COLLEGE OF ENGINEERING CHENGANNUR

FREE AND OPEN SOURCE SOFTWARE LAB REPORT

NAME:-MOHAMED SHAHIL.K
S4 .D
ROLLNO:34

Certificate

Name :   Class :

Roll No :   Exam No :

This is certified to be the bonafide record of practical work done in Free and Open Source Software as per Syllabus of class .... in the Lab during the academic year 20   /20

....

Teacher In-charge   *Head of Dept.*

....

Examiner's Signature   *Principal*

Date : ....   *Institution Rubber Stamp*

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TASK 1: Linux Commands

ls :

Used to list information about the files

```
ls :- list file in current directory
ls -l :-long list files in current directory
```

alias :

An alias definition provides a string value that shall replace a command name when it is encountered

```
alias -ll='ls -al:- Define ll as ls -al
Unalias ll:-        remove the definition of ll
```

cat :

Used to concatenate files and prints on the stdout.With no files or when files read from stdin

```
Cat <filename>
```

Sort :

write sorted concatenation of all files

```
sort <filename>
```

cut :

Print selected part of the line from each file to another

```
cut  -f3 -d
```

paste :

paste is used to write lines consisting of the sequentially corresponding lines from each files Separated by TABs to stdout

```
Paste <file1> <file2>
```

join :

Write a line for each pair of lines with identical join fields

```
Join <file1> <file2>
```

mkdir :

Create new directory

```
mkdir <folder>
```

ps :

For process management

ps aux:- display current running process

kill :

Terminate process by pid

```
Kill <pid>
pid
```

TASK2:-CGPA Computation

Computing CGPA requires to download the PDFs of the results and the file containing register number and names of students in our class.Then clean PDFs to create a file containing register number and mark of all students, one per line. Then the file in piped through a C program to yeild a file containing register number and CGPA of students, one per line. This file is joined with the file containing the register number and name of students to yeild the final file containing register number, name and CGPA of each students.

TASK3:-Networking

ifconfig

ifconfig is used to configure the kernel-resident network interfaces. It is used at boot time to set up interfaces as necessary. After thet it is usually only needed when debuggin or when system tuning is needed.

Display details about all interfaces

```
ifconfig -a
```

Display details about interface

```
ifconfig <interface>
```

Set ip address for interface

```
ifconfig <interface> <ip>
```

TASK4:-FTP usage and Commands

FTP (File Transfer Protocol) is used to transfer files between two remote systems. It is network protocol similar to HTTP, but for file transfer. ftp clients are used to connect to ftp servers. After connection tools provided by FTP can be used for file transfer.

Usage:-

Connect to server

```
ftp <server>
```

Download file from server

```
get <file>
```

Download multiple files from server

```
mget<directory>
```

Upload file to server

```
put <file>
```

Upload multiple files to server

```
mput <server>
```

Change remote working directory

```
cd <directory>
```

Change local working directory

```
lcd <directory>
```

Change file permissions of remote file

```
chmod [options][files]
```

Delete remote file

```
delete <filename>
```

Delete multiple remote files

```
mdelete <files>
```

Remove directory on remote server

```
rmdir <directory>
```

Exit ftp session `exit`

TASK5(a):-SSH

One essential tool to master as a system administrator is SSH. SSH, or Secure Shell, is a protocol used to securely log onto remote systems. It is the most common way to access remote Linux Server.SSH has remained popular because it is secure, light- weight, and useful in diverse situations.

The most basic form of the
command is:

```
# ssh remote_host
```

The remote_host in this example is the IP address or domain name that you are trying to connect to.

This command assumes that your username on the remote system is the same as your username on your local system.

If your username is different on the remote system, you can specify it by using this syntax:

```
# ssh
remote_username@remote_host
```

Once you have connected to the server, you will probably be asked to verify your identity by providing a password.

To exit back into your local session,
simply type:

```
# exit
```

These are some commands familiarised using this task. I worked with each commands. The result uploaded according to the instruction given. Output of the commands verified.

TASK5(b):-SCP

Scp (Secure Copy) is a command line tool to copy or transfer files across hosts. It uses the same kind of security mechanism like the ssh program. Infact it uses an ssh connection in the background to perform the file transfer.

