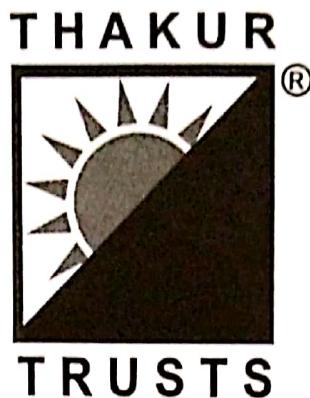


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This is to certify that the work entered in this journal
is the work of Mst. / Ms. Ayush Kumar mishra

who has worked for the year 2019-20 in the Computer
Laboratory.

Teacher In-Charge

Date : _____

Head of Department

Examiner

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Practical No. 1

Aim: → 1.] Install your choice of Linux distribution
e.g ubuntu, fedora

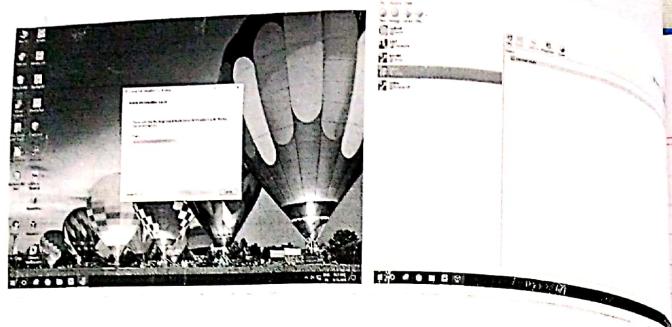
2.] Customize desktop environment by
changing different default options.
Changing default background, theme,
ScreenSaver.

3.] Screen Resolution

4.] Time Setting

Using a USB drive

- Most newer Computers can boot from USB. You should see a welcome screen prompting you to choose your language and giving you the option to install Ubuntu or try it from the USB.
- If your computer doesn't automatically do so, you might need to Press F12 Key to bring up boot menu, but be careful not to hold it down that can cause an error message.



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1] Prepare to Install Ubuntu →

- We recommend you plug your Computer into a Power Source.
- You should also make sure you have enough Space on your Computer to install Ubuntu.
- We advise to select download updates while installing and install this third-party Software now.
- You should also stay connected to the Internet, you will be asked so you can get latest updates while you install Ubuntu.
- If you are not connected to the Internet, you will be asked to select a wireless network, if available. We advise you to connect during the installation so we can ensure your machine is up to date.

2] Allocate drive Space →

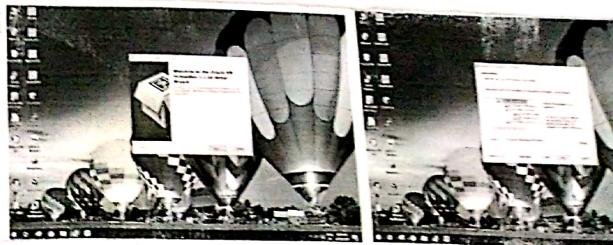
- Use checkboxes to choose whether you want to install Ubuntu alongside another Operating System, delete your existing operating system and replace it with Ubuntu, or if you are an advanced user choose the 'Something else' option.

3] Begin the installation

- Depending on your previous selections, you now verify that you have chosen the way in which you would like to install ubuntu.

The installation process will begin when we click the Install Now button.

Ubuntu needs about 4.5 GB to install, so add a few extra GB to allow for your files.



4] Select Your Location

- If you are connected to the internet this should be done automatically. Check your location is correct and click 'forwarded to proceed'. If you are unsure of your time zone type the name of the town you are in or click on the map and we will help you.

• Tip: If you are having problems connecting to the internet use the menu in top-right corner to select a network.



5] Select your preferred keyboard layout

Click on the language option you need. If you're not sure click the 'Select Keyboard layout' button for help.



