

Practical-01

37

Aim:- Install Your choice of Linux Distribution
e.g. Ubuntu, Fedora, Debian

Ubuntu : Ubuntu is a free and open source Software based on debian. Ubuntu is officially released under 3 editions Desktop, Server, union.

All the editions can be runned on the Computer alone or a Virtual box machine

It is a Popular open Source Software for cloud Computing with Support of openstack

Steps for installing Ubuntu in a Virtual Machine:

Step 1: Select a Virtual optical file or a physical drive to start Ubuntu in your Virtual machine. Space given to it is 1.86 GB.

Step 2: Select the language of your choice and click on 'Install Ubuntu'.

You can also 'try Ubuntu' for free on Computer device from this CD.

Step 3: In 'update and add Software' click on the normal installation.

38

Step 4: While Configuring installation type we need to click 'Create Virtual and install Ubuntu'. This step would delete all types of documents, Photos, etc in all operating systems.

Step 5: In this you only need to choose the location for the disk to work on ubuntu.

Step 6: In this type you need to choose Username and Password for the login in ubuntu and then click on Continue.

Step 7: Here you simply need to type Password again and it is done.

Step 8: Type name of Virtual disk and recommend Size to be given is 20 GB or 22 GB.

Therefore, now the VirtualBox is ready to use.

38

Step 5

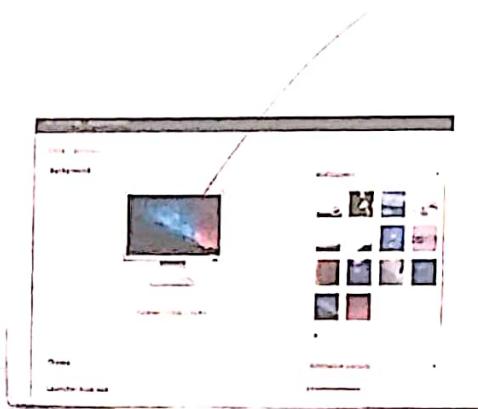
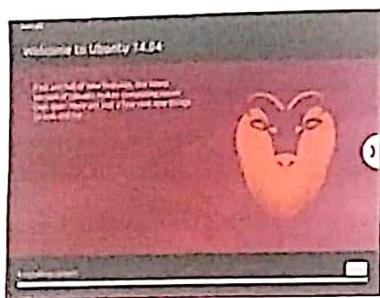
Step 6

Step 7

Step 8



58.



59.

- i) Customize desktop environment by changing wallpaper, desktop options like changing desktop orientation, themes, screensavers

Accessing Appearance Settings:

- 1) To access Appearance Settings in Ubuntu, let's click on User menu at the top right corner, on the top menu bar and select System Settings

- 2) A Window will pop-up with All settings divided into Personal, Hardware, and System options icons. Let's just click the appearance icon.

Changing Wallpaper Picture:

- 1) On the left Side of Background Part, You can see your current wallpaper.

- 2) On the right Side is Part where we can Select one of ubuntu Wallpapers, clicking on any thumbnail any wallpaper will be changed right away, with a fading effect.

- 3) If You want to Select wallpaper from Your Pictures folder, click the drop-down menu above thumbnails and select the Pictures Folder.

- 4) You will see all the Pictures in your Pictures folder as thumbnails, where you can select them as Your Wallpaper.

To add wallpaper that is in another folder, just click the plus icon below the Thumbnails and then in Pop-up window, Select the Path to our Custom folder and choose the picture inside of it.

changing Ubuntu Theme:

- 1) Ubuntu also has an option to change the Desktop theme, which in one click will change the entire way your Computer looks.
- 2) To do that, click on the deep brown menu below the wallpaper thumbnails, and choose between Ambiance, Radiance or High Contrast
- 3) Ambiance is a light theme, that looks a bit more mellow, while Radiance is that the darker brown theme used in Ubuntu by default

i) Screen Resolution: Ascertain the current Screen resolution for your desktop.

Changes the size or rotation of the Screen:

- i) You can change how big (or how detailed) things appear on the screen by changing the screen resolution.
- ii) You can change which way up things appear (for example, if you have a rotating display) by changing the rotation.
- iii) Click the icon on the very right of the menu bar and select System Settings.
- iv) Open Screen display.
- v) If you have multiple displays and they are not mirrored, you can have different settings on each display. Select a display in the Preview area.
- vi) Select your desired resolution and rotation.
- vii) Click Apply. The new settings will be applied for 30 seconds before reverting back. That way, if you cannot see anything with the new.

