

## Practical No. 1

Aim:- Open source operating system

1. Learn any open source operating system of your choice  
linux , android , free BSD , open solaris, etc
2. Learn the installation
3. Identify the unique features of your choice

What is an operating system

An operating system is system software that manages computer hardware, software resources, and provides common service for computer system

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

Step for ~~installation~~ of Ubuntu on virtual box

1. Install virtual box
2. Open virtual box : Double click the virtualbox app . icon
3. Click new, Blue bluge on upper left corner of the virtual box windows . Doing so open a pop-up menu
4. Enter the name of virtual box machine . and name it

This does not remove everything that was installed, but it removes may or executable like gcc, g++, cpp, ... contained in that directory

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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:- find info about any command 'info' command is used  
the syntax of info the command is "info (command name)"

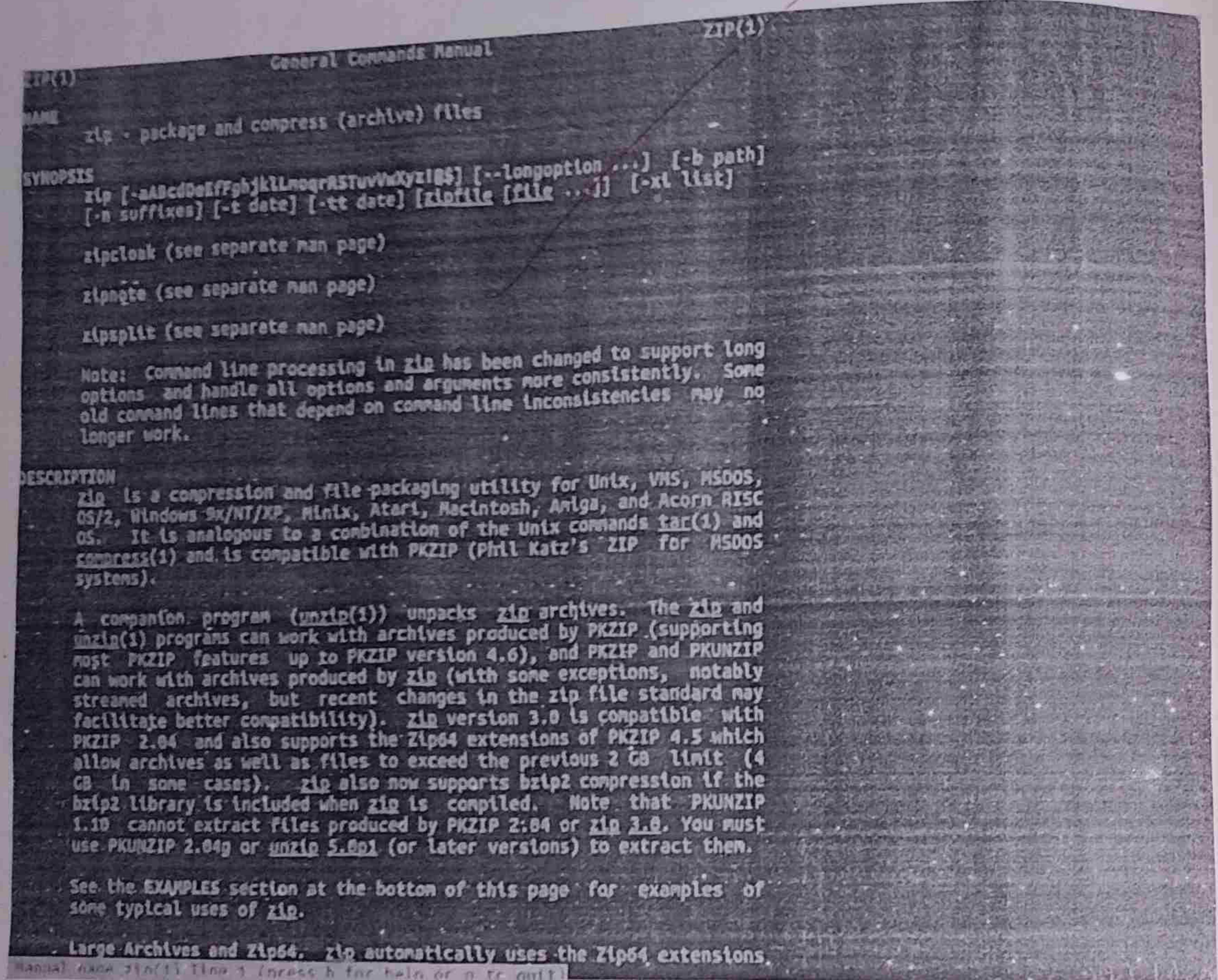
We are going to find the info about the 'grep' command

