**Linux Programming Assignment:4**

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**ROLL NO-06**

**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?**

-The /etc/passwd file has entries like:

username:x:UID:GID:comment:home:shell

So the **username** is the first field, separated by :.

To extract just the usernames, you can use cut or awk, but since you asked for grep + tee, here’s one way:

grep -o '^[^:]+' /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?**

• 1)Check if the binary is available at all

which <binary-name>

• 2)Search the filesystem for the binary

sudo find / -type f -name <binary-name> 2>/dev/null

• Use locate(faster, uses a database-update with sudo updatedb if needed

locate <binary-name>

• 3) Fix the issue depending on the result

export PATH=$PATH:/usr/local/bin

**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.**

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

• find /var/log → search under /var/log

• -type f → only regular files

• -name "\*.log" → only files ending in .log

• -mtime -1 → modified within the last 24 hours (less than 1 day ago)

• log\_report.txt → redirect results into log\_report.txt

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

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| **Shutdown-r** | **reboot** |
| shutdown is a more graceful way to bring the system down. | A more direct way to restart the system. |
| -r means reboot after shutting down. | Essentially tells the kernel to initiate a reboot right away. |
| It notifies logged-in users (via wall messages), and runs shutdown scripts (/etc/init.d, systemdunits, etc.). | On modern Linux (systemd-based), reboot is actually a symlink to systemctl reboot, which behaves similarly to shutdown -r now. |

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

Basic usage with both stdout and stderr:

Bash- ./yourscript.sh 2>&1 | tee debug.log

If you want to separate stdout and stderr into different files:

Bash- ./yourscript.sh > >(tee stdout.log) 2> >(tee stderr.log >&2)

When to use which:

• Combined log → 2>&1 | tee debug.log (simpler, good for most debugging).

• Separate logs → more advanced redirection (useful if you want to distinguish errors from normal output).

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

• Web Servers & Hosting (IT/Tech Industry)

• Embedded Systems & IoT (Automotive, Consumer Electronics)

• Supercomputing & Scientific Research

• Telecommunications

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

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| ASPECT | APPLICATION SOFTWARE | SYSTEM SOFTWARE | UTILITY SOFTWARE |
| DEFINITION | Programs designed to perform specific tasks for the user. | Software that manages hardware and provides a platform for running applications. | Programs that perform maintenance, optimization, and management tasks for the system. |
| PURPOSE | To help users accomplish tasks like word processing, browsing, or multimedia. | To control and manage hardware resources and provide services to applications. | To monitor, maintain, and enhance the performance or security of the system. |
| EXAMPLES IN LINUX | LibreOffice, Firefox, GIMP, VLC media player | Linux kernel, systemd, X Window System, GNOME/KDE desktop environment | top, htop, df, fsck, cron, tar, gzip |
| USER INTERACTION | Direct interaction with the user. | Mostly runs in the background; indirect interaction. | Can be run by users or automatically; provides system feedback and control. |

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

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| **ASPECT** | **OPEN-SOURCE OS** | **PROPRIETARY OS** |
| **DEFINITION** | The source code is publicly available; users can view, modify, and distribute it. | The source code is closed; only the vendor can modify or distribute it. |
| **COST** | Usally free or low-cost | Requires purchasing a license,often expensive |

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

1)Using uname:

uname -r

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

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| **ASPECT** | **HEAD** | **TAIL** |
| **PURPOSE** | Displays the beginning of a file or input. | Displays the end of a file or input. |
| **DEFAULT BEHAVIOUR** | Shows the first 10 lines of a file. | Shows the last 10 lines of a file. |