- 3) Time Settings change the time Zone of Your System to (or New York Time)
 - 1) If You are Currently in Indian Time, How does the displayed time change?
 - 2) After setting the time change, change the time Zone back to Your local time Zone.
 - 3) Just click on the clock on the top bar, and choose Time and Date Settings. Once the Time and Date window opens, choose manually. So You can change the time and date manually, otherwise choose Your time Zone from the map, and choose Automatic.

Yours
Hirav

A-: Installing and removing Software

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 don't have it installed.

Step 2:

Type 'sudo apt get install gcc'. After typing this following command installation will take place.

Step 3:

Type 'sudo apt-get install build-essential'. This will install all the libraries required for C and C++ programming language.

Now To UNINSTALL Gcc COMPILER:-

In Gcc 5.1.0, although there is no top
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 every thing that was installed,
but it removes major executables like gcc, g++,
C++..... contained in that directory.

80
11/10/17

Practical No :- 3

Aim:- utilization of grep,man Commands

Documentation:-

i) man ls
to - list directory ... [FILE]....

Description :-

List information about the files (the user directory by default) Sort entries alphabetically if none of -q, -v, -x, -n, -S, -t.

-q, --all

do not ignore entries starting with -A, --almost.

all

do not list implied

ii) man tar

~~tar, the GNU Version of the tar archiving Function letters.~~

-A, -- (alternab., -- Concatenab.

append Tar files to an arch.

-C, -- Create

Create a new archive.

- b)
- a) man mfsd
Create the directory
 - m - mfsd, mfsd - set file mode
 - P - Create an entry of existing mfsd Parent directory as needed
 - N - Verbose
Print a message for each created directory

- c) man 3 Rmtf
- The functions Rmtf(1) and vRmtf(1) write
into the standard output stream
Rmtf(1) writes output to the given output stream

- d) Info
- Then in the Info menu menu (left directory
menu)
- A few useful info commands
- 'Q' Quid
 - 'L' List all wtf (commands)
 - 'W' Shows wtf history
 - 'T' Test info Rmtf reads the clearing remainder

6) rmtf - Partition and Compress archive files 46

→ rmtf is a compression and file Partitioning utility for unix, VMS, MVS, DOS, OS/3,

→ It is analogous to a combination of the Linux
Compress command and Compress
add update existing entries and new file update.
update existing entries if newer on the file system
delete : Selected entries is an existing archive.
and delete them

*Eg
Info*

Practical - 4

Aim: Command line operations

i) Install new Package on your System

→ `Sudo apt-get install [Package name]`

ii) Remove the Package installed

→ `Sudo apt-get remove [Package name]`

iii) Find the Password file in / using find command

`# find / -name Password`

-/user/Password
/etc/Password

iv) Find the directory Password file under root and one level down.

→ `# find / -maxdepth 2 -name Password
-l etc/Password`

v) Find the Password file under root and 2 level down.

→ # find | -maxdepth 3 -name Password
| user | by | Password
| etc | Pwrm.d | Password
- /etc | Password

vi) Whereis Ps
Ps: /bin/Ps /user/share/man/man1/Ps.1.g2

⑦ Whereis bash
bash: /bin/bash /etc/bashrc /user/share/man/man1/bash/g2

⑧ In - s filenames.txt Preliminary2.txt

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11/02

Practical no. 5

File Operations

- Explore mounted file systems on your computer

Ans: df -k

```
jessicas-VirtualBox:~$ df -k
Filesystem      1K-blocks   Used Available  Mounted on
udev            494436       0  494436  /dev
tmpfs           102416     3676    98740  4% /run
/dev/sda1      7652728 3383372  3326024  51% /
tmpfs           512076      216   511860  1% /dev/shm
tmpfs           5120        4    5119  1% /run/lock
tmpfs           512076       0  512076  0% /sys/fs/cgroup
tmpfs           102416      48   102368  1% /run/dsfer/1000
jessicas-VirtualBox:~$
```

