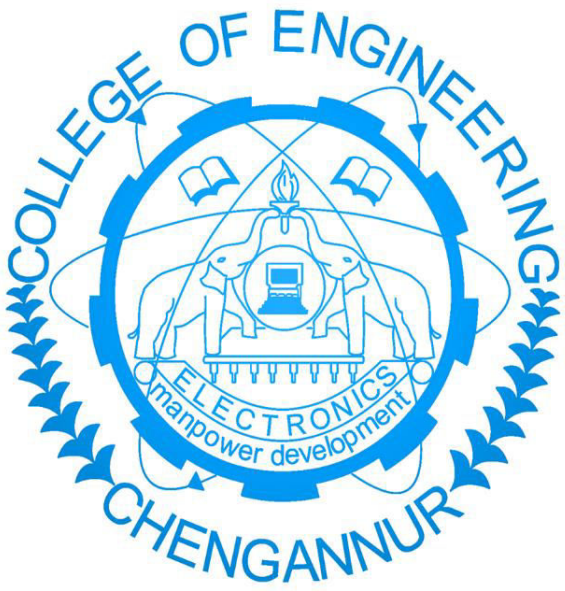

CS232 - FOSS LAB REPORT

13-05-2019

Abin Thomas
CHN17CS004
S4-D 01

CONTENTS

EXPERIMENT- 1

1.1 ls

ls is used to list information about the _les (the current working directory by default). Sorts entries alphabetically if none of -cftuvSUX nor --sort is speci_ed.
ls List _le in current directory
ls -l Long list _les in current directory

ls commad with options

List Files using ls with no option

ls

List Files With option –l

Here, ls -l (-l is character not one) shows file or directory, size, modified date and time, file or folder name and owner of file and its permission.

ls-l

Reverse Output Order

With combination of -ltr will shows latest modification file or directory date as last.

Ls –ltr

1.2 alias

The alias utility shall create or rede_ne alias de_nitions or write the values of existing alias de_nitions to standard output.An alias de_nition provides a string value that shall replace a command name when it is encountered.
The unalias utility shall remove the de_nition for each alias name speci_ed.

alias ll='ls -al' De_ne ll as ls -al
unalias ll Remove the de_nition of ll

1.3 cat

cat is used to concatenate _les and prints on the stdout.
With no _le or when _le is -, it reads from stdin
cat <filename> Prints the content of filename
into stdout

1.4 sort

sort is used to write sorted concatenation of all _les to
stdout. With no _le or when _le is -, it reads from stdin
sort <filename> Prints the sorted output of filename
into stdout

1.5 cut

cut is used to print selected parts of lines from each _le to
stdout.
cut -f3 -d' ' Prints the third column of space
separated line into stdout

1.6 paste

paste is used to write lines consisting of the sequentially cor-
responding lines from each _le separated by TABs to stdout.
With no _le or when _le is -, it reads from stdin
paste <file1> <file2>

1.7 join

join is used to write a line for each pair of lines with identical

join _elds stdout. The default join _eld is the _rst, delimited
by blanks. When _le1 or _le2 (not both) is -, it reads from
stdin
join <file1> <file2>

1.8 mkdir

mkdir is used to create a new directory.

mkdir <folder> Creates a new <folder>

1.9 uname

The command ‘uname‘ displays the information about the system.

uname [OPTION]

-a option:

It prints all the system information in the following order: Kernel name, network node hostname, kernel release date, kernel version, machine hardware name, hardware platform, operating system

uname –a

1.10 ifconfig

ifconfig stands for "interface configuration." It is used to view and change the configuration of the network interfaces on your system.

Syntax:

ifconfig [...OPTIONS] [INTERFACE]

Options:

-a : This option is used to display all the interfaces available, even if they are down.

Syntax:

ifconfig -a

- ifdown

The ifdown command disables a network interface, placing it in a state where it cannot transmit or receive data.

- ifup

ifup activates a network interface, making it available to transmit and receive data.

