



School Of Engineering

Linux Programming Assignment-4

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Q1. A system has a file /etc/passwd. How would you use grep + tee to extract usernames and save them to a file while also displaying them on screen?

Ans: To extract usernames from /etc/passwd and save them to a file while also displaying them on screen using grep and tee, we can use:

Example: `cut -d: -f1 /etc/passwd | tee usernames.txt`

cut -d: -f1 /etc/passwd : Extracts the usernames using colon ':' as delimiter.

tee usernames.txt : Writes the output to usernames.txt and displays it on screen.

Q2. A binary isn't found in \$PATH. How would you use commands (which, find, locate) to troubleshoot and fix the issue?

Ans: Search for the binary using find

Example: `sudo find / -name "binary_name" -type f 2>/dev/null`

1. **sudo:** Run with superuser privileges.
2. **find:** It is the search command.
3. **/ :** It means start searching from the root directory.
4. **-name "binary_name":** Look for files with exact name "binary_name".
5. **-type f:** Only search for regular files.
6. **2>/dev/null:** Redirect error messages to null, so only successful results shows.

Q3. Write a command pipeline that finds all .log files modified in the last 24 hours in /var/log and saves results into log_report.txt.

Ans: The command pipeline to find all .log files modified in the last 24 hours in /var/log and save the results are:

Example: `find /var/log -name "*.log" -mtime -1 | tee log_report.txt`

- **find /var/log:** Search in the /var/log directory.
- **-name "*.log":** Find files ending with .log extension.
- **-mtime -1:** Modified within the last 24 hours.
- **| tee log_report.txt:** Pipe output to tee, which displays on screen and saves to file.

Q4. What is the difference between shutdown -r now and reboot?

Ans: The **shutdown -r now** command performs a graceful reboot that properly warns logged-in users about the upcoming restart. It carefully shuts down all running services and processes in an orderly manner before rebooting the system. This command is safer for multi-user environments or production servers because it ensures all data is properly saved and filesystems are synced.

The **reboot** command performs a more immediate and direct restart without sending warnings to logged-in users. It's generally faster but may force stop some processes without giving them a chance to shut down properly. This command is better suited for single-user systems or emergency situations where speed is more important than graceful shutdown procedures.

Q5. How can you use the tee command to debug a script that generates both standard output and error messages?

Ans: You can use the tee command to debug a script by capturing both standard output and standard error to a file while still seeing them on screen.

Example: `./script.sh 2>&1 | tee debug.log`

• **2>&1:** Redirects stderr to stdout.

• **| tee debug.log:** Sends combined output to both screen and file.

Q6. Explain any three real-world applications of Linux in industries.

Ans:

1. Web Services & Cloud

Linux runs most websites and powers major cloud platforms like AWS and Google Cloud, handling billions of daily requests reliably.

2. Financial Systems

Banks and stock exchanges use Linux for trading platforms and ATMs due to its security, stability, and low latency for transactions.

3. Supercomputing & Research

Virtually all supercomputers run Linux, enabling scientific breakthroughs in weather forecasting, medical research, and space exploration.

Q7. Differentiate application, system and utility software in the context of Linux environment.

Ans:

System Software:

- Core operating system components.
- Manages hardware resources directly.
- Includes the Linux kernel.
- Handles memory and process management.
- Essential for booting and basic operation.
- Provides foundation for other software.

Utility Software:

- System maintenance and management tools.
- Helps administrators and users.
- Includes commands like ls, grep, cp.
- Package managers like apt and yum.
- Text editors like vim and nano.
- Diagnostic and monitoring tools.

Application Software:

- End-user programs for specific tasks.
- Solves user problems directly.
- Includes web browsers like Firefox.
- Office suites like LibreOffice.
- Media players like VLC.
- Development tools and databases.

Q8. What are the key differences between open-source and proprietary operating systems?

Ans: Open-Source Operating Systems

- Source code is publicly accessible.
- Free to use and distribute.
- Highly customisable and modifiable.
- Community-driven development.
- Transparent security model.
- Examples: Linux, FreeBSD, Android.
- No vendor lock-in.
- Community-supported documentation.
- Rapid innovation through collaboration.
- Drivers often developed by community.

Proprietary Operating Systems:

- Source code is kept secret.
- Requires purchase of licenses.
- Limited customisation options.
- Company-controlled development.
- Security through obscurity.
- Examples: Windows, macOS, iOS.
- Vendor lock-in common.
- Official company documentation.
- Controlled release cycles.
- Manufacturer-provided drivers.

Q9. Write the command to display the system's kernel version.

Ans: Command to display system kernel version:

Example: `uname -r`

Q10. What is the difference between head and tail commands in text processing?

Ans: The 'head' command displays the beginning of a file.

By default, it shows the first 10 lines of a file.

It is useful for quickly checking the start of large files.

The 'tail' command displays the end of a file.

By default, it shows the last 10 lines of a file.

It is commonly used to monitor log files and check recent entries.

You can specify a different number of lines with both commands using the `-n` option.

The tail command has a special `-f` option for following real-time updates in files.

Head shows the top portion while tail shows the bottom portion of files.

THANK YOU