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

Ans: mount

```
jessicas-VirtualBox:~$ mount
tmpfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev type tmpfs (rw,nosuid,nodev,relatime,size=494436,pr_inodes=122609,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,ptmxmode=627,ptmxmode=600)
/dev/sda1 on / type ext4 (rw,nosuid,nodev,relatime,errors=remount-ro,barrier=1)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120)
tmpfs on /run type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120)
tmpfs on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/systemd/systemdctl,cpuacct,cpu��置)
tmpfs on /sys/fs/cgroup type tmpfs (rw,nosuid,nodev,noexec,relatime,cpuacct,cpu配制)
tmpfs on /sys/fs/cgroup/unified type tmpfs (rw,nosuid,nodev,noexec,relatime)
cpuset 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=/)
tmpfs on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer,nsroo
tmpfs on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpu
acct,nsroot=)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsroo
t=)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory,nsroot
)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,bikin,nsroot=-
)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf,even
t)
cgroup on /sys/fs/cgroup/hugepages type cgroup (rw,nosuid,nodev,noexec,relatime,hugepages,nsroo
t=)
tmpfs on /dev/hugepages type tmpfs (rw,relatime,fd=12,pgnr=1,linenout=0,mlap
tline=5,mlapnsize=128K)
hugepages on /dev/hugepages type hugepages (rw,relatime)
```

Practical 5

Aim: File operations

- Explore mounted file system on your computer

df -k

- What are different ways of exploring mounted file systems on Linux?

→ mount.

3 Copying text from file
→ CP command mv command

```
jeba@jeba-VirtualBox:~/jeb$ touch dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt
jeba@jeba-VirtualBox:~/jeb$ mv dd.txt dd1.txt
cat: dd.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat dd1.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$ cat dd1.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$
```

- 6 Archiving and backup the work directory using tar, gzip and bzip2 commands

Aan: **grip filename.ttl**
FReply: **I filename.ttl**

```
[root@kali ~]# ./jms5 cat 49.exe.DLL  
[root@kali ~]# ./jms5 get 49.exe.DLL  
[root@kali ~]# ./jms5 getp dd.exe  
[root@kali ~]# ./jms5 to  
[root@kali ~]# ./jms5 cat dd.Fat.0Z  
[root@kali ~]# ./jms5 get dd.Fat.0Z  
[root@kali ~]# ./jms5 getp dd.Fat.0Z  
[root@kali ~]# ./jms5 to
```

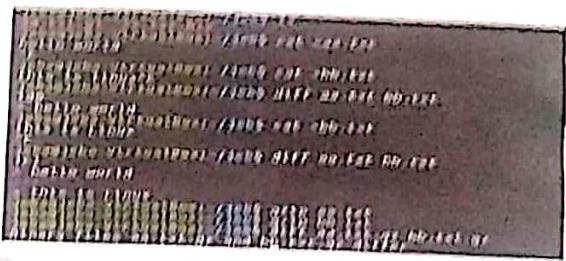
- 4) Recording and tracking the Workstation memory for, if required, step 2 Commands

→ group behavior by

Bryk 2) *fulvoviridis* [x]

d
G = $\left(\bigcup_{i=1}^n \{x_i\}_{\text{closed}} \right) \bigcup \{y_i\}_{\text{closed}}$
 $\rightarrow \bigcup_{i=1}^n \{x_i\}_{\text{closed}} \bigcup \{y_i\}_{\text{closed}}$

52



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

```
joba@joba-VirtualBox:~/Job5$ cat >hi.txt
hi
hi
hi
^C
joba@joba-VirtualBox:~/Job5$ cat >hi.txt
Hello
Hello
Hello
^C
joba@joba-VirtualBox:~/Job5$ diff -u hi.txt hi.txt >sam.patch
joba@joba-VirtualBox:~/Job5$ patch < sam.patch
^C
joba@joba-VirtualBox:~/Job5$ patch < sam.patch
patching file hi.txt
joba@joba-VirtualBox:~/Job5$ cat sam.patch
--- hi.txt      2020-01-08 22:14:55 +03509834 +0530
+++ hi.txt      2020-01-08 22:15:10 +259898738 +0530
@@ -1,3 +1,3 @@
-hi
+hi
Hello
Hello
Hello
joba@joba-VirtualBox:~/Job5$
```

6) Use Patch command to Patch a file And analyze its
Patch using Patch command again

Q102

16

Practical 6

Aim & Environment

Q) What account you are logged in? How do you find out?

