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Subject: Linux Programming

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LINUX PROGRAMMING ASSIGNMENT-04

1. How would you use grep + tee to extract usernames from /etc/passwd and save them while displaying on screen?

Command:

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

Explanation: `cut` extracts usernames, and `tee` saves them to a file while printing them on screen.

2. A binary isn't found in $PATH. How would you use commands (which, find, locate) to troubleshoot?

- Use `which binary` to check its PATH location.
- If not found, run: `locate binary`
- Or search manually: `find / -name binary 2>/dev/null`
- Then add its directory to PATH if needed.

3. Write a pipeline to find all .log files modified in the last 24 hours in /var/log and save to log_report.txt.

Command:

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

4. Difference between shutdown -r now and reboot?

- `shutdown -r now` schedules a controlled shutdown and restart.
- `reboot` triggers an immediate restart without scheduling.

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

Command:

```
script.sh 2>&1 | tee debug_output.txt
```

This captures both stdout and stderr while displaying them.

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

1. **Servers & Web Hosting** – Linux powers most web servers.
2. **Cybersecurity & Penetration Testing** – Tools like Kali Linux.
3. **Cloud & DevOps** – Containers, Kubernetes, automation tools.

7. Differentiate application, system, and utility software in Linux.

• **Application software** – user-level programs (e.g., LibreOffice).
• **System software** – OS components managing hardware.
• **Utility software** – tools that assist system operations (e.g., grep, awk).

8. Key differences between open-source and proprietary operating systems.

Open-source: Free to modify, transparent, community-driven.
Proprietary: Closed code, commercial licensing, controlled by vendors.

9. Command to display the system's kernel version.

Command:

```
uname -r
```

10. Difference between head and tail commands.

• `head` shows the first lines of a file.
• `tail` shows the last lines of a file.