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

After typing this command following output will 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



finding man pages from the line bring up the man page for the 'ls' command scroll down the examples section

→ To use the 'man' command simply type  
 'man (command name)'  
 Now we are going to find the manual for 'ls'  
 command

Simple type: 'man ls'

c) finding man pages by topic what man pages are available that document file compression

→ 'Tar', 'zip' are some man pages which are available for document files compression simple type

simple type: 'man zip'  
 man tar

d) finding man pages by section from the command lines bring up the man page for the print file functions which manual page section are library functions found

→ The number corresponds to what section of the manual data page is from. I user command for while 8 is

```

tar(1)
NAME
       tar - an archiving utility

SYNOPSIS
Traditional usage
       tar [-A|-c|-d|-f|-t|-u|-x] [-C|-G|-M|-P|-R|-S|-V|-W|-Z] [-b|-B|-k|-n|-r|-s|-w|-z] [-f archive] [file...]
       tar [-A] [-O] [archive] [file...]
       tar [-c] [-T] [archive] [options] [file...]
       tar [-d] [-T] [archive] [options] [file...]
       tar [-f] [-T] [archive] [options] [member...]
       tar [-r] [-T] [archive] [options] [file...]
       tar [-u] [-T] [archive] [options] [file...]
       tar [-x] [-T] [archive] [options] [member...]

GNU-style usage
       tar [--catenate|--concatenate] [options] archive archive
       tar --create [-f archive] [options] [file...]
       tar (--diff|--compare) [--file archive] [options] [file...]
       tar --delete [-f archive] [options] [member...]
       tar --append [-f archive] [options] [file...]
       tar --list [-f archive] [options] [member...]
       tar --set-label [--file archive] [options] [label...]
       tar --update [--file archive] [options] [file...]
       tar --update [-f archive] [options] [file...]
       tar (-e--extract)...(-f archive) [options] [member...]
       tar (-e--extract)...(-f archive) [options] [member...]

```

Manual page syntax: \$ man [section] [command] | less -r or less -n for help or q to quit

e. find the password file under root and 2 level down.

✓ # find 1-max depth 3-name passwd

- /usr/bin/passwd

- /etc/pam.d/passwd

- /etc/passwd

f. find the password file b/w sub directories level 2 & 4

# find -maxdepth 3 -maxdepth as name passwd

- /user/bin/passwd

- /etc/pam.d/passwd

g. Create a symbolic link to the file you found in left step

# ln -s file1 file2

h. Create an empty file example.txt if more i +to 1 tmp directory using relative pathname

# touch example.txt

# mv example.txt /tmp

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- i. due to the file moved to /tmp in previous step by absolute method.

