

Practical no. 1.

Aim: Install your choice of linux distribution.

Eg. 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 CO.

Step 3: In 'Updates and add software' click on the normal installation.

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Step 4: While configuring installation type we need to click 'Erase disk 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 clock 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.

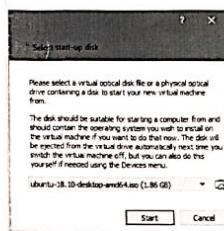
Step 7: Here you simply need to type password again and it is done.

Step 8: Type name of virtual disk and recommend size to be given is 2048 GB or 278.

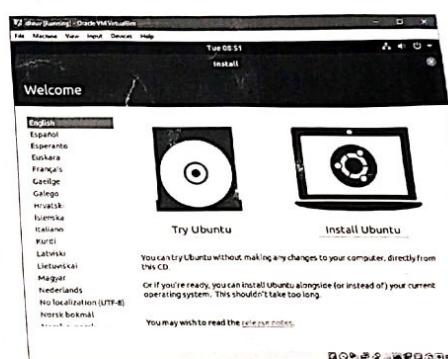
Therefore, now the virtual box is ready to use.

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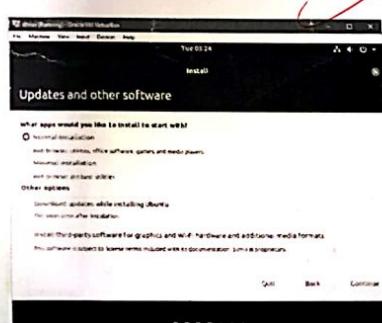
Step 1



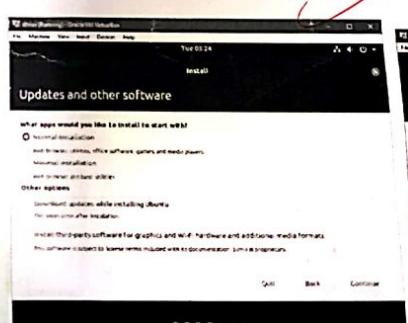
Step 2



Step 3



step 4



Installation type



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b) Customize desktop environment by changing different default options like changing default background themes, screen savers.

Accessing Appearance settings:

- ▷ To access appearance settings in Ubuntu, let's click on user menu at the top right corner, on the top right corner, on the top menu bar and select System settings.
- ▷ A window will pop-up with all settings divided into personal, hardware and system options icons. Let's first select the appearance icon.
- ▷ on the left side of Background part, you can see your current wallpaper.
- ▷ on the right side is part where, we can select one of ubuntu wallpapers. clicking on any thumbnail our wallpaper will be changed right away, with a fading effect.
- ▷ If you need to select wallpapers from your picture folder, click the drop-down menu above thumbnails and select the pictures folder.

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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.

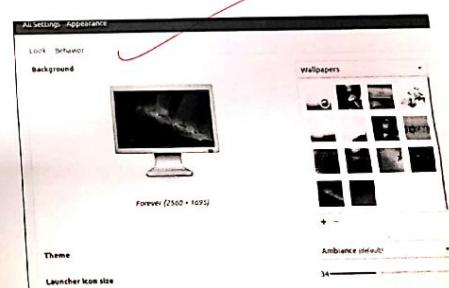
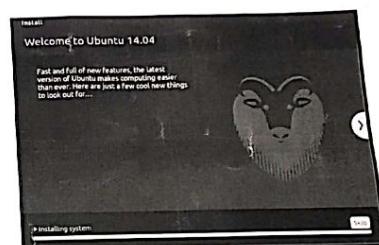
changing ubuntu theme:

- 1) Ubuntu also has an option to change the desktop theme, which in one click will change the entire using your computer looks.
- 2) To do that, click on the drop-down menu below the wallpaper thumbnails and choose between ambience, radiance or high contrast.
- 3) Ambiance is a light theme that looks a bit more Mac-like while radiance is the darker brown theme used in Ubuntu by default.

Screen resolution:

As certain the current screen resolution for your desktop.

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changes the size or rotation of the screen.

- 1) You can change how big (or how detailed) things appear on the screen resolution.
- 2) Click the icon on the way up things appear (for example, if you have a rotating display).
- 3) Open screen display.

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 rotating 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.

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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 typing the 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-level uninstall target, some directories do have it, in particular gcc, so you can do :

Type: cd build/gcc

Sudo make uninstall.

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

Practical no. 3.

Aim: utilization of grep, man commands

a) Finding info documentation from the command.

Line 5 bring up the info page for grep command.

Bring up the usage section.

Answer: 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.

