically to terminate.
- killall : Terminate processes by name.
- bg : Resume a suspended job in the background.
- fg : Bring a job to the foreground.
- jobs : List active jobs.
- nice : Run a program with modified scheduling priority.
- renice : Alter priority of running processes.
- uptime : Show how long the system has been running.
- time : Measure program running time.

6. Network management

- ifconfig : displays and configure network interfaces
- ip a : shows all network interfaces and their Ips
- ip r : displays the routing tables
- ping : Send ICMP Echo requests to network hosts
- netstat : show open ports and listening services
- ss : Socket statistics and listening services (faster than netstat)
- traceroute : Trace the route packets take to a network host
- nslookup : Query Internet name servers interactively
- dig : DNS lookup utility
- wget : Non-interactive network downloader
- curl : Transfer data with URLs
- scp : Secure copy files between hosts
- ssh : Secure shell for remote login
- ftp : File Transfer Protocol client

7. system information and monitoring

- uname : print system information
- hostname : Shows or sets the system's hostname
- lsusb : Lists USB devices connected to the system
- lspci : Lists PCI devices connected to the system

- lshw : Lists hardware configuration
- top **:** Displays dynamic processes and system information
- htop : Interactive process and resource monitoring
- ps : Report a snapshot of current process
- free : Displays the total, used, and free amounts of physical and swap memory
- df : Reports file system disk space usage
- du : Estimates file space usage for files or directories.
- Iostat : Reports CPU utilization and I/O statistics for devices and partitions.
- vmstat : Report virtual memory statistics
- netstat : show open ports and listening services
- uptime : Shows system uptime and load averages (1, 5, and 15 minutes).
- who : Displays information about users currently logged in.
- w : Shows who is logged on and what they are doing
- dmesg : Print the kernel ring buffer messages (system boot and hardware related message)
- journalctl : Query and view logs from system's journal

8. package management (depends on distributions)

Debian-based (e.g., Ubuntu)

- apt-get : APT package handling utility
  - apt-get install : Install a package
  - apt-get update : Update package list
  - apt-get upgrade : Upgrade installed packages
  - apt-get remove : Remove a package
- apt-cache : Query APT cache
  - apt-cache search : Search for a package
  - apt-cache show : Show package details

Red Hat-based (e.g., CentOS, Fedora)

- yum : Package manager for RPM-based systems
  - yum install : Install a package
  - yum update : Update installed packages
  - yum remove : Remove a package
- dnf : Next-generation package manager (Fedora, CentOS 8+)
  - dnf install : Install a package

- dnf update : Update installed packages
- dnf remove : Remove a package

General Commands

- rpm : RPM package manager
  - rpm -i : Install an RPM package
  - rpm -e : Remove an RPM package
- dpkg – Debian package manager
  - dpkg -i : Install a Debian package
  - dpkg -r : Remove a Debian package

9. System Services and Daemon Management

- systemctl : Control the systemd system and service manager
  - systemctl start : Start a service
  - systemctl stop : Stop a service
  - systemctl restart : Restart a service
  - systemctl enable : Enable a service to start on boot
  - systemctl disable : Disable a service from starting on boot
  - systemctl status : Check service status
- service : Older service management command (used in non systemd systems)
  - service start : Start a service
  - service stop : Stop a service
  - service restart : Restart a service
  - service status : Check service status

10. Archiving and Compression

Working with tar files

- tar -cvf archive.tar < files > : create a ter archive
- tar -xvf archive.tar : extract a tar archive
- tar -tvf archive.tar : list files in a tar archive
- tar -czvf archive.tar.gz < files > : create a compressed tar.gz archive
- tar -xzvf archive.tar.gz : extract a tar.gz archive
- tar -cJvf archive.tar.xz : Create a tar.xz archive
- tar -xJvf archive.tar.xz : Extract a tar.xz archive

Working with zip files

- zip archive.zip <files> : Create a zip archive
- unzip archive.zip : Extract a zip archive
- unzip -l archive.zip : List contents of a zip file
- zip -r archive.zip : Zip a directory

Working with gzip & bzip2

- gzip <file> : Compress a file using gzip
- gunzip <file> .gz : Decompress a gzip file
- bzip2 <file> : Compress a file using bzip2
- bunzip2 <file>.bz2 : Decompress a bzip2 file

