LP - Assignment 5 (Linux Programming)

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1. What is a shell in Linux OS? How many categories of shell currently exist in Linux? Why is the bash shell very popular?

A shell is a command-line interpreter that allows users to interact with the Linux operating system. It processes user commands and executes them.Categories of shells include:1. Bourne Shell (sh)2. Bourne Again Shell (bash)3. C Shell (csh)4. Korn Shell (ksh)5. Z Shell (zsh)Bash is the most popular because it's free, feature-rich, supports command history, scripting, and is the default shell in most Linux distributions.

2. What does the ls -Z command display?

The command `ls -Z` displays SELinux security contexts (labels) of files and directories, showing their user, role, and type security attributes.

3. Write a command to list all hidden files in the current directory.

Command: `ls -a` or `ls -ld .??*`Explanation: Files beginning with a dot (.) are hidden in Linux. The `-a` option lists them.

4. Explain the difference between hard links and soft links (symbolic links).

Hard links are direct references to the same inode (file data), whereas soft (symbolic) links point to the file path.Differences:- Hard links share inode; soft links don't.- Deleting the original file breaks a soft link but not a hard link.- Hard links can't span file systems; soft links can.Example:Hard link: ln file1 file2Soft link: ln -s file1 link1

5. A file has permissions -rwxr-x--x. Explain who can read, write, and execute it.

Breakdown:- Owner: rwx → can read, write, and execute- Group: r-x → can read and execute- Others: --x → can only execute

6. Write the command to change the group ownership of a file data.txt to group staff.

Command: `chgrp staff data.txt`

7. Why is it dangerous to give 777 permissions to a file?

Permission 777 gives read, write, and execute permissions to everyone. This allows any user to modify, delete, or execute the file, creating a serious security risk.Example: `chmod 777 /etc/passwd` would allow anyone to edit a system file.

8. What is the difference between apropos (man -k) and whatis (man -f)?

whatis (man -f): Displays a one-line description of a command.apropos (man -k): Searches manual pages for a keyword.Example:whatis ls → shows short description of lsapropos copy → lists all commands related to 'copy'

9. Write a command to redirect the error output of a command to a file named error.log.

Command: `command_name 2> error.log`Explanation: '2>' redirects standard error (stderr) to a file.

10. How can you use the tee command to append output to a file instead of overwriting it?

Command: `command | tee -a filename`Explanation: The `-a` option appends output instead of overwriting the file.