PRACTICAL NO 1

Aim: Open Source Operating System

a) Learn any open source operating system of your choice. Linux, Android, Free BSD, Open Solaris, etc.

b) Learn the installation

c) Identify the unique features of the O.S of your choice.

What is an operating system?

An operating system (O.S) is system software that manages computer hardware, software resources, and provides common services for any computer programs.

Time-sharing operating systems schedule tasks for efficient use of the system and may also include accounting software for cost allocation of processor time, mass storage, printing and other resources.

For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between programs and the computer hardware, although the application code is usually executed directly by the hardware and frequently makes system calls to an OS function or is interrupted by it.

Steps for installation of Ubuntu on Virtual Box:

Step1: Install VirtualBox

Step2: Open Virtual Box: Double click the VirtualBox app icon.

Step3: Click New. It's a blue badge in the upper left corner of the

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VirtualBox window. Doing so opens a pop-up menu

Step 4: Enter a name for your virtual machine. Type whatever you want to name your virtual machine (e.g. Ubuntu) into the "Name" text field that's near the top of the pop-up menu.

Step 5: Select Linux as the "Type" value. Click the "Type" dropdown box, then click Linux in the resulting drop-down menu.

Step 6: Select Ubuntu as the "Version" value. Ubuntu should be selected by default after you set the "Type" value to Linux, but if it isn't, click the "Version" drop-down box and click Ubuntu (64-bit) before proceeding.

Step 7: Click Next. It's at the bottom of the menu.

Step 8: Select an amount of RAM to use. Click and drag the slider left or right to decrease or increase the amount of RAM.
- The ideal amount of RAM will automatically be selected when you get to this page.
- Make sure not to increase the RAM into the red section of slides.

Step 9: Click Next: It is at the bottom of the menu.

Step 10: Create your virtual machine's virtual hard drive:
The virtual hard drive is a section of your computer's hard drive space which will be used to store your virtual machine's files and programs:

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- Click Create
- Click Next
- Click Next
- Select an amount of space to use

Step 11: Make sure that your Ubuntu file is done downloading the Ubuntu ISO finishes downloading, you can proceed with installing it to VirtualBox.

Step 12: Select hard disk file type.

Step 13: Choose file location and size.

Step 14: Select startup disk.

Step 15: Choose whether you want to try or install Ubuntu.

Step 16: Ubuntu is ready to use.

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PRACTICAL NO 2

Aim: Installing and removing software

a] Install gcc package, Verify that it runs and then remove it.

Step 1:
First type 'gcc-v' to know if you have already installed gcc compiler or not. If the output is blank then it means that you dont have gcc installed.

Step 2:
Type 'sudo apt-get install gcc'. After typing the following command installation will take place.

Step 3:
Type 'sudo apt-get install build essential'. This will instal all the libraries required for c and c++ programming language.

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HOW TO UNINSTALL GCC COMPILER:

In GCC 5.1.0, although there is no top-level uninstall target, some directories do have it, in particular gcc. So you can do:

Type: cd build / gcc
sudo make uninstall

This does not remove everything that was installed, but removes major executables like gcc, g++, cpp... contained in that directory.

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ZIP(1) General Commands Manual ZIP(1)

NAME

zip - package and compress (archive) files

SYNOPSIS

zip [-aABcdDeEfFghjkllmnoqrRSTuvVwXyz!@$] [--longoption ...] [-b path] [-n suffixes] [-t date] [-tt date] [zipfile [file ...]] [-xi list]

zipcloak (see separate man page)

zipnote (see separate man page)

zipsplit (see separate man page)

Note: Command line processing in zip has been changed to support long options and handle all options and arguments more consistently. Some old command lines that depend on command line inconsistencies may no longer work.

DESCRIPTION

zip is a compression and file packaging utility for Unix, VMS, MSDOS, OS/2, Windows 9x/NT/XP, Minix, Atari, Macintosh, Amiga, and Acorn RISC OS. It is analogous to a combination of the Unix commands tar(1) and compress(1) and is compatible with PKZIP (Phil Katz's ZIP for MSDOS systems).

A companion program (unzip(1)) unpacks zip archives. The zip and unzip(1) programs can work with archives produced by PKZIP (supporting most PKZIP features up to PKZIP version 4.6), and PKZIP and PKUNZIP can work with archives produced by zip (with some exceptions, notably streamed archives, but recent changes in the zip file standard may facilitate better compatibility). zip version 3.0 is compatible with PKZIP 2.04 and also supports the Zip64 extensions of PKZIP 4.5 which allow archives as well as files to exceed the previous 2 GB limit (4 GB in some cases). zip also now supports bzip2 compression if the bzip2 library is included when zip is compiled. Note that PKUNZIP 1.10 cannot extract files produced by PKZIP 2.04 or zip 3.0. You must use PKUNZIP 2.04g or unzip 5.0p1 (or later versions) to extract them.

