**1. File and Directory Operations (ls, mkdir, cd, rmdir, pwd, rm)**

1. Use ls to display files sorted by modification time.
2. List files and directories in reverse order using ls.
3. Use ls -lh to display file sizes in a human-readable format.
4. Create a directory structure dirA/dirB/dirC using mkdir -p.
5. Navigate to the parent directory of the current directory using cd ...
6. Use cd to move into the /tmp directory and confirm your location with pwd.
7. Remove an empty directory named old\_dir using rmdir.
8. Use rm -rf to delete a directory test\_dir and all its contents.
9. Use ls with the -a flag to display all files, including hidden ones.
10. Use ls -lR to list all files and directories recursively.

**2. File Viewing and Manipulation (cat, wc, head, tail, tac, more, less)**

**cat**

1. Create a file named example.txt and write "Hello, World!" into it using cat > example.txt.
2. Use cat to display the contents of example.txt.
3. Append "Welcome to Linux!" to example.txt using cat >> example.txt.
4. Concatenate two files file1.txt and file2.txt and save the result into merged.txt.
5. Display the contents of a file data.txt with line numbers using cat -n.
6. View a file's contents with non-printable characters shown as ^ using cat -v.
7. Use cat with redirection to create a file and append content in one step.

**wc**

1. Count the number of lines in data.txt using wc -l.
2. Use wc -w to count the words in notes.txt.
3. Calculate the number of characters in notes.txt using wc -c.
4. Combine cat and wc to count lines in a file displayed on the terminal.
5. Use wc to display the total number of lines, words, and characters in a file.
6. Apply wc to all .txt files in the current directory and sort the results by word count.
7. Count the lines in a directory's files using find and wc.

**head**

1. Display the first 3 lines of example.txt using head -n 3.
2. Use head with multiple files to show their first 5 lines.

**tail**

1. View the last 2 lines of logfile.txt using tail.
2. Monitor a log file in real time using tail -f logfile.txt.

**tac**

1. Reverse the lines in data.txt using tac.

**more and less**

1. Use more to view a large file and scroll through it line by line.
2. Navigate backward and forward in a file using less.

**3. File Permissions (chmod)**

1. Use chmod 744 to give read/write/execute permissions to the owner and read-only permissions to others.
2. Change the permissions of script.sh to make it executable by everyone.
3. Set file1.txt to have read/write permissions for the owner only using symbolic notation.
4. Remove execute permissions from a directory test\_dir using chmod.
5. Use chmod recursively to set read-only permissions for all .txt files in a directory.
6. Add execute permissions to all files in a directory using chmod +x \*.
7. Display the permissions of file.txt using ls -l and interpret them.

**4. File and Directory Copying and Moving (cp, mv)**

**cp**

1. Copy a file source.txt to destination.txt using cp.
2. Copy all .txt files from the current directory to backup/ using cp.
3. Use cp -r to copy an entire directory project to project\_backup.
4. Overwrite a file without confirmation using cp.
5. Use cp -i to enable confirmation before overwriting files.
6. Copy files and preserve their attributes using cp -p.

**mv**

1. Rename old\_name.txt to new\_name.txt using mv.
2. Move example.txt to the documents/ directory using mv.
3. Use mv to relocate all .log files to the /tmp directory.
4. Move a directory old\_dir to a new location new\_dir.

**5. Searching and History (find, history)**

**find**

1. Find all .txt files in the current directory using find.
2. Locate files modified within the last 3 days using find.
3. Search for files larger than 5 MB in the /var directory using find.
4. Use find to locate empty files and delete them.

**history**

1. Display the last 15 commands executed using history.
2. Search your history for commands related to chmod.
3. Clear the command history for the current session using history -c.

**6. Miscellaneous Commands (touch, man, clear)**

1. Create an empty file empty.txt using touch.
2. Update the timestamp of file.txt using touch.
3. Use man to open the manual for the ls command.
4. Find out more about the chmod command using man.
5. Clear the terminal screen using clear.

**7. Combined Tasks (Focus on cat, wc, chmod, cp, mv)**

1. Combine cat and wc to count the number of words in the first 10 lines of data.txt.
2. Use find to locate all .txt files and append their contents to merged.txt using cat.
3. Use chmod to set permissions of all .sh files in a directory to 755.
4. Combine cp and find to copy all .log files to a new directory.
5. Create a directory, copy a file into it, and then move it to another location.
6. Use mv to rename all .txt files in a directory by adding a \_backup suffix.

**8. Additional Exercises**

1. Reverse the contents of data.txt and save the result into reversed.txt.
2. Count the total words in multiple files and sort the result.
3. Copy only .png files from a directory to another directory.
4. Move all files starting with test\_ to a folder named test\_files.
5. Find and delete all .tmp files from the current directory using find.

**9. Advanced Challenges**

1. Use chmod to set group ownership and permissions for a shared directory.
2. Combine cat, tac, and head to display the first 3 lines of a file in reverse order.
3. Create a backup script that uses cp and find to archive files modified within the last 7 days.
4. Write a command to display only the longest line in a file using wc and sort.

**10. Comprehensive Practical Tasks**

1. Create multiple files using touch and change their permissions using chmod.
2. Write a command to find the most recent .txt file in a directory.
3. Create a pipeline to search for a term in multiple files and count the occurrences.
4. Copy all .conf files from /etc to a backup/ directory while preserving permissions.
5. Use chmod to remove all execute permissions from a directory and its subdirectories.

**11. Additional Variations**

1. Count the total characters in a directory’s files and sort by file size.
2. Move all files containing the word "report" to a specific directory.
3. Create a command pipeline to display only the middle lines of a file.
4. Display the last 5 commands related to file permissions from the command history.
5. Reverse the contents of multiple files and save the output into corresponding new files.

**12. Extra Questions**

1. Use find to locate files with specific permissions and modify them using chmod.
2. Use cat to create a file, display its contents, and then append to it.
3. Copy files from one directory to another while excluding certain file types.
4. Write a script that uses chmod, mv, and cp to manage file backups.
5. Create a pipeline to count the number of unique words in a file.

**13. Exploring the command**

1. Explore the effect of chmod symbolic notation by modifying specific bits.
2. Use cat to combine contents from files in different directories.
3. Create a nested directory structure, copy files into it, and then delete it.
4. Find and display all files modified within the past hour using find.
5. Use cp with the -n flag