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- 6] Enter your login and password details
- 7] Learn more about ubuntu while the System installs.
- 8] That's it.
All that's left is to restart your computer and start enjoying ubuntu.
- b] customization of desktop:
- Accessing Appearance Settings:
 - To access Appearance Settings in Ubuntu 11.04 let's click on user menu at 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 select the Appearance icon.
- Changing wallpaper picture
- On the left side of background bar you can see your current wallpaper.
 - On the right side is part where we can select one of ubuntu wallpapers. Clicking on any thumbnail over wallpapers will be changed right away with a fading effect.
 - If you want to select wallpaper from your picture folder, click the dropdown menu above thumbnail and select the picture folder.

1.1.5.

- You will see all the pictures in your Pictures folder as thumbnails, where you can select one as your wallpaper.
- To add wallpaper that is in another folder, click the plus icon below the thumbnails and in pop-up window, select the path to your folder and choose the picture inside of it.

Changing Ubuntu theme

- Ubuntu also has an option to change desktop theme which in one click will change the entire way your computer looks.

- To do that, click on the drop-down menu below the wallpaper thumbnails and choose between Ambiance / Radiance or High contrast.

- Ambiance is a light theme that looks a bit like Mac OS X while Radiance is the dark brown theme used in Ubuntu by default.

2] Screen Resolution:-

Change the size or rotation of the screen

- You can change how big can how detailed things appears on the screen by changing the screen resolution.

- You can change which way the things appear (For Example, if you have a rotating display by changing the rotation).

1. Click the icon at the very right of the menu bar and select System settings.
 2. Open Screen: Display
 3. 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.
 4. Select your desired resolution and rotation.
 5. Click Apply. The new settings will be applied for 30 seconds before reverting back. That way, if you cannot see anything with new settings:
- d.] Time settings change the time zone of your system
- If you are currently in Indian time. How does the display time change?
 - After noting the time change, change the time zone back to your local time zone.
 - Just click on the clock on top bar and choose time and date settings. Once the time settings window opens, choose Manually, so you change the time and date manually; otherwise choose your time zone from the map, and choose automatic.

Practical - 2

EE :-

Aims :- Installing and Removing Software.

a) install gcc package, verify that it is installed
then remove it

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

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

Step 3:- Type 'sudo apt-get install build-essential'.
This will install.

Now to uninstall gcc compiler.

In gcc 5.1.0, although there is no top
uninstall target, some directories do have it.
particular gcc, so you can do

Type: cd build/gcc

sudo make uninstall

This does not remove everything that was
but it removes major executables like gcc,
CPP ... contained in that directory.

:~ \$ info

OUTPUT : This is the info main menu
(aka directory node):

A few useful info commands =
'q' quits ;
'?' lists all info commands ;
'h' starts the info tutorial ;
'mTexinfo RET' visits the
Texinfo manual , etc;

Practical 3:-

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Aim:- utilization of grep's main command

a) Documentation

- finding info documentation from the command line bring up the info page for the grep command . Bring up usage section.

Solutions: 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 and type
:~ \$ info grep

After typing this command following output will be displayed onto your screen . Another more summarized form of showing info is the 'man' command . The command is same 'info' but required data.

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

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- Finding man pages from the command line:
Bring up the man page for the 'ls' command
Scroll down to see examples 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'

- Finding man pages by topic: what man pages are available that documentation document file compression.

Answer:- 'tar', 'zip' are some man pages which are available for documentation file compression.

Simply type: man zip
 man tar

- Finding manpages by section from the command line bring up the man page for the printf function which manual page section are library function found.

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: n \$ man ls

OUTPUT : NAME :

ls - list directory contents

SYNOPSIS

ls [OPTIONS] ... [FILE] ...

DESCRIPTION :

List information about the FILES sort entries alphabetically if none of -f, --force, --sort= --sort is specified

-a, --all

do not ignore entries starting with .

-A, --almost-all

do not list implied entries

--author

with -L, print the author of each file

-b, --escape

print e-style escape for non-graphic characters

-c, -l, list entries by columns

: n \$ man tar

OUTPUT : NAME : The GNU Version of the tar archiving utility

SYNOPSIS

tar [-J] A --concatenate | C --create

I d --diff --compare (- - delete | - - append)

No.

```

+-- l[ist] - - test [label] | u[update] | x[extract] -->
    -- g[et] [option] [pathname]
38 DESCRIPTION:
    Tap stores and extracts file from a tap or
    disk archive.

function letters:
    -A[dd] -- concatenate, --concatenate
        append tap files to an archive
    -C[reate] -- create
        create a new archive
    -D[iff], -- compare
        find difference between archive and
        file system.

    -- delete
        delete from the archive
    -M[erge] -- append
        append files to the end of an archive

:ur $ man 3 printf:
NAME: pprintf, spprintf, fpprintf, rprintf, Anprintf,
      upprintf, vppprintf, v2npprintf, fastprintf
      Output Version:
```

DESCRIPTION:
The function in the printf family produce
output according to a format as describe
below.