# /tmp/example.txt

- j. find the location of ls, ps, bash commands

# where ls

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

# where is ps

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

# where bash

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

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## Practical 5

1. Explore mounted file system on your computer  
→ `df -k`
2. What are different ways of exploring mounted file system on Linux  
→ `mount`
3. Copying text from files  
→ ~~cp command, mv command~~

```
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           512076      4    5116   1% /run/lock
tmpfs           512076      0   512076   0% /sys/fs/cgroup
tmpfs           102416     48   102368   1% /run/user/1000
jeba@jeba-VirtualBox:~$
```

Explor

```
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,release_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,nsroot=/)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct,nsroot=/)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsroot=/)
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_event,nsroot=/)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb,nsroot=/)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs.(rw,relatime,fd=32,pgrp=1,timeout=0,minproto=5,maxproto=5,direct)
hugetlbfss on /dev/hugepages type hugetlbfss (rw,relatime)
```

→ df -k

2. What  
on li

→ mou

3. Copyin

→ cp co

```
jeba@jeba-VirtualBox:~$ ls
Desktop      Downloads
Documents examples.desktop jj Music      Pictures      Public      Videos
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 dd.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt
Linux
jeba@jeba-VirtualBox:~/jeb$
```

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

jeba@jeba-VirtualBox:~/jeb\$

4. Archiving and backup the work directory using  
gzip and bzip2 command

 `gzip filename.txt`

Bzip2 filename.txt ✓

- Use diff command to create diff of two files

$\rightarrow$  diff filename1 filename2

6. use patch command to patch a file . And make a  
patching using command again

```
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*  
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt.bz2  
JewSSee1  
jeba@jeba-VirtualBox:~/jeb$ gzip dd.txt  
dd.txt.gz ss.txt.bz2  
jeba@jeba-VirtualBox:~/jeb$ ls  
dd.txt+0IeMoeet+*  
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt.gz  
Xzjeba@jeba-VirtualBox:~/jeb$
```

```
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz ss.txt.bzz
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
1d0
< hello world
> this is Ltnux
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$ █
```

### Practical No 6.

- o which account you are logged ? How do find out?
- who command & whoami
- 6. Display |etc|shadow file using cat command and understand the importance of shadow file. How it's different than passwd file.
- cat |etc|shadow
- As with passwd file in the shadow file is also separated with ":" colons characters and are as follow:
- Username , up to 8 characters , case-sensitive case - se usually all lowercase A direct match do the username in the etc |passwd file
- Password, 13 characters encrypted
- The number of days since the password was last changed
- The number of days before password may 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 January 1, 1970 that an account has been disabled

```
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
jeba@jeba-VirtualBox:~$ █
780 id=tty1

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          LOGIN@   IDLE   JCPU   PCPU 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      FROM          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
[judo] 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:::
lp:*:16911:0:99999:7:::
mail:*: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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- 8
- c. Get your current working directory  
→ `pwd`
  - d. Explore different ways of getting command lists  
→ `history`  
! line number
  - e. Create alias to most commonly used commands  
→ `alias label = "command"`

```
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 20:30 780 id=tty1  
jeba@jeba-VirtualBox:~$ █
```

```
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:~$ █
```

```
tcsc@tcsc-VirtualBox:~
```

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

```
:nq
```

```
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"
```

```
:nq
```

```
tcsc@tcsc-VirtualBox:~
```

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

- Select Linux as the 'Type' value. Click the 'Type' dropdown box, then click Linux in the resulting dropdown menu.
- Select Ubuntu as the 'Version' value. Ubuntu should be selected by default after you set the 'Type' value to Linux.
- 7:- Click Next: It at the bottom of the menu
- 8:- Select an amount of RAM to use: click and drag the slider left or right to decreases or increases the amount of RAM.
- 9:- Click Next: It at the bottom of the menu
- 10:- Create your virtual machine virtual hard drive. The virtual hard drive is a section of your computer hard drive space which will use to store your virtual machine files and program.

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

## 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 don't have gcc installed

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

Step 3: Type 'sudo apt-get install gcc'. After 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-level uninstall target, some directories do have it in particular gcc, so you can do

Type: cd build/gcc

sysadmin stuff. The man page for man itself explain it  
and list-the store

There are certain terms that have different pages in  
different section (eg:- 'printf' as a command appears in  
section 1, as a 'stub' function appears in section 3,  
in cases like that you can pass the section no to the term  
man before the page name to choose which one  
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'  
It will do substring matches too so you need to  
use "term" to limit it

e. command-line help list the available option for mkdir  
command. How can you do this ?

\$ mkdir -m a=rwx directoryname

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## Practical No 4

### Command line operations

a. Install one package on your system

sudo apt-get install (package name)

b. Remove the package installed

sudo apt-get remove (package name)

c. Find the password file in Linux using find command

at find | more password

• /usr/share/doc/nss-ldap-0.5.3/pam.d | password

• /usr/bin/password

• /etc/pam.d/password

• /etc/password

d. Find the dictionary password file under root and level one directory

• find / -max\_depth 2 -name password

### Practical No : 1

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 filename

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 the word to search

iv. Navigate

Movement in four directions:

Key

Action

k

Moves cursor up

j

Moves cursor down

h

Moves cursor left

l

Moves cursor right

