**LINUX PROGRAMMING : ASSIGNMENT 4**

**1. 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?**

Answer:

Extracting Usernames with grep and tee

To extract usernames from /etc/passwd and save them to a file while displaying on screen:

bash

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

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

Answer:

* Check if binary is in $PATH: which binary\_name
* Search for binary: find / -name binary\_name
* Use locate database: locate binary\_name

Fixing the Issue:

* Add binary's directory to $PATH: export PATH=$PATH:/path/to/binary
* Create a symlink: ln -s /path/to/binary /usr/local/bin/binary\_name

**3. 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.**

Answer:

bash

find /var/log -type f -name "\*.log" -mtime -1 > log\_report.txt

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

Answer:

|  |  |
| --- | --- |
| **shutdown -r now** | **reboot** |
| * Allows specifying restart time and sending messages | * Reboot is more straightforward. |
| * Shutdown requires specifying the -r option for restart | * Reboot is a direct command. |
| * Used for scheduled restarts | * Used for immediate restarts |

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

Answer:

bash

./script.sh 2>&1 | tee debug\_log.txt

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

Answer:

* Servers: Linux is widely used in web servers (Apache, Nginx), database servers, and more.
* Embedded Systems: Linux is used in IoT devices, routers, and other embedded systems.
* Scientific Computing: Linux is popular in scientific research for its stability, customizability, and cost-effectiveness.

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

Answer:

* Application Software: End-user applications (e.g., Firefox, LibreOffice).
* System Software: Manages hardware and provides services (e.g., kernel, device drivers).
* Utility Software: Performs specific tasks (e.g., grep, sed, awk).

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

Answer:

|  |  |
| --- | --- |
| **Proprietary operating system** | **Open source** |
| * Owned by specific company | * Developed collectively |
| * Source code not made public | * Source code made public |
| * Access to software is restricted | * Users can access, modify the source code |
| * Microsoft office, Adobe photoshop | * Linux operating system, Mozilla firefox browser |

**9. Write the command to display the system’s kernel version.**

Answer:

bash

uname -r

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

Answer:

|  |  |
| --- | --- |
| **head command** | **tail command** |
| * Displays the beginning of a file | * Displays the end |
| * Both display 10 lines by default, but head shows the first 10 | * Both display 10 lines by default, but tail shows the last 10. |
| * Useful for previewing file headers | * Useful for monitoring log files or viewing recent activity. |