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Answer: → The number corresponds to what section of the manual page is from; 1 is user command while 3 is
System admin stuff. The man pages for man itself
contain it and list the std one. There are certain
terms that have different page in different
sections; in these cases like that you can pass the
section no to the man before the page name to
choose which one you want or use man -a to show
every matching page in a search.
You can tell which section a term falls in with
man -k! gt will do substring matching too. So you
need to use "lterm" to limit it.

Simply type man 3 printf

- Command line help list the available options for
the man command

Answer: :ur \$ man 3 printf
 jycss

:ur \$ ls

man3 printf

Practical no-1

36 Command Line Operation

- a) install new package on your system
 sudo apt get install [package name]
- b) remove the package installed
 sudo apt-get remove [package name]
- c) find the password file in / using find command
 # find / -name password
 /usr/share/locale/nss-1/1ap-253/password
 •/usr/bin/passwd
 •/etc/passwd
 •/etc/pam.d/passwd
 •/etc/password

Find the directory password file under root and one level down

find / max depth 2-name passwd

•/etc/passwd

Find the Password file under root and 2 level down

find / -max depth 3 -name passwd

•/usr/bin/passwd

•/etc/pam.d/passwd

•/etc/password

Find the password file b/w sub-directories level 2-3-4
 # find - max depth 3 - maxdepth 5 -name passwd

•/usr/bin/passwd

•/etc/pam.d/passwd

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

ln -s file1 file2

e) Create an empty file example.txt & move it to /tmp directory using relative pathname

touch example.txt

mv example.txt /tmp

f) delete the file moved to /tmp in previous step by absolute method.

rm /tmp/example.txt

q1) How many

whereis ls

ls: /bin/ls /usr/share/man/man1/ls.1
whereis ps

ps: /bin/ps /usr/share/man/man1/ps.1
man/man1/ps.1.92

whereis bash

bash: /bin/bash /etc/bashrc /etc/profile /share/
man/man1/bash.1.92

Practical No-5

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File Operation

2] Explore Mounted File Systems on Your Computer
Ans :-> df -k

```
jeba@jeba-VirtualBox:~$ df -k
Filesystem      1K-blocks   Used Available Use% Mounted on
udev             494436       0   494436  0% /dev
tmpfs            102416    3576   98740  4% /run
/dev/sda1        7092728 3383372  3326924  51% /
tmpfs            512076    216   511860  1% /dev/shm
tmpfs            5120    4     5116  1% /run/lock
tmpfs            512076    0     512076  0% /sys/fs/cgroup
tmpfs            102416    48   102368  1% /run/user/1000
```

2] what are the different ways of Exploring mounted file systems on Linux?

Ans :-> Mount

```
jeba@jeba-VirtualBox:~$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime,size=494436k,nr_inodes=123009,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,size=494436k,nr_inodes=123009,mode=620,ptmxmode=666)
tmpfs on /dev/pts type tmpfs (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=666)
/dev/sda1 on / type ext4 (rw,nosuid,noexec,relatime,data=ordered)
securityfs on /sys/kernel/security type security (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,noexec,relatime,data=ordered)
tmpfs on /run/lock type tmpfs (rw,nosuid,noexec,relatime)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=5120k)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/systemd/systemd-release,nsdelegate=/sbin/nsswitch.conf,root=/)
cgroup on /sys/fs/cgroup/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset,nsroot=/)
cpu,cpuacct on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct)
cgroup on /sys/fs/cgroup/net_cls.net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,net_prio)
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)
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,mem)
cgroup on /sys/fs/cgroup/bikko type cgroup (rw,nosuid,nodev,noexec,relatime,bikko,nsroot=/)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
cgroup on /sys/fs/cgroup/hugepages type cgroup (rw,nosuid,nodev,noexec,relatime,hugepages)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=23,pgp=1,timesout=0,nbsp=1,maxprot=5,direct)
hugepages on /dev/hugepages type hugepages (rw,relatime)
```