See the EXAMPLES section at the bottom of this page for examples of some typical uses of zip.

Large Archives and Zip64. zip automatically uses the Zip64 extensions

Manual page zip(1) line 1 (press h for help or q to quit)

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PRACTICAL NO 3

Aim: Utilization of grep man commands.

Documentation:

a] Finding info documentation from the command line: bring up the info page for the grep command. Bring up the usage section.

Ans: To find info about any command 'info' command is used. The syntax of info command is "info (command name)".

We are going to find the info about the 'grep' command:

Open the terminal (Ctrl + Alt + T) and type: info grep.

After typing this command following output will be displayed onto your screen.

You can also scroll through pages using (space = up) and (backspace = down) keys.

Another more summarized form of showing info is the 'man' command. The command is same as 'info', but required data.

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b] Finding man pages from the and line. Bring up the man page for the 'ls' command. Scroll down to the examples section.

Ans: To use the 'man' command simply type 'man (command name)'.

Now we are going to find the manual for 'ls' command.

Simply type : 'man ls'

c] Finding man pages by topic. What man pages are available that document file compression.

Ans: 'Tar', 'Zip' are some man pages which are available for document file compression.

Simply type : 'man zip'
'man tar'

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```
TAR(1)                                                    GNU TAR Manual

NAME
       tar - an archiving utility

SYNOPSIS
   Traditional usage
       tar [A|c|d|r|t|u|x][GMSVbBDhiklmOpsRSUvwZ0[1|2|3|4|5|6|7][zZjJyqW[number]] [ARG...]

   UNIX-style usage
       tar -A [OPTIONS] ARCHIVE ARCHIVE

       tar -c [-f ARCHIVE] [OPTIONS] [FILE...]

       tar -d [-f ARCHIVE] [OPTIONS] [FILE...]

       tar -t [-f ARCHIVE] [OPTIONS] [MEMBER...]

       tar -r [-f ARCHIVE] [OPTIONS] [FILE...]

       tar -u [-f ARCHIVE] [OPTIONS] [FILE...]

       tar -x [-f ARCHIVE] [OPTIONS] [MEMBER...]

   GNU-style usage
       tar {--catenate|--concatenate} [OPTIONS] ARCHIVE ARCHIVE

       tar --create [--file ARCHIVE] [OPTIONS] [FILE...]

       tar {--diff|--compare} [--file ARCHIVE] [OPTIONS] [FILE...]

       tar --delete [--file ARCHIVE] [OPTIONS] [MEMBER...]

       tar --append [-f ARCHIVE] [OPTIONS] [FILE...]

       tar --list [-f ARCHIVE] [OPTIONS] [MEMBER...]

       tar --test-label [--file ARCHIVE] [OPTIONS] [LABEL...]

       tar --update [--file ARCHIVE] [OPTIONS] [FILE...]

       tar --update [-f ARCHIVE] [OPTIONS] [FILE...]