Now 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 requires data.

- b] Finding man pages from the command using up the man page for the 'ls' command scroll down to the example section.
 Answer: 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 documents file compression.
 Answer: 'tar', 'zip' are some man pages which are available for documents file compression.
 Simply type: man zip man tar.

- d] Finding man pages by section from the command bring up the manpages for the printf function which manual page section are library function.
 Answer: The number corresponds to what section of the manual page is from 1 is user command while 8 is sysadmin stuff.

NAME

tar - an archiving utility

Synopsis:

Traditional usage

~~tar [A|c|d|r|t|u|x] [GnSKUWom|psM Biq Jz.
 Zhp|RUMWD].~~

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

The man page for man itself explain if and list the sections.

There are terms that have different pages in different sections (eg. 'printf' as a command appears in section 1 as a 'stdio' function appears in section 3); in case like that you can pass the section no. to the man before the pagename to choose which one you want or we 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 substring matches too - so you need to use "term" to find it.

- c) Command line help list the available options for the mkdir command. How do you do this?

\$ mkdir -ma=rwx . directoryname

Aim: command line operations

1) Find 1-name password

→ /etc/cron.daily/passwd
 /etc/pam.d/passwd
 /etc/passwd
 /usr/bin/passwd

/usr/share/bash-completion/completions/passwd
 /usr/share/doc/passwd
 /usr/share/lintian/overrides/passwd.

2) find 1-maxdepth 2 -name passwd

/etc/passwd

3) find 1-maxdepth 2-maxdepth 3 -name passwd

/etc/cron.daily/passwd

/etc/pam.d/passwd

/etc/passwd

/usr/bin/passwd

/root/etc/passwd

4) find 1-maxdepth 3-maxdepth 5-name passed

/etc/cron.daily/passwd

/etc/pam.d/passwd

/etc/passwd

/usr/bin/passwd

/usr/share/bash-completion/completions/

5) ln -s abc.txt sang.txt

-ls

Desktop downloads Music Public templates

Documents filename2.txt pictures sang.txt videos

6) where is ls

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

7) where is ps

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

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8) where is bash

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

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1/2~~

```
jeba@jeba-VirtualBox:~$ df -k
Filesystem      1K-blocks   Used   Available  Use%   Mounted on
udev            494430       0  494430    0% /dev
tmpfs           102410  3676  98744    4% /run
tmpfs           7092728 3381372 3326944  51% /
/dev/sda1        512076   210  512055  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:~$ mount
system on / type proc (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
devtmpfs on /dev type devtmpfs (rw,nosuid,nodev,noexec,relatime)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,ptmxmode=0666)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /sys/fs/cgroup type tmpfs (clrw,nosuid,nodev,noexec,relatime)
tmpfs on /sys/fs/cgroup/systemd type tmpfs (clrw,nosuid,nodev,noexec,relatime,bs=4096)
cgroup on /sys/fs/cgroup type cgroup (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/agents type cgroup (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,cpuacct,nr_u
cgroup on /sys/fs/cgroup/net_cls/net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net
cls,net_prio,rootless)
cgroup on /sys/fs/cgroup/pid type cgroup (rw,nosuid,nodev,noexec,relatime,pids,nsroot,roo
cgroup on /sys/fs/cgroup/pmem type cgroup (rw,nosuid,nodev,noexec,relatime,mem,memcg,nsroot,
cpu,cpuacct)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuac
t,nsroot,rootless)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsroo
ot,rootless)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,blkio,nsroot,
cpu,cpuacct)
cgroup on /sys/fs/cgroup/blktio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio,nsroot,
cpu,cpuacct)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf,even
ts,nsroot,rootless)
cgroup on /sys/fs/cgroup/hugepages type cgroup (rw,nosuid,nodev,noexec,relatime,hugepages,ns
root,rootless)
cgroup on /sys/fs/cgroup/hugepages type hugepages (rw,relatime,fd=92,pgsize=1048576,timeout=6,htmp
syncfd=1, on /proc/selinux/mictype,autofs)
hugepages on /dev/hugepages type hugepages (rw,relatime)
```

```
jeba@jeba-VirtualBox:~$ ls
Desktop  Downloads  dd  Music  Public  Videos
Documents examples.desktop  dd  Pictures  Templates
jeba@jeba-VirtualBox:~$ cat dd
cat: dd: No such file or directory
jeba@jeba-VirtualBox:~$ jeb5 cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~$ jeb5 cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~$ jeb5 touch dd.txt
jeba@jeba-VirtualBox:~$ jeb5 ls
dd.txt  gg.txt
jeba@jeba-VirtualBox:~$ jeb5 cp gg.txt dd.txt
jeba@jeba-VirtualBox:~$ jeb5 cat dd.txt
cat: dd.txt: No such file or directory
jeba@jeba-VirtualBox:~$ jeb5 cat dd.txt
cat: dd.txt: No such file or directory
jeba@jeba-VirtualBox:~$ jeb5
welcome
Linux
jeba@jeba-VirtualBox:~$ jeb5
welcome
Linux
jeba@jeba-VirtualBox:~$ jeb5
```

```
jeba@jeba-VirtualBox:~$ jeb5 touch ss.txt
jeba@jeba-VirtualBox:~$ jeb5 mv gg.txt ss.txt
jeba@jeba-VirtualBox:~$ jeb5 cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~$ jeb5 cat ss.txt
welcome
Linux
jeba@jeba-VirtualBox:~$ jeb5
```