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8.] Copying text from files
Ans: cp command mv command

```
jebajeba-VirtualBox:~$ ls          Music    Pictures   Public
Desktop   examples.desktop  33     Templates  Videos
Documents  .VirtualBox   ed.job
jebajeba-VirtualBox:~/Desktop$ cd job
jebajeba-VirtualBox:~/job$ cat .gg.txt
cat: .gg.txt: No such file or directory
jebajeba-VirtualBox:~/job$ cat gg.txt
cat: gg.txt: No such file or directory
jebajeba-VirtualBox:~/job$ cat -gg.txt
cat: -gg.txt: No such file or directory
jebajeba-VirtualBox:~/job$ touch welcome
Linux
jebajeba-VirtualBox:~/job$ touch dd.txt
jebajeba-VirtualBox:~/job$ ls
dd.txt  gg.txt
jebajeba-VirtualBox:~/job$ cp gg.txt dd.txt
jebajeba-VirtualBox:~/job$ cat dd.txt
jebajeba-VirtualBox:~/job$ touch welcome
Linux
jebajeba-VirtualBox:~/job$ rm welcome
Linux
jebajeba-VirtualBox:~/job$ ■

jebajeba-VirtualBox:~$ touch ss.txt
jebajeba-VirtualBox:~$ /jeb$ mv gg.txt ss.txt
jebajeba-VirtualBox:~$ /jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jebajeba-VirtualBox:~$ /jeb$ cat ss.txt
Welcome
Linux
jebajeba-VirtualBox:~$ ■
```

Ar] Archiving and backup the whole directory using tar, gzip and bzip 2 commands

Ans: gzip filename.txt
Bzip2 filename.txt

```
jebas@jeba-VirtualBox:~/jeb$ bztp ss.txt  
jebas@jeba-VirtualBox:~/jeb$ ls  
dd.txt  
jebas@jeba-VirtualBox:~/jeb$ bzip2 -c dd.txt > ss.txt.bz2  
Bz#1$AVAR  
!jew$cat ss.txt.bz2  
jebas@jeba-VirtualBox:~/jeb$ gzip dd.txt  
jebas@jeba-VirtualBox:~/jeb$ ls  
ss.txt.bz2  
jebas@jeba-VirtualBox:~/jeb$ cat dd.txt.gz  
jebas@jeba-VirtualBox:~/jeb$ rm dd.txt & echo "ss.txt" > xzjebas@jeba-VirtualBox:~/jeb$ █
```

Use diff command to create diff to two files
→ diff filename1 filename2

```
jeba@jeba-VirtualBox:~/jebS ls  
jeba@jeba-virtualbox:~/jebS cat >aa.txt  
Hello world  
<C  
jeba@jeba-VirtualBox:~/jebS cat >bb.txt  
this is Linux<C  
jeba@jeba-VirtualBox:~/jebS diff aa.txt bb.txt  
100%  
<Hello world  
jeba@jeba-VirtualBox:~/jebS cat >bb.txt  
this is Linux  
<C  
jeba@jeba-VirtualBox:~/jebS diff aa.txt bb.txt  
1c1  
<Hello world  
> this is Linux  
jeba@jeba-VirtualBox:~/jebS gzip aa.txt  
jeba@jeba-VirtualBox:~/jebS gzip bb.txt  
jeba@jeba-VirtualBox:~/jebS Bzip2 -9 aa.txt.gz bb.txt.gz  
Binary files aa.txt.gz and bb.txt.gz differ
```