       tar {--extract|--get} [-f ARCHIVE] [OPTIONS] [MEMBER...]
Manual page tar(1) line 1 (press h for help or q to quit)
```

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d] Finding man pages by section from the cmdline bring up the man page for the printlib function. Which manual page section are library function found?

Ans: The number corresponds to what section of the manual page is from; 1 is user command, while 8 is sysadmin stuff. The man page for man itself explain it and list the std ones.

There are certain terms that have different pages in different sections (eg: 'printf' as a command appears in section 1. as a 'stdlib' function appears in section 3); in cases like that you can pass the section no to the man before the page name to choose which on you want or use man-a to show every matching page in a row.

You can tell what section a term falls in with 'man-k' (equivalent to apropos command). It will do substing matches too. So you need to use "term" to limit it.

e] Command-Line Help list the available options for the mkdir command. How can you do this?

Ans: mkdir -m a = rwx directoryname

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PRACTICAL NO 4

Command line operations:

a] Install new package on your system

sudo apt-get install (package name)

b] Remove the package installed

sudo apt-get remove (package name)

c] Find the passwd file in/ using find command

find / -name passwd
/usr/share/doc/nss_ldap-253/pam-d/passwd
/usr/bin/passwd
/etc/pam-d/passwd
/etc/passwd

Find the directory passwd file under root and one level down

find / -max depth 2 -name passwd
/etc/passwd

find the passwd file under root and two level down

find / -mandepth 3 -name passwd

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./usr/bin/passwd
./etc/pam.d/passwd
./etc/passwd

Find the password file b/w sub-directories level 2 and 4

find -mandepth 3 -mandepth 5 -name passwd
./usr/bin/passwd
./etc/pam-d/passwd

d] Create a symbolic link to the file you found in last step.

ln -s file1 file2

e] Create an empty file example.txt and move it to \tmp directory using relative pathname.

touch example.txt
mv example.txt ./tmp

f] Delete the file moved to /tmp in previous step by absolute method

rm/tmp/example.txt

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9] Find the location of ls, ps, bash commands:

whereis ls

ls : /bin/ls /usr/share/man/man1/ls.1.gz

whereis ps

ps: /bin/ps /usr/share/ maps: /bin /ps /usr/ share/ man/man1/ps.1.gz

whereis bash

bash: /bin/bash /etc/bash.bashrc /usr/share/man/man1/bash.1.gz

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```
jeba@jeba-VirtualBox:~$ df -k
Filesystem     1K-blocks    Used Available Use% Mounted on
udev              494436       0    494436   0% /dev
tmpfs             102416    3676     98740   4% /run
/dev/sda1        7092728 3383372   3326024  51% /
tmpfs             512076     216    511860   1% /dev/shm
tmpfs               5120       4      5116   1% /run/lock
tmpfs             512076       0    512076   0% /sys/fs/cgroup
tmpfs             102416      48    102368   1% /run/user/1000
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=494436k,nr_inodes=123609,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=102416k,mode=755)
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro,data=ordered)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,releas
e_agent=/lib/systemd/systemd-cgroups-agent,name=systemd,nsroot=/)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset,nsroot
=/)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net
_cls,net_prio,nsroot=/)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids,nsroot=/)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer,nsro
ot=/)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpua
cct,nsroot=/)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsro
ot=/)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory,nsroot
=/)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio,nsroot=/
)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_even
t,nsroot=/)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb,nsro
ot=/)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,minp
roto=5,maxproto=5,direct)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime)
```

```
jeba@jeba-VirtualBox:~$ ls
Desktop    Downloads          Music     Public     Videos
Documents  examples.desktop   Pictures  Templates
jeba@jeba-VirtualBox:~$ cd jeb
jeba@jeba-VirtualBox:~/jeb$ cat .gg.txt
cat: .gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat >gg.txt
welcome
Linux
^C
jeba@jeba-VirtualBox:~/jeb$ touch dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt  gg.txt
jeba@jeba-VirtualBox:~/jeb$ cp gg.txt dd.txt
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$
```

```
jeba@jeba-VirtualBox:~/jeb$ touch ss.txt
jeba@jeba-VirtualBox:~/jeb$ mv gg.txt ss.txt
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$
```

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PRACTICAL NO 5

File Operations

1] Explore mounted file systems on your computer

Ans: df -k

2] What are the different ways of exploring mounted file systems on Linux?

Ans : mount

3] Copying text from files

Ans: cp command, mv command

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4] Archiving and backup the work directory using gzip and bzip2 commands.

Ans: gzip filename.txt
Bzip2 filename.txt

5] Use diff command to create diff of two files

Ans: diff filename1 filename2

6] Use patch command to patch a file. And analyze the patch using patch command again.

```
jeba@jeba-VirtualBox:/$ tar -cvf data.tar /mnn
tar: data.tar: Cannot open: Permission denied
tar: Error is not recoverable: exiting now
jeba@jeba-VirtualBox:/$ sudo.tar -cvf data.tar /mnn
tar: Removing leading '/' from member names
/mnn/
/mnn/hd/
jeba@jeba-VirtualBox:/$ ls
bin   data.tar  etc      lib     mnn   opt   run   srv   usr
boot  dd        home     lost+found mnt  proc  sbin  sys   var
cdrom dev       initrd.img media   mnt1  root  snap  tmp   vmlinuz
jeba@jeba-VirtualBox:/$ cat data.tar
mnn/0000755000000000000000000000000000000013605376557010365 5ustar  rootrootmnn/hd/0000755000000
000000000000000000013605376557010760 5ustar  rootrootjeba@jeba-VirtualBox:/$
```

```
jeba@jeba-VirtualBox:~/jeb$ bzip2 ss.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt  ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt.bz2
BZh91AY&SY ◆▯▯▯▯◆▯▯▯
'J◆w$S◆◆▯▯1 jeba@jeba-VirtualBox:~/jeb$ gzip dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz  ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt.gz
◆▯▯▯d.txt+O◆I◆◆M◆◆◆◆+◆◆▯▯◆xzjeba@jeba-VirtualBox:~/jeb$
```

```
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz  ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat >aa.txt
hello world
^C
jeba@jeba-VirtualBox:~/jeb$ cat >bb.txt
this is linux^C
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt
1d0
< hello world
jeba@jeba-VirtualBox:~/jeb$ cat >bb.txt
this is Linux
^C
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt

hello world

> this is Linux
jeba@jeba-VirtualBox:~/jeb$ gzip aa.txt
jeba@jeba-VirtualBox:~/jeb$ gzip bb.txt
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt.gz bb.txt.gz
Binary files aa.txt.gz and bb.txt.gz differ
```

```
jeba@jeba-VirtualBox:~/jeb$ cat >hi.txt
hi
hi
hi
^C
jeba@jeba-VirtualBox:~/jeb$ cat >hii.txt
hello
hello
hello
^C
jeba@jeba-VirtualBox:~/jeb$ diff -u hi.txt hii.txt >sam.patch
jeba@jeba-VirtualBox:~/jeb$ patch <sam.patch
^C
jeba@jeba-VirtualBox:~/jeb$ patch <sam.patch
patching file hi.txt
jeba@jeba-VirtualBox:~/jeb$ cat sam.patch
--- hi.txt      2020-01-08 22:14:55.463569834 +0530
+++ hii.txt     2020-01-08 22:15:16.259898738 +0530
@@ -1,3 +1,3 @@
-hi
-hi
-hi
+hello
+hello
+hello
jeba@jeba-VirtualBox:~/jeb$
```