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Practical no 5.

Aim: File operations

1. Explore mounted file systems on your computers

⇒ df -k

2. What are the different ways of exploring mounted file system on Linux?

⇒ mount

3. Copying text from files

⇒ Cp command, mv command

4. Archiving and backup the work directory using tar, gzip and bzip commands

⇒ gzip filename.txt
Bzip3 filename.txt

5.

5. use different commands to create different of two files.

⇒ diff filename1 filename2.

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6) use patch command to patch a file. And analyse the patch command again.

```
jeb@jeb-VirtualBox:~/jeb$ bzip2 ss.txt
jeb@jeb-VirtualBox:~/jeb$ ls
dd.txt ss.txt.bz2
jeb@jeb-VirtualBox:~/jeb$ cat ss.txt.bz2
jeb@jeb-VirtualBox:~/jeb$ gzip dd.txt
jeb@jeb-VirtualBox:~/jeb$ ls
dd.txt.gz
jeb@jeb-VirtualBox:~/jeb$ cat dd.txt.gz
jeb@jeb-VirtualBox:~/jeb$ rm dd.txt
jeb@jeb-VirtualBox:~/jeb$ rm ss.txt
```

```
jeb@jeba-VirtualBox:~/jeb$ ls  
dd.txt.gz ss.txt.bz2  
jeb@jeba-VirtualBox:~/jeb$ cat >aa.txt  
Hello world  
<c  
jeb@jeba-VirtualBox:~/jeb$ cat >bb.txt  
This is Linux  
jeb@jeba-VirtualBox:~/jeb$ ddif aa.txt bb.txt  
1d0  
< hello_world  
jeb@jeba-VirtualBox:~/jeb$ cat >bb.txt  
this is Linux  
jeb@jeba-VirtualBox:~/jeb$ ddif aa.txt bb.txt  
1c1  
< hello_world  
>  
> this is Linux  
jeb@jeba-VirtualBox:~/jeb$ gzip aa.t  
jeb@jeba-VirtualBox:~/jeb$ gunzip bb.t  
jeb@jeba-VirtualBox:~/jeb$ ddif 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
.^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
.^C
+hello
+hello
+hello
jeba@jeba-VirtualBox:~/jeb$ █
```

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```
jeba@jeba-VirtualBox:~  
jeba@jeba-VirtualBox:~$ who  
jeba          ttys              2020-01-15 20:32 (:0)  
jeba@jeba-VirtualBox:~$ whoami  
jeba@jeba-VirtualBox:~$ who -l  
jeba          ttys              2020-01-15 20:30  
jeba@jeba-VirtualBox:~$  
LOGIN  
jeba@jeba-VirtualBox:~$
```

```
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
jebajeba    tty7     :0              20:32        4:28   8.19s  0.33s /sbin/upstart -
jebajeba    tty7     :0              20:35:14 up 4 min, 1 user, load average: 0.68, 0.77, 0.37
USER      TTY          FROM          LOGIN@        IDLE   JCPU   PCPU WHAT
jebajeba    tty7     :0              20:38        4:38   8.00s  0.33s /sbin/upstart --user
jebajeba@VirtualBox:~$ w -h
20:32        4:44   8.67s  0.33s /sbin/upstart -
jebajeba    tty7     :0
jebajeba@VirtualBox:~$ w -f
20:30:12 up 5 min, 1 user, load average: 0.41, 0.69, 0.37
USER      TTY          FROM          LOGIN@        IDLE   JCPU   PCPU WHAT
jebajeba    tty7     :0              20:32        5:36   9.00s  0.33s /sbin/upstart --user
```

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/shadow
[redacted]
```

Practical no. 6

Aim: Use Environment

- v) which account you are logged in? how do you find out?

