

# **Department of Cybersecurity**

## **Linux Programming**

### **ASSIGNMENT 5**

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**Class: 3-A**

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**1. What is a shell in Linux OS? How many categories of shell is currently exists in Linux? Why bash shell is very popular in Linux distribution?**

A **shell** is a command-line interface that allows users to interact with the Linux kernel by typing commands.

There are **two main categories** of shells:

- **Command-line shells** (e.g., bash, sh, zsh, csh, ksh)
- **Graphical shells** (used in GUIs like GNOME or KDE)  
**Bash (Bourne Again Shell)** is popular because it's **default in most distributions**, supports **scripting, history, aliases, and command completion**, and is **POSIX-compatible**.

**2. What does the ls -Z command display?**

It shows **SELinux security context labels** (user, role, type, and level) for each file and directory.

### **3. Command to list all hidden files in the current directory:**

`ls -a`

### **4. Explain the difference between hard links and soft links (symbolic links) in Linux.**

<b>Feature</b>	<b>Hard Link</b>	<b>Soft Link</b>
Points to	File's inode	File's path
Works after deleting original	Yes	No
Cross-filesystem support	No	Yes
Created using	<code>In file pathname</code>	<code>In -s file pathname</code>

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

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

So, the owner has full access, group can read & execute, and others can only execute.

**6. Write the command to change the group ownership of a file data.txt to group staff. (CO1)**

chgrp staff data.txt

**7. Why is it dangerous to give 777 permissions to a file? Explain with an example. (CO1)**

Permission 777 means **read, write, and execute** access for everyone (owner, group, and others).

**8. What is the difference between apropos (i.e., man -k) and whatis (i.e., man -f)? (CO1)**

**apropos (or man -k)** searches for **commands related to a keyword** in the manual page descriptions.

**whatis (or man -f)** shows a **one-line summary** about a specific command.

**9. Write a command to redirect the error output of a command to a file named error.log. (CO1)**

command 2> error.log

**10. How can you use the tee command to append output to a file instead of overwriting it? (CO4)**

```
command | tee -a output.txt
```