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```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ who
jeba     tty7         2020-01-15 20:32 (:0)
jeba@jeba-VirtualBox:~$ whoami
jeba
jeba@jeba-VirtualBox:~$ who -l
LOGIN    tty1         2020-01-15 20:30                780 id=tty1
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ w
 20:35:04 up 4 min,  1 user,  load average: 0.70, 0.79, 0.38
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
jeba     tty7     :0               20:32    4:28   8.19s  0.33s /sbin/upstart
jeba@jeba-VirtualBox:~$ w -s
 20:35:14 up 4 min,  1 user,  load average: 0.60, 0.77, 0.37
USER     TTY      FROM              IDLE WHAT
jeba     tty7     :0                4:38  /sbin/upstart --user
jeba@jeba-VirtualBox:~$ w -h
jeba     tty7     :0               20:32    4:44   8.67s  0.33s /sbin/upstart
jeba@jeba-VirtualBox:~$ w -f
 20:36:12 up 5 min,  1 user,  load average: 0.41, 0.69, 0.37
USER     TTY      LOGIN@   IDLE   JCPU   PCPU WHAT
jeba     tty7     20:32    5:36   9.00s  0:33s /sbin/upstart --user
```

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/shadow
[sudo] password for jeba:
root:!:18240:0:99999:7:::
daemon:*:16911:0:99999:7:::
bin:*:16911:0:99999:7:::
sys:*:16911:0:99999:7:::
sync:*:16911:0:99999:7:::
games:*:16911:0:99999:7:::
man:*:16911:0:99999:7:::
[illegible]:16911:0:99999:7:::
[illegible]:*:16911:0:99999:7:::
news:*:16911:0:99999:7:::
```

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
```

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PRACTICAL NO 6

Environment

Which account you are logged in? How do you find out?

s: who command & whoami

Display / etc / shadow file using cat command and understand the importance of shadow file. How it's different than passwd file.

ns: cat / etc / shadow

s with the passwd file, each file in the shadow file is also seperated with ":" colons characters, and are as follows:

- Username, up to 8 characters. Case sensitive, usually all lower-case. A direct match to the username in the /etc / passwd file.
- Password, 13 character encrypted. A blank entry (eg::) indicates a password is not required to log in (usually bad idea), and a "*" entry (eg: *:) indicates the account has been disabled.
- The number of days (since January 1, 1970) since the password was last changed.
- The number of days to warn user of an expiring password (7 for a full week)

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- The number of days after password expires that account is disabled.

- The number of days since January 1, 1970 that an account has been disabled.

- A reserved field for possible future use.

Each field is a passwd entry is seperated with ":" colon character and are as follows:

- Username, up to 8 characters. Case-sensitive, usually all lowercase.

- An "x" in the password field. Passwords are stored in the "/etc/shadow" file.
- Numeric user id. This is assigned by the "adduser" script. Uses this field, plus the following group field, to identify files belong to the user.
- Numeric group id. Red Hat uses group id's in a fairly unique way for enhanced file security.
- Full name of user. I'm not sure what the maximum length for this field is, but try to keep it reasonable.
- User's home directory.

- Users "shell account". Often set to "/bin/bash" to provide access to the bash shell.

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```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ pwd
/home/jeba
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ history
    1  who
    2  whoami
    3  who -l
    4  clear
    5  w
    6  w -s
    7  w -h
    8  w -f
    9  clear
   10  cat /etc/shadow
   11  sudo cat /etc/shadow
   12  clear
   13  sudo cat /etc/passwd
   14  pwd
   15  clear
   16  history
jeba@jeba-VirtualBox:~$ !3
who -l
LOGIN    tty1         2020-01-15 20:20
jeba@jeba-VirtualBox:~$                                    780 id=tty1
```

```
jeba@jeba-VirtualBox:~$ alias m="mkdir new"
jeba@jeba-VirtualBox:~$ m
jeba@jeba-VirtualBox:~$ ls
Desktop    Downloads                    Music    Pictures   Templates
Documents  examples.desktop  jj         new      Public     Videos
jeba@jeba-VirtualBox:~$
```