Using scp The basic syntax of scp is very simple to
memorize. It looks like this

```
$ scp source_file_path destination_file_path
```

Depending on the host, the file path should include the full host address, port number, username and password along with the directory path.So if you are "sending" file from your local machine to a remote machine (uploading) the syntax would look like this

```
$ scp ~/my_local_file.txt
user@remote_host.com:/some/remote/directory
```

When copying file from remote host to local host, its looks
just the reverse

```
$ scp user@remote_host.com:/some/remote/directory
~/my_local_file.txt # just download the file $ scp
user@192.168.1.3:/some/path/file.txt .
```

That is pretty much about using scp for regular tasks. Apart from it, there are a couple of extra options and functions that scp supports. By default scp will always overwrite files on the destination. If you need to avoid that, use a more powerful tool called rsync. Although scp is very efficient at transferring file securely, it lacks necessary features of a file synchronisation tool. All it can do is copy paste all the mentioned files from one location to another. A more powerful tool is Rsync which not only has all functions of scp but adds more features to intelligently synchronise files across 2 hosts. For example, it can check and upload only the modified files, ignore existing files and so on.

These are some commands familiarised using this task. I worked with each commands. The result uploaded according to the instruction given. Output of the commands verified.

TASK5(c):rsync

Rsync (Remote Sync) is a most commonly used command for copying and synchronizing files and directories remotely as well as locally in Linux/Unix systems. With the help of rsync command you can copy and synchronize your data remotely and locally across directories, across disks and networks, perform data backups and mirroring between two Linux machines

TASK6:-LINUX INSTALLATION

Linux is open-source, free to use kernel. It is used by programmers, organizations, profit and non-profit companies around the world to create Operating systems to suit their individual requirements. It is free to download and install on any computer. Because it is open source, there are a variety of different versions, or distributions, available developed by different groups.

In this task in the lab, we were given CD's to install linux in the preferred systems inside the lab. It was the simplest task , As it just takes 15 – 30 min to complete it just by inserting it in the system. The different steps that is performed are explaine below:

- Boot into the Live CD: Most computers are set to boot into the hard drive first, which means you will need to change some settings to boot from your newly- burned CD or USB. Start by rebooting the computer.
- Try out the Linux distribution before installing. Most Live CDs can launch a "live environment", giving you the ability to test it out before making the switch. You won't be able to create files, but you can navigate around the interface and decide if it's right for you.
- Start the installation process. If you're trying out the distro, you can launch the installation from the application on the desktop. If you decided not to try out the distribution, you can start the installation from the boot menu.
- Create a username and password. You will need to create login

information to install Linux. A password will be required to log into your account and perform administrative tasks.

- Set up the partition. Linux needs to be installed on a separate partition from any other operating systems on your computer if you intend dual booting Linux with another OS.
- Boot into Linux.
- Check your hardware.

These are the various steps performed during this task. I worked through it and was successfully able to complete my task.

TASK7:-HTTP and FTP servers

FTPserver:

FTP or File Transfer Protocol is a commonly used protocol for transferring files between computers, one act as a client, the other act as a server. In this post, we will talk about the FTP server in Linux systems, specifically Very Secure FTP Daemon (vsftpd).The commands used in setting up ftp server is:

- sudo apt install vsftpd
- sudo vsftpd
- ftp localhost

HTTPserver:

I used nginx HTTP server.The nginx HTTP server is also a frequently used web server in the world. It provides many powerful features, including dynamically loadable modules, robust media support, and extensive integration with other popular software.

STEPS:

1. Installing nginx
commands:

```
sudo apt update

sudo apt install apache2
```

2. Adjusting firewall

```
sudo ufw app list
```

```
sudo ufw allow Apache
```

```
sudo ufw status
```

3. checking web
server

```
sudo systemctl status
apache2
```

These are the steps used for setting up a http server in my system.These are some commands familiarised using this task. I worked with each commands. The result uploaded according to the instruction given. Output of the commands verified.

TASK8:-Further Task

(a) Package Management

In this task we were able to study the various commands that is used to download , update and upgrade all apps in the system through the terminal. The different commands used are:

- `apt-get install package-name(s)` - Installs the package(s) specified, along with any dependencies.
- `apt-get remove package-name(s)` - Removes the package(s) specified, but does not remove dependencies.
- `apt-get autoremove` - Removes any *orphaned* dependencies, meaning those that remain installed but are no longer required.
- `apt-get clean` - Removes downloaded package files (.deb) for software that is already installed.
- `apt-get purge package-name(s)` - Combines the functions of `remove` and `clean` for a specific package, as well as configuration files.
- `apt-get update` - Reads the `/etc/apt/sources.list` file and updates the system's database of packages available for installation. Run this after changing `sources.list`.
- `apt-get upgrade` - Upgrades all packages if there are updates available. Run this after running `apt-get update`.

While `apt-get` provides the most often-used functionality, APT provides additional information in the `apt-cache` command.

These are some commands familiarised using this task. I worked with each commands. The result uploaded according to the instruction given. Output of the commands verified.