→ Use command `who am I`

Q) Display /etc/passwd file using `cat` command and understand the importance of Shadow file. How it's different from Password file.

→ Use command `cat /etc/passwd`

As we see the Password file each field in the Shadow file is also separated with ":" colon characters as as follows:

- Usernames upto 8 characters. Case - Sensitive usually all lowercase.
- Password is 13 characters encrypted. A blank entry indicates a password is not required.
- The number of days, the Password was last changed.

Practical 6 Use Environment

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

Ans: who command & whoami

```
jebajeba-VirtualBox:~$ who
jeba    ttys2          2020-03-15 20:32  (root)
jeba    pts/0            2020-03-15 20:32  (root)
jebajeba-VirtualBox:~$ whoami
root
jebajeba-VirtualBox:~$ whoami
root
jebajeba-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   ttys2          20:32   4:28   0.19% 0.33% /sbin/start
jebajeba-VirtualBox:~$ w -s
20:35:14 up 4 min, 1 user,  load average: 0.69, 0.77, 0.37
USER  TTY      FROM             LOGIN   IDLE  JCPU PCPU WHAT
jeba   ttys2          20:32   4:38   0.19% 0.33% /sbin/start -user
jebajeba-VirtualBox:~$ w -h
jeba   ttys2          20:32   4:44   0.67% 0.33% /sbin/start
jebajeba-VirtualBox:~$ w -f
20:36:12 up 5 min, 1 user,  load average: 0.41, 0.49, 0.37
USER  TTY      LOGIN   IDLE  JCPU PCPU WHAT
jeba   ttys2          20:32   5:16   0.08% 0.31% /sbin/start -user
```

```
jebad@jebad-VirtualBox:~$ sudo cat /etc/shadow
root:$1$0:0:99999:7:::
daemon:$1$0:0:99999:7:::
bin:$1$0:0:99999:7:::
sys:$1$0:0:99999:7:::
sync:$1$0:0:99999:7:::
games:$1$0:0:99999:7:::
man:$1$0:0:99999:7:::
lp:$1$0:0:99999:7:::
mail:$1$0:0:99999:7:::
news:$1$0:0:99999:7:::
```

```
jebad@jebad-VirtualBox:~$ sudo cat /etc/passwd
root:x:0:0:root:/bin/bash
root:x:0:0:root:/usr/sbin/nologin
bin:x:1:0:bin:/usr/sbin/nologin
sys:x:2:0:sys:/dev/usr/sbin/nologin
sync:x:4:0:sync:/bin:/bin/sync
games:x:5:0: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
```

The number of days before Password may be changed.

The number of days after which Password must be changed.

The number of days to warn user of an expiring Password.

The number of days after Password expires that account is disabled.

The number of days since that account has been disabled.

Each field in Password entry is separated with colon characters, and are as follows.

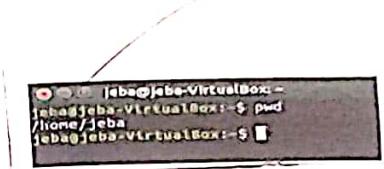
Username up to 8 characters

An 'x' in the Password field. Password are stored in the "/etc/shadow" file.

Numeric user id : This is assigned by the "adduser" script

- Numeric group id field that uses group id's in a fairly unique manner for enhanced file security usually group id will match the user id.
- Full name of user I'm not sure until the maximum length for this field is but try to keep under 30 characters
- User's "shell account" after Set to "/bin/bash" to provide access to the bash shell.
- c) Get your current working directory
→ Pwd

56



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

Q

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

Ans: history

line number

```
jeb@jeba-VirtualBox:~$ history
1 who
2 whoami
3 who -l
4 clear
5 w
6 w -s
7 w -t
8 clear
9 cat /etc/shadow
10 cat /etc/shadow
11 clear
12 sudo cat /etc/passwd
13 pwd
14 clear
15 history
jeb@jeba-VirtualBox:~$ who -l
LOGIN      tty1          2020-03-15 20:30
jeb@jeba-VirtualBox:~$
```

- e) 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"

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

57

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

→ history
line number

- 2) Create alias to most commonly used commands.

→ Alias Command instructs the Shell to replace one String with another String while executing the commands

→ alias label = "Command"

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11/02

3.