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Get your current working directory

Ans: pwd

38 Explore different ways of getting command history, how to run previously executed command without typing it.

Ans: history

c] Create alias to most commonly used commands

Alias command instructs the shell to replace one string with another string while executing the commands.

Ans: alias label = "command"

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PRACTICAL NO 7

Linux Editors : Vi

a] Create, Modify, search and navigate a file in editor.

(i) Creating a file :

To create a file, on the terminal type vi followed by file

(ii) Modifying the file :

To modify a file, on the vi editor, type 'o'.

(iii) Search in a file :

To find a word (forward search) press / followed by word to se

(iv) Navigate :
Movement in four directions :

Key	Action
k	Moves cursor up
j	Moves cursor down
h	Moves cursor left
l	Moves cursor right

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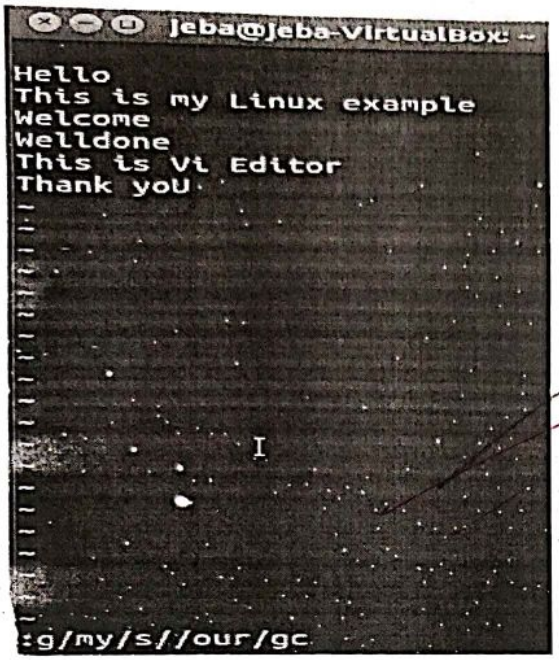