(b)Perl

Perl is a programming language that can be used to perform tasks that would be difficult or cumbersome on the command line. **Perl** is included by default with most GNU/**Linux** distributions. Usually, one invokes **Perl** by using a text editor to write a file and then passing it to the **perl** program.

Perl scripts can be named anything but conventionally end with ".pl". You can use any text editor to create this file -- Emacs, Vim, Gedit, or whatever your favorite is. A script could look like this:

```
my $a = 1 +
2; print
$a,"\n";
```

In this example, we create a variable (by using *my*) which is called *$a* (the dollar sign is Perl's way of denoting a variable), which stores the result of "1 + 2". It then uses the *print* function to print the result, which should be 3. The comma concatenates two or more strings together. In this case a newline is appended to the end of the printed string. All statements in Perl are terminated with a semicolon, even if they are on separate lines. If we save this file as *first.pl*, we can run it from the command line.

$ **perl first.pl** 3The Perl program printed out "3", just like we expected. If we don't want to type "perl" in order to run the script, we can put this line:

```
#!/usr/bin/per
l
```

at the start (be sure to use the correct path on your system), and do *chmod +x first.pl* to make it executable. Then we type *./first.pl* to run it.

Of course, we can use Perl to do more useful things. For example, we can look at all the files in the current directory.

These are some commands familiarised by completing this task. I worked with each commands. The result uploaded according to the instruction given. Output of the commands verified.

(c) Lamp stack

LAMP is an open source Web development platform that uses Linux as the operating system, Apache as the Web server, MySQL as the relational database management system and PHP as the object-oriented scripting language.

After you have Ubuntu up and running, you'll want to make sure that everything on your system is current. To do that, open the terminal and type in the following commands:

```
sudo apt update sudo apt ungrade sudo
apt install apache2 sudo ufw app list sudo
apt install ufw sudo apt install ufw app list
sudo ufw app info "WWW Full " sudo ufw
app allow in "WWW Full " sudo systemctl
enable apache2 cd /var/www/html/ ls rm
index.nginx-debian.html vim index.html sudo apt
install mariadb-server sudo
mysql_secure_installation sudo mariadb
mariadb -u admin -p sudo apt install php
libapache2-mod-php php-mysql sudo vim
/etc/apache2/mods-enabled/dir.conf sudo
systemctl restart apache2 sudo systemctl
status apache2 sudo vim index.php
```

These are some commands familiarised by completing this task. I worked with each commands. Output of the commands verified.

(d) Kernel compilation

We may need to compile our own kernel to add/remove some features present in the system. The kernel distributed with general settings which should run on all the possible installations. Thus they need to support a wide range of hardware. Some of the features may be built in the kernel while some of them may be built as modules.

It's alright if they are built as module as they don't increase the size of the kernel. Built-in features will increase the size of kernel, thus effecting the system's performance. (not too heavily) Making our own kernel will ensure the kernel is having appropriate set of features. Kernel compilatiion is caried out using the following commands:

- curl -fLO "https://cdn.kernel.org/pub/linux/kernel/v5.x/linux-5.0.9.tar.xz"
- sudo apt-get install git fakeroot build-essential ncurses-dev xz-utils libssl-dev bc flex libelf-dev bison
- tar xvzf linux-5.0.9.tar.xz
- cd linux-5.0.9
- cp /boot/config-4.19.0-kali4-amd64 .config
- make menuconfig
- Compilation time will vary from as little as fifteen minutes to over an hour, depending on your kernel configuration and processor capability. Once the `.config` file has been set for the custom kernel, within the source directory run the following command to compile: make
- make modules_install
- sudo make install

This task was a bit long enough but still successfully completed it. These are some commands familiarised using this task. I worked with each commands. The result uploaded according to the instruction given. Output of the commands verified.

TASK9:-Own Webpage

Task is to create own webpage using html file.

webpage link:

http://14.139.189.217/cs17d/cs17d34/

10.Individual Experiment

Networking

ifconfig - **ifconfig** is a system administration utility in Unix-like operating systems for network interface configuration.

ifconfig –a –Which shows all networks in the computer

route –Which shows the kernel ip routing table

iwconfig - is used to display and change the parameters of the network interface which are specific to the wireless operation_

dhclient-The Internet Systems Consortium DHCP client,dhclient,provides a means for configuring one or more network interfaces using the Dynamic Host Configuration Protocol,BooTP protocol,or if these protocols fail,by statically assigning an address.

ping - **PING** (Packet INternet Groper) **command** is the best way to test connectivity between two nodes. Whether it is Local Area Network (LAN) or Wide Area Network (WAN).

ifconfig <interface> up –To bring up all network interface

ifconfig <inferface>down-To shut down all network interface

Result

In this experiment we had successfully illustrate NETWORKING LINUX.