**Assignment 5:**

# **MTMC-509 Programming Lab-I**

### **System Management, Information Commands & Disk Usage**

### **and File Permission Commands**

**System Management and Information Commands**

 **Kernel and System Information**

* Use the uname -r command to display the current kernel release version of your system.
* Use the uname -a command to see detailed kernel information, including the system architecture and operating system. What additional information does uname -a provide compared to uname -r?

 **System Uptime and Load**

* Run the uptime command to display how long your system has been running and the current load average. What does the load average indicate in terms of system performance?

 **Hostname and IP Address**

* Use the hostname command to display the system's hostname.
* Use the hostname -i command to display the system's IP address. Record the output of both commands.

 **System Reboot History**

* Use the last reboot command to list the system's reboot history. How many times has the system rebooted in the last month?

 **Date, Time, and Calendar**

* Use the date command to display the current system date and time.
* Use the timedatectl command to check if your system clock is synchronized with a time server. Is the time synchronized? If not, describe how you would synchronize the clock.
* Use the cal command to display the current month's calendar. What day of the week does the current month start on?

 **Logged-In Users**

* Use the w command to list all logged-in users and their activity.
* Use the whoami command to confirm the username of the current session.
* Use the finger [user\_name] command (replace [user\_name] with an actual user) to show detailed information about a specific user, including their login details.

 **System Resource Limits**

* Use the ulimit -a command to list all current user limits on system resources. Note the maximum file size and the maximum number of open file descriptors for the current user.

 **System Shutdown**

* Schedule a system shutdown for 10 minutes from now using the shutdown [hh:mm] command.  
  Command: shutdown +10
* Cancel the scheduled shutdown using the shutdown -c command.
* Immediately shut down the system using the shutdown now command.  
  **(Note: You may want to skip this step unless you are in a testing environment.)**

 **Managing Kernel Modules**

* Use the modprobe [module\_name] command to add a specific kernel module (replace [module\_name] with an actual module, such as lp).  
  Command: modprobe lp
* Verify the module was added using lsmod and list the active kernel modules.

 **Boot Messages**

* Use the dmesg command to display boot-up messages from the kernel. Analyze the first few lines of the boot-up sequence and describe what information is shown.

### **Disk Usage Commands**

 **Checking Disk Usage**

* Use the df -h command to display the free and used space on all mounted file systems in human-readable format.
* Use the df -i command to check the number of free and used inodes on your mounted file systems. What are inodes, and why is it important to monitor them?
* Record the total space and used space for the root (/) file system.

 **Viewing Disk Partitions**

* Use the fdisk -l command to list the partitions on your system, including their sizes and types.
* Identify the partition type and size of your root (/) partition and your home partition (if separate). Describe the importance of understanding the partition layout of your system.

 **Inspecting Disk Usage in Directories**

* Use the du -sh command to show the total disk usage of the home directory (~/).
* Next, use the du -ah command to display the disk usage of all files and directories in your home directory. What files or directories are consuming the most space?

 **Mounting and Checking File Systems**

* Use the mount command to display a list of currently mounted file systems.
* Use the findmnt command to display the target mount points of all file systems. What is the difference between the output of mount and findmnt?

**File Permission Commands**

 **Setting Full Permissions for All Users**

* Create a new text file named testfile.txt in your home directory using the touch command.
* Use the chmod 777 command to assign read, write, and execute permissions for all users (owner, group, and others) to testfile.txt.  
  Command: chmod 777 testfile.txt
* Verify the new permissions using the ls -l command. Describe what the permissions mean in terms of access for the owner, group, and others.

 **Assigning Specific Permissions with chmod**

* Create another file named script.sh in your home directory.
* Use the chmod 755 command to give read, write, and execute permissions to the owner, and read and execute permissions to the group and others.  
  Command: chmod 755 script.sh
* Verify the permissions using ls -l and describe what each set of permissions (owner, group, others) allows users to do.

 **Changing Permissions to Allow Group and Others to Modify**

* Create a file named data.txt in your home directory.
* Use the chmod 766 command to grant full permissions to the owner, and read and write permissions to the group and others.  
  Command: chmod 766 data.txt
* Verify the permissions using ls -l and explain what actions the owner, group, and others can perform on the file.

 **Changing File Ownership**

* Use the chown command to change the ownership of testfile.txt to a different user (replace [user\_name] with a valid username on your system).  
  Command: sudo chown [user\_name] testfile.txt
* Verify the ownership change using ls -l and describe how the ownership information is displayed.

 **Changing File Ownership and Group Ownership**

* Use the chown command to change both the owner and group ownership of script.sh to a different user and group (replace [user\_name] and [group\_name] with valid user and group names on your system).  
  Command: sudo chown [user\_name]:[group\_name] script.sh
* Verify the ownership and group change using ls -l. Describe how the owner and group ownership are represented.

 **Combining Permission and Ownership Changes**

* Create a new directory named ProjectFiles in your home directory.
* Inside ProjectFiles, create a new file named project.txt.
* Use the chmod 755 command to assign appropriate permissions for the owner, group, and others to project.txt.
* Use the chown command to change the ownership and group ownership of project.txt to a different user and group (replace [user\_name] and [group\_name] with valid user and group names on your system).
* Verify the final permissions and ownership using ls -l and explain how the file permissions and ownership settings would impact different users.

 **Testing Permissions**

* Switch to another user (either using su or logging in as another user) who is not the owner of testfile.txt.
* Try to edit and save changes to testfile.txt. Record whether the changes were allowed or denied based on the file's permissions.
* Repeat the test for script.sh and data.txt, observing the differences in permissions for each file.