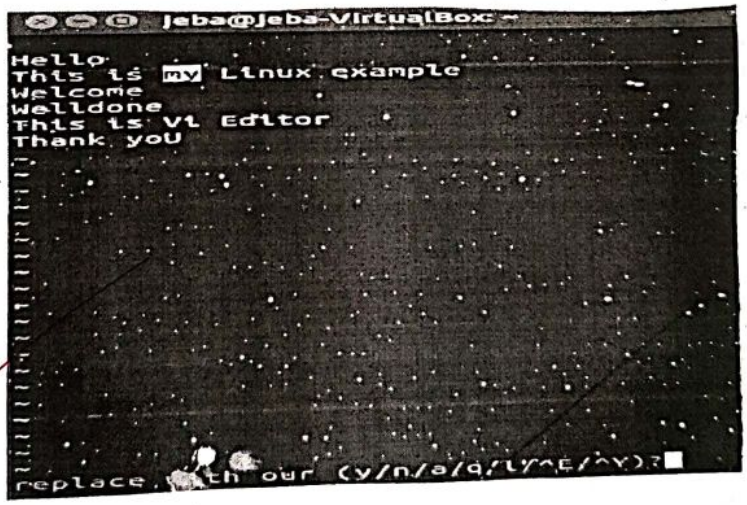

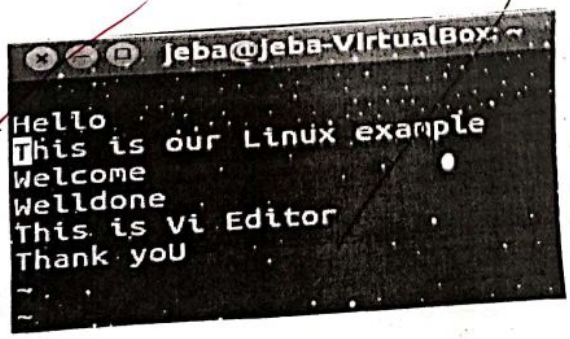

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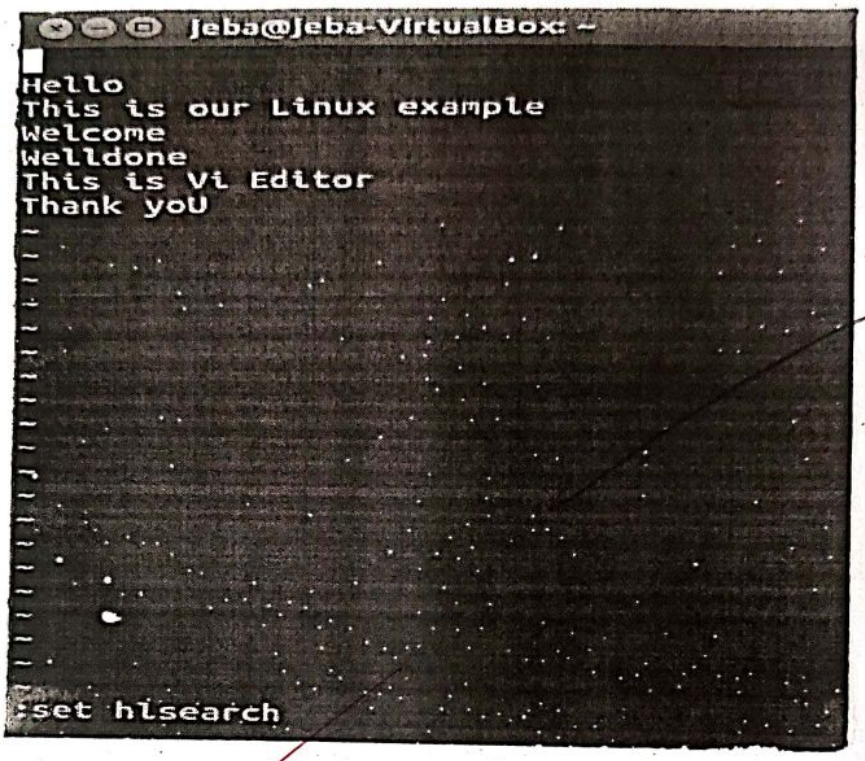

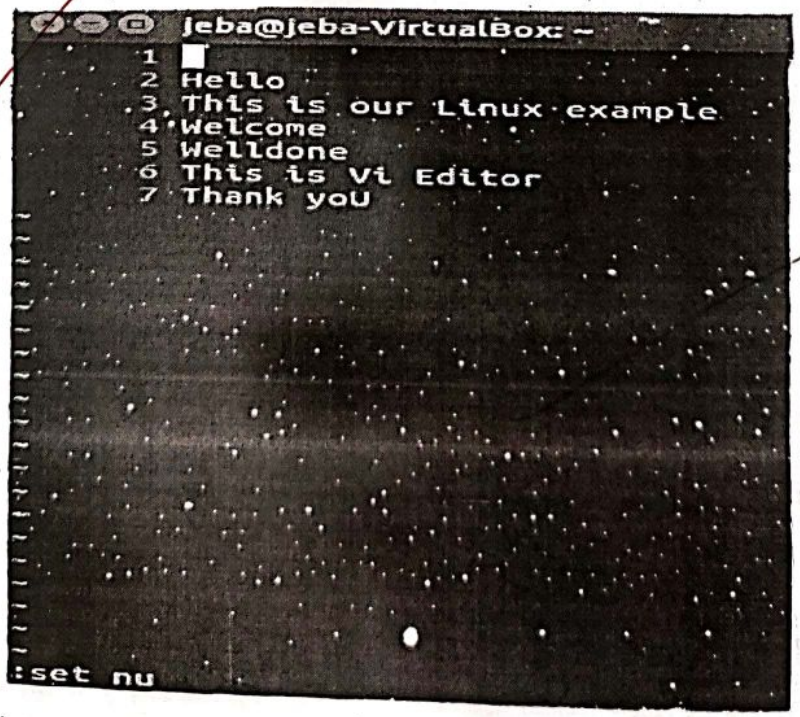

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Word Navigation:

Key	Action
b	Moves back to the begging of the word
e	Moves forward to the end of the word
w	Moves forward to the beginning of the word
0 (zero)	Moves to first character of a line
$	Move to the end of line

Scrolling

Key	Action
Ctrl + f	Scrolls forward
Ctrl + b	Scrolls backward
Ctrl + d	Scrolls half page
Ctrl + u	Scrolls half page backward

b] Learn all essentials commands like search / replace. highlight, show line numbers.

