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~~High Performance Computing Lab~~

Experiment1–FamiliarizationwithLinuxCommands

Objective:

To familiarize with basic Linux commands that are essential for operating within a High-Performance Computing (HPC) environment. The goal is to understand file system navigation, process monitoring, file manipulation, and basic shell scripting — all foundational skills for working on clusters such as *Paramrudra*.

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1. Navigation Commands

Command	Description
`pwd ls`	Prints the current working directory
`cd ls`	Lists files and directories in the current path
`-a cd`	Changes the directory
`..`	Lists all files, including hidden ones
	Moves one level up in the directory structure

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2. File and Directory Operations

Command	Description
`touch file.txt`	Creates an empty file
`mkdir new_folder`	Creates a new directory
`rm file.txt`	Deletes a file

`rm -r folder_name`	Deletes a directory and its contents
`cp source.txt destination.txt`	Copies a file
`cp -r src_folder/ dest_folder/`	Copies an entire directory
`mv oldname.txt newname.txt`	Renames or moves a file

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3. Permission Management

Command	Description
`chmod 755 file.sh`	Changes file permissions
`chown user:group file.txt`	Changes file ownership
`ls -l`	Displays detailed information (permissions, owner, size, etc.)

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4. Text Processing Commands

Command	Description
`cat file.txt`	Displays file content
`less file.txt`	Views content page by page
`more file.txt`	Another pager for text viewing
`grep 'pattern' file.txt`	Searches for a specific pattern
`awk '{print $1}' file.txt`	Prints the first column of each line
`sed 's/old/new/g' file.txt`	Substitutes text globally in a file

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5. System Monitoring Commands

Command	Description
`top ps`	Displays running processes in real-time
`aux df`	Shows active processes
`-h`	Displays disk usage in human-readable format
`du -sh folder_name`	Displays folder size summary

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6. Networking Commands

Command	Description
`ping google.com`	Checks network connectivity
`ifconfig`	Displays network interfaces (deprecated)
`ip addr`	Displays network information (recommended)
`netstat -tuln`	Displays active network connections
`ssh user@hostname`	Connects remotely to another system

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7. Shell Scripting Basics

Example:

```
#!/bin/bash
echo "Hello, World!"
read name
if [ "$name" == "Satya" ]; then
    echo "Welcome, Satya!"
else
    echo "Welcome, $name!"
fi
```

```
foriin {1..5}; do
    echo "Count: $i"
done

whiletrue; do
    echo "Looping..."
    break
Done
```

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8. Practical Exercise Summary

Task	Command Used
Show current directory	`pwd ls -a cd .. mkdir`
List hidden files	`projects touch`
Move up one directory	`file.txt rm`
Create a directory	`sample.txt cp`
Create a file	`report.doc backup/`
Remove a file	
Copy file to backup folder	
Move data to /tmp/	`mv data.csv /tmp/`
Change script permission	`chmod 700 script.sh`
Change ownership	`chown john document.txt`
Search for “error”	`grep 'error' system.log`
Replace “foo” with “bar”	`sed 's/foo/bar/g' textfile.txt`
Show disk usage	`df -h`

Display folder size	`du -sh .`
Ping a host	`ping www.example.com`
Display IP details	`ip addr`
Remote connection	`ssh alice@example.com`

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9. Conclusion

This assignment provided a strong foundation in basic Linux command-line operations crucial for working efficiently in an HPC environment. Mastering these commands will simplify file management, job submission, debugging, and system monitoring while working on clusters like Paramrudra.