Practical-7

Aim: Linear Editor : Vi

A) Creating, modify, Search and navigate a file editor

i) Creating a file
→ Create a file, on the terminal type Vi followed by filename

ii) Modifying the file

→ To modify a file, on the vi editor, type

iii) Search in a file:

→ To find a Word Press followed by words to search.

iv) Navigate:

→ i) Movement in four directions

ii) Word Navigation

iii) Scrolling

Movement in four directions

58

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

Word Navigation

Key	Action
b	Move back to the beginning of Word
e	Move forward to end of Word
w	Moves forward to beginning of Word
o (zero)	Move to first character of line
\$	Move to end of line

Scanning

Key	Action
ctrl+f	Scrolls forward
ctrl+b	Scrolls backward
ctrl+d	Scrolls half Page
ctrl+u	Scrolls half Page backward

28

```
john@john-VirtualBox:~$ nano file1
Hello
This is our Linux example
Hello
This is Vt Editor
Thank you
```

```
john@john-VirtualBox:~$ nano file1
Hello
This is our Linux example
Hello
This is Vt Editor
Thank you
```

```
john@john-VirtualBox:~$ nano file1
Hello
This is our Linux example
Hello
This is Vt Editor
Thank you
```

```
john@john-VirtualBox:~$ nano file1
Hello
This is our Linux example
Hello
This is Vt Editor
Thank you
```

29

i) learn all the editor commands like Search / replace,
highlight , Show line number

Replace :

Syntax : (g) word to be replaced (s) new word (y)

Highlight
Use set search

Show line number
Use set nu

Highlight

Scanned by CamScanner

Practical-8

Aim: Linux Security

- a) Use of Sudo to change user Privileges to root
→ Create an user named User

To give some users root Privileges edit /etc/Sudoers using visudo. Enter a new line as highlighted below.

- (b) Identify operation that require Sudo Privileges

60

- a) Use of sudo to change user privileges to root.
Create an user named user1

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

To give some users root privileges edit /etc/sudoers using visudo. Enter new line as highlighted below.

```
# 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_badmail  
Defaults secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin/  
sbin:/bin"  
# Host alias specification  
# User alias specification  
# Cnnd alias specification  
# User privilege specification  
root    ALL=(ALL:ALL) ALL  
user1   ALL=(ALL:ALL) ALL
```

- b) Identify operations that require sudo privileges

```
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.
```

c) Modify expiration date for new user using password ageing.

```
jeb@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
```

```
jeb@jeba-VirtualBox:~$ sudo chage user1
Changing the aging information for user1
Enter 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
jeb@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
```

```
jeb@jeba-VirtualBox:~$ sudo chage -E 25/01/2020 -m 10 -M 90 -I 30 -W 30 user1
jeb@jeba-VirtualBox:~$ sudo chage -l user1
Last password change : Jan 21, 2020
Password expires     : Apr 20, 2020
Password inactive    : May 20, 2020
Account expires       : Jan 01, 2022
Minimum number of days between password change : 10
Maximum number of days between password change : 90
Number of days of warning before password expires : 30
```

- E: Expiration Date
- 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) Modify expiration date for new user, using Password ageing.

- E : Expiration Date
- M : Minimum number of days before Password change
- I : Account inactive
- W : Number of days of warning before a password change is required.

Jeb

Practical 9

Aim: Network Management

a) Get IP address of Your machine using ifconfig

b) Get hostname of Your machine

Practical 9 Network Management

a) Get IP address of your machine using ifconfig

```
jeba@jeba-VirtualBox:~$ ifconfig  
enp0s3 Link encap:Ethernet HWaddr 00:0c:27:0e:0b:69  
inet addr:10.0.2.15 Brdcast:10.0.2.255 Mask:255.255.255.0  
inet6 addr: fe80::fc0c:27ff:fe0e:0b69/64 Scope:Link  
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1  
RX packets:2 errors:0 dropped:0 overrun:0 frame:0  
TX packets:13 errors:0 dropped:0 overrun:0 carrier:0  
collisions:0 txqueuelen:1000  
RX bytes:1180 (1.1 KB) TX bytes:6516 (6.5 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 overrun:0 frame:0  
TX packets:53240 errors:0 dropped:0 overrun:0 carrier:0  
collisions:0 txqueuelen:1  
RX bytes:4225072 (4.2 MB) TX bytes:4225072 (4.2 MB)
```

b) Get hostname of your machine

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

c) Use Ping to check the network connectivity to remote machines

d) Use of dig command

```
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 ns
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=62.0 ns
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=64.8 ns
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=64.1 ns
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=98.9 ms
^C
[1]: Stopped ping www.google.com
jeba@jeba-VirtualBox:~$
```