(i) Replace

(ii) Highlight
Use set hlsearch

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(iii) Show the line number
Use set nu

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PRACTICAL NO. 8

a] Use of sudo to change user privileges to root create a user named user1

To give some root privileges edit /etc/ sudoers using vi enter new line as highlighted below

b] Identify operations that require sudo privileges

c] Modify expirations data for new user password ageing

-E : Expiration Data
-m : Minimum number of days before password change
-M : Number of days password is valid
-I : Account Inactive
-W : Number of days of warning before a password change is required
d : Delete newly added user

```
ba@jeba-VirtualBox:~$ sudo chage -E 25/01/2020 -m 10 -M 90 -I 30 -W 30 user1
ba@jeba-VirtualBox:~$ sudo chage -l user1
st password change                                      : Jan 21, 2020
ssword expires                                          : Apr 20, 2020
ssword inactive                                         : May 20, 2020
count expires                                           : Jan 01, 2022
inimum number of days between password change           : 10
ximum number of days between password change            : 90
mber of days of warning before password expires         : 30
ba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ sudo userdel user1
[sudo] password for jeba:
jeba@jeba-VirtualBox:~$ su user1
No passwd entry for user 'user1'
```

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```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ sudo useradd user1
[sudo] password for jeba:
jeba@jeba-VirtualBox:~$ sudo passwd user1
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
jeba@jeba-VirtualBox:~$
```

```
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.
#
Defaults        env_reset
Defaults        mail_badpass
Defaults        secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:
sbin:/bin"

# Host alias specification

# User alias specification

# Cmnd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL

user1   ALL=(ALL:ALL) ALL
```

```
jeba@jeba-VirtualBox:~$ su user1
Password:
user1@jeba-VirtualBox:/home/jeba$ mkdir folder1
mkdir: cannot create directory 'folder1': Permission denied
user1@jeba-VirtualBox:/home/jeba$ sudo mkdir folder1
[sudo] password for user1:
user1 is not in the sudoers file.  This incident will be reported.
```

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ sudo chage -l user1
Last password change                                    : Jan 20, 2020
Password expires                                        : never
Password inactive                                       : never
Account expires                                         : never
Minimum number of days between password change          : 0
Maximum number of days between password change          : 99999
Number of days of warning before password expires       : 7
```

```
eba@jeba-VirtualBox:~$ sudo chage user1
hanging the aging information for user1
nter the new value, or press ENTER for the default

    Minimum Password Age [0]: 100
    Maximum Password Age [99999]: 200
    Last Password Change (YYYY-MM-DD) [2020-01-20]: 2020-01-21
    Password Expiration Warning [7]: 5
    Password Inactive [-1]:
    Account Expiration Date (YYYY-MM-DD) [-1]: 2020-01-31
eba@jeba-VirtualBox:~$ sudo chage -l user1
Last password change                                    : Jan 21, 2020
Password expires                                        : Aug 08, 2020
Password inactive                                       : never
Account expires                                         : Jan 31, 2020
Minimum number of days between password change          : 100
Maximum number of days between password change          : 200
Number of days of warning before password expires       : 5
jeba@jeba-VirtualBox:~$
```

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```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ hostname
jeba-VirtualBox
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ ping www.google.com
PING www.google.com (172.217.31.196) 56(84) bytes of data.
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=1 ttl=54 time=
97.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=
82.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=
84.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=
87.1 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=5 ttl=54 time=
93.5 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=6 ttl=54 time=
86.9 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=
98.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=
90.9 ms
^Z
[1]+  Stopped                 ping www.google.com
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ dig www.google.com

; <<>> DiG 9.10.3-P4-Ubuntu <<>> www.google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 52068
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;www.google.com.                IN      A

;; ANSWER SECTION:
www.google.com.         91      IN      A       172.217.166.100

;; Query time: 152 msec
;; SERVER: 127.0.1.1#53(127.0.1.1)
;; WHEN: Mon Jan 20 22:40:06 IST 2020
;; MSG SIZE  rcvd: 59

jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ traceroute www.google.com
traceroute to www.google.com (172.217.166.100), 30 hops max, 60 byte packets
1  10.0.2.2 (10.0.2.2)  0.190 ms  0.143 ms  0.151 ms
2  * * *
3  10.0.2.2 (10.0.2.2)  68.568 ms  68.486 ms  68.405 ms
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref
default         10.0.2.2        0.0.0.0         UG    100    0
10.0.2.0        *               255.255.255.0   U     100    0
link-local      *               255.255.0.0     U     1000   0
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$
```

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PRACTICAL NO 9

a] Get IP address of your machine using ifconfig

b] Get hostname of your machine

c] Use ping to check the network connectivity to remote machines

d] Use of dig command

e] Troubleshooting network using traceroute, route command

f] Use of arp command

g] Use of host command

h] Use of netstat command and Nmap command

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 08:00:27:0e:6b:69
          inet addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0
          inet6 addr: fe80::c0cd:53a0:d5a3:848e/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:2 errors:0 dropped:0 overruns:0 frame:0
          TX packets:73 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1180 (1.1 KB)  TX bytes:8518 (8.5 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:53240 errors:0 dropped:0 overruns:0 frame:0
          TX packets:53240 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:4225072 (4.2 MB)  TX bytes:4225072 (4.2 MB)
```

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PRACTICAL NO 10

Basics of shell scripting

a) To get a shell, you need to start a terminal.

b) To see what shell you have, run : echo $SHELL.

c) In linux, the dollar sign ($) stands for shell variable.

d) The echo command just returns whatever you type in.

e) #!/bin/bash - It is called shebang. It is written at the top of a shell script and it passes the instruction to the program /bin/bash.

- vi filename.sh

```
#!/bin/bash
echo "THIS IS LINUX!"
```

- Chmod 777 filename.sh

```
./filename.sh
```

Step to write and execute a shell script.

Shell script is just a simple text file with .sh extension, having executable permission.

a) Open terminal

b) Navigate to the [illegible] script using

```
tcsc@tcsc-VirtualBox: ~
c@tcsc-VirtualBox:~$ echo $SHELL
n/bash
c@tcsc-VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox: ~
#!/bin/bash
echo "THIS IS LINUX!"

"linux.sh" [New File]
```

```
tcsc@tcsc-VirtualBox: ~
tcsc@tcsc-VirtualBox:~$ vi linux.sh
tcsc@tcsc-VirtualBox:~$ chmod 777 linux.sh
tcsc@tcsc-VirtualBox:~$ ./linux.sh
THIS IS LINUX!
tcsc@tcsc-VirtualBox:~$
```

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```
#!/bin/bash
echo "Enter your name:"
read name
echo "My name is: $name"
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
:wq
```

```
tcsc@tcsc-VirtualBox: ~
tcsc@tcsc-VirtualBox:~$ vi ubuntu.sh
tcsc@tcsc-VirtualBox:~$ chmod 777 ubuntu.sh
tcsc@tcsc-VirtualBox:~$ ./ubuntu.sh
Enter your name:
TANVI
My name is: TANVI
tcsc@tcsc-VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox: ~
#!/bin/bash
a=100
b=25
sum=$(($a+$b))
echo "Sum is:$sum"
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
:wq
```

```
tcsc@tcsc-VirtualBox: ~
tcsc@tcsc-VirtualBox:~$ vi linux2.sh
tcsc@tcsc-VirtualBox:~$ chmod 777 linux2.sh
tcsc@tcsc-VirtualBox:~$ ./linux2.sh
Sum is:125
```

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cd command

c) Touch filename.sh

d) Vi filename.sh (to edit the script)

e) Chmod 777 filename.sh (for making the script executable)

f) sh filename.sh or ./filename.sh (for running the script)

Program to display your name

```
#!/bin/bash
Echo "Enter your name"
Read name
Echo "My name is : $name"
```

Program to find the sum of two variables

```
vi filename.sh
#!/bin/bash
a=100
b=25
Sum=$((($b+$b))
Echo " sum is : $sum"
```

Program to find the sum of two numbers (values passed during execution)

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Sed

Sed command or Steam Editor is very powerful utility offered by Linux systems. It is mainly used for text substitution, find replace but it can perform other text manipulations like insertion, deletion, search, etc. With sed, we can edit complete file without actually having to open it.

Consider the following text file.

1) Displaying partial text of a file.
With sed, we can view only part of a file rather than the whole file.

2) Display all except some lines
To display all content of a file except for some portion, use 'd'.

3) Deleting a line
To delete a line, use line number followed by 'd'.

4) Search and Replacing a string
's' option is for searching a word.

5) Replace a string on a particular line
To replace a string on a particular line, use line number with 's' option.

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```
tcsc@tcsc-VirtualBox: ~
#!/bin/bash
sum=$(($1+$2))
echo "sum is:$sum"
~
~
~
```

6] Add a line after / before the matched string.
To add a new line with some content after every pattern match, use option 'a'.

To add a new line with some content before every pattern match, use option 'i'.

7] To change a whole line with matched pattern.
To change a whole line to a new line when a search pattern matches, use option 'c'.

8] Appending lines
To add some content before every line with sed, use * and & as follows.

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