# CA1 – Advance Linux Laboratory

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**Subject : Advance Linux Lab**

**Subject Code : CSV103**

# My Mission

Investigate the workspace and prepare a **clean, organised, production-ready deliverable**.

# Part A — Workspace Exploration (15 Marks)

1. Extract the workspace archive.
2. Navigate into the workspace.
3. Display your current directory.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~$ cd Downloads/project_workspace
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ pwd
/home/pathik-singh/Downloads/project_workspace
```

4. List all files including hidden ones.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ ls -a
.  ..  data  logs  messages  README.txt  reports  temp  users
```

5. Display disk usage of each top-level folder.
6. Identify which folder consumes the most space.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ du -h *
1.1M    data
16K     logs
16K     messages
4.0K    README.txt
12K     reports
8.0K    temp
8.0K    users
```

7. Identify file types present in workspace.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ find . -type f
./messages/message_part_02.txt
./messages/message_part_03.txt
./messages/message_part_01.txt
./reports/report_old.txt
./reports/draft.txt
./logs/old.log
./logs/access.log
./logs/system.log
./temp/empty2.txt
./temp/unused.tmp
./temp/empty1.txt
./README.txt
./data/sample.txt
./data/large_data.bin
./users/new_users.txt
./users/duplicate_users.txt
./users/users.txt
```

# Part B — User Data Processing (15 Marks)

1. Display users.txt in sorted order.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ cd users
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace/users$ sort users.txt
Archishman
Keshav
Krishna
Krishna
Mehak
Mehak
Murli
Prince
Prince
Rimmi
Tarunesh
```

2. Create a file containing only unique users.
3. Create a file containing duplicate users.
4. Count total number of users.
5. Reverse each username and store result in a new file.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace/users$ sort users.txt | uniq > unique_users.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace/users$ sort users.txt | uniq -d > duplicate_users.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace/users$ rev users.txt > reversed_users.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace/users$ cd ..
```

# Part C — Log Investigation (15 Marks)

6. Extract only ERROR lines from system.log.
7. Count number of errors.
8. Extract only "login failed" entries from access.log.
9. Sort log entries.
10. Save processed results into error_report.txt.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ grep "ERROR" logs/system.log > logs/errors_only.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ wc -l logs/errors_only.txt
3 logs/errors_only.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ grep "login failed" logs/access.log > logs/failed_logins.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ sort logs/system.log > logs/sorted_system.log
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ cat logs/errors_only.txt logs/failed_logins.txt > error_report.txt
```

# Part D — Message Reconstruction (10 Marks)

11. Identify message parts.
12. Arrange them in correct order.
13. Combine into single sentence.
14. Save into:

```
processed/final_message.txt
```

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ mkdir processed
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ cat messages/message_part_01.txt messages/message_part_02.txt messages/message_part_03.txt > processed/final_message.txt
```

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ mkdir
processed

pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ cat
messages/message_part_01.txt messages/message_part_02.txt
messages/message_part_03.txt > processed/final_message.txt
```

# Part E — Cleanup Operations (15 Marks)

15. Identify empty files.
16. Verify they contain no data.
17. Delete only empty files.
18. Remove temporary files.
19. Verify cleanup success.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ find temp -type f -size 0
temp/empty2.txt
temp/empty1.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ find temp -type f -size 0 -exec rm {} \;
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ cat data/sample.txt
linux operations practice file
this file is used for counting and viewing
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ head -2 data/sample.txt
linux operations practice file
this file is used for counting and viewing
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ tail -1 data/sample.txt
this file is used for counting and viewing
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ less data/sample.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ ls temp
unused.tmp
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ rm temp/unused.tmp
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ ls temp
```

# Part F — File Viewing and Analysis (10 Marks)

1. View full content of sample.txt.
2. Display first 2 lines.
3. Display last 1 line.
4. Open using pager and navigate.
5. Count lines, words, characters.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ cat data/sample.txt
linux operations practice file
this file is used for counting and viewing
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ head -2 data/sample.txt
linux operations practice file
this file is used for counting and viewing
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ tail -1 data/sample.txt
this file is used for counting and viewing
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ less data/sample.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ ls temp
unused.tmp
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ rm temp/unused.tmp
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ ls temp
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ wc data/sample.txt
 2 12 74 data/sample.txt
```

# Part G — Search and Filtering (10 Marks)

1. Find all text files.
2. Find files modified recently.
3. Search for word "ERROR" across logs.
4. Save search results into a file.
5. Count number of matching lines using pipe.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ find . -name "*.txt"
./messages/message_part_02.txt
./messages/message_part_03.txt
./messages/message_part_01.txt
./processed/final_message.txt
./reports/report_old.txt
./reports/draft.txt
./logs/failed_logins.txt
./logs/errors_only.txt
./error_report.txt
./README.txt
./data/sample.txt
./users/reversed_users.txt
./users/unique_users.txt
./users/new_users.txt
./users/duplicate_users.txt
./users/users.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ grep "ERROR" logs/*.log
logs/sorted_system.log:ERROR disk failure
logs/sorted_system.log:ERROR network unreachable
logs/sorted_system.log:ERROR permission denied
logs/system.log:ERROR disk failure
logs/system.log:ERROR network unreachable
logs/system.log:ERROR permission denied
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ grep "ERROR" logs/system.log
ERROR disk failure
ERROR network unreachable
ERROR permission denied
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ grep "ERROR" logs/system.log > error_search_results.txt
```

# Part H — Redirection and Reporting (5 Marks)

6. Redirect disk usage output into report file.
7. Append current date and time.
8. Save system summary message using tee.

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ echo "Final Verification Completed" | tee -a statistics_report.txt
Final Verification Completed
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ cat statistics_report.txt
16K     ./messages
8.0K    ./processed
12K     ./reports
28K     ./logs
4.0K    ./temp
1.1M    ./data
20K     ./users
1.2M    .
Workspace Cleaned Successfully
Final Verification Completed
```

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ du -h > statistics_report.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ cat statistics_report.txt
16K     ./messages
8.0K    ./processed
12K     ./reports
28K     ./logs
4.0K    ./temp
1.1M    ./data
20K     ./users
1.2M    .
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ echo "Workspace Cleaned Successfully" >> statistics_report.txt
```

# Part I — Final Packaging (5 Marks)

Create final folder:

`deliverable/`

Place inside:

- unique users file
- duplicate users file
- error report
- reconstructed message
- statistics report

```
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ mkdir deliverable
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ cp users/unique_users.txt deliverable/
cp users/duplicate_users.txt deliverable/
cp error_report.txt deliverable/
cp processed/final_message.txt deliverable/
cp statistics_report.txt deliverable/
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ ls deliverable
duplicate_users.txt  error_report.txt  final_message.txt  statistics_report.txt  unique_users.txt
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ tar -cf final_submission.tar deliverable
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ ls
data  deliverable  error_report.txt  error_search_results.txt  final_submission.tar  logs  messages  processed  README.txt  reports  statistics_report.txt  temp  users
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ tar -cf final_submission.tar deliverable
ls
data  deliverable  error_report.txt  error_search_results.txt  final_submission.tar  logs  messages  processed  README.txt  reports  statistics_report.txt  temp  users
pathik-singh@pathik-singh-LOQ-15IAX9:~/Downloads/project_workspace$ 
```