STEPS:

1. For doing the above task, we run the shell script task1.sh

Script:

```
#!/usr/bin/env bash

ls
ls -lk
ls -1
ls -lt
ls -ltr
alias ll='ls -l'
ll
unalias ll
ll
pwd
cat > b.txt
grep 22 madrid.txt
grep a*.txt
grep a*.txt -c
uname
uname -s
```

free

uname -r

cat b.txt

cat real.txt

ls

ls -l

exit

Result:

```
abin@hp:~$ ls
Desktop          java.pdf        Music                Public    task3.sh
Documents        kernel.sh       MyFirstJavaProgram.java  snap      task7.sh
Downloads        kernel.txt      package.sh           task1     Templates
examples.desktop  lamp.typescript  Pictures             task2.sh  Videos
abin@hp:~$ ls -lk
total 7628
drwxr-xr-x 2 abin abin    4096 Apr 10 22:01 Desktop
drwxr-xr-x 2 abin abin    4096 May 11 13:57 Documents
drwxr-xr-x 4 abin abin    4096 May 11 16:33 Downloads
-rw-r--r-- 1 abin abin    8980 Mar 18 23:34 examples.desktop
-rw-rw-r-- 1 abin abin 2868524 Mar 19 17:03 java.pdf
-rw-rw-r-- 1 abin abin     620 May 10 21:26 kernel.sh
-rw-rw-r-- 1 abin abin 4692842 May 10 21:24 kernel.txt
-rw-r--r-- 1 abin abin  166301 May  7 22:42 lamp.typescript
```

```
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Music
-rw-r--r-- 1 abin abin     244 Mar 18 20:55 MyFirstJavaProgram.java
-rw-r--r-- 1 abin abin     682 May  9 01:01 package.sh
drwxr-xr-x 3 abin abin    4096 May 10 21:56 Pictures
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Public
drwxr-xr-x 3 abin abin    4096 Mar 18 20:09 snap
drwxr-xr-x 2 abin abin    4096 May  8 23:45 task1
-rw-r--r-- 1 abin abin    2152 May  9 00:40 task2.sh
-rw-r--r-- 1 abin abin     152 May  9 00:54 task3.sh
-rwxr-xr-x 1 abin abin     224 May  9 01:13 task7.sh
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Templates
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Videos
abin@hp:~$ ls -1
Desktop
Documents
Downloads
examples.desktop
java.pdf
kernel.sh
kernel.txt
lamp.typescript
Music
MyFirstJavaProgram.java
package.sh
Pictures
Public
```

```
snap
task1
task2.sh
task3.sh
task7.sh
Templates
Videos
abin@hp:~$ ls -lt
total 7628
drwxr-xr-x 4 abin abin    4096 May 11 16:33 Downloads
drwxr-xr-x 2 abin abin    4096 May 11 13:57 Documents
drwxr-xr-x 3 abin abin    4096 May 10 21:56 Pictures
-rw-rw-r-- 1 abin abin     620 May 10 21:26 kernel.sh
-rw-rw-r-- 1 abin abin 4692842 May 10 21:24 kernel.txt
-rwxr-xr-x 1 abin abin     224 May  9 01:13 task7.sh
-rw-r--r-- 1 abin abin     682 May  9 01:01 package.sh
-rw-r--r-- 1 abin abin     152 May  9 00:54 task3.sh
-rw-r--r-- 1 abin abin    2152 May  9 00:40 task2.sh
drwxr-xr-x 2 abin abin    4096 May  8 23:45 task1
-rw-r--r-- 1 abin abin  166301 May  7 22:42 lamp.typescript
drwxr-xr-x 2 abin abin    4096 Apr 10 22:01 Desktop
-rw-rw-r-- 1 abin abin 2868524 Mar 19 17:03 java.pdf
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Music
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Public
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Templates
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Videos
```

```
-rw-r--r-- 1 abin abin    8980 Mar 18 23:34 examples.desktop
-rw-r--r-- 1 abin abin     244 Mar 18 20:55 MyFirstJavaProgram.java
drwxr-xr-x 3 abin abin    4096 Mar 18 20:09 snap
abin@hp:~$ ls -ltr
total 7628
drwxr-xr-x 3 abin abin    4096 Mar 18 20:09 snap
-rw-r--r-- 1 abin abin     244 Mar 18 20:55 MyFirstJavaProgram.java
-rw-r--r-- 1 abin abin    8980 Mar 18 23:34 examples.desktop
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Videos
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Templates
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Public
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Music
-rw-rw-r-- 1 abin abin 2868524 Mar 19 17:03 java.pdf
drwxr-xr-x 2 abin abin    4096 Apr 10 22:01 Desktop
-rw-r--r-- 1 abin abin  166301 May  7 22:42 lamp.typescript
drwxr-xr-x 2 abin abin    4096 May  8 23:45 task1
-rw-r--r-- 1 abin abin    2152 May  9 00:40 task2.sh
-rw-r--r-- 1 abin abin     152 May  9 00:54 task3.sh
-rw-r--r-- 1 abin abin     682 May  9 01:01 package.sh
-rwxr-xr-x 1 abin abin     224 May  9 01:13 task7.sh
-rw-rw-r-- 1 abin abin 4692842 May 10 21:24 kernel.txt
-rw-rw-r-- 1 abin abin     620 May 10 21:26 kernel.sh
drwxr-xr-x 3 abin abin    4096 May 10 21:56 Pictures
drwxr-xr-x 2 abin abin    4096 May 11 13:57 Documents
drwxr-xr-x 4 abin abin    4096 May 11 16:33 Downloads
abin@hp:~$ alias ll='ls -l'
```

```
abin@hp:~$ ll
total 7628
drwxr-xr-x 2 abin abin    4096 Apr 10 22:01 Desktop
drwxr-xr-x 2 abin abin    4096 May 11 13:57 Documents
drwxr-xr-x 4 abin abin    4096 May 11 16:33 Downloads
-rw-r--r-- 1 abin abin    8980 Mar 18 23:34 examples.desktop
-rw-rw-r-- 1 abin abin 2868524 Mar 19 17:03 java.pdf
-rw-rw-r-- 1 abin abin     620 May 10 21:26 kernel.sh
-rw-rw-r-- 1 abin abin 4692842 May 10 21:24 kernel.txt
-rw-r--r-- 1 abin abin  166301 May  7 22:42 lamp.typescript
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Music
-rw-r--r-- 1 abin abin     244 Mar 18 20:55 MyFirstJavaProgram.java
-rw-r--r-- 1 abin abin     682 May  9 01:01 package.sh
drwxr-xr-x 3 abin abin    4096 May 10 21:56 Pictures
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Public
drwxr-xr-x 3 abin abin    4096 Mar 18 20:09 snap
drwxr-xr-x 2 abin abin    4096 May  8 23:45 task1
-rw-r--r-- 1 abin abin    2152 May  9 00:40 task2.sh
-rw-r--r-- 1 abin abin     152 May  9 00:54 task3.sh
-rwxr-xr-x 1 abin abin     224 May  9 01:13 task7.sh
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Templates
drwxr-xr-x 2 abin abin    4096 Mar 18 23:44 Videos
abin@hp:~$ unalias ll
abin@hp:~$ ll
ll: command not found
abin@hp:~$ pwd
```

