List of Experiments/Practical

1. To Study basic & User status Unix/Linux Commands.
2. Study & use of commands for performing arithmetic operations with Unix/Linux.
3. Create a file called wlcc.txt with some lines and display how many lines, words and characters are present in that file.
4. Append ten more simple lines to the wlcc.txt file created above and split the appended file into 3 parts. What will be the names of these split files? Display the contents of each of these files. How many lines will be there on the last file?
5. Given two files each of which contains names of students. Create a program to display only those names that are found on both the files.
6. Create a program to find out the inode number of any desired file.
7. Study & use of the Command for changing file permissions.
8. Write a pipeline of commands, which displays on the monitor as well as saves the information about the number of users using the system at present on a file called usere.ux.
9. Execute shell commands through vi editor.
10. Installation, Configuration & Customizations of Unix/Linux.
11. Write a shell script that accepts any number of arguments and prints them in the reverse order.
12. Write a shell script to find the smallest of three numbers that are read from the keyboard.
13. Write a shell script that reports the logging in of a specified user within one minute after he/she logs in. The script automatically terminates if the specified user does not login during a specified period of time.
14. Installation of SAMBA, APACHE, TOMCAT.
15. Implementation of DNS, LDAP services,
16. Study & installation of Firewall & Proxy server

Prerequisite Practical

Step 1: Download and Install Oracle VirtualBox

1. **Visit the Oracle VirtualBox Website:**
    - Go to the Oracle VirtualBox official website.
2. **Download VirtualBox:**
    - Click on the "Downloads" link in the left-hand menu.
    - Choose the version appropriate for your operating system (Windows, macOS, Linux, or Solaris).
    - Click the link for your OS to start the download.
3. **Install VirtualBox:**
    - Once the download is complete, open the installer file.
    - Follow the on-screen instructions to install VirtualBox. The default settings are usually sufficient, but you can customize the installation if necessary.
    - Click "Next" to proceed through each step and "Install" to begin the installation.
4. **Complete the Installation:**
    - After installation, click "Finish" to close the installer. VirtualBox is now installed on your system.

Step 2: Download Ubuntu or Another Linux Distribution

1. **Visit the Ubuntu Website:**
    - Go to the Ubuntu official website.
2. **Choose a Version:**
    - For beginners, the LTS (Long Term Support) version is recommended. Click on "Ubuntu Desktop" and select the latest LTS version.
3. **Download Ubuntu:**
    - Click the "Download" button to start the download. This will download an ISO file, which is a disk image used for installation.
4. **Alternative Linux Distributions:**
    - You can also download other Linux distributions (such as Debian, Fedora, CentOS, etc.) from their respective official websites.

Step 3: Create a New Virtual Machine in VirtualBox

1. **Open VirtualBox:**
    - Launch VirtualBox from your desktop or start menu.

2. **Create a New Virtual Machine:**
    - Click the "New" button in the top-left corner of the VirtualBox Manager.
    - Enter a name for your virtual machine (e.g., "Ubuntu VM").
    - Choose the type (Linux) and version (Ubuntu 64-bit).
    - Click "Next."
3. **Allocate Memory:**
    - Allocate memory (RAM) for your virtual machine. 2 GB (2048 MB) is the minimum recommended for Ubuntu, but 4 GB or more is preferable if your host machine has enough RAM.
    - Click "Next."
4. **Create a Virtual Hard Disk:**
    - Choose "Create a virtual hard disk now" and click "Create."
    - Select "VDI (VirtualBox Disk Image)" and click "Next."
    - Choose "Dynamically allocated" to save space on your physical hard drive.
    - Allocate at least 25 GB of space for the virtual hard disk (you can allocate more if desired).
    - Click "Create."

Step 4: Install Ubuntu on the Virtual Machine

1. **Start the Virtual Machine:**
    - Select your new virtual machine from the list in VirtualBox Manager.
    - Click the "Start" button.
2. **Load the Ubuntu ISO File:**
    - When prompted to "Select start-up disk," click the folder icon to browse.
    - Locate and select the Ubuntu ISO file you downloaded earlier.
    - Click "Start."
3. **Begin Ubuntu Installation:**
    - Once the virtual machine starts, you will see the Ubuntu installation screen.
    - Select "Install Ubuntu."
4. **Follow the Installation Steps:**
    - Choose your preferred language and click "Continue."
    - Select the keyboard layout and click "Continue."