```
000 jeba@jeba-VirtualBox: ~  
Hello  
This is my Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you  
I  
:g/my/s//our/gc
```

```
000 jeba@jeba-VirtualBox: ~  
Hello  
This is my Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you  
I  
replace with our (y/n/a/d/r/Y^E/^Y)? ■
```

```
x - 0 jeba@jeba-VirtualBox: ~  
Hello  
This is our Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you  
~  
~
```

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## Word Navigation

Key

b

e

w

0(zeros)

\$

## 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 essential commands like search | replace, highlight  
show line numbers

i. Replace

Syntax : :lg / word to be replaced / g / new word / gc

ii Highlight

Use set nlssearch

iii Show the line number

Use set nu

```
jeba@jeba-VirtualBox: ~
Hello
This is our Linux example
Welcome
Welldone
This is Vi Editor
Thank you

:set hlsearch
```

```
jeba@jeba-VirtualBox: ~
1
2 Hello
3 This is our Linux example
4 Welcome
5 Welldone
6 This is Vi Editor
7 Thank you

:set nu
```

### Practical No 8

- a. Use of sudo to change user privileges to root  
Create an user named user1  
to give some root privileges edit /etc/sudoers using visudo. Enter new line as highlighted below
- b. Identify operations that require sudo privileges
- c. Modify expirations data for new user password ageing

- 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. Delete newly added user

```
jeba@jeba-VirtualBox:~$ sudo chage -E 25/01/2020 -m 10 -M 90 -I 30 -W 30 user1
jeba@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
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ sudo userdel user1
[jsudo] password for jeba:
jeba@jeba-VirtualBox:~$ su user1
No passwd entry for user "user1"
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:/  
# 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:~$ sudo chage -l user1  
Last password change  
Password expires  
Password inactive  
Account expires  
Minimum number of days between password change : Jan 20, 2020  
Maximum number of days between password change : never  
Number of days of warning before password expires : never
```

```
jeba@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
```

```
jeba@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
```

a. User  
C  
Jo g  
visual

b. I

c. M  
age

- E:  
- m:  
- M:  
- I:  
- W:  
ch

d.  
ba@jeba-Vir  
ba@jeba-Vir  
st password  
ssword expi  
ssword inac  
count expir  
nimum numbe  
ximum numbe  
mber of da  
ba@jeba-Vi

99

## Practical No: 9

- a) Get IP address of your machines 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:~$ ifconfig  
enp0s3      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)
```

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

*ifconfig*

```
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:~$
```

*dig*

```
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:~$
```

*traceroute*

```
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:~$
```

*route*

```
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:~$
```

*arp*

```
jeba@jeba-VirtualBox:~  
jeba@jeba-VirtualBox:~$ arp  
Address HWtype Hwaddress Flags Mask Iface  
10.0.2.2 ether 52:54:00:12:35:02 C enp0s
```

```
jeba@jeba-VirtualBox:~$ host -V  
host 9.10.3-P4-Ubuntu
```

