Study of Basic Commands in Linux Operating System

File and Directory Management

`ls`

- **Description**: Lists files and directories in the current directory.
- **Usage**: `ls [options] [directory]`
- **Examples**:
  - `ls` - List files and directories.
  - `ls -l` - List with detailed information.
  - `ls -a` - List all files, including hidden ones.

`cd`

- **Description**: Changes the current directory.
- **Usage**: `cd [directory]`
- **Examples**:
  - `cd /home/user` - Change to `/home/user` directory.
  - `cd ..` - Move up one directory.
  - `cd ~` - Move to the home directory.

`pwd`

- **Description**: Prints the current working directory.
- **Usage**: `pwd`
- **Examples**:
  - `pwd` - Display the full path of the current directory.

`mkdir`

- **Description**: Creates a new directory.
- **Usage**: `mkdir [options] directory_name`
- **Examples**:
  - `mkdir new_folder` - Create a directory named `new_folder`.
  - `mkdir -p parent_folder/child_folder` - Create parent and child directories.

`rmdir`

- **Description**: Removes an empty directory.
- **Usage**: `rmdir directory_name`
- **Examples**:
  - `rmdir old_folder` - Remove the empty directory `old_folder`.

`rm`

- **Description**: Removes files or directories.
- **Usage**: `rm [options] file_name`

- **Examples**:
  - `rm file.txt` - Remove `file.txt`.
  - `rm -r folder_name` - Remove `folder_name` and its contents recursively.

`cp`

- **Description**: Copies files or directories.
- **Usage**: `cp [options] source destination`
- **Examples**:
  - `cp file1.txt file2.txt` - Copy `file1.txt` to `file2.txt`.
  - `cp -r dir1 dir2` - Copy `dir1` to `dir2` recursively.

`mv`

- **Description**: Moves or renames files or directories.
- **Usage**: `mv [options] source destination`
- **Examples**:
  - `mv file1.txt /home/user/` - Move `file1.txt` to `/home/user/`.
  - `mv old_name.txt new_name.txt` - Rename `old_name.txt` to `new_name.txt`.

File Viewing and Editing

`cat`

- **Description**: Concatenates and displays file content.
- **Usage**: `cat [options] file_name`
- **Examples**:
  - `cat file.txt` - Display the content of `file.txt`.
  - `cat file1.txt file2.txt` - Concatenate and display both files.

`more`

- **Description**: Views file content one page at a time.
- **Usage**: `more file_name`
- **Examples**:
  - `more file.txt` - View the content of `file.txt` page by page.

`less`

- **Description**: Views file content with backward and forward navigation.
- **Usage**: `less file_name`
- **Examples**:
  - `less file.txt` - View and navigate through `file.txt`.

`head`

- **Description**: Displays the first few lines of a file.
- **Usage**: `head [options] file_name`
- **Examples**:
  - `head file.txt` - Display the first 10 lines of `file.txt`.

- `head -n 5 file.txt` - Display the first 5 lines.

`tail`

- **Description**: Displays the last few lines of a file.
- **Usage**: `tail [options] file_name`
- **Examples**:
  - `tail file.txt` - Display the last 10 lines of `file.txt`.
  - `tail -n 5 file.txt` - Display the last 5 lines.

`nano`

- **Description**: A simple text editor.
- **Usage**: `nano file_name`
- **Examples**:
  - `nano file.txt` - Open `file.txt` in the `nano` editor.

System Information

`uname`

- **Description**: Displays system information.
- **Usage**: `uname [options]`
- **Examples**:
  - `uname -a` - Display all available system information.

`top`

- **Description**: Displays real-time system processes and resource usage.
- **Usage**: `top`
- **Examples**:
  - `top` - View system processes and performance metrics.

`df`

- **Description**: Shows disk space usage.
- **Usage**: `df [options]`
- **Examples**:
  - `df` - Display disk space usage for all filesystems.
  - `df -h` - Display sizes in human-readable format.

`du`

- **Description**: Shows disk usage of files and directories.
- **Usage**: `du [options] [directory]`
- **Examples**:
  - `du` - Display disk usage of the current directory.
  - `du -sh /home/user` - Display the total disk usage of `/home/user`.

`free`

- **Description**: Displays memory usage.
- **Usage**: `free [options]`
- **Examples**:
  - `free` - Show memory usage.
  - `free -h` - Show memory usage in human-readable format.

Process Management

`ps`

- **Description**: Displays information about active processes.
- **Usage**: `ps [options]`
- **Examples**:
  - `ps` - Display processes for the current user.
  - `ps aux` - Display detailed information about all processes.

`top`

- **Description**: Real-time view of system processes.
- **Usage**: `top`
- **Examples**:
  - `top` - Show active processes and system usage.

`kill`

- **Description**: Sends signals to processes, typically to terminate them.
- **Usage**: `kill [options] pid`
- **Examples**:
  - `kill 1234` - Terminate process with PID `1234`.
  - `kill -9 1234` - Forcefully terminate process with PID `1234`.

Networking

`ping`

- **Description**: Tests network connectivity to a host.
- **Usage**: `ping [options] destination`
- **Examples**:
  - `ping google.com` - Send ICMP packets to `google.com`.

`ifconfig`

- **Description**: Displays or configures network interfaces.
- **Usage**: `ifconfig [interface] [options]`
- **Examples**:
  - `ifconfig` - Display network interfaces and their details.

`netstat`

- **Description**: Displays network connections and routing tables.

- **Usage**: `netstat [options]`
- **Examples**:
  - `netstat -tuln` - Display listening ports and network connections.

`ssh`

- **Description**: Connects to a remote host securely.
- **Usage**: `ssh [user@]hostname`
- **Examples**:
  - `ssh user@remote_host` - Connect to `remote_host` as `user`.

User Management

`whoami`

- **Description**: Displays the currently logged-in user.
- **Usage**: `whoami`
- **Examples**:
  - `whoami` - Show the username of the current user.

`adduser`

- **Description**: Adds a new user to the system.
- **Usage**: `adduser username`
- **Examples**:
  - `adduser newuser` - Add a new user named `newuser`.

`passwd`

- **Description**: Changes user passwords.
- **Usage**: `passwd [username]`
- **Examples**:
  - `passwd` - Change the password of the current user.
  - `passwd newuser` - Change the password of `newuser`.

File Permissions

`chmod`

- **Description**: Changes file permissions.
- **Usage**: `chmod [options] mode file_name`
- **Examples**:
  - `chmod 755 file.txt` - Set permissions of `file.txt` to `rwxr-xr-x`.

`chown`

- **Description**: Changes file owner and group.
- **Usage**: `chown [options] owner:group file_name`
- **Examples**:
  - `chown user:group file.txt` - Change the owner and group of `file.txt`.

Archiving and Compression

`tar`

- **Description**: Archives files into a single file.
- **Usage**: `tar [options] archive_file file_names`
- **Examples**:
  - `tar -cvf archive.tar file1 file2` - Create a tarball `archive.tar`.
  - `tar -xvf archive.tar` - Extract files from `archive.tar`.

`gzip`

- **Description**: Compresses files using the gzip algorithm.
- **Usage**: `gzip [options] file_name`
- **Examples**:
  - `gzip file.txt` - Compress `file.txt` into `file.txt.gz`.
  - `gzip -d file.txt.gz` - Decompress `file.txt.gz`.