EXPERIMENT- 2

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 the PDFs to create a file containing register

number and marks of all courses of students, one per line. Then the

file in piped through a C program to yeild a file containg 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.

Shellscript

https://raw.githubusercontent.com/ceccs17d01/cs232/master/task2/task2.sh

EXPERINMENT- 3

Networking

3.1 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>

3.2 route

route manipulates the kernel’s IP routing tables. Its primary

use is to set up static routes to specifi c hosts or networks

via an interface after it has been configured with the ifconfig

program.

Display details about current routing table

route

Add a default gateway address

route add default gw <ip>

3.3 dhclient

iwconfig is similar to ifconfig, but is dedicated to the wireless interfaces. It is used to set the parameters of the network interfaces which are specific to the wireless operation.

iwconfig may also be used to display those parameters, and

the wireless statistics.

Display details all wireless interfaces

Iwconfig

EXPERIMENT- 4

SSH

ssh (SSH client) is a program for logging into a remote machine and

for executing commands on a remote machine. It is intended to provide secure encrypted communications between two untrusted hosts

over an insecure network.

Connect to a remote server

ssh user@remoteip

rsync

rsync is a fast, versatile file-copying tool. It can copy locally,

to/from another host over any remote shell, or to/from a remote

rsync daemon. It offers a large number of options that control every

aspect of its behaviour and permit very flexible specification of the

set of files to be copied.

Basic syntax

rsync [options] <source> <destination>

Copy/Sync a file on a local computer

rsync -azvh <sourcefile> <destination>

Copy/Sync a directory on a local computer

rsync -azvh <sourcedirectory> <destination>

Copy/Sync a directory to a remote computer

rsync -azvh <sourcedirectory> user@serverip:<destination>

SCP

scp copies files between hosts on a network. It uses ssh for data transfer and uses the same authentication and provides the same security as ssh. scp will ask for passwords or passphrases if they are needed for authentication. The source and destination may be specified as a local pathname,

a remote host with optional path in the form of [user@]host:[path]

or a URI in the form scp://[user@]host[:port][/path].