→ who command and whoami

b) Display /etc/Shadow file using cat command and understand the importance of shadow file, how its different than passwd file.

⇒ cat /etc/Shadow.

As with passed file, each field in the shadow file is also separated with ":" colon character, and are as follows:-

- * username, up to 8 characters. Case-sensitive, usually all lowercase. A direct match to the username in the /etc/passwd file.
 - * password: 13 characters encrypted. A blank entry (eg "") indicates a password is not required to login (usually a bad idea) and a "*" entry (eg: *) indicates the account has been disabled.

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- * The number of days (Since January 1, 1970). Since the password was last change.
- * The number of days before password may be changed (0 indicates it may be changed at any time).
- * The number of days after which password must be changed (999999 indicates user can keep his or her password unchanged for many many years.)
- * The number of days to warn user of an expiring password (7 for a full week)
- * 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 in a password entry is separated with ":" colon character, and are as follows :-

username : up to 8 characters. case-sensitive, usually all lowercase.

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```
jebadjebha-Vl/tuulBox:~$ sudo cat /etc/passwd
root:x:0:0:root:/root:/bin/sh
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:Listing List Manager:/var/list:/usr/sbin/nologin
```

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

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- * An "x" in the password field. Password are stored in the "User Shadow" file.
- * Numeric user id. This is assigned by "aduser" script unix uses this field, plus the following group fields, to identify which files belong to the user.
- * Numeric group id. Red Hat uses group id's in a family unique manner for enhanced file security usually the group id will match the user id.
- * Full name of user. I'm not sure what the maximum length of this field is by try to keep it reasonable (under 30 char).
- * user's home directory. usually /home /username (eg. /home/smit). All user's personal files, web pages, mail forwarded, etc. will be stored here.
- * user's "Shell account": often set to "/bin/bash" to provide access to the bash shell. (my personal favorite shell).

c) get your current working directory

⇒ pwd.

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d) Explore different ways of getting command history.

⇒ history

! line number:

e) 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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```
jeba@jeba-VirtualBox:~$ history
1 who
2 w
3 whoami
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 pkill
15 clear
16 history
jeba@jeba-VirtualBox:~$ ls
jeba@jeba-VirtualBox:~$ 2020-01-15 20:30
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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Key	Action
k	Moves cursor up
j	Moves cursor down
h	Moves cursor left
l	Moves cursor right

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

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

```

jeba@jeba-VirtualBox:~$ 
Hello
This is my Linux example
Welcome
Welldone
This is VI Editor
Thank you

I

:j/our/gc

```

Practical no.1.

045

- Aim :- Linux editors : vi
- Create, modify, Search and navigate a file in order.

- Create a file :-

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

- Modify the file :-

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

- Search in a file :-

To find a word (forward search) press followed by the word to search.

- Navigate :-

Movement in four directions

word navigate

Scolling .

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b) Learn all essential commands like search / replace,
highlight, show line numbers.

(i) Replace :-

Syntax : !g!word to be replaced /S!/new word !gc

(ii) Highlight :-
use set hlsearch

(iii) Show the line number
use set nu.

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```
jeba@jeba-VirtualBox: ~
Hello
This is my Linux example
Wellcome
Welldone
This is Vl Editor
Thank you
```

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

jeba@jeba-VirtualBox: ~

Hello

This is our Linux example

Wellcome

Welldone

This is Vl Editor

Thank you

:set hlsearch

jeba@jeba-VirtualBox: ~

1 Hello
2 This is our Linux example
3 Wellcome
4 Welldone
5 This is Vl Editor
6 Thank you

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

Please consider using 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
```

```
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 : 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
```

Practical no. 8

047

Unit: Linux Security

a) use of Sudo to change user privileges to root.

Create an user named user1

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

b) Identify operations that require sudo privileges.

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

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- 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

1) Delete newly added user.

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```
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) [2020-01-26]: 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
jeba@jeba-VirtualBox:~$
```

```
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:~$
```

10/12/2020

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

Practical no. 9

Topic: Network management

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

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

Output of ifconfig:

```
enp0s3      Link encap:Ethernet HWaddr 08:00:27:0e:6b:69
           inet addr:10.0.2.255 Bcast:10.0.2.255 Mask:255.255.255.0
             inet brd: fe0:0c0d:b5a3:b48e/64 Scope:link
               inet brd: fe0:0c0d:b5a3:b48e/64 Scope:link
                 UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
                 RX packets:2 errors:0 dropped:0 overruns:0 frame:0
                 TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
                 collisions:0 txqueuelen:1000
                 RX bytes:1180 (1.1 KB) TX bytes:8518 (8.5 KB)
                 RX bytes:225072 (4.2 MB) TX bytes:4225072 (4.2 MB)
```

Output of ping:

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

Output of dig:

```
<--> DLG 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
```

IPN

- 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

The screenshot shows a terminal window with several command outputs:

- arp:** Shows ARP table details for interface enp0s.