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

```
jeba@jeba-VirtualBox:~/jeb$ cat >ht.txt
ht
ht
^C
jeba@jeba-VirtualBox:~/jeb$ cat >hl.txt
Hello
Hello
Hello
Hello
^C
jeba@jeba-VirtualBox:~/jeb$ diff -u ht.txt hl.txt >sam.patch
jeba@jeba-VirtualBox:~/jeb$ patch -s sam.patch
^C
jeba@jeba-VirtualBox:~/jeb$ patch -s sam.patch
patching file ht.txt
jeba@jeba-VirtualBox:~/jeb$ cat sam.patch
--- ht.txt      2020-01-08 22:14:55.4035699834 +0530
+++ hl.txt      2020-01-08 22:15:16.259898738 +0530
@@ -1,3 +1,3 @@
-ht
+ht
^C
jeba@jeba-VirtualBox:~/jeb$ cat sam.patch
@@ -1,3 +1,3 @@
-ht
+ht
^C
jeba@jeba-VirtualBox:~/jeb$ cat sam.patch
@@ -1,3 +1,3 @@
-ht
+ht
^C
jeba@jeba-VirtualBox:~/jeb$
```

Practical No-6

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User Environment

- a] which account you are logged in? How do you find out?
Ans: who command & whoami

```
jeba@jeba-VirtualBox:~$ who
jeba          tty7        2020-01-15 20:32 (:0)
jeba@jeba-VirtualBox:~$ whoami
jeba@jeba-VirtualBox:~$ who -l
LOGIN      tty1        2020-01-15 20:30
jeba@jeba-VirtualBox:~$ █ 786 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    8.19s  0.33s /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
```

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

Ans:-> cat /etc/shadow

As with the passwd 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 lower case - A direct match to the username in the /etc/passwd file.
- Password, 13 characters encrypted - A blank entry (e.g.::) indicates a password is not required to log in (usually a bad idea) and "****" entry (e.g.: *) indicates the account

18.

has been disabled.

- The number of days (since January 1, 1970) the password was last changed.
- The number of days before password may be changed (999999). Indicates user can keep the current password unchanged for many, many years.
- The number of days to warn user of an expiring password (7 days, a full week).
- The number of days after password expires that account is disabled.
- The number of days since January 1, 1970 the account has been disabled.
- A reserved field for possible future use.

group field, to identify which files belong to the user

- Nomadic groupid. Red hat user group id's in a fairly 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 for this field is, but try to keep it reasonable (under 30 characters).
- User's home directory. Usually /home/username (e.g. /home/smith). All user's personal files, web pages, mail forwarding, 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).

```
jebad@jeba-VirtualBox:~$ sudo cat /etc/shadow
[sudo] password for jeba:
root::18248:0:99999:7:::
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:::
```

Each field in a password record entry is separated with ":" colon characters, and are as follows:

- Username up to 8 characters. Case-sensitive, usually all lowercase.
- An "x" in the password field. Forward are stored in the "etc/shadow" file.
- Nomadic user id. This is assigned by the "adduser" script. Unix user info field, plus the following:

c) Get your current working directory

Ans:- pwd

```
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
games:x:4:65534:sync:/bin:/bin/sync
games:x:5:do/games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lpix:x:7:lp:/var/spool/lpd:/usr/sbin/nologin
mailx:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
ucp:x:10:10:ucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:11:proxy:/bin:/usr/sbin/nologin
www-data:x: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
```

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

Ans:- history

1) line number

```
jeba@jeba-VirtualBox:~$ history
1 whoami
2 who -l
3 clear .
4 w
5 w
6 w -h
7 w -f
8 clear
9 cat /etc/shadow
10 sudo cat /etc/shadow
11 clear .
12 sudo cat /etc/passwd
13 pwd
14 clear
15 history
jeba@jeba-VirtualBox:~$ !3
who -l
LOGIN    ttv1      2020-01-15 20:30          788 id=tty1
jeba@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 command.

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

Section 1:

Basic Editors VI

- (a) Create, modify, search and navigate in the file editor.
- (i) Creating a file
To create a file on the terminal type of command by the name:
- (ii) Modifying the file
To modify a file on the terminal type of command by the name:
- (iii) Search in a file
To find a word (search) pattern featured by the word to search.
- (iv) Navigate in
Movement in four directions

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

Word Navigation

Key	Action
b	Moves back in the beginning of the word
e	Moves forward in the ending of the word
m	Moves forward to the beginning of the next
o	Moves to the first character of a file
g	Move to the end of the file

Scrolling

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

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

Symbol / is about to be replaced by new
current ge