E) Troubleshooting network using traceroute, route, netstat commands

c) Troubleshooting network using traceroute, route command

```
jeba@jeba-VirtualBox:~$ traceroute www.google.com
traceroute to www.google.com (172.25.66.199), 30 hops max, 64 byte packets
1 10.0.2.2 (10.0.2.2) 0.198 ms 0.143 ms 0.151 ms
2 *
3 10.0.2.2 (10.0.2.2) 68.568 ms 68.489 ms 68.469 ms
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
default         10.0.2.2        0.0.0.0       UG    100      0        0 ens1f0
10.0.2.0        *               255.255.255.0  U     100      0        0 ens1f0
Link-local      *               255.255.0.0   U     1000     0        0 ens1f0
jeba@jeba-VirtualBox:~$
```

f) Use of arp command

```
jeba@jeba-VirtualBox:~$ arp
jeba@jeba-VirtualBox:~$ arp
Address          HWtype  HWaddress          Flags Mask
10.0.2.2          ether   52:54:00:12:35:02  C      00:00:00:00:00:00
```

g) Use of host command

```
jeba@jeba-VirtualBox:~$ host -V
host 9.10.3.94-Ubuntu
jeba@jeba-VirtualBox:~$
```

F) Use of cat (command)

G) Use of host (command).

13

```
laba@lelabo-VirtualBox:~$ nmap www.google.com
Starting Nmap 7.01 ( https://nmap.org ) at 2020-01-20 22:51 IST
Nmap scan report for www.google.com (216.58.196.68)
Host is up (0.044s latency).
Other addresses for www.google.com (not scanned): 2404:6800:4007:811::20
rDNS record for 216.58.196.68: bom05s11-tn-f4.le100.net
Not shown: 998 filtered ports
PORT      STATE SERVICE
80/tcp     open  http
443/tcp    open  https

Nmap done: 1 IP address (1 host up) scanned in 20.32 seconds
laba@lelabo-VirtualBox:~$
```

Use of netstat Command and Nmap Command

65

Practical 10

Nano & Shell Scripting

Basics of shell Scripting

- To get a shell, You need to start a terminal
- To see what shell you have, run : echo \$SHELL
- In linux, the dollar sign (\$) stands for shell Variable.
- The echo command just return whatever you type in
- #!/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

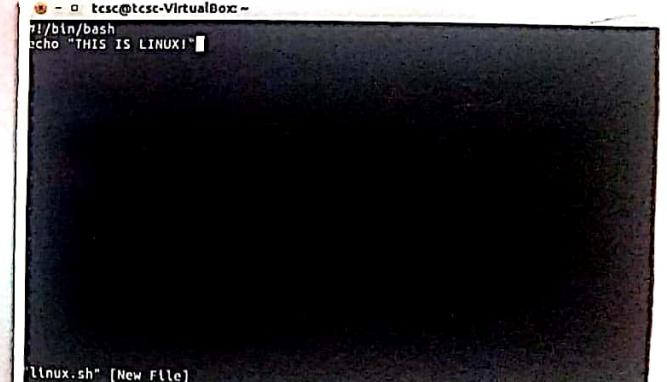
Echo \$SHELL

```
* Vi filenano.sh
#!/bin/bash
echo "This is LINUX!"
```

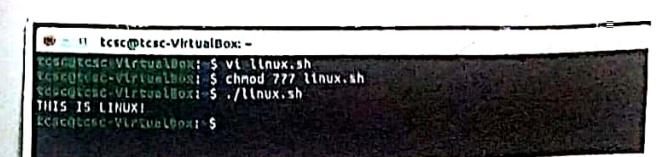
```
* chmod 777 filenano.sh
./filenano.sh
```



```
tsc@tsc-VirtualBox:~$ echo $SHELL
/bin/bash
tsc@tsc-VirtualBox:~$
```

```
tsc@tsc-VirtualBox:~$ touch linux.sh
tsc@tsc-VirtualBox:~$ nano linux.sh
tsc@tsc-VirtualBox:~$ echo "THIS IS LINUX!" > linux.sh
tsc@tsc-VirtualBox:~$
```

```
tsc@tsc-VirtualBox:~$ ./linux.sh
THIS IS LINUX!
tsc@tsc-VirtualBox:~$
```