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

```
jeba@jeba-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::2004  
rDNS record for 216.58.196.68: bom05s11-in-f4.1e100.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  
jeba@jeba-VirtualBox:~$
```

```
© © © jeba@jeba-VirtualBox ~  
jeba@jeba-VirtualBox:~$ netstat  
Active Internet connections (w/o servers)  
Proto Recv-Q Send-Q Local Address           Foreign Address         State  
Active UNIX domain sockets (w/o servers)  
Proto RefCnt Flags       Type      State          I-Node Path  
unix  2      [ ]        DGRAM               42149  /run/user/1000/system  
d/notify  
unix  2      [ ]        DGRAM               9694   /run/systemd/journal/  
syslog  
unix  16     [ . ]      DGRAM               9695   /run/systemd/journal/  
dev-log  
unix  7      [ ]        DGRAM               9704   /run/systemd/journal/  
socket  
unix  3      [ ]        DGRAM               9684   /run/systemd/notify  
unix  3      [ ]        STREAM   CONNECTED    44042  @/tmp/dbus-CymTeI7AQG  
unix  3      [ ]        STREAM   CONNECTED    43331  @/tmp/dbus-CymTeI7AQG  
unix  3      [ ]        STREAM   CONNECTED    42988  @/tmp/dbus-CymTeI7AQG  
unix  3      [ ]        STREAM   CONNECTED    42690  @/tmp/dbus-CMGGc6G7PS  
stdout  
unix  3      [ ]        STREAM   CONNECTED    13242  /run/systemd/journal/  
stdout  
unix  3      [ ]        STREAM   CONNECTED    43113  /run/systemd/journal/  
unix  3      [ ]        STREAM   CONNECTED    43013  /run/systemd/journal/  
unix  3      [ ]        STREAM   CONNECTED    42935
```

10/02

## Practical No. 10

Aim: Shell scripting

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. To echo command just returns whatever you type.
- e. #!/bin/bash - It is called Shebang. It is written at top of shell script and it passes the instruction to the program/bin/bash

Echo \$SHELL

vi filename.sh

#!/bin/bash

echo "THIS IS LINUX!"

chmod 777 filename.sh

! filename.sh

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

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
- e) chmod 777 filename.sh
- f) sh filename.sh or ./filename.sh

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"

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

Step  
g  
nau  
a  
b  
scr  
Pm  
#  
E  
R  
E

```
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  
tcsc@tcsc-VirtualBox:~$
```

Program to find the sum of two numbers

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

Program to find the sum of two variable numbers

1. Displaying partial text of a file

With sed, we can view only part of a file rather than seeing whole file.

2. Display all except some lines

To display all content of a file except for some portion use option 'd'.

3. Deleting a line

To display delete a line, use line number followed by

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

"lin.sh" 3 lines, 46 characters

```
tcsc@tcsc-VirtualBox: ~$ vi lin.sh  
tcsc@tcsc-VirtualBox: ~$ chmod 777 lin.sh  
tcsc@tcsc-VirtualBox: ~$ ./lin.sh 50 70  
sum is:120  
tcsc@tcsc-VirtualBox: ~$
```

subjects offered in cs

datastructure

database management

linux

python

green tech

softskill

stats

calculus

computer basic

:wq

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

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 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

\$  
/  
\$

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

```
tcsc@tcsc-VirtualBox:~$ sed '6 s/cs/computer system /' cs.txt  
subjects offered in cs  
datastructure  
database management  
linux  
python  
green tech  
softskill  
stats  
calculus  
computer basic
```

```
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 '/linux/c "this is linux"' cs.txt  
subjects offered in cs  
datastructure  
database management  
"this is linux"  
python  
green tech  
softskill  
stats  
calculus  
compr
```

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

4. Search

5. Split

6. Replace

To replace  
numbers

7. Add

To add  
pattern

To add  
pattern

7. To

a

8. A

To  
use