```
jeb@jeba-VirtualBox:~$ cat file1  
Hello  
This is my Linux example  
Welcome  
Wellcome  
This is VI Editor  
Thank you  
jeb@jeba-VirtualBox:~$
```

```
jeb@jeba-VirtualBox:~$ vi file1  
Hello  
This is my Linux example  
Welcome  
Welldone  
This is VI Editor  
Thank you  
jeb@jeba-VirtualBox:~$
```

it's implemented
use set hsearch

```
jeb@jeba-VirtualBox:~$ cat file1  
Hello  
This is our Linux example  
Welcome  
Welldone  
This is VI Editor  
Thank you  
jeb@jeba-VirtualBox:~$  
iset hsearch
```

iii) Show the line number
use :set nu

```
jeb@jeba-VirtualBox:~$ cat file1  
1 Hello  
2 This is our Linux example  
3 Welcome  
4 Welldone  
5 This is VI Editor  
6 Thank you  
jeb@jeba-VirtualBox:~$  
:set nu
```

Practical - 9

Linux Security

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

```
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:~$
```

To give some user most 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_badpass
Defaults secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
#
# Host alias specification
#
# User alias specification
#
# Cmnd alias specification
#
# User privilege specification
root    ALL=(ALL:ALL) ALL
user1   ALL=(ALL:ALL) ALL
```

- 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

```
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
```

```
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]: 2020-01-20
      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 09, 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:~$ 

```

-E: Expiration Date

-m: Minimum number of days before password change

-M: No. of days password is Valid.

-I: Account is active

-W: No. of days of warning before a password change is required.

d.] Delete newly added user

```

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 - 9

Network Management

- a) Get IP address of your machine using ifconfig

```
jeba@jeba-VirtualBox:~$ ifconfig
enp0s3 Link encap:Ethernet HWaddr 08:00:27:8e: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)
```

- b) Get hostname of your machine.

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

- c) Use ping to check the network connectivity to alternate routers

```
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.ie100.net (172.217.31.196): icmp_seq=1 ttl=54 time=97.0 ms
64 bytes from maa03s28-1n-f4.ie100.net (172.217.31.196): icmp_seq=2 ttl=54 time=82.0 ms
64 bytes from maa03s28-1n-f4.ie100.net (172.217.31.196): icmp_seq=3 ttl=54 time=84.8 ms
64 bytes from maa03s28-1n-f4.ie100.net (172.217.31.196): icmp_seq=4 ttl=54 time=87.1 ms
64 bytes from maa03s28-1n-f4.ie100.net (172.217.31.196): icmp_seq=5 ttl=54 time=93.5 ms
64 bytes from maa03s28-1n-f4.ie100.net (172.217.31.196): icmp_seq=6 ttl=54 time=86.0 ms
64 bytes from maa03s28-1n-f4.ie100.net (172.217.31.196): icmp_seq=7 ttl=54 time=95.0 ms
64 bytes from maa03s28-1n-f4.ie100.net (172.217.31.196): icmp_seq=8 ttl=54 time=99.9 ms
^Z
[1]+  Stopped                  ping www.google.com
jeba@jeba-VirtualBox:~$
```

- d) Use of dig command

```
jeba@jeba-VirtualBox:~$ dig www.google.com
; <>> 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 172.217.166.106
; Query time: 152 msec
; SERVER: 127.0.1.1#53(127.0.1.1)
; WHEN: Mon Jan 26 22:40:06 IST 2020
; MSG SIZE rcvd: 59
jeba@jeba-VirtualBox:~$
```

e) Troubleshooting network using traceroute
troute command.

```
jeba@jeba-VirtualBox:~$ traceroute www.google.com
traceroute to www.google.com (172.217.196.109), 30 hops max, 60 byte packets
1 10.0.2.2 (10.0.2.2) 0.190 ms 0.143 ms 0.151 ms
2 * *
3 10.0.2.2 (10.0.2.2) 68.568 ms 68.486 ms 68.405 ms
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway      Genmask      Flags Metric Ref    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
jeba@jeba-VirtualBox:~$
```

f) Use of arp command

```
jeba@jeba-VirtualBox:~$ arp
Address          HWtype  HWaddress          Flags Mask
10.0.2.2        ether    52:54:00:12:35:02  C       enp0s3
```

g) Use of host command

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

h) Use of netstat command and Nmap Command.