- Choose "Normal installation" and Do not check "Download updates while installing Ubuntu."
- Click "Continue."
- Choose "Erase disk and install Ubuntu" (this will only affect the virtual disk, not your actual hard drive).
- Click "Install Now" and confirm any warnings.

5. **Configure Ubuntu Settings:**
   - Select your time zone and click "Continue."
   - Enter your name, computer name, username, and password. Click "Continue."
6. **Complete the Installation:**
   - The installation will proceed. This may take some time.
   - Once complete, you will be prompted to restart the virtual machine.
   - After restarting, remove the installation medium (ISO file) if prompted.
7. **Login to Your New Ubuntu VM:**
   - Log in with the username and password you set during the installation.
   - Ubuntu is now ready to use in VirtualBox!

Step 5: Additional Configuration and Install Guest Additions

1. **Install VirtualBox Guest Additions:**
   - Guest Additions provide better integration between the host and the VM (e.g., better graphics, shared clipboard, shared folders).
   - In the VirtualBox menu, go to "Devices" > "Insert Guest Additions CD image."
   - Follow the prompts in Ubuntu to install the Guest Additions.
2. **Reboot the Virtual Machine:**
   - After installing Guest Additions, reboot your virtual machine.
3. **Optional: Customize Your VM Settings:**
   - Adjust settings such as display resolution, shared folders, and network settings as needed through the VirtualBox Manager.

Step 6: Explore and Use Ubuntu

1. **Start Exploring:**
   - Familiarize yourself with the Ubuntu environment. Open the terminal, browse the file system, install new applications, and customize the desktop.
2. **Install Additional Software:**

- Use the apt package manager to install software. Open the terminal and run commands like sudo apt update and sudo apt install [software-name] to install new programs.

Repeat for Other Linux Distributions

If you want to try out other Linux distributions, repeat steps 2 to 6 using the ISO file for the respective Linux distribution.

Practical 1: Basic & User Status Unix/Linux Commands

Objective:

Learn basic Unix/Linux commands and commands related to user status.

Commands to Study:

- **Basic Commands**: ls, pwd, cd, mkdir, rmdir, cp, mv, rm, touch
- **User Status Commands**: who, whoami, id, last, w

Instructions:

1. Open a terminal.
2. Practice basic file and directory manipulation commands.
3. Use user status commands to check your user details and who is currently logged into the system.

Practical 2: Performing Arithmetic Operations with Unix/Linux Commands

Objective:

Learn to perform basic arithmetic operations in Linux.

Commands to Study:

- **expr**: Command for arithmetic operations.
- **bc**: Command for basic calculator functionalities.

Instructions:

1. Open a terminal.
2. Use expr for basic arithmetic operations such as addition, subtraction, multiplication, and division.
    - Example: expr 5 + 3
3. Use bc for more complex calculations.
    - Example: echo "5 * 3" | bc

Practical 3: File Content Analysis (Counting Lines, Words, and Characters)

Objective:

Learn to create a file and analyze its content.

Instructions:

1. Open a terminal and use the nano or vi editor to create a file named wlcc.txt.
    - Command: nano wlcc.txt
2. Add several lines of text to the file and save it.
3. Use the wc command to count the number of lines, words, and characters in the file.

- Command: wc wlcc.txt

Practical 4: File Manipulation (Appending, Splitting, and Displaying Content)

Objective:

Learn to append text to a file, split files, and display their content.

Instructions:

1. Append ten lines to wlcc.txt using echo or a text editor.
   - Command: echo "New line" >> wlcc.txt (Repeat for ten lines)
2. Split the file into three parts using the split command.
   - Command: split -l 5 wlcc.txt part_
3. The split files will be named part_aa, part_ab, part_ac, etc. Display their contents using cat.
   - Command: cat part_aa
4. Analyze the number of lines in the last file.

Practical 5: Finding Common Names in Two Files

Objective:

Write a program to find and display common names in two files.

Instructions:

1. Create two files, file1.txt and file2.txt, each containing names of students.
   - Command: nano file1.txt and nano file2.txt
2. Use comm or grep to find common names.
   - Command: comm -12 <(sort file1.txt) <(sort file2.txt)

Practical 6: Finding the Inode Number of a File

Objective:

Learn to find the inode number of a file.