11.Text Processing

- grep : Search for patterns within files
  - grep 'pattern' file.txt – Search for a pattern in a file
  - grep -r 'pattern' /dir/ – Recursively search for a pattern
- sed : Stream editor for filtering and transforming text
  - sed 's/old/new/g' file.txt – Replace old with new globally
- awk : A powerful text processing language
  - awk '{print $1}' file.txt – Print the first column of each line in a file
- cut : Remove sections from each line of a file
  - cut -d ':' -f 1 /etc/passwd – Print the first field of each line, delimited by ":"
- sort : Sort lines of text files
  - sort file.txt – Sort file content in ascending order
- uniq : Report or omit repeated lines in a file
  - sort file.txt | uniq – Sort and remove duplicate lines
- tee : Read from standard input and write to standard output and files
  - echo "text" | tee file.txt – Write to file and show output on screen
- tr : Translate or delete characters
  - echo "hello" | tr 'a-z' 'A-Z' – Convert lowercase to uppercase
- paste : Merge lines of files
  - paste file1.txt file2.txt – Combine lines of file1 and file2 side by side
- wc : Word, line, character, and byte count
  - wc -l file.txt – Count lines in a file
  - wc -w file.txt – Count words in a file

12. System Shutdown and Reboot

- shutdown : Shut down the system
  - shutdown -h now : Immediately shut down
  - shutdown -r now : Reboot the system
  - shutdown -h +10 : Shut down after 10 minutes
  - shutdown -h 22:00 : Schedule shutdown at 10:00 PM
  - shutdown -c : Cancel a scheduled shutdown
- reboot : Reboot the system
- halt : Halt the system immediately (equivalent to turning off power)
- poweroff : Power off the system
- init : Change the runlevel (old-style system manager)
  - init 0 : Shutdown
  - init 6 : Reboot

13. System Diagnostics and Troubleshooting

- dmesg : Print the kernel ring buffer messages (system boot and hardware-related messages)
- journalctl : Query and view logs from systemd's journal
- strace : Trace system calls and signals
  - strace : Trace a command's system calls
- lsof : List open files (useful for debugging)
  - lsof : Show processes using a specific file
- vmstat : Report virtual memory statistics
- iostat : Report CPU and I/O statistics
- mpstat : Report CPU usage statistics
- pidstat : Report statistics by process
- free : Display memory usage
- uptime : How long the system has been running
- watch : Execute a program periodically, showing output
  - watch -n 1 free – Watch memory usage every second
- lshw : List hardware configuration
- htop : Interactive process viewer (better than top)
- netstat : Network statistics (deprecated in favor of ss)
- ss : Show socket statistics (more efficient than netstat)

14. Networking & Remote Management

- ifconfig : Configure network interfaces (older command, replaced by ip)
- ip : A more modern alternative for managing network interfaces and routing
  - ip addr : Show IP addresses
  - ip link : Show or manipulate network interfaces
  - ip route : Show or manipulate routing tables
- ss : Display socket statistics (useful for diagnosing network issues)
- nmap : Network exploration tool (can be used for security auditing)
- telnet : User interface to the TELNET protocol (less common nowadays)
- nc (Netcat) : Network utility for reading and writing from network connections
  - nc -l -p 1234 : Listen on port 1234
  - nc <host><port> : Connect to a host and port
- iptables : Administration tool for IPv4 packet filtering and NAT (Network Address Translation)
- firewalld : Frontend for managing firewall rules (used in some distros like Fedora and CentOS)
- ufw : Uncomplicated firewall (front-end for iptables)
  - ufw enable – Enable firewall
  - ufw allow <port> – Allow traffic on a specific port
- tcpdump : Command-line packet analyzer
- curl : Transfer data from or to a server using various protocols (HTTP, FTP, etc.)
- wget : Download files from the web via HTTP, HTTPS, FTP
- scp : Secure copy over SSH (used to copy files between systems)
  - scp file.txt user@remote:/path/to/destination/ – Copy file to remote server
- rsync : Remote file and directory synchronization (often used for backups)
  - rsync -avz /local/path/ remote:/remote/path/ – Sync directories

15. Task Scheduling

- cron : Daemon for running scheduled commands
  - crontab -e : Edit cron jobs for the current user
  - crontab -l : List the current user's cron jobs
  - crontab -r : Remove the current user's cron jobs
- at : Run commands at a specified time
  - at 09:00 : Schedule a command to run at 09:00 AM
- batch : Run commands when the system load is low

- sleep : Delay for a specified time
  - sleep 5s – Sleep for 5 seconds

16. System Backup and Restore

- rsync : Remote file and directory synchronization
  - rsync -avz source/ destination/ : Synchronize files
  - rsync -avz -e ssh source/ user@remote:/destination/ : Sync over SSH
- cpio : Copy files to and from archives
- dd : Low-level copying and backup of entire filesystems
  - dd if=/dev/sda of=/path/to/backup.img : Backup a disk/partition
  - dd if=/path/to/backup.img of=/dev/sda : Restore a disk/partition