```
jeba@jeba-VirtualBox:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
unix            [ ]      DGRAM
[...]
unix            [ ]      DGRAM
syslog          [ ]      STREAM
[...]
dev-log          [ ]      DGRAM
unix            [ ]      DGRAM
[...]
unix            [ ]      DGRAM
unix            [ ]      STREAM  CONNECTED  42149  /run/user/1000/system
[...]
unix            [ ]      STREAM  CONNECTED  43331  @/tmp/dbus-CyfTeTz7QG
[...]
unix            [ ]      STREAM  CONNECTED  42290  @/tmp/dbus-CHGCCdGTB5
[...]
unix            [ ]      STREAM  CONNECTED  13242  /run/systemd/journal/
[...]
stdout          [ ]      STREAM  CONNECTED  43113  /run/systemd/journal/
[...]
unix            [ ]      STREAM  CONNECTED  42995  CONNECTED
```

```
jeba@jeba-VirtualBox:~$ nmap www.google.com
Starting Nmap 7.61 ( 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::2084
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:~$
```

Practical - 10

Aims: SHELL SCRIPTING

Objectives 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 displays 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

```
tcsctcsc@tcsctcsc-VirtualBox:~$ vi linux.sh
tcsctcsc@tcsctcsc-VirtualBox:~$ echo $SHELL
/bin/bash
tcsctcsc@tcsctcsc-VirtualBox:~$
```

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

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

"linux.sh" [New File]

- chmod 777 filename.sh ./filename.sh

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

- Q) How to write and execute a shell script
- A) Shell script is just a simple text file with .sh extension having executable permission
- Open terminal
 - Navigate to the place where you want to execute script using cd command
 - Touch file name .sh
 - vi filename.sh [You can use your favorite editor to edit the script]
 - chmod 777 filename.sh (for making the script executable)
 - 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"
```

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```
tsc@tsc-VirtualBox:~$ #!/bin/bash
tsc@tsc-VirtualBox:~$ echo "Enter your name:"
tsc@tsc-VirtualBox:~$ read name
tsc@tsc-VirtualBox:~$ echo "My name is: $name"
tsc@tsc-VirtualBox:~$ 
tsc@tsc-VirtualBox:~$ 
tsc@tsc-VirtualBox:~$ vi ubuntu.sh
tsc@tsc-VirtualBox:~$ chmod 777 ubuntu.sh
tsc@tsc-VirtualBox:~$ ./ubuntu.sh
tsc@tsc-VirtualBox:~$ Enter your name: TANVI.
tsc@tsc-VirtualBox:~$ My name is: TANVI.
tsc@tsc-VirtualBox:~$ 
```

Program to find the sum of two Variables

```
vi filename.sh
#!/bin/bash
a=100
b=20
sum=$((a+b))
echo "sum is: $sum"
```

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

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

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

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```
tsc@tsc-VirtualBox:~  
#!/bin/bash  
a=$1  
b=$2  
sum=$((a+b))  
echo "Sum is:$sum"  
lin.sh" 3 lines, 46 characters
```

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

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.

```
subjects offered in cs  
datastructure  
database management  
linux  
python  
green tech  
softskill  
stats  
calculus  
computer basic
```

file rather than seeing whole file.

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

- 2] Display all except some lines
To display all content of a file except for some portion, use option 'd'

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

- 3] Deleting a line
To delete a line, use line number followed by 'd'

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

- 4] Search and Replacing a string
's' option is for searching a word

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

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

```
tscs@tscs-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
```

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

```
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:~$
```

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

```
tcsc@tcsc-VirtualBox:~$ sed '/cs/i "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:~$
```

F) To change a whole line with matched
pattern

To change a whole line to a new line when
Search pattern matched, use option 'c'

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

8) Appending File

To add some content before every line with sed use *
and das backslash.

```
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
```

SG
Jul 03