EXPERINMENT- 5

FTP

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 serve

EXPERINMENT 6

Linux Installation

Installing a linux distribution on system requires the creation of an ext4 (sometimes ext3) formatted partition. Different directories like /usr /home /boot can be installed on separate partitions formatted as ext4. These should be mounted during init via fstab entries (which will be created by default for most linux distributions).

If the system uses UEFI then a separate partition formatted as FAT32 is required for ESP which contains boot managers and boot information for the UEFI.

The installation of required proprietry drivers may be provided with the installation image. If not it should be manually installed.

After the copying of required OS files localization settings like time, timezone, language, etc.. are configured. The installation interface might provide options for the creation of additional user accounts for the installed operation system. The password for the root user might be configured during installation, or set to a default password.

Images:

https://github.com/ceccs17d01/cs232/tree/master/task6

EXPERIMENT- 7

HTTP Server

Creating HTTP using nginx is simple. Installation of nginx can be done in ubuntu by using apt package manager.

apt install nginx

To start nginx server the following command can be used

nginx -s start

To stop nginx server

nginx -s stop

To restart nginx server

nginx -s restart

The most common server hosting directory (server root) is /var/www/html/.

This can be changed in nginx configuration file located at /etc/nginx/nginx.conf.

It contains configuration settings like ports, hostnames, ect.. By creating an index.html at the server root directory and restart nginx will make nginx load the index.html file when the IP address of the server machine is accessed through the same machine or a machine connected to the same network.

FTP Server

FTP server can be created using any FTP server application. This server was created using vsftpd (Very Secure FTP daemon). vsftpd server can be started using

vsftpd

FTP is used to transfer files across devices. Remote file transfer can be done through any FTP clients in conjunction with an FTP server. Linux has a builtin FTP client, ftp.

To access FTP server on an IP

$ ftp <serverip>

Usage of ftp client is demostrated in FTP Usage and Commands

EXPERIMENT- 8

1.Package management

In linux, programs are provided through package managers. These

packages undergo customizations and testings so the the software

program is completely compatible with the installed linux distribution.

apt provides a high-level CLI (Command Line Interface) for the package management system and is intended as an interface for the end user which enables some options better suited for interactive usage by default compared to more specialized APT tools like apt-cache and apt-get.

Syntax:

apt […COMMANDS] […PACKAGES]

2. perl

Perl 5 is a high level, general purpose, interpreted, dynamic language. ”Perl” is a family of languages. While Perl generally refers

to Perl 5, there is also another language Perl 6, which is a sister programming language to Perl 5, which is not indented as replacement

for Perl 5.

Program to print two numbers

```
#!/usr/bin/perl

use strict;

use warnings;

print "Enter two numbers \n";

$a = <>;
```

```
$b = <>;
my $sum = $a+$b;
print "Sum = $sum\n
```

3. LAMP stack

LAMP - Linux Apache MySQL PHP

LAMP stack is a web development platform which uses Linux as the operating system, Apache as the web server, MySQL as the relational database management system and PHP as the server side scripting language.

Apache is a web server similar to nginx. It hosts files in a specified directory as server root. Apache has modules for executing PHP at the server. This creates dynamic websites.

The data for the webpage like login credentials, user details, etc.. in a MySQL database running on the server system.

Most commonly MySQL is replaced by MariaDB since the latter is an open source fork of the former.

All the packages required for the lamp stack can be installed through

```
# apt install apache2 mariadb-server php \
libapache2-mod-php php-mysql
```

4.Kernel Compilation

Linux kernel is an open source kernal. It's code can be obtained through versioning systems like git or directly downloaded as archive

from https://kernel.org/.

It is then extracted to a convenient directory. For the configuration and compilation of the kernel certain packages are required. These can be installed with

```
# apt install git fakeroot build-essential ncurses-dev \
xz-utils libssl-dev bc flex libelf-dev bison
```

It can be then configured manully using

```
$ make menuconfig
```

Configuring the kernel manually can cause system crashes. The configuration can be applied by copying the current system kernel configuration from /boot directory.

The kernel can be compiled by

```
$ make
```

The kernel modules can compile by

```
$ make modules_install
```

The kernel can be installed by

```
# make install
```

EXPERIMENT- 9

Own web pages on server

The server was configured to use the home directory of the user account as a hosting webpage. So creating an index.html file into the

home directory of the student in the server was enough to start a

webpage.