Address	Htype	HWaddr	Flags	Mask	Iface
10.0.2.2	ether	52:54:00:12:35:02	C		enp0s
- traceroute:** Traces the route to www.google.com (172.217.166.100).

```
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
...
3 10.0.2.2 (10.0.2.2) 68.568 ms 68.486 ms 68.485 ms
```
- route:** Displays the 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	enp0s3
10.0.2.0	*	255.255.255.0	U	100	0	0	enp0s3
link-local	*	255.255.0.0	U	1000	0	0	enp0s3
- host:** Checks if a host is up at 9.10.3.4-P4-Ubuntu.

```
jeba@jeba-VirtualBox:~$ host -V
host 9.10.3.4-P4-Ubuntu
jeba@jeba-VirtualBox:~$
```
- netstat:** Shows active Internet connections.

Proto Recv-Q Send-Q Local Address Foreign Address State	I-Node	Path
tcp 0 0 127.0.0.1:22 0.0.0.0:*	42149	/run/user/1000/systemd/journal/socket
unix [] [] DGRAM	9694	/run/systemd/journal/
unix [] [] DGRAM	9695	/run/systemd/journal/
socket [] [] DGRAM	9704	/run/systemd/journal/
unix [] [] DGRAM	9684	/run/systemd/notify
unix [] [] STREAM CONNECTED	44042	@/tmp/dbus-CymTe17AQG
unix [] [] STREAM CONNECTED	42981	@/tmp/dbus-CyMGc6GT7S
unix [] [] STREAM CONNECTED	42690	@/tmp/dbus-CMGGc6GT7S
unix [] [] STREAM CONNECTED	13242	/run/systemd/journal/
unix [] [] STREAM CONNECTED	43113	/run/systemd/journal/
unix [] [] STREAM CONNECTED	43013	
unix [] [] STREAM CONNECTED	42935	
- nmap:** Scans www.google.com (216.58.196.68).

```
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:~$
```

```

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

tscsc@tcsc-VirtualBox:~$ echo "THIS IS LINUX!" > ubuntu.sh
tscsc@tcsc-VirtualBox:~$ chmod 777 ubuntu.sh
tscsc@tcsc-VirtualBox:~$ ./ubuntu.sh
Enter your name:
TANVI
My name is: TANVI
tscsc@tcsc-VirtualBox:~$ 

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

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

tscsc@tcsc-VirtualBox:~$ 
tscsc@tcsc-VirtualBox:~$ vi cs.txt
tscsc@tcsc-VirtualBox:~$ sed -n 3,5p cs.txt
database management
linux
python
tscsc@tcsc-VirtualBox:~$ 

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

```

Practical no.10.

051

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) 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.

Echo \$SHELL

- vi filename.sh
#!/bin/bash
echo "This is Linux!"
- chmod 777 filename.sh
./filename.sh

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Steps 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"
```

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The image contains three vertically stacked screenshots of a terminal window titled "tcsc@tcsc-VirtualBox: ~".
1. The top screenshot shows the command: `#!/bin/bash
echo "Enter your name:"
read name
echo "My name is: $name"`. The output shows the prompt "Enter your name:".
2. The middle screenshot shows the command: `#!/bin/bash
a=100
b=25
sum=$((a+b))
echo "Sum is: $sum"`. The output shows the prompt "Sum is: ".
3. The bottom screenshot shows the command: `#!/bin/bash
sum=$((a+b))
echo "Sum is: $sum"`. The output shows the result "Sum is: 125".
A status bar at the bottom of the terminal window indicates "lin.sh 3 lines, 46 characters".

Sed

Sed command or Stream Editor is very powerful utility offered by Linux systems. It is mainly used for text substitutions, find and replace but it can perform other text manipulations.

With Sed, we can edit complete files 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 seeing whole file.
- 2) Display all except some lines
To display all content of a file except for some portions, use option 'd'.
- 3) Deleting a line
To delete a line, use line number followed by 'd'.
- 4) Search and replacing a string.

's' option is searching a word.

```
tsc@tsc-VirtualBox:~$ sed 3,5d cs.txt
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calculus
computer basic
tsc@tsc-VirtualBox:~$
```

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

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

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

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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 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.

051

```
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
computer basic
```

```
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:~$
```

```
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
```

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