Instructions:

1. Open a terminal.
2. Use the ls -i command to display the inode number of a file.
   - Command: ls -i wlcc.txt

Practical 7: Changing File Permissions

Objective:

Learn to change file permissions in Unix/Linux.

Commands to Study:

- **chmod**: Command to change file permissions.

Instructions:

1. Use the chmod command to change permissions of wlcc.txt.
    - Command: chmod 755 wlcc.txt
2. Verify the changes using ls -l.

Practical 8: Pipeline Commands and User Monitoring

Objective:

Learn to use pipeline commands and monitor users.

Instructions:

1. Write a pipeline command that displays the current users and saves this information in usere.ux.
    - Command: who | tee usere.ux

Practical 9: Execute Shell Commands through vi Editor

Objective:

Learn to execute shell commands within the vi editor.

Instructions:

1. Open a file using vi editor.
    - Command: vi testfile
2. Switch to command mode and execute shell commands using :!.
    - Command: :!ls

Practical 10: Installation, Configuration & Customization of Unix/Linux

Objective:

Learn to install, configure, and customize Unix/Linux.

Instructions:

1. Learn how to install a Linux distribution such as Ubuntu or CentOS.
2. Customize the environment by changing settings, installing packages, and configuring the desktop environment.

Practical 11: Shell Script to Print Arguments in Reverse Order

Objective:

Write a shell script that accepts arguments and prints them in reverse order.

Instructions:

1. Create a shell script file reverse.sh.

- Command: nano reverse.sh

2. Write the script to print arguments in reverse.

bash

Copy code

```
#!/bin/bash
for ((i=$#; i>0; i--)); do
  echo ${!i}
done
```

3. Make the script executable and run it with arguments.
    - Command: chmod +x reverse.sh
    - Command: ./reverse.sh arg1 arg2 arg3

Practical 12: Shell Script to Find the Smallest of Three Numbers

Objective:

Write a shell script to find the smallest of three numbers.

Instructions:

1. Create a shell script file smallest.sh.
    - Command: nano smallest.sh
2. Write the script to find the smallest number.

bash

Copy code

```
#!/bin/bash
echo "Enter three numbers:"
read a b c
if [ $a -le $b ] && [ $a -le $c ]; then
  echo "$a is the smallest"
elif [ $b -le $a ] && [ $b -le $c ]; then
  echo "$b is the smallest"
else
  echo "$c is the smallest"
fi
```

3. Make the script executable and test it.

- Command: chmod +x smallest.sh
- Command: ./smallest.sh

Practical 13: Shell Script to Monitor User Login

Objective:

Write a shell script that reports the login of a specified user.

Instructions:

1. Create a shell script user_monitor.sh.
   - Command: nano user_monitor.sh
2. Write the script to monitor user login.

```
#!/bin/bash
echo "Enter username to monitor:"
read username
while true; do
  if who | grep -q $username; then
    echo "$username has logged in."
    exit
  else
    sleep 60
  fi
done
```

3. Make the script executable and run it.
   - Command: chmod +x user_monitor.sh
   - Command: ./user_monitor.sh

Practical 14: Installation of SAMBA, APACHE, TOMCAT

Objective:

Learn to install and configure SAMBA, APACHE, and TOMCAT servers.

Instructions:

1. Install the necessary packages using the package manager (apt or yum).
   - SAMBA: sudo apt install samba or sudo yum install samba
   - APACHE: sudo apt install apache2 or sudo yum install httpd
   - TOMCAT: sudo apt install tomcat9 or sudo yum install tomcat

2. Learn to configure each service and verify that they are running.

Practical 15: Implementation of DNS, LDAP Services

Objective:

Implement DNS and LDAP services.

Instructions:

1. Install bind for DNS and openldap for LDAP using the package manager.
    - DNS: sudo apt install bind9 or sudo yum install bind
    - LDAP: sudo apt install slapd or sudo yum install openldap
2. Configure the services as required and test their functionality.

Practical 16: Study & Installation of Firewall & Proxy Server

Objective:

Learn about firewalls and proxy servers, and install and configure them.

Instructions:

1. Install ufw or iptables for firewall management.
    - Command: sudo apt install ufw or sudo yum install iptables-services
2. Learn basic configuration commands for firewalls.
3. Install a proxy server like Squid.
    - Command: sudo apt install squid or sudo yum install squid
4. Configure the proxy server and verify its functionality.