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 place where you want to create script using cd command.
- c) Touch filename.sh
- d) Vi filename.sh [You can use your favorite editor, 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=$(( $a + $b ))
```

```
Echo "Sum is : $sum"
```

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

```
tsc@tsc-VirtualBox: ~
#!/bin/bash
echo "Enter your name:"
read name
echo "My name is: $name"
:tq
```

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

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

Program To find the Sum of Two numbers (Values Passed during execution)

Sed

Sed (Command) or Stream Editor is Very Powerful utility offered by Linux System. 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.

i) Displaying Partial text of a file.

With Sed, we can view only part of a file rather than Seeing whole file.

```
tcsc@tcsc-VirtualBox: ~
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calculus
computer basic

:wq
```

```
tcsc@tcsc-VirtualBox: ~
[1]+ 0 tcsc@tcsc-VirtualBox: ~
ls -l cs.txt
[2]+ 0 tcsc@tcsc-VirtualBox: ~ sed -n 3,5p cs.txt
database management
linux
python
[3]+ 0 tcsc@tcsc-VirtualBox: ~
```

2) Display all except Some lines
To display all Content of a file except
for Some portion, we option 'd'

```
tcsctcse@VirtualBox:~$ sed 3,5d cs.txt
subjects offered in cs
datastructure
green tech
softskill
stats
calculus
computer basic
tcsctcse@VirtualBox:~$
```

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

```
tcsctcse@VirtualBox:~$ sed 's/cs/computer/' cs.txt
subjects offered in computer
datastructure
database management
linux
python
green tech
softskill
stats
calculus
computer basic
```

4) Search and Replacing a String
's' option is for / Searching or word

```
tcsctcse@VirtualBox:~$ v l linux.sh
tcsctcse@VirtualBox:~$ chmod 777 linux.sh
tcsctcse@VirtualBox:~$ ./linux.sh
THIS IS LINUX!
tcsctcse@VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox:~$ sed '/cs/a "this is linux"' cs.txt
subjects offered in cs
>this is linux"
datastructure
database management
linux
python
green tech
softskill
stats
calculus
computer basic
tcsc@tcsc-VirtualBox:~$
```

```
tcsc@tcsc-VirtualBox:~$ sed '/cs/l "this is linux"' cs.txt
>this is linux"
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calculus
computer basic
tcsc@tcsc-VirtualBox:~$
```

Replace a String on a Particular Line
 To replace a string on a particular line, use line number with 's' option

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'.

15

7) To change a whole line with matched pattern

To change a whole line for a newline either a
Search pattern matching, use option 'i'

8) Appending lines

To add some content before every line
with sed, use t and d as follows

72

```
tsc@tcsd-VirtualBox:~$ sed '/linux/c\Thanks' cs.txt
subjects offered in cs
Thanks datastructure
Thanks database management
Thanks "this is linux"
python
green tech
softskill
stats
calculus
computer basic
```

```
tsc@tcsd-VirtualBox:~$ sed -e 's/.*/Thanks &/' cs.txt
Thanks subjects offered in cs
Thanks datastructure
Thanks database management
Thanks "this is linux"
Thanks python
Thanks green tech
Thanks softskill
Thanks stats
Thanks calculus
Thanks computer basic
```

PPR
11/21

★ ★ INDEX ★ ★

No.	Title	Page No.	Date	Staff Member's Signature
1)	Linux Installation		30/11/19	/
2)	Installation & Removing Software		21/12/19	/
3)	Utilization of Grep, man, Commands		21/12/19	/
4)	Command Line operation		21/12/20	/
5)	File operation		21/12/20	/
6)	User Environment		11/1/20	/
7)	Linux EDITOR : Vi		11/1/20	/
8)	LINUX SECURITY		18/1/20	27/1/20
9)	Network Management		18/1/20	11/1/20
10)	Shell Scripting		8/2/20	/